

**WASTE MANAGEMENT OF NEW YORK  
CHAFFEE FACILITY**

**VALLEY FILL LANDFILL EXPANSION**

**6 NYCRR PART 360 SOLID WASTE MANAGEMENT PERMIT  
MODIFICATION APPLICATION**

**PART V  
OPERATION AND MAINTENANCE MANUAL**

Prepared for:



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## **1. INTRODUCTION**

The Chaffee Facility is located in the Town of Sardinia, Erie County, New York. Landfilling operations began at the site in 1958. The current facility contains the 51 acre Closed Landfill, 57.3 acre Western Landfill Expansion and 29.4 acre soil borrow area. The facility operates under a New York State Department of Environmental Conservation (NYSDEC) 6 NYCRR Part 360 Solid Waste Management Facility Operation Permit No. 9-1462-00001/00006 issued on June 29, 2011. The facility is currently owned and operated by Waste Management of New York, LLC (WMNY).

This Operations and Maintenance Manual addresses the requirements of 6 NYCRR Part 360-2.9. This is part of a submittal to the NYSDEC for modification of the current Solid Waste Management Facility Operations Permit to include an additional 13.7 acres of landfill area, a project referred to as the Valley Fill Landfill Expansion. The proposed Expansion is described in the Engineering Report (Part III of this submittal) and is shown graphically on the Engineering Drawings.

## **2. LANDFILL DISPOSAL METHODS**

The Chaffee Facility will be operated in accordance with the requirements of 6 NYCRR Part 360 relating to landfill operation, as described in this manual. Only permitted wastes will be disposed at the facility. The Chaffee Facility is permitted for the disposal of residential and commercial refuse, sludges, and other special wastes as defined in this manual. The Chaffee Facility accepts these types of wastes and has a waste-screening program in place to prevent the disposal of wastes that are not permitted in the landfill (see Section 8).

The working face of the disposal area is the center of landfill operations. Traffic routing within the disposal area, the location of litter fences, and the operation of landfill equipment are coordinated to allow proper filling operations at the working face. Solid waste is managed at the landfill in a manner intended to limit the potential for adverse impacts on human health and the environment.

To control litter, waste received at the site will be transported in covered vehicles, and fencing will be placed around the landfill working face to contain blown material. The size of the working face

is limited to an area that can be effectively maintained, operated, and controlled. Vectors are controlled by limiting the size of the working face and by using effective daily and intermediate cover material. Odors will be controlled by limiting the size of the working face, using effective daily cover and through the installation of interim gas collection devices (see Section 13). Dust will be controlled by maintaining clean access roads and by applying water when conditions require.

The Chaffee Facility is surrounded by a buffer of woodland on three sides that helps control noise and provides a visual screen in several directions from landfill related activities. Since landfill construction activities are usually concentrated in areas removed from most local residences, the noise generated from construction at the landfill is not expected to cause off-site impacts, as was discussed in Appendix N of the March 2005 Chaffee Facility Western Landfill Expansion Draft Environmental Impact Statement. The landfill equipment has mufflers to further reduce potential nuisance from noise.

The Chaffee Facility currently monitors the groundwater and surface water surrounding the landfill on a quarterly basis, and as part of the expansion, additional wells will be installed to allow further groundwater monitoring (see Section 10). Operations include the collection of stormwater that contacts waste for treatment as leachate. This includes the construction and maintenance of the leachate collection systems and the diversion of stormwater runoff that potentially may be impacted by leachate to a lined detention pond for proper disposal.

The landfill accepts approved Beneficial Use Determination (BUD) materials for use in internal landfill roadway construction and as alternative materials for daily cover. The Chaffee Facility continually reviews the availability of alternate daily cover materials (e.g., C & D debris, petroleum impacted soils, synthetic materials, etc.) for potential use at the site (see Section 9).

## **2.1 Landfill Liner and Containment**

The Closed Landfill has a footprint area of approximately 51 acres. It is separated into the original fill area and a lined area as described below.

The original fill area footprint is underlain by a 30 to 50 foot thick natural clay till layer. The liner beneath the cells constructed outside of the original fill area consists of a minimum of 24 inches

of compacted barrier soil with an in-place hydraulic conductivity of less than  $1.0 \times 10^{-7}$  cm/sec. This layer was placed directly on the in-situ clay till subsoil. The liner was constructed at a minimum 3 percent slope towards leachate collection lines that surround the 51-acre closed landfill area. The base liner system connects to a vertical containment berm that surrounds the landfill.

The Western Landfill Expansion has a waste area of approximately 57.3 acres, of which 3.4 acres will be constructed on the west berm of the closed landfill. This expansion area is constructed with a double composite liner system. The landfill is subdivided into six cells, each of which contains a primary leachate collection system, primary liner, secondary leachate collection system and secondary liner. Each of the cells are designed with a minimum 2.5 percent floor slope, to allow liquid to flow into the collection pipes and sumps to allow for removal by pumps.

The proposed Valley Fill Landfill Expansion has a waste footprint of approximately 13.7 acres, 4.1 acres are located on the support berm between the Western Landfill Expansion and Closed Landfill with the remaining 9.6 acres overlying the Closed Landfill. The expansion will extend the Cell 1 and 2 footprints to cover the additional area. The landfill area will also be constructed with a double composite liner system; the primary collection system will be connected into either the Cell 1 or 2 baseliner system and the secondary collection system will be independent to allow flow to a separate sump and pump system.

## **2.2 Leachate Collection and Removal**

The development of the Closed Landfill's leachate collection system is described in Section 11. This leachate collection system is constructed with a series of interior leachate collection pipes leading to either side riser sumps, which discharge to tanks (i.e., LST 1 and 2), gravity transmission lines discharging to a pump station manhole (i.e. LCS 3/4 manhole) or interior sumps, which are pumped (i.e., LCS 5). The leachate from LCS 3/4 manhole and LCS 5 are currently pumped into the expansion systems transmission piping and above ground leachate storage tanks.

The Western and Valley Fill Landfill Expansions will include both primary and secondary leachate collection systems that discharges to transmission lines that flow by gravity to the



above ground leachate storage tanks and loadout facility. During the Valley Fill Landfill Expansion, LCS 5 will be modified to remove and replace the vertical riser and pump system with a side riser sump and pump system located beneath the subgrade of the Cell 2 baseliner. LCS 5 will continue to be pumped into the expansion systems transmission piping and above ground leachate storage tanks.

The leachate collection systems are designed to collect and remove leachate generated by infiltration of storm and melt water through the daily, intermediate and final cover systems into the fill area. The leachate is pumped into tank trucks from LST 1, 2 and the expansion's above ground storage tanks and transported to the City of Niagara Falls Wastewater Treatment Facility. The Chaffee Facility has made arrangements with the Buffalo Sewer Authority as a back-up in the event the City of Niagara Falls Wastewater Treatment Facility is not able to accept the leachate loads.

### **3. PERSONNEL REQUIREMENTS**

#### **3.1 Management Organization**

WMNY is responsible for the management of the landfill and related facilities. The organizational structure is presented in Figure 1. The District Manager is responsible for making all primary decisions related to the administration and operation of the site. The management of site related activities is the responsibility of the Operations Manager who reports directly to the District Manager.

A total of 15 to 20 employees carry out solid waste permitting, billing, tracking, inspection, disposal, and construction operations under the direction of the various supervisors. This number varies based on the amount of ongoing landfill construction. All of these employees are located at the landfill, including the District Manager, Operations Manager, Scale Operator, Mechanic, Laborers, and Equipment Operators.

### **3.2 Personnel Responsibilities**

The following presents an overview of personnel responsibilities and duties including lines of authority. The staff members can vary in number and level of responsibility. However, in general staff members and their responsibilities are as follows:

- District Manager, who will (i) supervise and manage overall operation and maintenance of the landfill and associated facilities, (ii) make and manage contracts with waste hauling companies, (iii) oversee construction at the site, and (iv) ensure that the landfill is operating in compliance with the terms and conditions of the permit;
- Operations Manager, who will (i) supervise and manage the day to day operation and maintenance of the landfill and associated facilities, (ii) ensure that facility performance monitoring is completed as required, (iii) conduct the required daily, monthly, quarterly and annual inspections, and (iv) ensure that the landfill is operating in compliance with the terms and conditions of the permit;
- Site Engineer, who will (i) ensure that the landfill is developed according to the engineering plans; (ii) record any variations from the engineering plans; and (iii) monitor environmental compliance of the facility;
- Equipment Operators, who will operate the landfill equipment for the purposes of waste placement and site maintenance, and ensuring that safety procedures, and landfill policies are adhered to as applicable;
- Mechanics, who will perform routine maintenance on the equipment at the facility;
- Scale Operator, who will record the weights and physical condition (i.e., covered, etc.) of all waste hauling vehicles that enter the site; and
- Laborers, who will perform miscellaneous tasks at the site, including litter control, grounds maintenance, etc.

In addition, part-time personnel may be added to the Chaffee Facility staff as necessary during periods of construction, during routine cleaning of the facility, and during special projects. If conditions warrant, additional engineering, operations and safety personnel, may be reassigned from other WMNY facilities in the area. During landfill construction events, several contractors may be present on site. The number of personnel employed by each contractor varies based on the requirements of each project.

Each employee is trained to perform any of the duties of the job classification under him/her and is required to perform those tasks when asked by a supervising landfill employee.

### **3.3 Employee Safety And Training Program**

All site personnel are trained to perform their specific duties and to recognize potentially hazardous or dangerous situations at the landfill. Training for operations employees includes but is not limited to the following topics under supervised review:

- Part 360 Operating Permit Conditions;
- Facility Performance Monitoring (i.e., environmental monitoring, leachate collection and leachate storage);
- Spill Prevention;
- Emergency Management Procedures;
- Lock Out Tag Out;
- Confined Space Entry Identification;
- Waste Identification;
- Special Waste Management; and
- Asbestos Management.

Specifically, the Operations Manager must attend and successfully complete a course of instruction in solid waste management procedures. This course must meet the requirements as stated in 6 NYCRR Part 360-1.14(u)(2).

The Employee Safety and Training Program for the landfill provides personnel with a structured and organized instruction program for the performance of their assigned duties at the facility, during both routine and emergency conditions. A record of training for each employee is

maintained on file at the landfill. Regular facility-wide monthly training programs have been developed and are given on a monthly basis. A sample annual schedule of the regular Monthly Training/Safety Meetings is shown in Appendix F.

#### Introductory Training Program Outline

New employees will be provided with introductory training in the following areas;

- An introduction to the layout of the landfill and a general landfill tour;
- Relationship between their job classification and the landfill;
- An overview of the contents of the Operations and Maintenance Manual and Contingency Plan (Part IV of this submittal);
- An overview of the monitoring facilities, various landfill structures, and equipment used on site;
- Instruction on the location, importance, and use of safety and emergency equipment; and
- An overview of the emergency response procedures that are presented in the Contingency Plan (Part IV of this submittal).

Employees involved directly with the solid waste receiving and management aspects of the facility will learn the proper handling of each type of solid waste material (municipal solid waste, sludges, asbestos, industrial waste, etc.) along with the practical implementation of applicable regulatory guidelines. In addition, these employees will be trained in the recognition of acceptable and unacceptable wastes, as well as the steps to be taken in the situation when unauthorized waste is received. Emphasis will be continually placed on safe and proper solid waste handling.

## Record Keeping

Documentation of the training provided to each employee will be maintained on file in the office (see Figure 2 for location). This documentation will consist of the actual training/safety meeting held for that month with the date of meeting and the copies of any Training/Safety Meeting records. The Monthly Training/Safety Meeting record includes the date training was given, topic of training or instruction, and the names of employees in attendance. This form also serves as a record that the instruction was given and successfully completed by the employee.

A copy of the Training/Safety Meeting record is also put in each individual employee's personnel file. A copy of any test is also kept in the employee's personnel file.

## **4. LANDFILL FACILITIES AND EQUIPMENT**

### **4.1 Landfill Facilities**

The entrance to the landfill site is located at 10860 Olean Road in the Town of Sardinia. There is a sign at the entrance with information for the public. It displays the permit number, days of operation, and hours of operation. The site has seven major structures including a scale house, a maintenance facility, which includes a truck wash area, a recycling facility, a grounds maintenance building, leachate loadout and landfill operations building, the main office and a power production plant. Locations of these structures are shown on Figure 2.

The scale house is a one story, concrete block and frame building located along the main access road to the scale. One in-coming (gross) and one out-going (tare) scale is located adjacent to the scale house. The scales are connected to a computer system for tracking, billing, reporting, etc. In case of equipment malfunction, either scale can be used for both gross and tare weights.

The maintenance facility is a two-and-a-half story steel frame building located north of the scale house. Maintenance of landfill equipment is performed in this structure. The truck wash portion of this building is used by trucks to wash off accumulated soil/solid waste when necessary.

The grounds maintenance facility is a one-story concrete block and steel structure. This building houses offices, is used for storage of tools, supplies and small equipment. This building also houses an operator's break room and a records storage area, which is secured from the rest of the building. This building is also used for the introduction to the landfill segment of the many tours of the site, which are given to various groups (school children, civic groups, government agencies, etc.).

The recycling/transfer building is a three-story concrete and steel building with an office wing. The recycling facility is equipped with compacting and baling equipment and is designed to accommodate the sorting, storage, and shipping of recyclables, which are delivered by private and municipal solid waste haulers. It is also used to store and transfer recyclables to other facilities.

The leachate loadout and landfill operations building is a one and a half story steel building. One half of the building houses an enclosed concrete leachate loadout pad and sump capable of containing 110 percent of a 7,000 gallon tanker truck. The tanker trucks have the ability to drive through the building and be loaded under cover during inclement weather. Two leachate loadout pumps are located adjacent to the loadout pad. The other half of the building contains an office for the landfill Operations Manager, an operator's break room, rest room, electrical/communications room and a small shop area with overhead storage loft.

The office building is a one story concrete block and wood frame structure. This building houses the landfill's administrative staff and District Manager. The building is equipped with offices and a conference room.

The power production plant is a one story concrete block structure. The building houses eight engine/generator sets that are capable of combusting landfill gas and converting it into electrical power. The electrical power is sold into the local electrical grid, but can also be used as a source of backup power for the facility in the event that there is a power outage.

## **4.2 Landfill Equipment**

The type of motorized equipment utilized at the landfill is listed in Appendix C. The equipment is used to complete the site activities related to daily waste placement operations, soil borrow activities and site maintenance.

Routine maintenance and major repair of all equipment and machinery is handled on-site in the maintenance facility.

Landfill equipment that routinely operates at the active face is equipped with fire extinguishers that may be used in the event of a fire. Extinguishers are maintained in conformance with State and local fire codes and regulations.

In the event that a piece of equipment is inoperable or additional equipment is needed, rental equipment is available on two hours notice.

## **4.3 Gas Monitoring Equipment**

A GEM 2000 Combustible Gas Meter or equivalent combustible gas meter is utilized on-site for the detection of landfill gases at the landfill boundaries and in on-site structures. The detection range of the meter is 0-100 percent LEL and is calibrated on a schedule recommended by the manufacturer.

## **4.4 Internal Communication System**

An internal communication system consisting of telephones and two-way radios is utilized at the site. Motorola GTX or equivalent two-way radios, and telephones are located in the maintenance facilities, main office building, recycling facility, leachate loadout and landfill operations building, power production plant and at the scale house. In addition, two-way radios are located in site vehicles and carried by Managers and Supervisors. The District Manager and Operations Manager also carry cellular telephones. A fax machine is available in the main office building.

## **5. LANDFILL OPERATIONAL CONTROLS**

### **5.1 Hours of Operation**

The landfill is open to receive solid waste from 7:00 AM to 5:00 PM Monday through Friday and 8:00 AM to 1:00 PM on Saturdays, as required. A sign is installed at the entrance to the landfill, which indicates the hours of operation. The landfill is closed on six (6) holidays; New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. If any of the above holidays fall on a weekday, the landfill is usually open on the following Saturday (7:00 AM to 5:00 PM) as if it were a weekday.

Hours and days may change in case of specific emergencies. If night operation is contemplated, the landfill will supply adequate lights for the active area or any construction areas.

Even though the landfill operation is limited to certain times, the operating systems, including the leachate collection and storage system and the landfill gas collection and control system, are designed to function 24 hours per day, 7 days per week, and 365 days per year. Personnel are assigned to operate and maintain the systems as required by the regulations.

### **5.2 Access and Traffic Flow Controls**

The landfill has a chain link fence with locking gates in all areas where the public has access. The existing landfill access road, in conjunction with the perimeter access roads, provide a significant amount of space for the queuing of incoming and exiting vehicles at the landfill. Internal access roads are constructed as close as practical to the working face. Access roads are maintained on a regular basis to allow passage by vehicular traffic and to ensure proper drainage.

Traffic speed is controlled by signs posted along the access road.



### **5.3 Landfill Rules and Regulations**

The landfill is operated and maintained in compliance with the rules and regulations set forth by the NYSDEC in 6 NYCRR Part 360, and the rules and regulations set forth and periodically changed by Chaffee Facility management and this manual.

Access control, operations, maintenance, inspection, monitoring, record keeping and reporting shall be in conformance with the requirements of this manual.

No waste or debris burning will take place at the Chaffee Facility without a permit from the NYSDEC.

If salvaging is performed, the Operations Manager is responsible for ensuring that salvaging is controlled and performed in a designated area and that there is no interference with the landfill operations or creation of hazards or nuisances.

## **6. FILL PROGRESSION**

Currently Cells 3 through 6 of the Western Landfill Expansion are constructed and being filled, Figure 2 depicts the current site conditions. The remaining cells will be constructed as follow; Cell 2 baseliner, Cell 1 baseliner, Cell 2 overliner and Cell 1 overliner, This is based on the conceptual progression of waste filling and interim cover construction shown on the permit drawings, but the specific limits of each stage may be modified depending upon actual waste volumes and rate of filling of the landfill, management of stormwater run-off and the gas collection system, and other operational conditions.

The filling of a cell during each phase will proceed as shown on Figures 3 through 5. Initially, the cell will be divided into 3 to 4-acre areas, to limit the amount of stormwater collected in the leachate collection system as described below. First, a 5-foot lift of select waste will be placed over the leachate collection layer followed by 5 feet of waste and then daily cover. The initial 10 feet of waste may not contain sludges, C&D, soils, industrial wastes, or any waste containing significant quantities of fines. At the completion of each day, a complete 10-foot lift must be placed in all areas that were opened during the day. This layer will then be covered with daily cover, excluding the leading edges to prevent fines from migrating into the leachate collection

layer. Daily cover will not be placed between the two 5-foot lifts. Following the first 10-foot layer, subsequent lifts will be placed approximately 10 feet in thickness until reaching final grade. As the cell is filled above the perimeter berm, the lifts along the outside slopes of the waste will be constructed first and covered with interim final cover. This process is shown on Figure 9, and will allow for landfill operations to occur behind a visual screen.

After liner construction has been completed on each of the phases but prior to placing waste, the Chaffee Facility will maintain the leachate collection layer in the following manner. Stormwater that does not fall directly on the collection layer or waste placed on it will be directed away from the collection layer to prevent clogging and sedimentation. No traffic will be allowed on the collection layer. Haul roads to provide access for waste haulers or construction vehicles will not be allowed on the collection layer. Dust will be minimized from entering the collection layer by keeping surrounding roads and surfaces clean and watered. Each cell will be allowed to remain open (i.e., exposed top of finished primary leachate collection layer) for only one winter season, if the cell remains open for longer periods, a plan to protect the liner system will be required by the NYSDEC.

Each of the Western or Valley Fill Landfill Expansion cells is designed with both a primary leachate collection system and a secondary leachate collection system. Each of these systems is designed to operate independently of each other and for each cell. This will allow for an individual cell to be shut down and monitored, if a problem is detected, allowing for the landfill to continue operating in one of the other constructed cells.

As each phase of the landfill is constructed and filled, interim final cover will be placed on areas that reach final grade. Figure 8, presents a conceptual progression of cover construction, corresponding to approximate cell construction. The actual area capped may vary based on fill conditions at that point in time. The final capping events will proceed as final grades are achieved and sufficient settlement has occurred to allow placement of the final cap.

The filling and placement of interim cover and final cover is described in more detail in Sections 9.1.3 and 9.1.4.

## **6.1 Stormwater Controls**

Stormwater diversion within each cell during filling will be accomplished by using either a berm and sump pump or rain tarp and sump pump. Each cell will be divided into active waste placement areas of approximately 3 to 4 acres. The details of the diversion devices are shown on Figures 6 and 7. The stormwater can be diverted using either berms, flaps or rain tarps or any other suitable method which prevents the comingling of landfill leachate and stormwater.

Stormwater diversion berms will be constructed across the floor of the proposed cells by placing a flap upslope of the berm along the primary liner and then up and over the berm. The berm will be constructed out of additional primary drainage material and will vary in height depending on the drainage area upslope. The berm will be sized to contain a 25-year, 24-hour storm. A sump will be installed at the low point behind the berm, as shown on the figure, to allow for a sump pump to remove the stormwater. Stormwater will be removed from these sump areas on a daily basis and following rain events to prevent excessive heads and prevent leakage through the diversion berms (see form in Appendix B3k). The material covering the diversion berm and forming the flap will be a suitable plastic material. The material shall be extended a sufficient length upslope of the berm to prevent significant water migration between the material and the liner. Stormwater will be kept out of the perforated leachate collection pipes upstream of the diversion berm by either tarping the leachate collection material or blocking the pipes at the berm.

Stormwater rain tarps may also be used, where the entire cell's primary drainage material is initially covered and is then removed in strips as waste placement proceeds from the high end of the cell to the sump. The rain tarp material covering the cell will be a suitable reinforced plastic material capable of prevent significant water infiltration. The separation between the removed tarp and exposed waste will be a minimum of 10 feet to allow stormwater that contacts the waste to be collected in the primary drainage material. Stormwater collected on the rain tarp will flow to the sump area where it can be removed by pumping it up and out of the cell. Stormwater will be removed from the sump areas on a daily basis and following rain events to prevent excessive heads and prevent leakage through the rain tarps (see form in Appendix B3k).

Upon completing the filling of a open area, the next area will be prepared for filling. A diversion berm and flap will be constructed or the rain tarp will be further removed as shown on Figures 6 or 7. Extra drainage material placed to form the berm along the flap may either be removed and reused or graded across the top of the drainage layer.

The current operation at the working face limits run-on/runoff. The operation of the landfill includes limiting the size of the working face. A smaller working face results in better control of waste placement procedures for limiting run-on/runoff.

The slopes of the working face and the area around the working face are prepared (sloped inward) to collect the precipitation that comes into contact with the waste and daily cover. Precipitation that comes into contact with the working face waste or daily cover, percolates through the waste mass into the landfill.

If the working face is located in a large flat area, run-on control is primarily performed through limitation of the size of the working face. In areas where the working face is adjacent to a large upslope area, a diversion swale will be constructed between the upslope area and the working face to intercept surface runoff from the slope and divert the runoff away from the working face. The decision to construct a diversion swale is based on daily field conditions and the fact that surface water which contacts either waste or daily cover must be collected and treated as leachate.

Stormwater controls outside the cell will consist of the perimeter drainage channels, culverts and sedimentation basins. These devices will be constructed as each cell is developed. Therefore, runoff from the perimeter berms and roads will be initially directed to these structures. Upon placing intermediate cover, interim final cover or final cover, stormwater will be directed into the perimeter drainage structures as described above.

The design of sedimentation basin #5 allows for the basin to be closed in the event that stormwater runoff from the landfill has been contaminated. This allows for the stormwater to be tested and disposed of properly. The basin inlet and outlet are equipped with valves, which will be typically open, and on a daily basis the water will be visually inspected (see form in Appendix B3k). If a problem is detected, the valves will be closed and the Operations Manager will initiate

an investigation to determine the source and concentration of the contamination as discussed in the Contingency Plan (Part IV of this submittal).

## **6.2 Waste Fill Monitoring**

Acceptable wastes and the waste receiving process are described in Section 7 and 8. As waste is placed each day, a daily log will be maintained to include the following information:

- Waste Type
- Waste Quantity
- Waste Origin and or Hauler
- Date Waste was Received

In addition to the daily log, each days waste placement will be indicated on a copy of the fill progression drawings, noting the horizontal and vertical location of the days waste placement. This information will be recorded by the Scale House Operator as each load is accepted for disposal.

Select waste deposited within the first 5 foot lift above the leachate collection layer will be placed in a manner which prevents damage to the liner system. To achieve this, the landfill will position a spotter on the leachate collection layer to inspect the select waste and ensure removal of rigid objects (i.e. objects greater than 2 feet in length including wood, metal, bed springs etc.). Trucks depositing the waste and landfill equipment placing the waste will be located on haul roads and platforms of significant thickness to prevent damage to the liner and collection systems. Low ground pressure equipment will be utilized to place the lift of select waste. Upon completion of the placement of the select lift, the Operations Manager will monitor both the primary and secondary leachate collection systems to ensure that damage did not occur.

## **7. WASTE AMOUNTS AND CHARACTERIZATION**

### **7.1 Waste Amounts**

The Chaffee Facility is presently permitted to accept up to 600,000 tons of solid waste annually. The quarterly waste receipts must not exceed 180,000 tons per quarter for any one quarter ending March 31, June 30, September 30 and December 31. The Chaffee Facility can also accept BUD materials in addition to the solid waste. BUD materials used as alternate daily cover (ADC), cannot exceed 20 percent of the total annual amount of non-BUD solid waste disposed in the landfill. Therefore, the Chaffee Facility could theoretically accept 120,000 tons of BUD material to be used as ADC annually in addition to the 600,000 tons per year of solid waste. Other potential BUD materials used within the landfill for access roads, etc. are not limited by the 20 percent rule, but will be subject to NYSDEC approval on a case by case basis. All BUD materials must be approved on a case by case basis by the NYSDEC prior to acceptance at the landfill.

### **7.2 Waste Characterization**

The only wastes accepted for disposal at the Chaffee Facility are municipal waste and nonhazardous industrial solid wastes, construction and demolition (C&D) debris, contaminated soil and sludges. Industrial wastes, commercial wastes, and sludges will be accepted only upon written acceptance by the NYSDEC Regional Solid Material Engineer (RSME) except that waste streams less than 100 tons per year and virgin petroleum contaminated soils (i.e. spill of pure petroleum product) meeting the landfill acceptance requirements may be received by the Chaffee Facility without approval by the NYSDEC. For waste streams less than 100 tons per year and virgin petroleum soils, the landfill must maintain adequate documentation that the material is non-hazardous and meets the landfill acceptance criteria. Drum disposal at the landfill may be allowed based on the information provided in Section 8. All requests for acceptance will be submitted on the WMNY Waste Material Profile form approved by NYSDEC. Neither bulk liquid wastes, nor wastes containing free liquids or wastes with a solids content of less than 20 percent shall be received at the landfill. Wastes containing free liquid shall be approved by the department. No hazardous waste (as defined in 6 NYCRR Part 371), which is subject to regulation under 6 NYCRR Parts 370 through 374 and no radioactive waste (as defined and regulated in 6 NYCRR Part 380) will be received at the facility.

### **7.3 Placement And Compaction Of Solid Waste**

Waste will be placed in the landfill as stated in Section 6 of this manual, which includes proper cover management and stormwater controls. Solid waste, excluding industrial waste and ash, will be spread and compacted on the preceding lift of solid waste. Cover material is soil or other suitable material, or a combination of same, acceptable to the NYSDEC that is used to cover compacted solid waste in a landfill.

When solid waste is deposited at the working face by incoming trucks, the following conditions will be adhered to during operations;

1. The working face width will be restricted to the smallest area practicable, based upon the peak daily incoming waste rate.
2. Trucks will be unloaded as close to the working face as possible to limit tracking waste out of the landfill.
3. Before additional waste filling occurs in an area that has received daily or intermediate cover, the soil may be scraped off and stockpiled for continued use as daily cover material. When BUD soils have been used as alternate daily cover, the cover may not be removed and reused. When the amount of waste contaminating the soil prohibits its use as daily cover, the soil shall be disposed of in the landfill.
4. Lift height will be a maximum of ten (10) feet, except that the first lift placed over the leachate collection layer will be installed as five (5) feet of select waste followed by five (5) feet of waste.
5. The Equipment Operator will watch for any unauthorized wastes, including tires or white goods, and if any are encountered, will follow the unauthorized waste procedures (see Section 8.2).
6. Waste will be spread and compacted in layers not to exceed two (2) feet in thickness. Each layer shall be compacted with a minimum of three (3) passes of the equipment.

7. Maximum working face slope will be no greater than three (3) horizontal to one (1) vertical.
8. A minimum of six (6) inches of cover material or ADC will be applied to the top surface of waste at the end of each day.
9. At least twelve (12) inches of compacted soil (intermediate cover) shall be placed over all areas that will not receive wastes within 30 days.

Based on fill volume calculations, the expected in-place density of waste at the landfill is approximately 1,400 pounds per cubic yard.

## **8. SOLID WASTE RECEIVING PROCESS**

### **8.1 Waste Placement Control**

The landfill is routinely surveyed to estimate available airspace and to calculate remaining site life. Annual aerial surveys and quarterly ground surveys are performed to provide the Chaffee Facility with volume data to evaluate airspace utilization. Grade stakes are placed along the exterior berms and slope staking is performed during final grade waste placement. These surveys are also performed to ensure sideslopes and waste elevations are within approved limits.

### **8.2 Receipt And Monitoring Of Incoming Solid Waste**

Incoming traffic enters at the main entrance off Olean Road and proceeds to the scale house.

Procedures for receiving vehicles at the scale house are as follows;

1. Vehicles drive onto the in-coming scale and stop.
2. The Scale Operator makes sure that the driver has an agreement on file with the landfill. The Scale Operator records the date and time, account number (this will reference the



- waste origin/hauler), waste type, approved application number if applicable, the current location of solid waste placement, gross vehicle weight, tare weight, and the net weight of solid waste in the computer, which generates a scale ticket.
3. Scale tickets are verified and signed by the driver of the vehicle. The Scale Operator gives one copy of the scale ticket to the driver and the other copies are retained for future reference and compiling the monthly invoicing.
  4. Vehicles are directed to the active working area of the landfill.
  5. For loads containing industrial waste or when tare weights are not available, the vehicle is reweighed on the outgoing scale after depositing solid waste in the disposal area.
  6. WMNY will maintain copies of completed forms for a period of three (3) years after they have been completed.

The landfill accepts a variety of residential, commercial, and non-hazardous industrial wastes. Customers of the landfill are required to sign a Service Agreement prior to disposing of solid waste. The Agreement clearly outlines what is and what is not acceptable at the landfill.

Acceptance of hazardous waste as defined in 6 NYCRR Part 371 is prohibited. Radioactive waste subject to the regulations of 6 NYCRR Part 382 is prohibited from disposal in the landfill. "Below Regulatory Control" radioactive waste will be treated as radioactive waste.

Disposal of solid waste at the landfill from industrial operations is prohibited except as approved in accordance with the Special Waste approval process and accepted by the NYSDEC. Commercial waste streams are allowed for disposal at the landfill, but must be approved by the NYSDEC. Sludges with a solid content less than 20 percent, and sludges, which have free moisture, are not accepted for direct landfill disposal. Section 20 of this Operations and Maintenance Manual provides a method for receiving and disposing of liquid waste through the use of the liquid solidification process. Waste water treatment plant sludge must be stabilized by the generator in accordance with the Criteria for Sludge Stabilization for Disposal in New York State, established September 24, 2003 by the NYSDEC. At the working face, the sludge will be mixed with other refuse during spreading and compaction at the working face or placed

into a pit excavated into the previous lift of waste. If sludge is placed in a pit excavated in solid waste, no mixing will occur. Odors should be reported to the operations manager to determine if any action must be taken concerning odor control (see Section 13).

Incinerator ash from the incineration of non-hazardous municipal, commercial, or industrial solid waste will be accepted at the landfill if the ash is tested and shown to be non-hazardous. Incinerator ash is approved in accordance with the Special Waste approval process and accepted by the NYSDEC.

Drum and tank disposal at the landfill will be allowed as described here. The drums shall be empty as described by the RCRA definition stated in 40 CFR 261.7, and must be opened. If closed drums, full or partially full drums are delivered to the site, they must be rejected or held in the landfill until inspected by the NYSDEC RSME. The contents of the drums will be verified with the generator prior to opening to ensure that proper safety precautions are taken. These drums will then be opened and inspected by the NYSDEC RSME, if acceptable they will be disposed of in the landfill. If a generator plans on disposing of several similar drums over a period of time, the NYSDEC may allow the site to perform inspections of the drums. Acceptance of tanks for disposal will be allowed if: the tanks are empty according to the RCRA definition referenced above; and each end of the tank ends is removed to allow for the tank to be crushed flat upon placement in the landfill.

Other wastes which are specifically excluded are whole tanks, except as allowed under 6 NYCRR Part 360-2.17(r), septic tank pumpings, flammables, whole cars, whole tires, lead acid batteries, regulated medical waste and explosive bottle gas containers, which have not had pressure fittings removed.

Landfill personnel will be on duty during operational hours to ensure that only NYSDEC approved wastes are disposed at the landfill. In the event unauthorized wastes are received at the landfill, landfill personnel shall refuse to accept unapproved wastes for deposit at the landfill and shall immediately notify the NYSDEC RSME and/or the on-site monitor of the incident within two hours of discovery on a business day or on the next business day following a weekend or holiday, providing the hauler's name and (if possible) license number of the vehicle, the type of waste thought to have been transported, and the generator of the waste. If the waste has already been dumped and cannot be reloaded, the waste shall be segregated and

secured until proper disposal can be arranged for within 30 days. A written report on the incident shall be forwarded to the NYSDEC on-site monitor and the NYSDEC RSME within five (5) working days.

At least one solid waste collection vehicle is chosen at random on a weekly basis for inspection of unacceptable waste at the working face. The District Manager or Operations Manager will pick a number between 1 and 100 and a particular date in a week. On that day, the Scale Operator will add that number to the beginning scale ticket number and the resulting number will be the vehicle inspected. Inspection activities include both screening before and after the solid waste has been deposited at the working face. The results of this inspection are recorded and maintained on file at the landfill (Appendix B2). Additional random inspections will be performed as requested by the NYSDEC on-site monitor.

As industrial wastes are brought onto the site, the procedures for receiving vehicles at the scale house will be followed and upon acceptance of the load, the Scale Operator will notify the landfill operators of the industrial waste (identify the truck/hauler and the type of waste). Loads of industrial waste will then be checked at the active area by the landfill operators prior to disposal to ensure compliance with the accepted waste requirements. Sampling and analysis of these loads will be conducted, if the landfill operator observes unusual conditions (difference in color, odor, consistency, etc.).

The Equipment Operator checks all loads of waste at the time of disposal. Any waste, which, because of its appearance, odor, physical properties or packaging does not appear to be acceptable waste, is considered unacceptable waste.

If whole tires are identified in the waste as it is being unloaded from trucks or as it is being placed by the compactors, the landfill operators will move the tires to the edges of the working face. Upon completing the waste placement for the day, the tires will be collected and properly disposed of.

The Operations Manager is responsible for insuring that the unacceptable waste is segregated on the site as promptly as practicable. The Operations Manager is responsible for completing a waste hauler inspection form for the suspicious waste received, specifying its temporary disposition on-site and notification as stated above.

The landfill's disposal agreements address what is to be done with suspicious wastes and places all responsibility on the generator to prove that the waste is acceptable for disposal at the landfill.

If the waste is determined to be unacceptable waste, it will be handled as outlined in the Contingency Plan (Part IV of this submittal).

### **8.3 Special Wastes**

#### **8.3.1 Overview**

The goal of the Special Waste Program is to ensure that only non-hazardous wastes are received for disposal at the Chaffee Facility. A waste is hazardous if it is listed in 40 CFR 261.31-261.3 or 6 NYCRR Part 371 or, if by its characteristics, it is determined to be hazardous. Part of the approval process is ensuring that documentation is provided that fully characterizes the waste.

When profiling a Special Waste stream into the Chaffee Facility, a Generator's Waste Profile (Appendix B1) must be completed. This document can be obtained from the facility or by contacting the Special Waste Approvals Person. Each section of the Generator Profile is typed or filled out in ink with detailed information and signed by an authorized representative for the generator. If someone other than the generator is signing the profile, a letter of authorization from the generator must be provided.

Paperwork including analytical test results, Material Safety Data Sheets (MSDS), site history and description describing the waste along with the profile must be included with the profile. The information is then sent to the Special Waste Approval Person at Waste Management, WNY Industrial Sales, Customer Service/Waste Approvals, 1550 Balmer Road, Model City, NY 14107.

Analytical test results, if required, must come from a laboratory certified by the New York State Department of Health for analysis of hazardous waste characteristics. Analytical reports must be signed by the lab and include the chain of custody report.

Once the completed package (Generator's Waste Profile, test results, MSDS, supplemental information, supporting letters, service agreement, etc.) is received by the approvals person, a decision can be made on the acceptability of the waste within a two to three day time period.

The NYSDEC must approve all industrial waste, commercial waste and sludge special waste streams that exceed 100 tons per year. (For waste streams less than 100 tons per year and virgin petroleum soils, the landfill must maintain adequate documentation that the material is non-hazardous and meets the landfill acceptance criteria.) A copy of the profile and associated paper work is submitted to the NYSDEC for review and approval, after the Special Waste Approvals Person has reviewed and accepted the profile. The generator is notified in writing when the waste stream has been approved for acceptance into the facility. A copy of the Special Waste Management Decision is then sent to the generator along with any special conditions of disposal noted on the approval. Special handling may be required depending on waste type. Generally any special handling requirements will be noted on the profile.

A hauler must possess a NYS Department of Environmental Conservation Waste Transporter Permit, to haul industrial processed waste or special waste. This permit must be in the vehicle and available for inspection, if requested. Loads must be tarped in order to be accepted into the facility. In addition, manifests are required for friable asbestos wastes.

### **8.3.2 Customers Served and Types of Waste Streams**

The Chaffee Facility provides disposal services for Special Waste customers primarily in New York. One customer may have a number of different special waste streams. Examples of special waste streams include; grinding sludge from a manufacturing process, incinerator ash from a hospital, and outdated or off-spec products from a pharmaceutical manufacturer. Approximately 10 to 20 percent of the total volume at the Chaffee Facility is identified as special waste. Each special waste stream is documented and appropriately managed according to its individual Special Waste Management Decision.

### 8.3.3 State and Local Regulatory Requirements

The following New York State regulations govern the management of special waste handled by the Chaffee Facility;

6 NYCRR Part 360	Solid Waste Facility Regulations
6 NYCRR Part 364	Transport of Waste
6 NYCRR Part 703	Groundwater Standards
6 NYCRR Part 370-373	Relating to Identifying Standards for Hazardous Wastes

These regulations are followed in conjunction with the Special Waste program. The additional procedures followed in this plan are to ensure compliance with the above referenced regulations. Prior to the site's acceptance of any industrial/commercial waste stream, as defined in 6 NYCRR Part 364.1 (d) (3), all necessary permits must be secured and approved.

### 8.3.4 Asbestos Landfill Procedures

"Friable" asbestos means that the material can be easily crumbled under hand pressure and would likely emit or release fibers. This type of asbestos is regulated by the USEPA and NYSDEC. Examples of friable asbestos are; pipe insulation and boiler wrap.

Conditions for hauling and disposal are:

- 24 hour notification to the Chaffee Facility;
- A 2212 placard, indicating the presence of asbestos, on four sides of the container;
- Class 9 Label on opposing two sides near the closure of container for bulk shipments;
- Manifest requirements;
  - 1) Full address of generator.
  - 2) Emergency phone number in the event of a spill.
  - 3) DOT shipping information **MUST READ**; Asbestos, 9, NA2212, III, RQ.
  - 4) All information must be printed or typed.
  - 5) Signatures where appropriate.

- Drivers should wear respirators with filters designated to remove asbestos;
- Material must be double bagged in 3 mil bags and labeled, packaged, and transported in accordance with OSHA (1910-1001,1910-1200), DOT 49 CFR (172 & 173) and National Emission Standards for Asbestos NESHAPS (Subpart M). Each bag must have a label with the generator's name and address;
- Transporter must be trained in accordance with OSHA, DOT and NESHAPS;
- Disposed of in trench during normal business hours;
- Non-perforated tarp required;
- Must list the Chaffee Landfill on Waste Transporter permit; and
- Material must be profiled.

Non-Friable asbestos is not a regulated substance, provided it cannot or does not become friable due to handling or off-loading at the landfill. Non-friable Asbestos Containing Materials (ACM) must be landfilled and not used as a BUD material, such as daily cover. Upon arrival at the working face, the operator or designated landfill personnel will direct the hauler to the selected disposal area away from the active face. The operator(s) should remain in the cab and spotter and operator should remain up wind of the disposal location and be sure to keep other haul vehicles away from the area until the load is buried.

If the loading/unloading warning sign is not already up, then keep the container/vehicles away from the area until the load is buried.

The Equipment Operator shall direct the hauler to the excavated trench, swale or other designated area large enough to accept the load. While backing up to the trench, if the container door is open, the waste must be secured so that bags or drums do not fall out before reaching the designated area. The area should be such that it is perpendicular to prevailing winds and refuse should be pushed toward the windward side of the designated area. To minimize the amount of trash/cover required, the designated area should be kept as narrow as possible.

Dumping of the asbestos-containing load shall be done with care to reduce the potential for puncturing a container and to prevent visible emissions. The dumped load is not compacted, but should be covered from the up wind side with refuse or soil. This procedure should be conducted carefully with the intent to "bridge" the asbestos-containing load with refuse. At least

3 feet of refuse or 18 inches of soil will be pushed over the load prior to passing over it with compaction equipment. Do not run machinery over exposed asbestos.

After the asbestos has been unloaded, the designated landfill personnel signs the shipping paper as received and gives the hauler a copy. Another copy must be mailed by the landfill to the generator within 30 days.

### Reporting Requirements

In the event that small amounts of bags or containers are ruptured, the designated landfill personnel witnessing the disposal should note it on the shipping paper.

If there is a significant amount of improperly enclosed or uncovered waste, or any ACM not sealed in leak-tight containers, a report must be submitted by the following work day along with a copy of the Waste Shipment Report to the generator's NESHAPS administering agency and the landfill's NESHAPS administering agency.

If quantity discrepancies of contained waste are discovered, the site must reconcile the discrepancy with the generator within 15 days of receipt. If the discrepancy cannot be reconciled, the site must immediately report the discrepancy and reconciliation attempts to Federal or State Agency Administrator in writing with a copy of the shipping paper.

The disposal location of asbestos-containing loads must be identified horizontally and vertically within the landfill. Disposal locations are to be recorded so that proper precautionary measures can be taken in the event the material required excavation. The landfill must generate a map indicating the location, depth, area and volume of waste. This will require the use of a global positioning system (GPS) or similar unit that can be used to record vertical and horizontal positioning of the asbestos disposal area. The GPS information is then used to establish the location on a site map of the landfill.

Asbestos disposal will not take place within a minimum of 10 feet of the perimeter of the fill or within 15 feet of final contour elevations. Disposal shall be conducted away from the active face. ACM shall not be placed in any roadway, including access roads for any purpose.



The landfill must notify Federal or State Agency Administrator in writing at least 45 days prior to excavating or disturbing asbestos waste deposited and covered. If excavation begins on a date other than that on the original notice, notice of the new start date must be provided at least 10 working days before excavation begins. The notice must include the scheduled start and completion dates, procedures to control emission during excavation, storage, transport and ultimate disposal, and the location of any temporary storage site and final disposal site. The proper personal protective equipment for the operators and spotter includes head, respiratory, body, and foot protection.

#### Landfill Closure Requirements

Within 60 days of site closure, a notation must be recorded on the deed to facility property and on any other instrument that would be examined during a title search to notify any potential purchaser that the land was used for disposal of asbestos-containing waste, a survey plot and record of location and quantity of waste disposed have been filed with Federal or State Agency Administrator and the site is subject to 40 CFR 61, Subpart M.

#### **8.3.5 Asbestos Spill Reporting Requirements**

Persons in charge of a vehicle or facility (landfill) from which asbestos has been released in a quantity that is equal to or greater than its reportable quantity (RQ) must immediately notify the National Response Center (NRC). Friable asbestos equal to or greater than one (1) pound is a reportable quantity and a spill must be reported immediately.

The following procedure should be followed if a RQ of asbestos is released to the environment either while on the road or at the landfill. (This procedure must also be used for reporting oil spills or other hazardous substance spills greater than their RQ.) Failure to report a spill could result in those persons having knowledge of the release being subject to criminal penalties.

Initially, the spill should cautiously be contained with the nearby available equipment. The hauler should contact the dispatcher who should contact the emergency coordinator. The dispatcher, the safety officer or other supervisor should make the necessary phone calls. The dispatcher or whoever gets the first call must keep a record of the time all calls were made and

other pertinent information. The truck driver must remain at the spill site until a supervisor allows him to leave.

The following agencies need to be notified:

- National Response Center(NRC)(U.S. Coast Guard) 1-800-424-8802 or 1-202-267-2675; and
- In New York notify the NRC and the Department of Labor 1-518-457-1255.

The following information will be required;

- Caller's name and company.
- Company phone, address, city, county, state, and zip.
- Who is the spiller?
- Spiller's phone, address, city, county, state, and zip.
- Spill date and time.
  - 1.) Discovered after the fact?
  - 2.) Directly observed?
- Type of spill material.
- Total quantity spilled/released (to the environment).
- Source and cause of release.
- Effected medium.
  - 1.) Injuries, fatalities, evacuations?
- Response actions (clean up).
- Anyone else notified?
- Any other comments?

After you have provided this information, you will be given a case number and the name of the case officer, which should be recorded. The NRC forwards the information to appropriate USEPA regional offices.

Several hypothetical instances follow to help determine if you have a reportable spill. If a bag of asbestos falls from the transport vehicle and is not broken, or if it breaks and less than one (1) pound escapes, this is not considered a reportable spill or release. If a bag, ruptures inside the

trailer or sealed roll off box and more than one (1) pound escapes inside the box and not to the environment, this is also not a reportable release. Other releases greater than one (1) pound are considered reportable.

## **9. COVER MATERIAL MANAGEMENT PLAN**

In accordance with 6 NYCRR Part 360-2.9(h), the following sections detail the cover material management plan for the Chaffee Facility.

Cover materials, excluding gravel, geomembrane and geonet/geotextiles, are imported from offsite or are excavated from areas on Chaffee Facility property. These areas include existing borrow areas located south and east of the Closed Landfill.

### **9.1 Method Of Cover Placement**

#### **9.1.1 Daily Cover**

A minimum of 6 inches of compacted cover material is applied on exposed surfaces of solid waste at the close of each operating day to control vectors, fires, odors, blowing litter, and scavenging. In addition to soil, the NYSDEC may approve, on a case-by-case basis, the use of certain wastes, contaminated soils, and other materials for ADC. These materials can consist of soil, foundry sand, and synthetic cover. Requests for the use of ADC will be made to the NYSDEC prior to its use. The landfill shall contact the NYSDEC to schedule a date and time for inspecting the potential ADC. In the event that nuisance conditions develop as a result of the use of an ADC, the NYSDEC may rescind the approval to utilize the ADC. ADC shall not be stripped after placement and must be covered the following operating day with either waste or virgin soil. When virgin soil is used for daily cover it may be removed at the start of the workday and prior to the placement of any additional lifts. The previous day's daily cover is removed prior to placement of refuse to integrate the new waste with the previous day's waste to promote downward (rather than lateral) migration of leachate to the leachate collection system and to provide better compaction of refuse. Virgin soil will be used as cover on external slopes.

The daily cover material is placed in one lift. Material is dumped adjacent to the open face and is spread over the waste with a bulldozer. The material is compacted by tracking with a

bulldozer. Any stormwater or runoff contacting the daily cover must be directed into the landfill and be collected and treated as leachate.

The storage of ADC is limited to areas where runoff can be collected (i.e., not on sideslopes) as leachate and where windblown materials will not land on intermediate and final covered areas. A soil berm will be constructed around ADC storage areas to collect the runoff and prohibit runoff from contacting the ADC. The collected runoff will percolate back into the landfill. If an excess of runoff exists within the bermed storage area, the leachate tanker is to be utilized to collect the runoff and transfer the runoff to a permitted treatment plant. ADC stockpiles shall not create nuisances, disrupt daily operations, and should be removed as they are used to minimize the amount to be stockpiled.

### **9.1.2 Crushed C&D as Daily Cover**

The Chaffee Facility has approval to use crushed C&D as daily cover, as follows:

#### C&D Material Acceptance/Storage

The Chaffee Facility will only accept recognizable C&D debris as defined by Part 360-1.2(b)(38). Incoming loads of C&D will be inspected for unacceptable articles of debris including, but not limited to metal and plastic containers larger than 1 gallon, white goods, bulky items such furniture, friable asbestos, paper, plastic, cardboard, and electrical fixtures. These unacceptable articles of debris will be removed at the time of inspection and landfilled. The recognizable C&D that has been inspected and accepted will then be stockpiled and /or processed by crushing on an as needed basis.

Incoming loads of C&D that are not immediately crushed for daily cover will be stockpiled within the landfill footprint. C&D loads that are dusty or may cause a littering nuisance shall be immediately disposed of and will not be used as ADC. As C&D debris is needed for daily cover, it will be removed from the stockpile for crushing. The Chaffee Facility anticipates stockpiling no more than 10,000 tons of C&D debris at any given time. Unprocessed C&D debris storage piles will not exceed 20 feet in height, and the area of the storage piles at the base of the pile will not exceed 5,000 square feet. A minimum separation distance of 25 feet will be maintained between adjacent piles.

Separate piles of unprocessed C&D debris will not be covered as long as weather conditions allow. C&D will not be stored in any one pile for more than 30 days.

#### Leachate Management and Drainage

All unprocessed C&D debris will be stored and managed to limit rainwater run-on and run-off. C&D debris stockpiles will be located within the landfill footprint. Each pile that will not be used during the current operating day will be surrounded by a soil berm to limit run-on and run-off. Run-off from the stockpiles will be directed into the waste mass for collection as leachate.

#### C&D Crushing /Spreading

C&D debris used as daily cover will be removed from the stockpile or tipped directly onto the working face. The C&D debris will be spread in a 2-4 foot lift using a bulldozer or trash compactor. The C&D debris will then be crushed using the trash compactor. The trash compactor will pass over the C&D debris until the C&D pieces are small enough to be effective daily cover. The crushed C&D will then be spread using a bulldozer or compactor into a minimum 12-inch layer of daily cover. The C&D shall not be stripped after placement and must be covered within 72-hours of placement with either waste or virgin soil.

#### Documentation/Reporting

As required by 6 NYCRR Part 360-16.4(h)(i)(1&2) and 360-16.4 (k)(1), the Chaffee Facility will continue to document the quantity of C&D debris that is stockpiled and crushed for use as daily cover. The volume of C&D debris accepted for use as ADC will be reported quarterly.

As with other BUD materials, any C&D debris that is stockpiled and crushed for ADC will not be counted against the Chaffee Facility's annual permitted tonnage. However, the total amount of ADC cannot exceed 20 percent of the total annual amount of non-BUD solid waste disposed in the landfill.

### **9.1.3 Intermediate Cover**

A minimum of 12 inches of compacted virgin soils is to be applied as intermediate cover in areas that will not receive wastes within 30 days. The virgin soils used shall be a clayey soil so as to limit the amount of stormwater infiltration. Intermediate cover does not include topsoil or vegetation. Erosion damage to the intermediate cover is repaired as necessary when weather conditions permit. This cover material is placed in one twelve (12) inch lift. Material is dumped adjacent to the area to be covered and is spread over the area with a bulldozer. The material is then compacted by tracking with a bulldozer. Stormwater generated from the intermediate cover surfaces or passing over this surface from other capped surfaces shall be directed to the perimeter drainage structures to minimize leachate generation.

### **9.1.4 Final Cover**

A permit condition has been included to allow an initial settlement period (after reaching top of waste elevations) prior to construction of the final cover system for the existing landfill. As part of the permit conditions for the landfill expansion areas, the NYSDEC requires that an interim final cover be placed on all surfaces upon reaching top of waste elevations. This will allow for an initial settlement period prior to constructing the final cover system. The purpose of the interim final cover is to control surface water runoff, leachate generation and containment, and odors, as well as to provide a visual appearance similar to the surrounding area. Interim final cover will also be installed on areas of the landfill that have not or will not receive waste within one year, regardless of the area reaching final waste elevations.

#### Interim Final Cover

Interim final cover soil for the existing landfill will consist of relatively homogeneous, natural soil, which is free of material that, due to nature, size or shape, is deleterious to the intended use. No particles larger than 6-inch in maximum dimension (per ASTM D 422) will be allowed. The material will have at least 30 percent passing the No. 200 sieve by weight and will be classified according to the Unified Soil Classification System (per ASTM D 2487) as CL, ML, SC, SM, GM, or GC.

The interim final cover will be constructed 27 inches in thickness, consisting of 24 inches of soil having the ability to achieve a permeability of  $1 \times 10^{-6}$  cm/sec and 3 inches of topsoil. The lower 24 inches of soil shall be placed in two loose lifts of sufficient thickness to achieve a compacted thickness of 12 inches for each lift. The placement and compaction criteria for this soil shall be determined based on developing a moisture density relationship with comparisons to remolded permeability tests. If the soil is similar to the soils being used at the site for low permeability liner construction, sufficient data should exist to allow for placement of the soil following the same compaction criteria as was used for the liner. If the soil source is different, or significant changes in index properties are noted, additional testing will be required in combination with the construction of a test pad to determine the required compaction criteria.

In areas within 2 feet of gas wells, the material will be compacted with hand-held compaction equipment. Heavy equipment and trucks will be prohibited from traveling on the finished interim cover soil areas, and any ruts or low areas will be filled to provide positive drainage and promote stormwater runoff from the interim cover area.

Interim final cover will be placed on areas of waste that will not or have not received waste for one year in accordance with Condition 24 of the current Part 360 Permit.

#### Proposed Landfill Schedule

As shown in Figure 12, the remaining cells will be constructed and filled in four stages. The schedule for installing the interim final cover will be based upon waste placement schedules and development of the proposed cells. In general, interim final cover will be placed on the outside slopes of the landfill upon reaching grade. The interim final cover will also be installed on areas of the landfill that have not or will not receive waste within one year, regardless of the area reaching final waste elevations. Upon reaching final waste grades, 12-inches of intermediate cover will be placed to comply with 6 NYCRR 360-2.17(d). As time and weather allows, the intermediate cover might be removed and replaced with interim final cover followed by seeding and mulching as per Section 9.2.1. Seeding of the interim final cover will not take place during freezing or inclement weather periods, but will be completed as soon as practical.

The schedule for installing the final cover is shown on Figure 12. The areas proposed for final cover placement are divided into four capping events that are scheduled based on the

anticipated cell construction sequence and a waste receipt rate of 425,000 tons per year (exclusive of BUD). The figure presents the approximate area scheduled for final cover placement, the year since initial construction and the year that the capping event is scheduled to take place. As shown on the figure, capping event one will be performed prior to completing the landfill cell construction. Events two through four will occur over several construction seasons, depending upon the rate of waste receipt.

In general, the site will be filled and final cover will be applied in four events. As each section of the landfill reaches final grade, the interim final cover will be applied to the area. After the rate of waste settlement in a completed area has diminished significantly, the final cover system will be applied. In areas where significant settlement has taken place, additional waste will be placed to achieve the final permitted waste grades prior to application of the final cover system.

### Final Cover

Prior to the installation of the final cover system, the interim cover will be stripped and removed to a minimum thickness of 6 inches. The final cover system will be constructed once portions of the site have reached design height and initial settling has occurred.

The final cover system for the proposed landfill will consist of the following components:

#### For 3H:1V slopes

- Prepared grading layer over the waste;
- Gas venting layer – non-woven geotextile with venting strips;
- 50 mil structured LLDPE geomembrane liner;
- Non-woven geotextile drainage layer;
- 24-inch barrier protection layer; and
- 6-inch topsoil layer.

#### For 4 percent slopes

- Prepared grading layer over the waste;
- Gas venting layer – non-woven geotextile with venting strips;
- Minimum 18-inch barrier soil layer (Permeability less than  $1 \times 10^{-6}$  cm/sec, the permeability shall be verified through permeability testing.);



- 40 mil textured LLDPE geomembrane liner;
- Non-woven geotextile drainage layer;
- 24-inch barrier protection layer; and
- 6-inch topsoil layer.

The specifications and construction requirements for the final cap materials will meet the requirements of 6 NYCRR Part 360-2.13(r). Engineering design and Construction QA/QC procedures must be submitted and approved by the NYSDEC prior to constructing the final cap. A construction certification report will be submitted to the NYSDEC within 45 days after the completion of landfill closure construction. The report will include all items required under §360-2.15(d)(7).

## 9.2 Cover Maintenance

### 9.2.1 Seeding and Mulching

Seeding and mulching will occur within 14 days of completion of intermediate, interim or final cover construction. The seed mixture will be as described below, for either temporary or permanent uses.

<u>Name of Grass</u>	Application		
	<u>Rate Per Acre</u>	<u>Purity</u>	<u>Germination</u>
Perennial Ryegrass	10 pounds	95%	85%
Kentucky Bluegrass	20 pounds	85%	75%
Strong Creeping Red Fescue	20 pounds	95%	80%
Chewing Fescue	20 pounds	95%	80%
Hard Fescue	20 pounds	95%	80%
White Clover	10 pounds	98%	75%

The seeded areas will be mulched to conserve soil moisture and provide additional temporary erosion protection. Mulch may consist of clean hay, straw or wood-fiber. Alternatively, hydro seeding may be used. A natural or synthetic erosion mat may be installed prior to seeding.

### **9.2.2 Mowing**

Vegetated cover areas will be mowed on an annual basis. Initial mowing will not begin until after vegetated areas have completed one growing season and the grasses have set and dropped seeds.

One of Chaffee Facility's goals is to establish a grassland bird habitat on areas of the landfill that have been final capped. In order to best manage the final capped areas for grassland birds, half of the final capped areas of the landfill should be mowed each year. This mowing practice is based on the findings of the breeding bird surveys performed at several final capped Waste Management landfills in Western New York. The results of the breeding bird surveys on the capped landfill indicate that the sites were excellent habitat for several grassland species that are either absent or uncommon in the general area.

### **9.2.3 Cover Assessment**

The Chaffee Facility will implement a program of assessing daily and intermediate cover in accordance with the Cover Integrity Assessment form in Appendix B3a. Other cover inspections are also performed in accordance with the Stormwater Pollution Prevention Plan (SWPPP) and the Gas Collection and Control System (GCCS) Plan cover integrity inspection. The inspection frequency and reporting requirements are discussed in those plans. Copies of the SWPPP and GCCS plan are on file at the facility.

## **9.3 Quantity of Cover Material**

The following are the estimated materials needs for the proposed landfill's final cover system;

6 inch Suitable Subbase Soil	58,271 CY
Gas Venting Geosynthetic	362,274 SY
Barrier Soil (18 inches on 4 percent slopes)	61,029 CY
40 mil Textured LLDPE Geomembrane Liner	121,968 SY
50 mil Structured LLDPE Geomembrane Liner	227,238 SY
Drainage Layer Geosynthetic	362,274 SY

Barrier Protection Soil (24 inches)	232,883 CY
Topsoil (6 inches)	58,271 CY

These quantity estimates are based on approximately 75 acres of cover system area. The components of the cover and their thickness are as stated in the current 6 NYCRR Part 360 regulations. Criteria for placement of the final cap materials will be based upon design drawings, specifications and QA/QC plans developed for each capping event. These plans will be submitted to the NYSDEC for review and approval prior to beginning the construction of each segment of the cap.

Stockpiles of materials will be made available for emergency, daily, intermediate or interim covers.

## **10. ENVIRONMENTAL MONITORING PLAN**

The Environmental Monitoring Plan (EMP) for the Chaffee Facility is a separate document that includes groundwater, surface water and leachate monitoring. The EMP is included as Part VI of this submittal. The EMP includes discussions pertaining to the operation and maintenance of the monitoring points.

### **10.1 Groundwater Collection System**

For the Western Landfill Expansion, Cell 6 was designed and constructed with a groundwater collection system in accordance with 6 NYCRR Part 360-2.13(d). This system collects groundwater through a geocomposite drainage material, which directs the water to a collection trench and pipe, which then flows to a collection sump where a submersible pump discharges the water into the perimeter drainage swale.

The groundwater collection pump consists of an EPG wheeled sump drainer, model WSD2-2 and is installed in a 12-inch HDPE sideslope riser. Associated flow meters and valves are also installed within the sideslope riser. The riser pipe allows for the pump to be removed for repair and replacement if necessary. The groundwater pump is sized to remove 10.5 gpm at 32 feet of total head.

### Groundwater Sump Pumping System Control/Operation

The groundwater collection pump is configured with four level probes, including (from bottom of sump up) a reference probe, pump off probe, pump on probe, and sump high level probe, which are described below:

- Pump-Off: initiated by a low-level conductance probe interlocked to the pump starter to shut down the pump upon reaching a minimum liquid level in the sump. This is activated when the sump has a liquid level of 12-inches.
- Pump-On: initiated by a high-level conductance probe located in the sump and interlocked to the pump starter in the pump control panel. This is activated when the sump has a liquid level of 18-inches.
- High Level Alarm Condition: Initiated by a high-high point level conductance probe interlocked to an audio and visual alarm located in the pump control panel. Depressing the Acknowledge/Silence push button will silence alarm. The visual alarm light will remain energized until the alarm condition has cleared. This alarm is activated when the liquid level in the sump reaches a level of 24-inches and will deactivate when the liquid level in the sump drops to a level of 23-inches.

The Autodialer installed as part of the leachate storage tank controls is also formatted to send an alarm in the event that a high liquid level alarm condition in the groundwater sump occurs. The specifics of the Autodialer are discussed in the leachate storage tank operation section.

The groundwater sump pumps are operated in the following manner;

- For panel and pump to operate, electric disconnect switch mounted behind the control panel and the circuit breaker in the leachate loadout building must be in the "On" position. Note: both disconnect switch and circuit breaker should normally be in the "On" position.
- Sump normally operates with Hand-Off-Auto Switch (H-O-A) in "Auto" position. In the "Auto" position, pump will turn on automatically when the groundwater level in the sump

reaches the "pump on" level probe, and turns off automatically when the groundwater level in the sump reaches the "pump off" level probe.

- Typically the sump would only operate with the H-O-A switch in the "Hand" position, if there were problems with the sump level probes. In this position, the pump will run continuously.
- Alarm horn can be shut off by pressing the "Alarm Silence" button. This does not eliminate the alarm condition.

### Groundwater Sump Pumping System Inspection

Inspection of the groundwater collection sumps consists of daily and monthly activities, which are described in Appendix B3c and B3e. Once a day, the flow meter in the sump will be read and the amount of groundwater generated will be recorded on the form in Appendix B3c. Each month, the high level alarm and flow meter for the sump will be checked to ensure proper functioning (form in Appendix B3e).

## **11. LEACHATE MANAGEMENT PLAN**

### **11.1 Introduction**

This section addresses the requirements of 6 NYCRR Part 360-2.9(j) and 2.17(g) regarding leachate management. The Chaffee Facility is constructed, operated, and maintained in a manner that is intended to limit the quantity of leachate generated, and to prevent the migration of leachate into surface water and groundwater. This section addresses how leachate is managed at the site to meet these goals.

#### **11.1.1 Closed Landfill Leachate Collection System**

The Closed Landfill's leachate collection system was constructed in two stages. The first included the construction of a perimeter leachate drain around the Original Fill Area with the installation of three collection tanks denoted as tanks 1, 2 and 3. The second included construction of 24 inches of compacted liner material, with an in-place hydraulic conductivity of

less than  $1.0 \times 10^{-7}$  cm/sec, to both the west and north of the Original Fill Area. The lined areas were constructed with approximately 3 percent slopes to allow leachate to drain to a system of leachate collection pipes and ultimately to collection tanks 4 and 5.

As the Closed Landfill began to reach capacity and portions were scheduled for closure, several components of the leachate collection system were replaced to allow for continued collection. These modifications allowed for the facility to better maintain and operate the collection system during closure and post closure. The work included retrofitting the existing leachate collection tanks at locations 1, 2, 3 and 4 by decommissioning the original tanks located within the landfill and replacing them with new tanks located outside of the landfill berm. The leachate collection tanks at locations 3 and 4 were replaced with one double walled, cathodically protected steel tank. Leachate collection tanks at locations 1 and 2 were each replaced with a sump and riser located within the landfill and a double walled, cathodically protected steel tank located outside of the landfill. The existing leachate collection sump at location 5 was left in its original location.

The Closed Landfill's present leachate transmission and storage system now consists of four leachate collection sumps (LCS) and two leachate storage tanks (LST). In addition, as part of the landfill gas control system there are currently three condensate knockouts, which either transmit condensate directly to a LST or collect it in a storage tank for subsequent disposal. Two of the condensate knockouts drain liquid directly into either LST 1 or LST 2. The third condensate knockout consists of a tank, which collects liquid from the gas header just prior to the gas entering the power production plant or flare, the operation and maintenance of this tank will be discussed in this section. The current layout and location of the various sumps and tanks can be seen on Figure 9.

As part of the Western Landfill Expansion project, the single tank that replaced tanks 3 and 4 was replaced with a new double wall HDPE manhole pump station (LCS 3/4 manhole), which discharges into the expansion's leachate transmission line and above ground storage tanks. LCS 5 is currently directly connected to the expansion's leachate transmission lines and above ground storage tanks. LCS 5 is scheduled to be modified prior to the construction of the Western Landfill Expansion Cell 2 baseliner. The modification will include removing the vertical riser and constructing a new side riser discharge system beneath the Cell 2 baseliner subgrade.

For the purposes of this Operation and Maintenance Plan the Closed Landfill's leachate collection, transmission, and storage facilities are designated as follows:

- Leachate System 1, consists of LCS 1 and LST 1,
- Leachate System 2, consists of LCS 2 and LST 2,
- Leachate System 3/4, consists of LCS 3/4 manhole,
- Leachate System 5, consists of LCS 5, and
- Gas Condensate Knockout Tank.

The operation and maintenance of each of these systems are discussed in Section 11.2. Operational procedures provided in this manual are for the current configuration of LCS 5, updates to the operation of LCS 5 will be required upon completing the modifications, though there are not significant operational changes required since a similar pump and panel will be installed adjacent to the proposed side riser system.

#### **11.1.2 Expansion Area Landfill Leachate Collection System**

The expansion area's leachate collection, transmission and storage systems are designed to collect and store leachate generated from the landfill in a manner that limits impacts to public health and the environment. Due to the fact that the operation of the landfill includes limiting the size of the working face, smaller amounts of precipitation are introduced into the waste mass, which limits the generation of leachate. Limiting leachate generation is also a result of applying daily, intermediate and interim cover as required by the regulations and the installation of a NYSDEC approved final cover system at closure.

Each cell of the Western and Valley Fill Landfill Expansions is constructed with a double composite liner system meeting the requirements of 6 NYCRR Part 360-2.13. The double composite liner system contains a primary leachate collection layer and secondary leachate collection layer. The primary system is constructed with a granular drainage layer, collection pipes, collection sump and sump pump to allow for removal of the leachate to the gravity transmission line and on-site storage tanks. The secondary leachate collection system is constructed with a geocomposite drainage layer, collection pipes, collection sump and sump pump to allow for removal of liquid to the gravity transmission line and on-site storage tanks. The leachate storage system consists of two above ground storage tanks located within a secondary containment tank. Leachate flow into and out of the

tanks is controlled by piping and valves located in the control vault, which is constructed within the secondary containment tank. Leachate is transferred to tanker trucks through the loadout pump located adjacent to loadout pad. The loadout pump can also be used to transfer leachate between either of the storage tanks. Trucks are loaded on the loadout pad, which is located within the enclosed loadout building. The components of the leachate collection system are shown on Figure 9 and the design of the leachate collection system is shown in the Engineering Report Appendix C (Part III of this submittal and Part IV of the February 2005 Western Landfill Expansion submittal) and on the Engineering Drawings, specifically sheets 13 through 22.

As part of the gas control system there are currently two condensate knockouts, which transmit condensate directly into the transmission system piping for disposal to the above ground leachate storage tanks.

Section 11.3 of this Operations and Maintenance Manual will discuss the Expansion Areas leachate system as follows:

- Leachate Collection,
- Leachate Transmission,
- Leachate Storage, and
- Routine Maintenance.

#### **11.1.3 Leachate Disposal**

Leachate is transported off-site by tanker trucks to a permitted wastewater treatment facility. Currently, the landfill maintains agreements with the City of Niagara Falls Wastewater Treatment Facility and the Buffalo Sewer Authority. The landfill will maintain agreements with at least two (2) treatment facilities. Copies of current Disposal Agreements are included in Appendix D.

Hauling of leachate is provided by an independent hauler, which is capable of transporting the leachate. A contract with the hauler, M & T Trucking, Inc., is maintained by the facility.



## **11.2 Closed Landfill Leachate Collection, Transmission and Storage Systems**

### **11.2.1 Leachate System 1 and 2**

As shown on Figure 9, leachate generated along the eastern half of the Closed Landfill is collected in perimeter perforated drain pipes that slope to either LCS 1 or LCS 2. These sumps were installed in the locations of the former leachate collection tanks 1 and 2, and consist of a manufactured HDPE sump with 24-inch diameter sideriser pipe daylighting along the outside of the landfill berm. Located within each of the siderisers is a sump pump equipped with level controls. Leachate is pumped from the siderisers to each of the new leachate storage tanks, denoted as either LST 1 or LST 2. These tanks are dual contained and have been equipped with a submersible pump, level controls, leak detection monitoring system and cathodic protection monitoring test station. The submersible pumps located within the tanks allow for leachate to be transferred to a tanker truck for off-site disposal. The tanker trucks are filled on concrete loadout pads, which have been constructed adjacent to the storage tanks.

In the event of a power failure, a diesel powered backup generator is located adjacent to the flare building. This generator can be manually started to operate both LCS 1 and 2 and LST 1 and 2. Instructions for operating the emergency generator can be found in Appendix G. If a power failure occurs at LCS 1 or 2 or at LST 1 or 2, an Autodialer has been installed as part of these systems to transmit a power failure message to a list of site personnel. The receipt of this message will allow site personnel to initiate a manual startup of the generator.

### **Leachate Collection Sumps No. 1 and No. 2 Operation**

Leachate is collected and pumped from LCS 1 and LCS 2 located along the toe of the east berm of the existing landfill. Each sump is equipped with an EPG WSDPT 5-2 wheeled sump drainer. The pump and associated level probes are located inside a 24 inch diameter HDPE sideslope riser pipe which is welded to the HDPE sump. Each pump's control panel is located at the corresponding leachate storage tank. This riser pipe allows the pumps and level probes to be accessed for service, if necessary. The pumps are sized to pump approximately 15 gpm at 45 feet of total head.

### Leachate Sump Pumping System Control/Operation

The leachate sump pumps are configured with four level probes (from bottom of sump up); reference probe, pump off probe, pump on probe, and sump high-level probe (see Appendix A1 and A2), which are also described below;

- Pump-Off: initiated by a low-level conductance probe interlocked to the pump starter to shut down the pump upon reaching a minimum liquid level in the sump. This is activated when the liquid level in the sump has a level of 8-inches.
- Pump-On: initiated by a high-level conductance probe located in the leachate sump and interlocked to the pump starter in the pump control panel. This is activated when the liquid level in the sump has a level of 36-inches.
- High Level Alarm Condition: Initiated by a high-high point level conductance probe interlocked to an audio and visual alarm located in the pump control panel. Depressing the Acknowledge/Silence push button will silence alarm. The visual alarm light will remain energized until the alarm condition has cleared. The alarm is activated when the liquid level in the sump has a level of 42-inches and will deactivate when the sump drops to a liquid level of 41-inches.
- Interlock feature to shut down sump pump based on high liquid level condition in the leachate storage tank (i.e., alarm signal relayed from Tank Control Panel).

As stated above, a control interlock between LST 1 and LCS 1 or LST 2 and LCS 2 have been installed to automatically shut off the sump pumps and / or will not start if a high liquid level condition exists at LST 1 and LST 2.

An Autodialer has also been installed as part of the LST 1 and LST 2 controls and has been formatted to send an alarm in the event that a high liquid level alarm condition in the sump occurs. The specifics of the Autodialer are discussed in the leachate storage tank operation section.

The leachate sump pumps are operated in the following manner;

- For panel and pump to operate, electric disconnect switch mounted behind the control panel and the circuit breaker in the flare building must be in the "On" position. Note: both disconnect switch and circuit breaker should normally be in the "On" position.
- Sump normally operates with H-O-A switch in "Auto" position. In the "Auto" position, pump will turn on automatically when the leachate level in the sump reaches the "pump on" level probe, and turns off automatically when the leachate level in the sump reaches the "pump off" level probe.
- Typically the sump would only operate with the H-O-A switch in the "Hand" position, if there were problems with the sump level probes. In this position, the pump will run continuously.
- Alarm horn can be shut off by pressing the "Alarm Silence" button. This does not eliminate the alarm condition.

#### Leachate Sump Pumping System Inspections

Inspection of the leachate collection sumps consists of both weekly and monthly activities and are described in Appendix B3d and B3e. The weekly inspection involves monitoring of the sideslope riser secondary containment inspection ports for any signs of leakage (form in Appendix B3d). Each month, the high level alarm will be checked to ensure proper functioning (form in Appendix B3e).

#### Leachate Storage Tank No. 1 and No. 2 Operation

Leachate that is collected and pumped from LCS 1 and LCS 2 will be directed to LST 1 and LST 2 respectively. Each of the leachate storage tanks were manufactured by Highland Tank and Manufacturing Company. Tank drawings and information are provided in Appendix A1 and A2. LST 1 and LST 2 are double-wall steel underground storage tanks with polyurethane coating for corrosion resistance, designated as Steel Tank Institute – P3 Tank (S.T.I. P-3). LST 1 has a 12,000-gallon capacity and LST 2 has a 25,000-gallon capacity. Both tanks have an

interstitial space with a leak detection monitoring system to allow continuous monitoring of the interstice for the life of the tanks, a rectangular piping containment sump, and a Protection Prover 2 (PP2) cathodic protection monitor test station.

Each tank is equipped with a Flygt CP 3127 HT submersible pump, which transfers the leachate from the tank to the tanker trucks located at the loadout pads. The pump control panel is located adjacent to the loadout pad to allow the tanker truck driver to turn the pump on and off as required.

### Leachate Tank System Controls

The leachate tanks are configured with five different indicators that either indicate tank or pump operational problems (see Appendix A1 and A2). The following alarms conditions are indicated at the LST 1 and LST 2 control panels;

- Tank High Level ("High Level" light on control panel), which is triggered when the tank reaches 80 percent of its volume.
- Liquid detected in the outer tank ("Leachate Detected" light on the control panel).
- Liquid accumulating in the rectangular containment chamber which could indicate a leak in one of the pipes going to the tank ("Containment Chamber Leak" light on the control panel), which is initiated when containment chamber has approximately 8-inches of liquid in it.
- Pump seal is leaking ("Seal Fail" light on the control panel).
- Pump over temperature ("Overtemp" light on the control panel).

Each of the submersible pumps is equipped with a control and status device referred to as "CAS". The "CAS" is a device that monitors the pump operating temperature for a high temperature condition (Overtemp) and monitors moisture within the pump casing to determine if the pump seal is leaking (Seal Fail). The submersible pumps will automatically shut off in the

event an over temperature condition is detected. Once the temperature has decreased, the pump can be restarted after depressing the "CAS Reset" button.

Control interlocks between LST 1 and LCS 1, and LST 2 and LCS 2, have been installed to automatically shut off (or not start) the respective sump pumps if a high level condition exists at LST 1 and LST 2.

LST 1 and LST 2 are also equipped with an Autodialer that is programmed to call the list of phone numbers in Appendix A1 and Appendix A2 in the event a problem is detected with the liquid level inside LST 1 and LST 2 or the secondary containment system for each tank.

- Autodialer Telephone Number: 496-5345.
- Alarm conditions that are transmitted via the Autodialer:
  - "Alert Condition 1" = Leachate Collection Sump High Level;
  - "Alert Condition 2" = Liquid detected in the outer tank of the double walled tank sump;
  - "Alert Condition 3" = Leachate Tank High Level;
  - "Alert Condition 4" = Liquid Detected in Rectangular Containment Chamber; and
  - Power Failure.
- If called by Autodialer, responsible individuals must acknowledge receipt of message by entering "555" on a touch tone phone.

Instructions for the operation and maintenance of the Phonetics, Inc. Model 1104 Autodialer are included in Appendix I.

#### Leachate Tank Pump Operation

Each of the leachate tanks are operated as follows during routine tanker truck filling:

- For panel and pump to operate, electric disconnect switch mounted behind the control panel and the circuit breaker in the flare building must be in the "On" position. Note: both disconnect switch and circuit breaker should normally be in the "On" position.

- Connect hose from loadout pad discharge to tank truck.
- Open tank truck valve.
- Verify that the control panel "Main Circuit Breaker" switch is in the "On" position.
- Record initial leachate level, date and time.
- Open valve at loadout pad discharge.
- Turn Pump #1 or #2 "On-Off" switch to the "On" position. Note; if leachate tank level is low, pump will not operate.
- When tank truck is full, turn Pump #1 or #2 "On-Off" switch to the "Off" position. Note: If the pump shuts off automatically due to low level in the tank, turn Pump #1/ or #2 "On-Off" switch to the "Off" position and proceed with the steps below. Failure to turn the pump "On-Off" switch to the "Off" position could result in accidental discharge of leachate since the pump would automatically turn back on when the low tank level condition was eliminated.
- Close tank truck valve.
- Drain hose back to loadout pad discharge.
- Disconnect hose from tank truck.
- Close valve at loadout pad discharge.
- Record final leachate level, after pumping.

During normal operations, the leachate storage tanks are pumped upon reaching the designated high level.

## Leachate Tank Inspections

Inspection of the leachate storage tanks consists of daily, weekly, monthly and semi-annual activities, which are listed in Appendix B3c through B3f. Daily inspection of the tanks involves checking and recording the current leachate level (form in Appendix B3c). The leachate levels are estimated by lowering a water meter into the tanks and recording the measurement from the top of the riser to the level of liquid within the tanks. This measurement can then be correlated to charts provided in Appendix A-1 and A-2 for each tank to estimate the stored gallons of leachate. The weekly inspection involves monitoring of the dual contained inlet and outlet piping for any signs of leakage, monitoring of the interstitial space sensor and checking of the cathodic protection terminals to ensure that the wiring and terminals are in good working order (form in Appendix B3d). Each month, the Autodialer, high level and containment chamber alarms will be checked to ensure proper functioning (form in Appendix B3e). The semi-annual inspection will involve testing the cathodic protection systems and monitoring the interstitial space by checking the functionality of the leak detection sensor (form in Appendix B3f). The leak detection sensor will be checked by removing it from the tank and subjecting it to water; an alarm will be produced from this action, if the sensor is in good working condition.

The cathodic protection testing instructions for LST 1 and LST 2 are as follows;

1. Inspect equipment and accessories to ensure that they are free from any damage.
2. Twenty-four hours prior to use, remove the porous plug and fill the electrode body with distilled water-until it is at least three-fourths full. Replace the porous plug and tighten securely. Note: To avoid contamination and resultant erroneous readings, always be sure to use distilled water.
3. Allow the copper sulfate solution to saturate-the porous plug overnight. The reference electrode or half-cell, as it is commonly called, is an integral part of the equipment.
4. Verify the cathodic protection on the S.T.I. P-3 tank as described below.
  - Remove the manhole cover exposing the PP2 terminal.

- To setup the meter, connect the black test wire to the port marked "COM". Connect the red test wire to the port marked "FREQ". Turn the dial of the meter clockwise to the DCV2 setting. The display screen should show a decimal point and three zeros (.000).
- Connect the positive pole (red test lead) of the meter to the PP2 test terminal. If a PP2 test terminal is not available, the inside metal surface of the steel tank can be used for terminal location by connecting a wire to a nail driven through the bottom of a wooden gauge stick and lower the stick through the tank's fill pipe.
- Connect the negative pole (the black test lead) of the meter to the copper/copper sulfate half cell (reference electrode).
- Remove the protective cap from the base of the reference electrode (copper/copper sulfate half cell) and place the porous plug in the earth around the tank. Typically, earth can be contacted through the submersible pump or fill manhole. For best results, place the half cell adjacent to the tank. Note: Readings can be taken through soil, sand or gravel. The application of water onto the earth will assist in obtaining accurate readings. The placement of the reference electrode onto concrete or asphalt may give false, inaccurate readings.
- The meter should read more negative than -850 millivolts or -0.85 volts. This voltage reading indicates the tank is properly protected. Reference the National Association of Corrosion Engineers' Recommended Practice of Corrosion Control for Underground Storage Tank Systems, RP-02-85, for additional information and cathodic protection criteria.
- This reading should be taken at time of installation and every six months thereafter for the life of the installation. The PP2 test terminal will be inspected weekly to ensure wiring and connectors are in good repair.
- If the voltage level falls below -850 millivolts or if the voltage level fluctuates significantly, this may indicate poor reference cell contact with the earth.



Repositioning the reference cell in several locations around the tank may be necessary to get a true indication of cathodic protection levels. If the level is more negative than -1.800 volts, contact the Steel Tank Institute or the local STI-P3 supplier. Typically new tanks with zinc anodes will exhibit a potential of -1.100 volts and tanks with magnesium anodes will exhibit a potential near -1.650 volts.

Refer to Sections 5 and 6 of Appendix A6, R-972-01, Recommended Practice for the Addition of Supplemental Anodes to STI-P3 UST's for more information on reference electrode maintenance and cathodic protection testing.

#### Leachate Loadout Pad Inspections

Prior to every use, the loadout pad drain will be checked to ensure that if a spill were to occur, the pipe will allow flow back to the storage tank. On an annual basis, the leachate loadout pads for LST 1 and LST 2 will be checked to ensure proper functioning (form in Appendix B3g). The concrete will be assessed for cracks and deterioration, the sump will be assessed for operational grate, cracks and deterioration and the drain pipe will be checked for any clogging.

#### Leachate System Alarm Procedures

In the event that an alarm has been activated, the facility operations manager will initiate a log stating the date, time, which alarm has been activated and the subsequent repair to deactivate the alarm (form in Appendix B3h). In the following section, each alarm that has been provided in either leachate system 1 or 2 will be listed.

1. High Level Sump Alarm (light/horn at the LCS 1 or LCS 2 control panel in conjunction with "Alert Condition 1" sent via the Autodialer).
2. Leachate Detected in the interstitial space of the double walled tank (light on control panel in conjunction with "Alert Condition 2" sent via the Autodialer).
3. High Level Tank Alarm (light on control panel in conjunction with "Alert Condition 3" sent via the Autodialer).
4. Liquid Detected in the Rectangular Containment (light on control panel in conjunction with "Alert Condition 4" sent via the Autodialer).

5. Pump seal is leaking ("Seal Fail" light on the control panel).
6. Pump over temperature ("Overtemp" light on the control panel).

The alarms that are sent via the Autodialer will phone each number programmed, and then wait for an acknowledgement. The landfill personnel that acknowledges the alarm will immediately go to the source of the alarm to begin trouble shooting the problem and determining what repairs are required.

### **11.2.2 Leachate System 3/4**

As shown on Figure 9, leachate generated along the south and western sides of the Closed Landfill is collected in perforated drain pipes, which slope to two solid drain pipes, which combine and gravity drain into LCS 3/4 manhole. The LCS 3/4 manhole consists of a dual contained HDPE manhole, which contains a submersible pump, level controls and leak monitoring system. The submersible pump allows for leachate to be discharged into a transmission line for transfer directly into the expansion's above ground leachate storage tanks.

In the event of a power outage, two switches are manually turned on in the power production plant and the remainder of the site, including all of the buildings and leachate systems will be supplied with electricity. If a power failure occurs at the tank 3 and 4 manhole, an Autodialer has been installed as part of the system to transmit a power failure message to a list of site personnel. The receipt of this message will allow site personnel to initiate the switches.

#### **Leachate Collection Sump No. 3 and No. 4 Operation**

The LCS is a dual contained HDPE manhole pump station that was installed in 2011, design drawings are included in Appendix A3. The manhole allows for approximately 500 gallons of leachate storage between the pump on and pump off levels. The manhole is equipped with an EPG WSD12-2 submersible pump and associated level probes. The pump control panel is located adjacent to the manhole with the master controls located within the leachate loadout building. Associated flow meters and valves are installed within the manhole. The manhole has a removable cover to allow for the pumps and level probes to be accessed for service, if necessary. The pump is sized to remove approximately 70 gpm at 35 feet of total head.

### Leachate Sump Pumping System Control/Operation

The leachate sump pump is configured with four level probes (from bottom of sump up); reference probe, pump off probe, pump on probe, and sump high-level probe as described below;

- Pump-Off: initiated by a low-level conductance probe interlocked to the pump starter to shut down the pump upon reaching a minimum liquid level in the sump. This is activated when the liquid level in the sump has a level of 12-inches.
- Pump-On: initiated by a high-level conductance probe located in the leachate sump and interlocked to the pump starter in the pump control panel. This is activated when the liquid level in the sump has a level of 66-inches.
- High Level Alarm Condition: Initiated by a high-high point level conductance probe interlocked to an audio and visual alarm located in the pump control panel. Depressing the Acknowledge/Silence push button will silence alarm. The visual alarm light will remain energized until the alarm condition has cleared. The alarm is activated when the liquid level in the sump has a level of 78-inches and will deactivate when the sump drops to a liquid level of 77-inches.
- Interlock feature to shut down sump pump based on high liquid level condition in the leachate storage tank (i.e., alarm signal relayed from Tank Control Panel).

As stated above, a control interlock between the above ground leachate storage tanks and the manhole sump pump has been installed to automatically shut off (or not start) the sump pump if a high liquid level condition exists at the storage tanks.

An Autodialer has also been installed as part of the leachate storage tank controls and has been formatted to send an alarm in the event that a high liquid level alarm condition in the sump occurs. The specifics of the Autodialer are discussed in the leachate storage tank operation section.

The leachate sump pump is operated in the following manner;

- For panel and pump to operate, electric disconnect switch mounted behind the control panel and the circuit breaker in the flare building must be in the "On" position. Note: both disconnect switch and circuit breaker should normally be in the "On" position.
- Sump normally operates with H-0-A switch in "Auto" position. In the "Auto" position, pump will turn on automatically when the leachate level in the sump reaches the "pump on" level probe, and turns off automatically when the leachate level in the sump reaches the "pump off" level probe.
- Typically the sump would only operate with the H-0-A switch in the "Hand" position, if there were problems with the sump level probes. In this position the pump will run continuously.
- Alarm horn can be shut off by pressing the "Alarm Silence" button. This does not eliminate the alarm condition.

#### Leachate Sump and Pumping System Inspections

Inspection of the leachate collection sump consists of daily, weekly, monthly, semi-annual and annual activities, which are listed in Appendix B3c through B3g. Once a day, the flow meter at the manhole will be read and the amount of leachate generated will be recorded on the form in Appendix B3c. The weekly inspection involves monitoring of the dual contained inlet piping from lines J and K for any signs of leakage and monitoring of the interstitial space sensor (form in Appendix B3d). Each month, the high level alarm and flow meter will be checked to ensure proper functioning (form in Appendix B3e). The semi-annual inspection will involve checking the functionality of the interstitial leak detection sensor (form in Appendix B3f). The leak detection sensor will be checked by removing it from the tank and subjecting it to water; an alarm will be produced from this action if the sensor is in good working condition. The annual inspection will involve checking the operation of the dump port valve (form in Appendix B3g).

### **11.2.3 Leachate System 5**

As shown on Figure 9, leachate generated along the north and western sides of the existing facility is collected in perforated drain pipes, which slope to LCS 5. The sump is a concrete tank located at the floor of the landfill and has been constructed with a steel riser, which extends through the waste to the top of the existing landfill. The sump is equipped with a submersible pump and level controls. The submersible pump located within the sump allows for leachate to be transferred into a transmission line leading to the expansion's above ground leachate storage tanks.

In the event of a power outage, two switches are manually turned on in the power production plant and the remainder of the site, including all of the buildings and leachate systems will be supplied with electricity. If a power failure occurs at sump 5, an Autodialer has been installed as part of the system to transmit a power failure message to a list of site personnel. The receipt of this message will allow site personnel to initiate the switches.

#### Leachate Collection Sump No. 5 Operation

Leachate Collection Sump 5 (LCS 5) is a 6,600 gallon reinforced rectangular concrete tank with approximate outside dimensions of 20 feet long by 17 feet wide by 10 feet high. The collection sump is equipped with an EPG VSDPT 17-6 vertical sump drainer. The pump and associated level probes are located inside the sump and can be removed through the steel riser pipe. The pump control panel is located adjacent to the steel riser with the master controls located within the leachate loadout building. The pump is sized to pump approximately 100 gpm at 165 feet of total head.

#### Leachate Sump Pumping System Control/Operation

The leachate sump pump is configured with five level probes (from bottom of sump up); reference probe, low level alarm probe, pump off probe, pump on probe, and sump high-level probe, which are described below;

- Low Level Alarm: initiated by a low-level conductance probe and is activated when the liquid level in the sump has a level of 8-inches and will deactivate when the liquid level in the sump reaches a level of 9 inches.
- Pump-Off: initiated by a low-level conductance probe interlocked to the pump starter to shut down the pump upon reaching a minimum liquid level in the sump. This is activated when the sump has a liquid level of 10-inches.
- Pump-On: initiated by a high-level conductance probe located in the leachate sump and interlocked to the pump starter in the pump control panel. This is activated when the liquid level in the sump has a level of 40-inches.
- High Level Alarm Condition: Initiated by a high-high point level conductance probe interlocked to an audio and visual alarm located in the pump control panel. Depressing the Acknowledge/Silence push button will silence alarm. The visual alarm light will remain energized until the alarm condition has cleared. The alarm is activated when the liquid level in the sump has a level of 53-inches and will deactivate when the sump drops to a liquid level of 52-inches.
- Interlock feature to shut down sump pump based on high liquid level condition in the leachate storage tank (i.e., alarm signal relayed from Tank Control Panel).

As stated above a control interlock between the above ground leachate storage tanks and the sump pump has been installed to automatically shut off the sump pump and / or will not start if a high liquid level condition exists at the storage tanks.

An Autodialer has also been installed as part of the leachate storage tank controls and has been formatted to send an alarm in the event that a high liquid level alarm condition in the sump occurs. The specifics of the Autodialer are discussed in the leachate storage tank operation section.

#### Leachate Sump Pump Operation

The leachate sump pump is operated in the following manner;

- For panel and pump to operate, electric disconnect switch mounted behind the control panel and the circuit breaker in the flare building must be in the "On" position. Note: both disconnect switch and circuit breaker should normally be in the "On" position.
- Sump normally operates with H-0-A switch in "Auto" position. In the "Auto" position, pump will turn on automatically when the leachate level in the sump reaches the "pump on" level probe, and turns off automatically when the leachate level in the sump reaches the "pump off" level probe.
- Typically the sump would only operate with the H-0-A switch in the "Hand" position, if there were problems with the sump level probes. In this position the pump will operate continuously.
- Alarm horn can be shut off by pressing the "Alarm Silence" button. This does not eliminate the alarm condition.

#### Leachate Sump and Pumping System Inspections

Inspection of the leachate collection sump consists of daily, weekly and monthly activities, which are listed in Appendix B3c through B3e. Once a day, the flow meter at the sump will be read and the amount of leachate generated will be recorded on the form in Appendix B3c. The weekly inspection involves monitoring of the outlet piping for any signs of leakage (form in Appendix B3d). Each month, the high level alarm and flow meter will be checked to ensure proper functioning (form in Appendix B3e).

#### **11.2.4 Gas Condensate Knockout Tank**

As shown on Figure 9, condensate generated in the gas header system can be discharged at five locations. Four of the condensate knockouts drain liquid directly into LST 1, LST 2 or the leachate transmission lines for discharge into the expansion's above ground leachate storage tank. The fifth condensate knockout consists of a tank which collects liquid from the gas header just prior to the gas entering the flare. The tank is dual contained and has been equipped with level controls and a leak detection monitoring system. Condensate drains into

the tank via a 4 inch HDPE discharge pipe from both the incoming header and the flare knockout pot.

In the event of a power outage, two switches are manually turned on in the power production plant and the remainder of the site, including all of the buildings and leachate systems will be supplied with electricity. If a power failure occurs at the condensate knockout tank, an Autodialer has been installed as part of the system to transmit a power failure message to a list of site personnel. The receipt of this message will allow site personnel to initiate the switches.

### Condensate Knockout Tank Operation

The condensate knockout tank was manufactured by Highland Tank and Manufacturing Company. The tank drawings and information are provided in Appendix A5. The tank is a double-wall S.T.I. P-3 steel underground storage tank with fiberglass reinforced polyester resin coating for corrosion resistance. The tank has a 5,000-gallon capacity. The tank has an interstitial space with a leak detection monitoring system to allow continuous monitoring of the entire interstice for the life of the tank, and sacrificial anodes have been attached on each end of the tank for corrosion protection.

The tank is equipped with a Flygt CP 3127 HT submersible pump, which transfers the condensate from the tank to tanker trucks. The pump control panel is located adjacent to the tank and loadout piping to allow the tanker truck driver to turn the pump on and off when required.

### Condensate Knockout Tank System Controls

The condensate knockout tank is configured with five different indicators that either indicate tank or pump operational problems. The following alarms are indicated at the control panel:

- Tank High Level ("High Level" light on control panel), which is initiated when the tank reaches 80 percent of its volume.
- Liquid detected in the outer tank ("Leachate Detected" light on the control panel).



- Liquid accumulating in the rectangular containment chamber which could indicate a leak in one of the pipes going to the tank ("Containment Chamber Leak" light on the control panel), which is initiated when containment chamber has approximately 8-inches of liquid in it.
- Pump seal is leaking ("Seal Fail" light on the control panel).
- Pump over temperature ("Overtemp" light on the control panel).

The submersible pump is equipped with a control and status device referred to as "CAS". The "CAS" is a device that monitors the pump operating temperature for a high temperature condition ("Overtemp" and monitors moisture within the pump casing to determine if the pump seal is leaking ("Seal Fail"). The submersible pump will automatically shut off in the event an over temperature condition is detected. Once the temperature has decreased, the pump can be restarted after depressing the "CAS Reset" button.

The condensate knockout tank system is also equipped with an Autodialer that is programmed to call a list of employee phone numbers in the event a problem is detected with the liquid level inside the storage tank, secondary containment system, or a power failure occurs. The following alarm conditions will be transmitted via the Autodialer:

- "Alert Condition 1" = Liquid Detected in the secondary containment tank of the leachate storage system;
- "Alert Condition 2" = Leachate Tank High Level;
- "Alert Condition 3" = Liquid Detected in Rectangular Containment Chamber; and
- Power Failure.

#### Condensate Knockout Tank Pump Operation

The condensate knockout tank is operated as follows during routine tanker truck filling:

- For panel and pump to operate, electric disconnect switch mounted behind the control panel and the circuit breaker in the power production plant must be in the "On" position. Note: both disconnect switch and circuit breaker should normally be in the "On" position.
- Connect hose from loadout discharge to tank truck.
- Open tank truck valve.
- Verify that the control panel "Main Circuit Breaker" switch is in the "On" position.
- Record initial leachate level, date and time.
- Open valve at loadout discharge.
- Turn Pump "On-Off" switch to the "On" position. Note: if tank level is low, pump will not operate.
- When tank truck is full, turn Pump "On-Off" switch to the "Off" position. Note: If the pump shuts off automatically due to low level in the tank, turn Pump "On-Off" switch to the "Off" position and proceed with the steps below. Failure to turn the pump "On-Off" switch to the "Off" position could result in accidental discharge of condensate since the pump would automatically turn back on when the low tank level condition was eliminated.
- Close tank truck valve.
- Drain hose back to loadout discharge.
- Disconnect hose from tank truck.
- Close valve at loadout discharge.
- Record final tank level, after pumping.

During normal operations, the condensate knockout tank is pumped upon reaching the designated high level.

### Condensate Knockout Tank Inspections

Inspection of the condensate knockout tank consists of daily, weekly, monthly and semi-annual activities, which are listed in Appendix B3c through B3f. Daily inspection of the tank involves checking and recording the current liquid level (form in Appendix B3c). The liquid level is estimated by lowering a water meter into the tank and recording the measurement from the top of the riser to the level of liquid within the tank. This measurement can then be correlated to charts provided in Appendix A5 to estimate the stored gallons of condensate. The weekly inspection involves monitoring of the dual contained inlet and outlet piping for any signs of leakage, monitoring of the interstitial space sensor and checking of the cathodic protection terminals to ensure that the wiring and terminals are in good working order (form in Appendix B3d). Each month, the Autodialer, high level and containment chamber alarms will be checked to ensure proper functioning (form in Appendix B3e). The semi-annual inspection will involve testing the cathodic protection systems and monitoring the interstitial space by checking the functionality of the leak detection sensor (form in Appendix B3f). The leak detection sensor will be checked by removing it from the tank and subjecting it to water; an alarm will be produced from this action if the sensor is in good working condition.

The cathodic protection testing instructions for the tank are as follows;

1. Inspect equipment and accessories to ensure that they are free from any damage.
2. Twenty-four hours prior to use, remove the porous plug and fill the electrode body with distilled water-until it is at least three-fourths full. Replace the porous plug and tighten securely. Note: To avoid contamination and resultant erroneous readings, always be sure to use distilled water.
3. Allow the copper sulfate solution to saturate-the porous plug overnight. The reference electrode or half-cell, as it is commonly called, is an integral part of the equipment.
4. Verify the cathodic protection on the S.T.I. P-3 tank as described below.

- Remove the manhole cover exposing the PP2 terminal.
- To setup the meter, connect the black test wire to the port marked "COM". Connect the red test wire to the port marked "FREQ". Turn the dial of the meter clockwise to the DCV2 setting. The display screen should show a decimal point and three zeros (.000).
- Connect the positive pole (red test lead) of the meter to the PP2 test terminal. If a PP2 test terminal is not available, the inside metal surface of the steel tank can be used for terminal location by connecting a wire to a nail driven through the bottom of a wooden gauge stick and lower the stick through the tank's fill pipe.
- Connect the negative pole (the black test lead) of the meter to the copper/copper sulfate half cell (reference electrode).
- Remove the protective cap from the base of the reference electrode (copper/copper sulfate half cell) and place the porous plug in the earth around the tank. Typically, earth can be contacted through the submersible pump or fill manhole. For best results, place the half cell adjacent to the tank. Note: Readings can be taken through soil, sand or gravel. The application of water onto the earth will assist in obtaining accurate readings. The placement of the reference electrode onto concrete or asphalt may give false, inaccurate readings.
- The meter should read more negative than -850 millivolts or -0.85 volts. This voltage reading indicates the tank is properly protected. Reference the National Association of Corrosion Engineers' Recommended Practice of Corrosion Control for Underground Storage Tank Systems, RP-02-85, for additional information and cathodic protection criteria.
- This reading should be taken at time of installation and every six months thereafter for the life of the installation. The PP2 test terminal will be inspected weekly to ensure wiring and connectors are in good repair.

- If the voltage level falls below -850 millivolts or if the voltage level fluctuates significantly, this may indicate poor reference cell contact with the earth. Repositioning the reference cell in several locations around the tank may be necessary to get a true indication of cathodic protection levels. If the level is more negative than -1.800 volts, contact the Steel Tank Institute or the local STI-P3 supplier. Typically new tanks with zinc anodes will exhibit a potential of -1.100 volts and tanks with magnesium anodes will exhibit a potential near -1.650 volts.

Refer to Sections 5 and 6 of Appendix A6, R-972-01, Recommended Practice for the Addition of Supplemental Anodes to STI-P3 UST's for more information on reference electrode maintenance and cathodic protection testing.

#### Condensate System Alarm Procedures

In the event that an alarm has been activated, the facility Operations Manager will initiate a log stating the date, time, which alarm has been activated and the subsequent repair to deactivate the alarm (form in Appendix B3h). In the following section, each alarm that has been provided in the system will be listed.

1. Leachate Detected in the interstitial space of the double walled tank (light on control panel in conjunction with "Alert Condition 1" sent via the Autodialer).
2. High Level Tank Alarm (light on control panel in conjunction with "Alert Condition 2" sent via the Autodialer).
3. Liquid Detected in the Rectangular Containment (light on control panel in conjunction with "Alert Condition 3" sent via the Autodialer).
4. Pump seal is leaking ("Seal Fail" light on the control panel).
5. Pump over temperature ("Overtemp" light on the control panel).

The alarms that are sent via the Autodialer will phone each number and then wait for an acknowledgement. The landfill personnel that acknowledges the alarm will immediately go to the source of the alarm to begin trouble shooting the problem and determining what repairs are required.

### **11.2.5 Routine Maintenance**

A schedule for the routine semi-annual flushing and inspection of the leachate collection and removal system has been established to maintain the operational efficiency of the system. Portions of the older leachate collection system at the Closed Landfill do not have a means of access and are not maintained in accordance with this program. The leachate collection and transfer pipes that can be accessed are cleaned a minimum of twice annually. The cleaning will consist of inserting a power washer hose into the pipe with sufficient pressure and volume to remove accumulated sediment and biological growth. Written documentation of the cleaning shall be submitted to the NYSDEC RSME within 30 days of completion of the cleaning. The on-site monitor must be given a minimum of five days notice prior to the cleaning.

Routine video inspection will not be required by the NYSDEC, however in the event that a video inspection is deemed necessary, the accessible portions of all the leachate collection and transfer lines will be videoed as requested by the NYSDEC. The requested video inspections shall be recorded and maintained on file at the landfill. A written summary of the inspection shall be submitted to the NYSDEC RSME within 30 days following completion of the video inspection. The on-site monitor must be given a minimum of five days notice prior to performing the video inspection.

Annually, the existing leachate storage tanks, sumps and condensate knockout tank will be emptied for cleaning and maintenance. Notification is to be provided to the NYSDEC on-site monitor a minimum of five days before the planned cleaning activities. The cleaning will consist of inserting a power washer hose (utilized for cleaning leachate lines) down the riser and into the leachate tanks or sump. The washer head (when in operation) will be manually moved around in the risers to agitate sediment buildup on the bottom of the tanks or sumps. This operation will be performed for approximately fifteen (15) minutes. Following agitation, the liquid and solids will be pumped or vacuumed into leachate transfer vehicles for transport to a permitted treatment plant. This cycle of washing and vacuuming will continue until all of the sediments have been removed. Written documentation of the tank cleanings shall be submitted to the NYSDEC RSME within 30 days of the completion of the cleanings.

Additionally, the leachate loadout pads will be maintained on an annual basis by performing the following. The pad and sumps will be pressure washed and vacuumed, the drain pipes will also be pressure washed to ensure no blockages and the concrete portions of the pad and sump will be sealed to prevent corrosion of the concrete surfaces.

Included in Appendix B3i are typical routine maintenance forms for pipe cleaning and videoing, tank and sump cleaning and loadout pad cleaning.

### **11.3 Expansion Areas - Leachate Collection, Transmission and Storage System**

#### **11.3.1 Leachate Collection System**

The Western and Valley Fill Landfill Expansion areas include separate leachate collection system as shown on Figure 9. As discussed previously, a primary leachate collection system and secondary leachate collection system will be constructed within each cell. Each of these systems will allow liquid to flow by gravity to a sump in the landfill, and then be pumped out of the landfill and into the transmission and storage systems.

Each primary leachate collection pumps consists of an EPG wheeled sump drainer, model WSD12-2 installed in an 18-inch HDPE sideslope riser. Associated flow meters and valves are also installed within each of the sideslope risers. The riser pipe allows for the pumps to be removed for repair and replacement, if necessary. The primary pumps are sized to remove 65 gpm at 36 feet of total head.

Each secondary leachate collection pump consist of an EPG wheeled sump drainer, model WSD2-2 installed in a 12-inch HDPE sideslope riser. Associated flow meters and valves are also installed within each of the sideslope risers. The riser pipe allows for the pumps to be removed for repair and replacement, if necessary. The secondary pumps are sized to remove 12 gpm at 26 feet of total head.

### Leachate Sump Pumping System Control/Operation

Both the primary and secondary leachate collection pumps are configured with four level probes (from bottom of sump up); reference probe, pump off probe, pump on probe, and sump high level probe, which are described below;

- Pump-Off: initiated by a low-level conductance probe interlocked to the pump starter to shut down the pump upon reaching a minimum liquid level in the sump. This is activated when either of the sumps has a liquid level of 12-inches.
- Pump-On: initiated by a high-level conductance probe located in the leachate sump and interlocked to the pump starter in the pump control panel. This is activated when the primary sump has a liquid level of 24-inches and the secondary sump has a liquid level of 18-inches.
- High Level Alarm Condition: Initiated by a high-high point level conductance probe interlocked to an audio and visual alarm located in the pump control panel. Depressing the Acknowledge/Silence push button will silence alarm. The visual alarm light will remain energized until the alarm condition has cleared. This alarm is activated when either of the liquid levels in the sumps reaches a level of 30-inches and will deactivate when the liquid level in the sump drops to a level of 29-inches. The exception is that the overliner secondary pumps will be activated when the liquid level is 24-inches and will deactivate when the liquid level in the sump drops to a level of 23-inches.
- Interlock feature to shut down sump pump based on high liquid level condition in the leachate storage tank (i.e., alarm signal relayed from Tank Control Panel).

As stated above, a control interlock between the above ground leachate storage tanks and all of the primary and secondary leachate sump pumps will be installed to automatically shut off the sump pumps and / or will not start if a high liquid level condition exists at storage tanks.

An Autodialer installed as part of the storage tank controls is formatted to send an alarm in the event that a high liquid level alarm condition in the sump occurs. The specifics of the Autodialer are discussed in the leachate storage tank operation section.



The leachate sump pumps are operated in the following manner:

- For panel and pump to operate, electric disconnect switch mounted behind the control panel and the circuit breaker in the leachate loadout building must be in the "On" position. Note: both disconnect switch and circuit breaker should normally be in the "On" position.
- Sump normally operates with H-0-A switch in "Auto" position. In the "Auto" position, pump will turn on automatically when the leachate level in the sump reaches the "pump on" level probe, and turns off automatically when the leachate level in the sump reaches the "pump off" level probe.
- Typically the sump would only operate with the H-0-A switch in the "Hand" position, if there were problems with the sump level probes. In this position the pump will operate continuously.
- Alarm horn can be shut off by pressing the "Alarm Silence" button. This does not eliminate the alarm condition.

#### Leachate Sump Pumping System Inspection

Inspection of the leachate collection sumps consists of daily and monthly activities and are listed in Appendix B3c and B3e. Once a day, the flow meters for each of the primary and secondary sumps will be read and the amount of leachate generated by each system will be recorded on the form in Appendix B3c. Each month, the high level alarm and flow meters for every sump will be checked to ensure proper functioning (form in Appendix B3e).

### **11.3.2 Leachate Transmission System**

The leachate transmission system is constructed as a dual contained HDPE pipe system, which flows by gravity to the control vault located adjacent to the above ground leachate storage tanks and as shown on Engineering Drawing 13 and Figure 9 of this manual. From the control vault, the leachate can be directed to either of the storage tanks or directly to the loadout pad. The

operation of the control vault and transmission system is discussed below. At several locations along the transmission line, both cleanouts and secondary containment monitoring points are installed to allow for routine inspection and maintenance.

#### Leachate Transmission System Control/Operation

Control of the leachate transmission system is provided at either the sump pumps or control vault. In the event that the transmission system needs to be repaired or maintained, the following procedure will be followed;

- Each sump pump will be manually turned off;
- The valve in the control vault will be closed to isolate the transmission piping;
- Leachate remaining in the system will be pumped out at an elevation above the highest liquid level in the pipe; and
- The required maintenance (i.e., pipe cleaning) or repair will be completed.

In the event that the leachate transmission pipe needs to be replaced and will remain out of service for more than 24-hours or cause leachate on the primary liner to exceed the 1-foot of head, a temporary leachate transmission system will be installed.

#### Leachate Transmission System Inspection

Inspection of the leachate transmission system consists of weekly activities that are listed in Appendix B3d. The weekly inspection involves monitoring of the secondary containment ports for any signs of leakage (form in Appendix B3d).

### **11.3.3 Leachate Storage Tank System**

The above ground leachate storage tanks are two approximately 56-foot diameter by 23-feet high (405,366 gallons each) glass lined steel tanks located within a 154-foot diameter by 7-foot

high (975,410 gallons) glass lined steel tank. The outer tank system provides the required secondary containment for both primary tanks in the event a failure occurs.

As stated above, the transmission lines are routed through a control vault located within the secondary containment tank, this vault contains all of the valves required to control leachate flow into or out of the tanks.

As discussed in Section 6.0, landfill cells will be opened in 3.5-acre areas. The leachate levels in the proposed above ground storage tanks will be maintained at approximately 20 percent of the total volume to contain the 25-year, 24-hour storm during the opening of each 3.5-acre area. When the tank volume reaches 20 percent of the total volume, additional tank trucks will be used until the tank volume returns to 20 percent. During normal operation, where all operating cells are sufficiently covered with waste, additional tank trucks will be used when either of the tanks exceed their designated high level. The additional trucks will be used until the volume can be consistently maintained below the tanks high level.

The secondary containment tank is constructed with a sloped concrete floor to allow for liquid to flow to the center of the tank, where a sump is located. During normal operations, any collected stormwater will be discharged into the perimeter swale around the tank via a 2 inch portable construction pump located on the roof of the control vault. The stormwater will be removed daily and after all rain events (see form in Appendix B3k). As noted on the form, a visual confirmation of the water indicating that it is not contaminated with leachate must be made each time prior to discharging the stormwater. In the case of a small spill or over flow that occurs within the secondary tank, the liquid will be pumped directly into tank trucks or back into the leachate tanks. If either of the primary tanks begins to have severe leakage or a failure occurs, the leachate will be stored in the secondary containment system for subsequent removal. After removing any quantity of leachate from within the secondary containment tank, the entire floor and sump shall be washed and rinsed prior to collecting and discharging subsequent stormwater.

### Leachate Tank System Controls

The leachate tanks are configured with five different indicators that either indicate tank or pump operational problems. The following alarms are indicated at the tank and pump control panels located within the leachate loadout building;

- Tank High Level ("High Level" light on control panel), which is initiated when either of the tanks reaches 75 percent of its volume.
- Liquid detected in the secondary containment tank ("Leachate Detected" light on the control panel), which is initiated when the secondary containment tanks has over 12-inches of liquid in it.
- Liquid accumulating in control vault, which could indicate a leak in one of the pipes going to the tank ("Control Vault Leak" light on the control panel). This is initiated when the sump in the control vault has approximately 18-inches of liquid in it.
- Pump seal is leaking ("Seal Fail" light on the control panel).
- Pump over temperature ("Overtemp" light on the control panel).

The transfer pump will be equipped with a control and status device referred to as "CAS". The "CAS" is a device that monitors the pump operating temperature for a high temperature condition ("Overtemp") and monitors moisture within the pump casing to determine if the pump seal is leaking ("Seal Fail"). The transfer pumps will automatically shut off in the event an over temperature condition is detected. Once the temperature has decreased, the pump can be restarted after depressing the "CAS Reset" button.

As stated above, a control interlock between the primary storage tanks and all of the primary and secondary leachate sumps will be installed to automatically shut off (or not start) the sump pumps if a high level condition exists at storage tanks.

The storage tank system is also equipped with an Autodialer that is programmed to call a list of employee phone numbers in the event a problem is detected with the liquid level inside the storage tanks, secondary containment system, control vault sump, or any of the primary and secondary leachate collection sumps. The following alarm conditions will be transmitted via the Autodialer.

- "Alert Condition 1" = Leachate Collection Sump High Level, Autodialer will transmit which cell and whether it is the primary or secondary system.
- "Alert Condition 2" = Liquid Detected in the secondary containment tank of the leachate storage system
- "Alert Condition 3" = Leachate Tank High Level
- "Alert Condition 4" = Liquid Detected in Control Vault Sump
- Power Failure

#### Leachate Tank Pump Operation

The leachate transfer pumps and panel are located within the loadout building directly adjacent to the loadout pad. The pumps are self-priming centrifugal pumps with 6-inch discharges, each capable of transferring liquid at a 500 gallon per minute rate. The pumps can be used to transfer leachate directly into tank trucks or transfer leachate between the two leachate storage tanks.

The leachate tanks are operated as follows during routine tanker truck filling:

- For panel and pump to operate, electric disconnect switch mounted behind the control panel and the circuit breaker in the leachate loadout building must be in the "On" position. Note: both disconnect switch and circuit breaker should normally be in the "On" position.
- Pull tanker truck up to the loadout arm.
- Open tank truck inlet.
- Verify that the control panel "Main Circuit Breaker" switch is in the "On" position.

- Be sure that the inlet and outlet valves for the transfer pump are in the open position.
- Ensure that the tank valves are open or in the correct position to enable the required pumping.
- Record initial leachate level, date and time.
- Turn Transfer Pump "On-Off" switch to the "On" position.
- When tank truck is full, turn Transfer Pump "On-Off" switch to the "Off" position. Note: If the pump shuts off automatically due to low level in the tank, turn Transfer Pump "On-Off" switch to the "Off" position and proceed with the steps below. Failure to turn the pump "On-Off" switch to the "Off" position could result in accidental discharge of leachate since the pump would automatically turn back on when the low tank level condition was eliminated.
- Allow loadout arm to drain.
- Close tank truck inlet.
- Record final leachate level after pumping.

#### Leachate Tank Inspections

Inspection of the leachate storage tanks consists of daily, weekly, monthly and annual activities, which are listed in Appendix B3c through B3e and B3g. Daily inspection of the tanks involves checking and recording the current leachate level (form in Appendix B3c) and removing stormwater from within the secondary containment tank (form in Appendix B3k). The leachate level within each of the tanks will be based upon a digital readout. The weekly inspection involves monitoring of the dual contained inlet and outlet piping in the control vault for any signs of leakage, monitoring of each of the primary tanks for any signs of leakage and verifying the digital tank level with an actual tank measurement (form in Appendix B3d). Each month, the Autodialer, high level and control vault alarms will be checked to ensure proper functioning

(form in Appendix B3e). On an annual basis, each of the valves and pipes located within the control vault will be inspected and all of the sensors and alarms will be checked. The control vault concrete will be assessed for cracks and deterioration, the sump will be assessed for cracks and deterioration (form in Appendix B3g).

#### Leachate Loadout Pad Inspection

The loadout pad has been designed to contain an entire tanker truck spill. On an annual basis, the leachate loadout pad will be checked to ensure that the concrete does not have excessive cracks or deterioration (form in Appendix B3g).

#### Secondary Tank Floor Inspection

On an annual basis, the secondary containment tank floor will be checked to ensure proper functioning. The concrete will be assessed for cracks and deterioration, and the sump will be checked for operational grate, cracks and deterioration (form in Appendix B3g).

#### Leachate Tank System Alarm Procedures

In the event that an alarm has been activated, the facility Operations Manager will initiate a log stating the date, time, which alarm has been activated and the subsequent repair to deactivate the alarm (form in Appendix B3h). In the following section, each alarm that has been provided in any portion of the leachate system will be listed.

1. High Level Sump Alarm (light/horn at any of the primary or secondary sump pump control panels in conjunction with "Alert Condition 1" sent via the Autodialer, which will transmit which cell and whether it is the primary, secondary or groundwater system).
2. Liquid Detected in the Secondary Containment Tank (light on control panel in conjunction with "Alert Condition 2" sent via the Autodialer).
3. High Level Tank Alarm (light on control panel in conjunction with "Alert Condition 3" sent via the Autodialer).
4. Liquid Detected in the Control Vault Sump (light on control panel in conjunction with "Alert Condition 4" sent via the Autodialer).

The alarms that are sent via the Autodialer will phone each number programmed, and then wait for an acknowledgement. The landfill personnel that acknowledges the alarm will immediately go to the source of the alarm to begin trouble shooting the problem and determining what repairs are required.

#### **11.3.4 Routine Maintenance**

A schedule for the routine semi-annual flushing and inspection of the leachate collection and removal system will be established to maintain the operational efficiency of the system. The leachate collection and transfer pipes will be cleaned a minimum of twice annually. The cleaning will consist of inserting a power washer hose into the pipe with sufficient pressure and volume to remove accumulated sediment and biological growth. Written documentation of the cleaning shall be submitted to the NYSDEC RSME within 30 days of completion of the cleaning. The on-site monitor must be given a minimum of five days notice prior to the cleaning.

In addition to the cleaning, routine video inspections of all the leachate collection and transfer lines is required by the NYSDEC, to be performed on a bi-annual basis. The video inspections shall be recorded and maintained on file at the landfill. A written summary of the inspection shall be submitted to the NYSDEC RSME within 30 days following completion of the video inspection. The on-site monitor must be given a minimum of five days notice prior to performing the video inspection.

Annually, the primary leachate collection sumps and leachate storage tanks will be emptied for cleaning and maintenance. Notification is to be provided to the NYSDEC on-site monitor a minimum of five days before the planned cleaning activities. The cleaning will consist of power washing the interior of both primary tanks and removing any solids that have collected at the bottoms of the tanks. Following washing, the liquid and solids will be pumped or vacuumed into leachate transfer vehicles for transport to a permitted treatment plant. This cycle of washing and vacuuming will continue until all of the sediments have been removed. Written documentation of the tank cleanings shall be submitted to the NYSDEC RSME within 30 days of the completion of the cleanings.

Additionally, the leachate loadout pad and sump, secondary containment floor and sump and control vault interior and sump will be maintained on an annual basis by performing the



following tasks. The loadout pad, secondary containment floor, control vault and their respective sumps will be pressure washed and vacuumed, the concrete portions of each will be sealed to minimize deterioration of the concrete surfaces.

Included in Appendix B3j are typical routine maintenance forms for pipe cleaning and videoing, tank and sump cleaning and loadout pad cleaning.

## **12. GAS MONITORING PROGRAM**

### Landfill Gas Control

Landfill gas is extracted from both the Closed Landfill and expansion landfill areas by using a combination of vertical and horizontal collection systems. Additional vertical and horizontal collection systems will be added to the expansion areas as waste placement continues until the final cover is installed. The landfill gas is used to operate the power production plant and can also be burned in the enclosed flare unit when the power plant is down or when excess gas is being produced. The control of landfill gas is addressed in both the solid waste regulations, 6 NYCRR Part 360, as well as the federal air regulations, 40 CFR Part 60, Subpart WWW, and 40 CFR Part 63, Subpart AAAA. The Part 360 solid waste regulations control the migration of landfill gas off-site through subsoils. The federal regulations regulate the landfill emissions from the surface of the landfill as part of the New Source Performance Standards for Municipal Solid Waste (MSW) landfills.

The Part 360 regulations establish a limit for landfill concentrations not to exceed the lower explosive limit at the property boundary. The methane concentrations at the property boundary are measured through a series of landfill gas probes. The gas probes are similar to the groundwater monitoring well except the gas probe is typically installed across the seasonal low water table. The gas probes are monitored on a quarterly basis.

The 40 CFR Part 60, Subpart WWW NSPS requirements are addressed in the Gas Collection and Control System (GCCS) Plan (EarthTech, November, 2004).

Pursuant to 40 CFR Part 63, Subpart AAAA, MACT standards, WMNY has developed a Startup, Shutdown and Malfunction (SSM) Plan for the Chaffee Landfill (EMCON, January,

2004) that describes in detail the procedures for operating and maintaining the landfill gas collection and control system and the continuous monitoring system (CMS) during periods of SSM.

Methane is highly explosive. In an effort to ensure that landfill gas will not create a hazard to health, safety or property, the Chaffee Facility developed a gas monitoring program.

In accordance with 6 NYCRR Part 360-2.17(f), a monitoring program has been developed to monitor methane and other explosive gases generated by the facility. The concentration of these gases must not exceed;

1. Twenty-five percent of the lower explosive limit for gases in structures on or off-site, excluding gas control or recovery system components; and
2. The lower explosive limit for the gases at or beyond the property boundary.

A combustible gas meter is utilized on-site for the detection of landfill gases in the permanent gas probes at the landfill boundaries and all permanent onsite structures. The meter currently used is a GEM 2000 Combustible Gas Meter. The detection range of the meter is 0-100 percent LEL and is calibrated on a schedule recommended by the manufacturer. An instruction manual for the operation and maintenance of the GEM 2000 is included in Appendix H.

The gas probes are discussed (i.e. location and construction) in the EMP (Part VI of this submittal). Gas monitoring takes place quarterly at the landfill. More frequent monitoring may be required by the NYSDEC if landfill gas migration is detected.

If gas is detected above the levels stipulated above, the Chaffee Facility will immediately notify the NYSDEC and within seven (7) days of detection, will provide a description of the steps to be taken to protect human health. Within forty-five (45) days of detection, the Chaffee Facility will submit a plan to implement a remediation plan for the gas releases and schedule for the implementation of this plan within 60 days beyond the date of detection.

Copies of the gas monitoring forms can be found in Appendix B3b.

### Landfill Surface Scans

The surface of the landfill is required to be monitored for methane concentrations along the entire perimeter of the collection area, after installation of the collection system. The surface scans are to be performed in accordance with the GCCS Plan.

## **13. ODOR ABATEMENT/MANAGEMENT PROGRAM**

### Odor Control

The majority of the waste accepted for disposal at the Chaffee Facility is mixed MSW. Mixed MSW has an organic waste component that has the potential of being odorous as the organic component begins to decompose (rot). Loads of MSW that have set in a transfer trailer over the weekend tend to be more odorous than loads that are less than a day old. The Chaffee Facility does occasionally accept stabilized wastewater treatment plant (WWTP) sludge. However, even with stabilization in accordance with the Criteria for Sludge Stabilization for Disposal in New York State, established September 24, 2003 by the NYSDEC (see Section 8.2) the WWTP sludge might have some odor.

The Chaffee Facility has developed a standard operating policy concerning wastes that have not been previously accepted for management at the landfill that might be odorous. Under the standard operating procedure, potentially odorous waste will be taken as a "test load" where a full or partial load of the waste will be brought to the Chaffee Facility for management. The waste is examined during the "test load" period to determine what, if any, special procedures will be needed to manage the waste so as to minimize any impacts due to odors. After the "test run" a determination is made as to whether or not the waste is acceptable for management at the facility.

Any potential odorous waste that is accepted for management at the Chaffee Facility falls under the "3 strike" policy. The "3 strike" policy requires that the generator of the waste be notified whenever a waste stream emanates odors strong enough to potentially result in an odor complaint, even after all odor controls have been implemented. Acceptance of the waste stream at the landfill is terminated after the third notification. Odors generated by waste material will be controlled by the application of 6 inches of daily cover or alternate material.

The Chaffee Facility currently has a number of procedures that are implemented on a daily basis to control odors leaving the facility. The odor control program components consist of activities, which are performed as standard operating procedures, and others, which are implemented on an as needed basis. A summary of the program follows:

- The landfill areas are equipped with vertical and horizontal gas extraction systems, which operate continually during disposal operations to minimize fugitive landfill gas and odor emissions.
- Additional landfill expansion areas will be constructed with vertical and horizontal gas extraction systems.
- Waste is covered daily with synthetic materials, soil, or other approved alternate daily cover materials.
- Additional soil cover is placed over waste, if odors are not suppressed with the use of typical daily cover techniques.
- Waste materials, such as sludge, which have the potential for being particularly odorous are not accepted past 2:30 p.m. in order to avoid these materials being too close to the surface at the end of the operating day.

The landfill will apply odor control media to waste materials as needed. The odor control media, such as EcoCare Odor Control Solutions or equivalent, will be applied in accordance with the manufacturer's recommendations for odor control. At least one drum of this material will be available at the Chaffee Facility. A copy of the odor control media product data sheet is on file with the Operations Manager.

Following application, traffic will be minimized over the area of application to limit disruption and the subsequent potential release of odors. If necessary, additional odor control media will be applied to areas that have been disturbed by construction activities.

## Report/Complaint Management

An odor complaint program has been established for the Chaffee Facility and includes the following components:

- a. The Chaffee Facility will maintain a 24-hour per day local telephone number for the receipt of landfill odor complaints from residents of the Town of Sardinia. The telephone number has been activated and is (716) 496-5000 x 271.
- b. The Chaffee Facility will notify community and government centers of the availability of the telephone number.
- c. The Chaffee Facility will log all incoming telephone calls and record the identity of the caller, including name, address and phone number and the following information if it is available from the caller; the location, nature and duration of the odor. The Chaffee Facility will record the date and time of the complaint and the meteorological conditions (including, but not limited to, wind direction and temperature).
- d. Upon receipt of the complaint, the Chaffee Facility will investigate the complaint in order to determine the source of the odor. This investigation will be performed within 24 hours of the start of the following operating day from the incoming complaint call. In making the assessment, the Chaffee Facility will consider the nature of the waste being disposed of at the landfill; landfill gas and leachate collection and transfer activities; the daily, intermediate and final cover material being used, and any other activities which may be contributing to potential off-site landfill odors.
- e. If the Chaffee Facility determines the source of the odor, it will take corrective action to mitigate the odor problem. Mitigation may include decreasing the size of the working face of the landfill; increasing the use of flares and landfill gas treatment facilities; modification of leachate collection activities; evaluation and modification, if necessary, of daily and intermediate cover materials; restriction or elimination of waste streams or operational changes associated therewith and

other measures which the Chaffee Facility determines will reduce off-site impacts.

- f. The NYSDEC may require the Chaffee Facility modify, upgrade or expand gas collection capabilities within the landfill if off-site landfill gas odors are determined to be an off-site nuisance by the NYSDEC.
- g. The Chaffee Facility will provide a report to the NYSDEC of the complaints/reports received, information recorded from the complaint/report and the action taken or proposed. These reports will be submitted as part of the quarterly report submitted to the NYSDEC. The results of odor investigations will also be forwarded to the complainant.

#### **14. WINTER AND INCLEMENT WEATHER OPERATION**

Various inclement weather conditions may affect the operation of the landfill. Some of these possible weather conditions and associated measures that can be taken are described below.

##### **14.1 Freezing Conditions**

The landfill has not experienced any problems in obtaining soil cover material due to freezing conditions. Working a wide area and staying ahead of the frost has enabled Equipment Operators to obtain soil cover material year round. Soil cover material for winter months is usually stockpiled. As a precautionary measure, stockpiling of soil cover is accomplished before the onset of the winter months. When ADC is used, soil cover material requirements are greatly reduced.

If icy or freezing conditions create potentially dangerous operating conditions, the Operations Manager will determine if it is necessary to either temporarily stop operations, or modify operations.

## **14.2 Snowfall**

If snowfall occurs overnight, an Equipment Operator is assigned to arrive at the site early and is responsible for snow removal. Snow removal activities will start immediately upon arrival. The available on-site equipment is adequate to remove accumulated snow from access roads and operational areas.

In the event of extremely heavy snow, the Operations Manager will decide if it is necessary to modify or temporarily suspend operations until snow removal on access roads and the disposal areas permit continued operation.

It may be determined that it is necessary to make the following modifications to operations; limiting the size of the working face; moving the working face to a protected area; cessation of non-essential earthwork, etc. If snowfall should become more severe, it may be determined that operations should be temporarily suspended. It is expected that if a snowstorm occurred that was severe enough to suspend operations at the landfill, solid waste collection activities throughout the area would also be temporarily ceased until an improvement in the weather conditions enabled reinstatement of services.

Following cessation of the storm, landfill equipment would be utilized to remove accumulated snow from access roads and operational areas, and snow banks would be arranged in a manner to promote adequate drainage when melting occurs.

## **14.3 Heavy Rains**

Control of surface water drainage by drainage swales, diversion swales, downchutes and sediment ponds, along with the use of gravel for operational haul roads, provides continued access to the site during these weather conditions.

In the case of heavy rains, the Operations Manager may determine that it is necessary to either modify operations or temporarily suspend operations until improved weather conditions allow re-establishment of operations. In the event of heavy rain, modifications to operating procedures may include; minimizing the size of the work face, modification of truck access to the working face, and cessation of non-essential earthwork.

During a heavy rainfall event, landfill personnel will regularly check culverts, and sedimentation basins for debris, which may be blocking water flow. Following a 1/2 inch rainfall event as recorded by the on-site gauge, the Operations Manager will inspect the drainage structures, daily, intermediate, interim and final cover areas for erosion. If problems are detected with any of these, a prompt repair will be made to mitigate future problems.

#### **14.4 Electrical Storms**

If necessary, landfilling activities will be suspended for the duration of the storm for the safety of field personnel. Refuge should be taken in any landfill building, or in rubber-tired vehicles.

#### **14.5 Windy Conditions**

Litter will be contained as close to the working area as possible. Portable fencing is currently used to control papers at the working area and is located downwind. Woven or chain-linked wire and netting are all appropriate for this purpose. Fencing is placed strategically downwind and is moved as necessary. In addition, steps will be taken to clear fences of litter before they become inundated, thus increasing their effectiveness.

Restriction of the active working area to as small an area as possible will assist in the control of litter. Small amounts of cover material can be spread on the solid waste during the on-going operation when wind presents a problem.

Picking up of windblown paper and litter from trees, fences, fields, etc. is a routine part of site operations. Additional personnel are called in to manually pick up blowing litter as needed.

The Operations Manager will suspend operations when windblown litter is leaving landfill property, or when winds exceed sixty (60) miles per hour.



## **15. CONVENIENCE STATION OPERATION**

Presently the landfill provides disposal services for MSW, trash, and recyclables to the Town of Sardinia residents on the last Saturday of each month. Additionally, individuals may dispose of MSW, trash, and recyclables for a fee, during regular business hours, Monday through Friday, at the convenience station located just north of the scale house. At no time are small or private vehicles allowed on the permitted landfill.

The on-site convenience station/drop off area utilized by customers shall be maintained in a clean and litter free condition. As full containers are removed, all spilled debris shall be cleaned up. The area shall be cleaned up at the end of each day. Recycled materials, including appliances, shall be removed periodically. No excessive accumulation will be permitted.

The Scale Operator is responsible for identifying any unacceptable waste attempted to be brought into the convenience station.

## **16. ROLL-OFF STORAGE AREA**

The roll-off storage area is located north of the scale house and is indicated on Figure 2. The area consists of a compacted gravel area approximately 60,000 square feet in size. This area allows WMNY haulers to deposit their containers at the landfill before, after and during operational hours, so that the Operations Manager can efficiently control waste disposal at the working face.

In compliance with 6 NYCRR Part 360 1.7(b)(7), the landfill will operate the roll-off storage area in the following manner for shipments of nonputrescible industrial and commercial waste:

- A log will be kept stating the date and time that the container was delivered to the area followed by the date and time when the container was taken to the working face to be emptied.
- The time between delivery and emptying will not exceed five days.
- The containers will be covered with waterproof tarps and will not be opened during the storage period for any purpose.
- The containers used for storage will meet the design requirements specified by the USDOT for each type of waste stored.

- Containers will be stored in a manner which will prevent possible damage or rupture to the storage containers.
- During the storage period, the Hauling Company Operations Manager will inspect the containers and storage area weekly to insure the area is free of nuisances (i.e. dust, odor, noise and leaks).
- If spills or leaks are detected, the landfill must immediately notify the NYSDEC and follow the spill procedures as stated in the Facilities Contingency Plan (Part IV of this submittal).

The facility may temporarily store shipments of putrescible waste in the roll-off storage area. This storage will only be allowed under circumstances when the immediate disposal of the waste could result in significant nuisances or environmental concerns. These include delaying the disposal of a load containing waste susceptible to littering during periods of high wind, delaying the disposal of frozen loads to prevent excessive traffic hold-ups, storing a minimum number of loads that could not be disposed due to the landfill closing down (usually due to weather), etc. This waste shall not be stored for longer than 24-hours, and will be managed in the following manner:

- A log will be kept stating the date and time that the container was delivered to the area followed by the date and time when the container was taken to the working face to be emptied.
- The containers will be covered with waterproof tarps and will not be opened during the storage period for any purpose.
- Containers will be stored in a manner which will prevent possible damage or rupture to the storage containers.
- During the storage period, the Hauling Company Operations Manager will inspect the containers and storage area daily to insure the area is free of nuisances (i.e. dust, odor, noise and leaks).
- If spills or leaks are detected, the landfill must immediately notify the NYSDEC and follow the spill procedures as stated in the Facilities Contingency Plan (Part IV of this submittal).

## **17. FIRE PREVENTION PLAN**

In order to prevent the occurrence of a fire at the Chaffee Facility, personnel will be trained to maintain safe operating practices. Smoking and open flames will be restricted to designated areas away from the active landfill face.

A hot-load extinguishing area shall be designated at the landfill by the Operations Manager. The area shall be adjacent to the facility's working face, between the working face and the center of the landfill to mitigate any potential contamination from a hot-load. The Scale Operator and Equipment Operators shall be notified of the area. If the Scale Operator or Equipment Operator determines a load to be hot, the Scale or Equipment Operators shall direct the hauler to the area and the Operations Manager will be notified. Landfill personnel will proceed to the area (under direction from Operations Manager) with fire extinguishing equipment (e.g. soil, chemical extinguishers, water, or a combination). The hauler will be directed to dump the load and any potential fires will be extinguished. Landfill personnel will reload the waste and direct the hauler to the working face of the landfill for waste disposal. The fire extinguishing event shall be recorded in the landfill records.

The facility also maintains a supply of fire extinguishers and water trucks that may be used in the event of an emergency incident. These extinguishers are located at the scale house and the maintenance facility for easy accessibility. Fire extinguishers are also located on the landfill vehicles and equipment for use in cases of field emergencies. Extinguishers are maintained in conformance with State and local fire codes and regulations. There is no open burning allowed at the Chaffee Facility.

Fire response procedures are discussed in the monthly training/safety meetings conducted at the landfill.

Emergency telephone numbers are listed in the Contingency Plan (Part IV of this Submittal). These numbers are conspicuously posted at each generally available telephone at the landfill facility.

## **18. FACILITY INSPECTIONS**

As stated throughout the above sections, landfill personnel will be required to perform inspections at varying time intervals to ensure that the landfill systems are properly maintained and functioning. The majority of these inspections and maintenance schedules are discussed as part of the groundwater suppression system, leachate collection, transmission and storage systems and waste tracking systems. In addition to the inspections discussed elsewhere in this document, the facility will perform weekly inspections.

These weekly inspections will consist of the following items;

- Inspect all landfill covers, including daily, intermediate, interim final and final,
- Inspect the active areas of the landfill facility for erosion damage, and
- Inspect the perimeter of the landfill facility for litter, odors, leachate seeps and ponding water.

Upon making these inspections, the Operations Manager will complete the form titled Facility Inspection located in Appendix B3a. The Operations Manager will note any issue by describing it on the figure provided. An updated figure will be developed for each phase of the development. Upon completing the inspection, required maintenance or operations modifications shall be made. These resolutions and the date that they were completed shall be indicated on the corresponding inspection form. These forms shall be maintained at the landfill and be made available for NYSDEC review.

## **19. RECORD KEEPING AND REPORTING**

The landfill has established procedures to monitor the operation and maintenance of the landfill, including a program of self-inspection, record keeping, and reporting. Copies of example quarterly and annual reports are found in Appendix E.

### **19.1 Record Keeping**

The landfill maintains records to evaluate the operation, maintenance, and monitoring of the landfill. The information is recorded and maintained in files at the main facility office, several of forms are located within Appendix B. These records and files are then used to prepare the quarterly and annual report submittals to the NYSDEC.

### **19.2 Reporting**

The landfill submits four quarterly reports and an annual report to the NYSDEC using forms provided by the NYSDEC.

All quarterly and annual reports shall be submitted to the following;

NYSDEC  
Division of Solid & Hazardous Materials  
Bureau of Solid Waste & Land Management  
625 Broadway  
Albany, New York 12233-4013

NYSDEC  
270 Michigan Avenue  
Buffalo, New York 14203-2999  
Attn: Regional Solid Materials  
Engineer

#### **19.2.1 Quarterly Reports**

Each quarterly monitoring report will provide information on activities occurring during the quarter in question (January 1 to March 31, April 1 to June 30, July 1 to September 30, October 1 to December 31) and will be submitted no later than 60 days after the last day of the quarter in question. All quarterly reports will be submitted on the forms provided by the NYSDEC or electronically, as specified by the NYSDEC, and shall also contain the following;

1. Report on funding levels of closure and post-closure funds and evidence that proper financial assurance mechanisms are in place.
2. Amounts of leachate collected by each primary and secondary leachate collection systems on a daily basis.
3. Amount of leachate removed from the leachate tanks on a daily basis and the disposal location.
4. Amounts and dates of fluid removed from the leak detection monitoring risers (double contained tanks and double contained leachate lines).
5. Amounts of waste (mixed municipal, water and wastewater sludges, industrial waste & sludges, ash, C&D debris, asbestos, compost, yard wastes, contaminated soils) received from each New York State County, from each State and from outside of the Country.
6. Amounts of landfill gas condensate generated at the flare knockout tank, the disposal location, and the number of landfill gas collection wells in operation.
7. Groundwater and surface water quality results.
8. The amount and types of waste utilized as ADC.
9. The results of the methane gas migration monitoring program required by 6 NYCRR Part 360-2.17(f)(2).
10. The results of the monitoring of the landfill surface in accordance with 6 NYCRR 360-2.21(f)(3). Any remediation or required modifications shall be reported as well.
11. Odor Complaint records as applicable.

### **19.2.2 Annual Report**

The Annual Report will be submitted no later than 60 days after January 1 of each year on forms provided by the NYSDEC or electronically, as specified by the NYSDEC, and shall also contain the following information;

1. Any changes in water quality, which have occurred throughout the report year and a summary of the water quality information as specified in the EMP.
2. Any changes to the fill progression plan.
3. Updated cost estimates for closure/post-closure activities and financial records of agreed upon payments to closure and post-closure accounts (if applicable).
4. Volume of leachate collected in the primary and secondary leachate collection systems on a monthly basis.
5. Anything that causes the operator to implement the Contingency Plan (Part IV of this submittal) at the landfill and responses taken by landfill personnel.
6. Any changes from the approved plans, report and specifications or permit along with a justification for the change.
7. A summary and record of unauthorized wastes brought to the facility and their disposition.
8. The top of casing, ground surface, and bottom elevations of all monitoring wells.
9. Proof of two (2) leachate disposal locations and two leachate transporters.
10. An annually updated topographic map.
11. Amount of mine materials utilized for landfill construction and cover. Updated soil balance comparing the required soils for construction, operation and closure of the

landfill to the amount of materials remaining in the permitted mine. Amounts shall be verified based on ground or aerial surveys.

12. Proof of current certification for laboratory conducting sampling and analyses under the facility's EMP and Site Analytical Plan.
13. Odor complaint records as applicable.

### **19.2.3 Annual Gas Recovery Facility Report**

As discussed in Section 12 of this manual, the Chaffee Facility currently operates a landfill gas collection system, which consists of existing vertical and horizontal wells, headers, condensate knockouts, an enclosed flare unit and a power production plant. The landfill expansion areas will continue to utilize the current system with the addition of wells, headers and condensate knockouts.

As part of the landfill operations, an Annual Gas Recovery Facility Report will be submitted no later than 60 days after January 1 of each year on forms provided by the NYSDEC or electronically, as specified by the NYSDEC, and shall also contain the following information;

1. A summary showing monthly estimates of the quantity of landfill gas recovered;
2. A summary showing monthly estimates of the quantity of condensate generated at the condensate knockout tank adjacent to the power production plant and the enclosed flare unit (condensate knockouts at existing LST 1 and LST 2 and any knockouts that directly discharge into the expansion's leachate collection system do not have to be tracked);
3. A summary of the annual condensate sampling data, which will consist of an analysis including baseline parameters and any additional parameters specified by the department pending review of the previous sampling results;
4. A summary of the annual hours of operation for the flare and blower; and
5. A list of full and part time employees, relative to the gas recovery system and their titles.



## **20. LIQUID WASTE SOLIDIFICATION**

### **20.1 Introduction**

WMNY provides a disposal option for generators of liquid waste by operating a solidification process at the Chaffee Facility. Operation of the solidification process is intended to directly address Part 360-2.17(k) and (n) and Special Condition 9 of the current Part 360 Permit, which prohibit the disposal of wastes containing free liquids within the landfill. Authorized wastes, which contain free liquids, are solidified with an appropriate absorbent material prior to disposal in the active area of the landfill (see Figure 2).

The solidification process is operated as an integrated component of the existing permitted solid waste management activities at the facility. The solidification process is operated in conjunction with on-going operation of the landfill. Existing facilities and controls (site controls, staffing and supervision, and the waste control program) apply to the solidification process.

### **20.2 Solidification Process Area**

#### **20.2.1 Location and Setting**

The location of the solidification process area will be within the constructed expansion area landfill footprint adjacent to the active disposal area. This location can change yearly as the landfill is being filled, constructed and capped.

The constructed and future landfill cells are double lined in accordance with 6 NYCRR Part 360 requirements. Therefore, since the solidification process area is contained within the lined landfill, double containment of the mixing system will not be required.

#### **20.2.2 Liquid Solidification Mixing System**

The liquid solidification-mixing system consists of four steel mixing vessels, each with a maximum capacity of approximately 6,300 gallons, and a total system capacity of 25,200 gallons. Each mixing vessel is approximately 8 feet wide by 20 feet long by 7 feet deep, and is capable of containing the liquid waste as it is being mixed with the absorbent material. The

mixing vessels are buried and backfilled into the landfill to provide vessel stability during mixing operations. Safety fencing and barriers are placed around the mixing vessels to provide a physical barrier to prevent persons from falling into the mixing vessels.

The area surrounding the mixing vessels is compacted to allow equipment to operate on all four sides of the mixing vessels. The compacted areas are sloped toward the mixing vessels to facilitate drainage of any spilled liquids back into the mixing vessels. A water storage tank and pressure washer system are also available, to allow rinsing of waste containers prior to leaving the site. A typical plan and section view of the mixing vessel setup is shown on Figure 10. The area consists of a waste unloading and loading area, a mixing area and an absorbent material stockpile area.

## **20.3 Liquid Solidification Operation and Maintenance**

### **20.3.1 Access Control and Operating Hours**

Access to the liquid solidification process area at the Chaffee Facility is the same as access to the active landfill areas, as described in Section 5.2 of this Operations and Maintenance Manual. In addition, the liquid solidification process only occurs during the normal landfill operating hours, as stated in Section 5.1 of this Operations and Maintenance Manual.

### **20.3.2 Incoming Materials**

#### Waste Types and Characterization

The Chaffee Facility accepts non-hazardous wastes containing free liquids that are amenable to efficient solidification with available bulking agents and which do not pose a safety or health hazard to operating personnel. The facility's waste control plan is used to screen candidate wastes against these two basic acceptance criteria.

In screening candidate wastes for possible acceptance, the facility's Special Waste Program as described in Section 8.3 of this Operations and Maintenance Manual will, for example, evaluate the waste's possible reactivity (reactive sulfides and cyanides, compatibility with solidification agents or prior waste residuals, etc.) and potential emissions (excessive solvent levels, for

example) that may affect worker health and safety. Specific limitations for wastes to be received for liquid solidification include the following:

- Wastes with a pH less than 4 or greater than 11 will not be accepted,
- Wastes that are organic solvent-based products will not be accepted,
- Wastes that are pure petroleum products, such as off-specification fuels or heating oils, will not be accepted, and
- Wastes that do not meet the above screening criteria will not be accepted.

Typical wastes that will be accepted for solidification at the Chaffee Facility include:

- Sludges of various types, such as oil/water separator sludge, paint booth sludge, carwash sludge and paper sludge,
- Off-specification commercial products such as off-specification latex paint and off-specification vinegar,
- Metal cleaning water,
- Waste plasticizer,
- Water from installation of soil borings,
- Flocculent waste water, and
- Food wastes, including off-specification bottled beverages, sauces and soups.

All special wastes, which are profiled and approved by the Chaffee Facility for acceptance to the liquid solidification process, will be submitted to the NYSDEC for review and approval. Drums and totes that will not be returned to the waste generator shall be identified as part of

the special waste approval, so that the Chaffee Facility can accept and crush these containers once they have been emptied.

### Waste Quantities

All wastes accepted by the facility are ultimately disposed of in the active landfill, following solidification. The quantity (by weight) of the liquid waste stream is recorded during the initial inbound receipt control process, prior to solidification. This inbound liquid waste weight is tracked and recorded against the existing approved design capacity (600,000 tons per year) for active landfilling. Absorbent waste materials used in the liquid solidification process will also be tracked and recorded.

### Waste Control Program

The liquid waste stream is integrated into the Chaffee Facility's Waste Control Program. This Waste Control Program includes three primary methods for inbound waste monitoring: pre-acceptance waste screening measures, quality control measures for waste load acceptance and periodic, detailed inspections of inbound waste loads. These three components, as they are applied to the facility's waste stream, are discussed in detail in Section 8.2 of this Operations and Maintenance Manual. Additional details regarding liquid wastes are discussed below.

Section 8.2 of this Operations and Maintenance Manual indicates that waste streams with free liquid are not accepted for disposal, though as discussed in this section, they may be approved for disposal through the liquid solidification process.

Liquid wastes will most commonly be delivered to the facility in tankers, small vacuum trucks, as well as in sealed totes and drums. For delivery of the waste load to the site, the waste vehicle driver will enter the site through the existing entrance and proceed onto the scale for weighing and inbound processing. All inbound waste loads will be weighed; drum tare weights for empty drums returned to the generator will be reconciled for recording of actual waste weight, etc.

Concurrent with weighing, the vehicle driver will present shipping documentation (manifest) to scale house personnel. The personnel will review the shipping papers for accuracy, including review against the approved waste profile, and inspect the waste load to verify the quantities and types of waste listed on the manifest and profile. Scale house personnel will check if:

- The volume of the waste (bulk liquid weight, number of drums, etc.) agrees with the volume on the accompanying manifest.
- Shipping containers are in acceptable condition (i.e. container integrity, labels or markings are complete and accurate, etc.), and
- The waste's appearance matches the waste's physical description as described on the profile and as exhibited by previous shipments.

In the event of an inbound discrepancy, the waste generator is contacted for appropriate resolution. The waste load is returned or rejected if the discrepancy cannot be correctly resolved. The waste hauler will be instructed to contact the generator for further instructions, in the event of load rejection. The generator will also be immediately notified directly by WMNY in the event of load rejection.

In the event that the waste load is approved for acceptance, the shipment will be directed to the liquid solidification process area for unloading. Landfill operators will be notified such that they are available to direct and assist the vehicle driver in unloading of the waste; the operators will be concurrently notified/reminded by the scale house personnel of any special handling requirements concerning unloading, solidification or disposal of the waste, as necessary.

A landfill operator monitors all waste unloading. During the unloading process, the operator observes the waste load to determine if:

- The waste load substantively differs visually from the description contained on the profile or from previous loads of the same waste stream, and
- The load exhibits an odor, which is noticeably different or stronger than the odor described on the profile or exhibited by previous shipments.

If any actual or potential discrepancies are determined, the operator will document the discrepancy and notify the Special Waste Approvals Person for additional guidance and instruction.

In the event that unauthorized wastes are received, the material will be managed in accordance with the procedures outlined in the Contingency Plan (Part IV of this submittal).

Due to the nature of the liquid waste, random load inspections are not conducted in accordance with the Waste Control Program (i.e. dumping of a designated load in the landfill active area for detailed inspection). Instead, a facility operator directly monitors all waste loads delivered to the facility during the unloading and mixing process.

### **20.3.3 Equipment**

The equipment used in the liquid stabilization process is both mobile and stationary equipment. The typical equipment will include:

- Steel mixing vessels,
- An excavator to mix the waste loads during solidification and to load-out the solidified material,
- A water storage tank and pressure washer system, and
- Off road dump trucks to transport the solidified waste material to the daily active landfill area.

### **20.3.4 Personnel Staffing and Training**

The same management and personnel currently working at the Chaffee Facility operate the liquid solidification process. Employee safety and training is performed in accordance with the current facility programs as well as with the comprehensive Corporate Safety and Health

Program. The Chaffee Facility District Manager has ultimate responsibility and authority for ensuring that the liquid solidification process is adequately staffed with trained personnel.

One of the current landfill operator's is trained in the operations of the liquid solidification process. This operator will only be assigned to the liquid solidification process area on days when liquids are being solidified. The operator's duties will include:

- Directing and monitoring unloading of inbound waste loads,
- Visually inspecting drums and totes to ensure all liquid waste is removed,
- Monitoring of waste loads during unloading and processing to verify that the waste load is consistent with the pre-acceptance characterization,
- Placement of absorbent material into the mixing vessel,
- Mixing the waste load with the absorbent material,
- Ensuring through visual inspection that the waste has been sufficiently solidified and that no free liquids are present,
- Load-out of the solidified material into the off road dump trucks for transport to the active landfill area,
- Empty drums and totes not being returned to the waste generator will be crushed and transported to the active landfill area, and
- Routine policing of the facility for nuisance conditions, implementation of good housekeeping procedures, etc.

The assigned landfill operator will be supported as necessary by the remaining on-site work force.

All personnel associated with operation of the liquid solidification process receive appropriate initial and on-going training to ensure that they can adequately and safely perform their work duties. Training is provided through specific facility training sessions and/or within the context of routine safety meetings. All personnel training sessions are documented.

### **20.3.5 Waste Solidification Procedures**

Following completion of the inbound scale and inspection process, all loads are directed to the facility for unloading. In most cases, the liquid waste is discharged directly from the inbound truck into the mixing vessels. The unloading process can also include rinsing of the inbound tanker or container, as necessary. The resulting rinse water will be directed into the mixing vessels.

Drums and totes that are not being returned to the waste generator will be visually inspected to ensure that the containers are empty. The empty containers will be placed adjacent to the mixing vessels until liquid solidification is complete. The containers will then be crushed using the excavator and loaded out for disposal in the active landfill area.

Absorbent materials are staged adjacent to the mixing vessels (see Figure 10). Absorbent materials may be auto fluff, slag, fly ash, wood chips and other appropriate materials. Absorbent materials may also be temporarily stored in other areas of the active landfill. All of the absorbent materials will be appropriately covered with soil or tarps when not in active use.

Prior to discharging the waste load, a layer of the designated absorbent material is placed in the bottom of the vessels. The waste load is then discharged into the mixing vessels; the operator then adds more of the designated absorbent material. At all times a minimum freeboard of 1 foot is maintained for the materials being processed within the mixing vessels. The operator mixes the waste and absorbent material with the excavator. A sufficient quantity of absorbent material is added until mixing of the waste is complete and free liquids are no longer present, based on visual inspection.

After the mixing process is complete, the mixed waste is loaded into off road dump trucks using the excavator and transported to the active landfill area.



Routine operating procedures will be to pre-schedule liquid waste loads so as to coordinate with the on-site inventory of absorbent material, such that all loads will be processed and landfilled on a daily basis. At a minimum, no unsolidified waste load will remain in the mixing vessels overnight and all empty drums and totes will be crushed and disposed of daily.

#### **20.3.6 Site Inspection, Maintenance and Monitoring**

The liquid solidification process area is policed on a daily basis by the landfill operator for potential nuisance conditions and acceptable housekeeping. This activity includes inspecting the mixing vessels and adjacent areas.

The Chaffee Facility is formally inspected on a weekly basis to ensure overall facility integrity and environmentally-sound operations. The liquid solidification process area is included in this inspection to ensure that the mixing vessels are not damaged and that the stockpiled absorbent materials are being properly managed. Operations will immediately cease if any damage or a breach is noted in the mixing vessels; operations will resume only upon completion of acceptable repair.

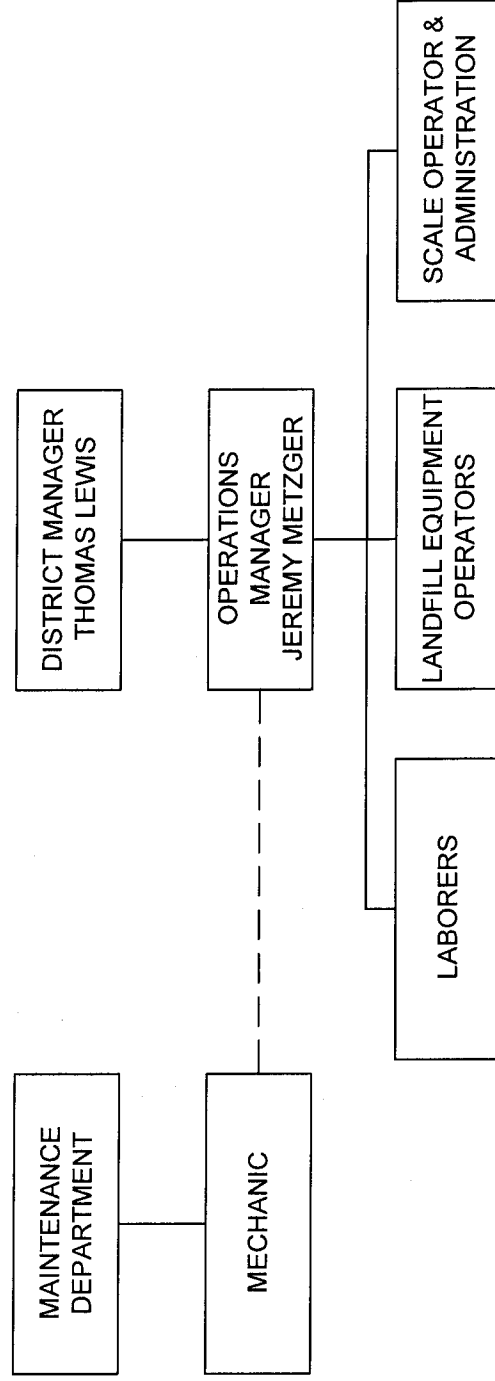
All deficiencies identified during the weekly inspections will be promptly repaired and documented. All structural repairs made to the mixing vessels will be specifically documented and maintained with facility records.

#### **20.3.7 Record Keeping and Reporting**

All liquid waste loads received and processed at the Chaffee Facility are recorded and maintained at the facility. Absorbent materials used for liquid waste mixing are also recorded. These records will be summarized and included as part of the NYSDEC quarterly and annual reports.

## **FIGURES**

# CHAFFEE LANDFILL FACILITY ORGANIZATIONAL CHART



**McMahon & Mann**  
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BUFFALO, NY 14214  
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FAX: (716) 834-8934

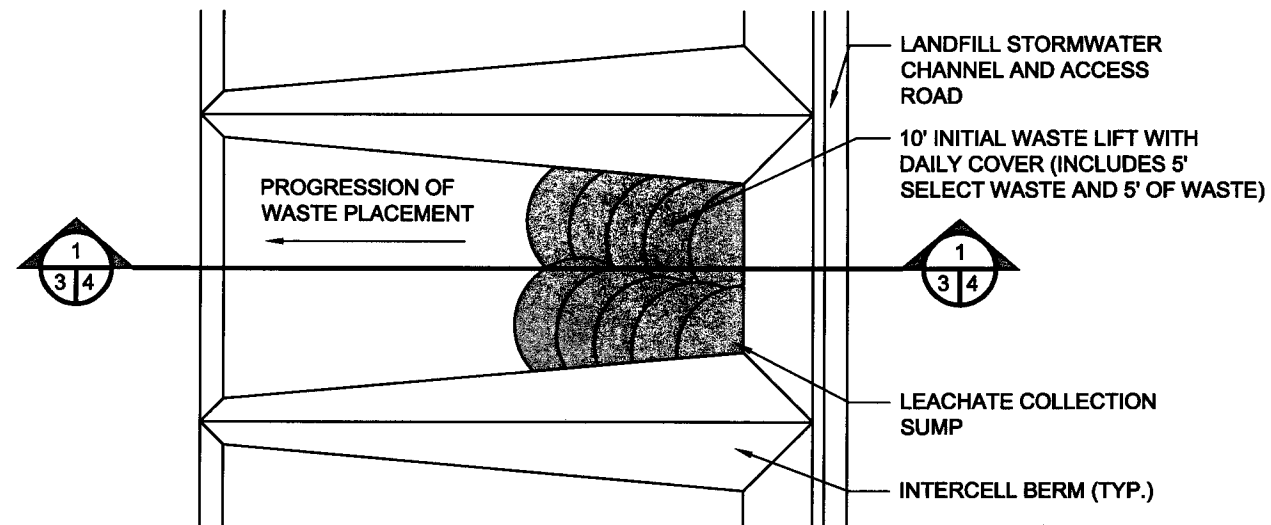
CHAFFEE FACILITY  
O & M MANUAL  
ERIE COUNTY NEW YORK

ORGANIZATIONAL CHART

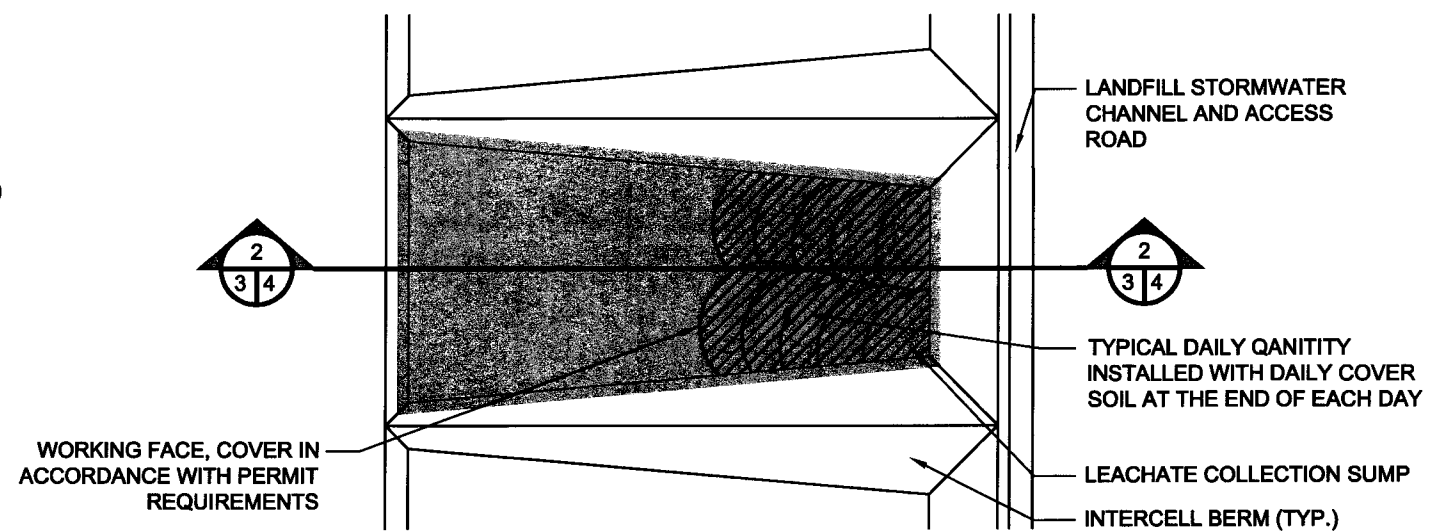
DWG. NO. 00016-232

FIGURE 1

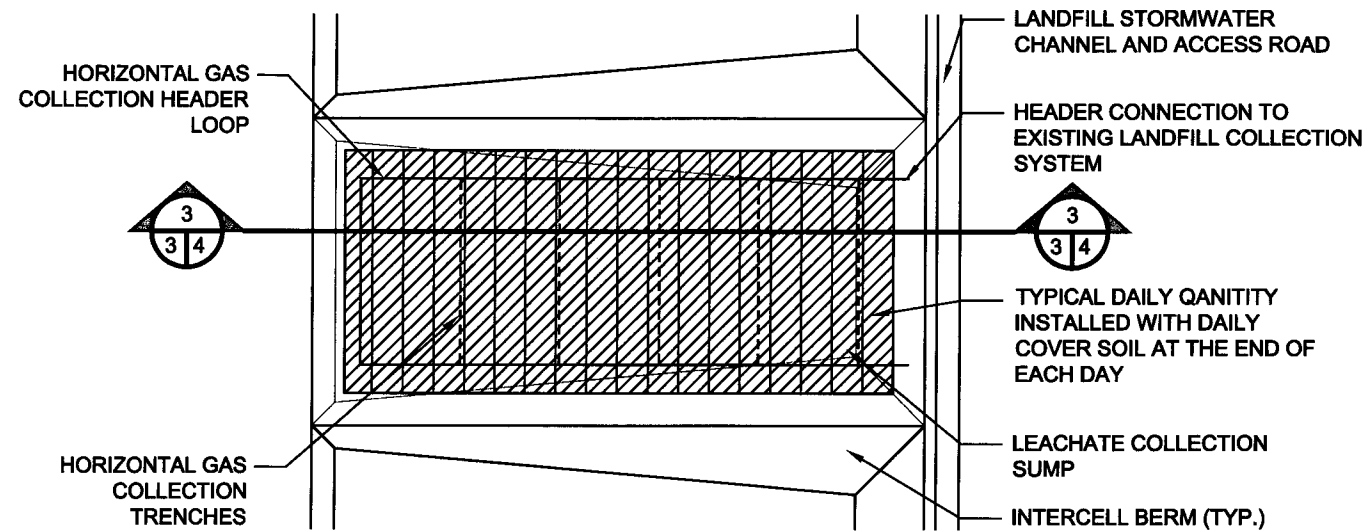




**1 INITIAL FILL CONDITION PLAN**  
SCALE: N.T.S.



**2 INTERMEDIATE FILLING PLAN**  
SCALE: N.T.S.



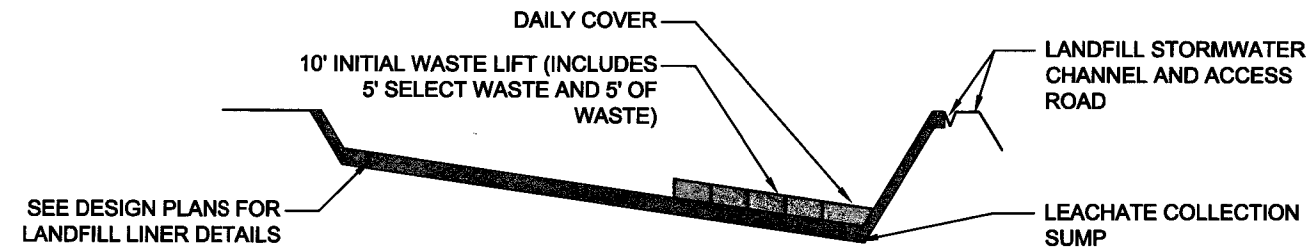
**3 INTERMEDIATE FILLING PLAN**  
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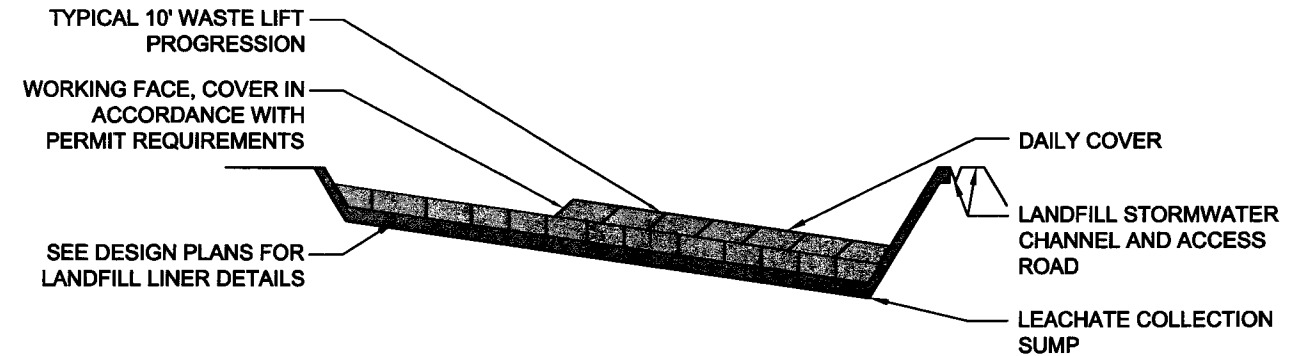
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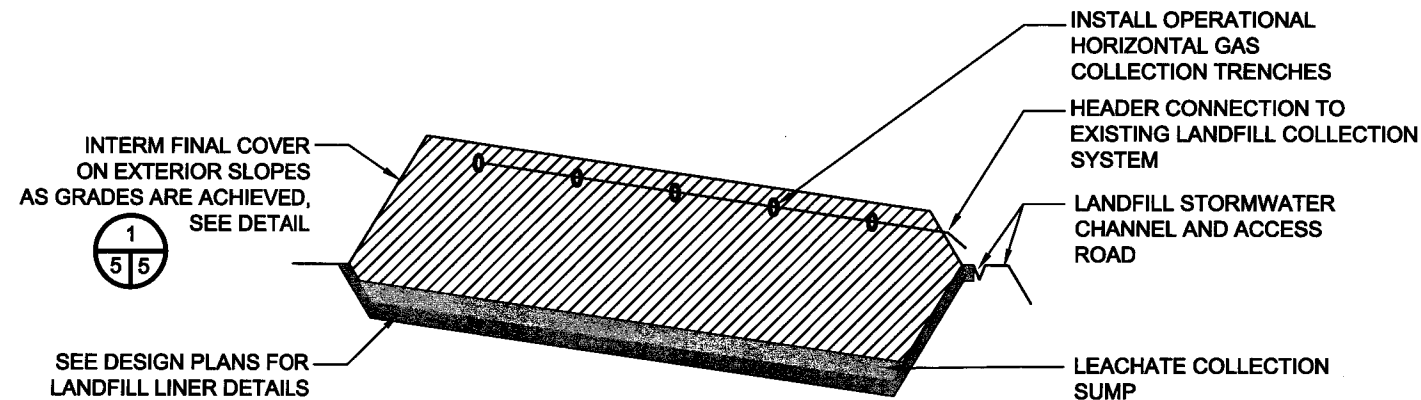
GENERAL  
FILL PROGRESSION PLANS  
FIGURE 3  
DWG. NO. 00016-148a



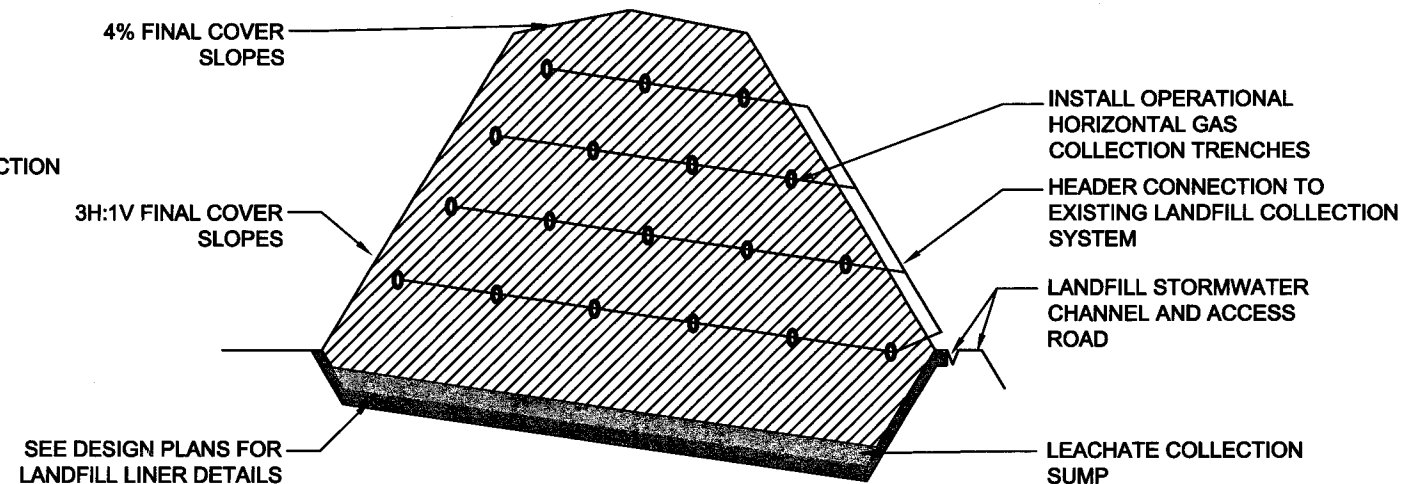
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**2 INTERMEDIATE FILLING SECTION**  
SCALE: N.T.S.



**3 INTERMEDIATE CONDITION SECTION**  
SCALE: N.T.S.



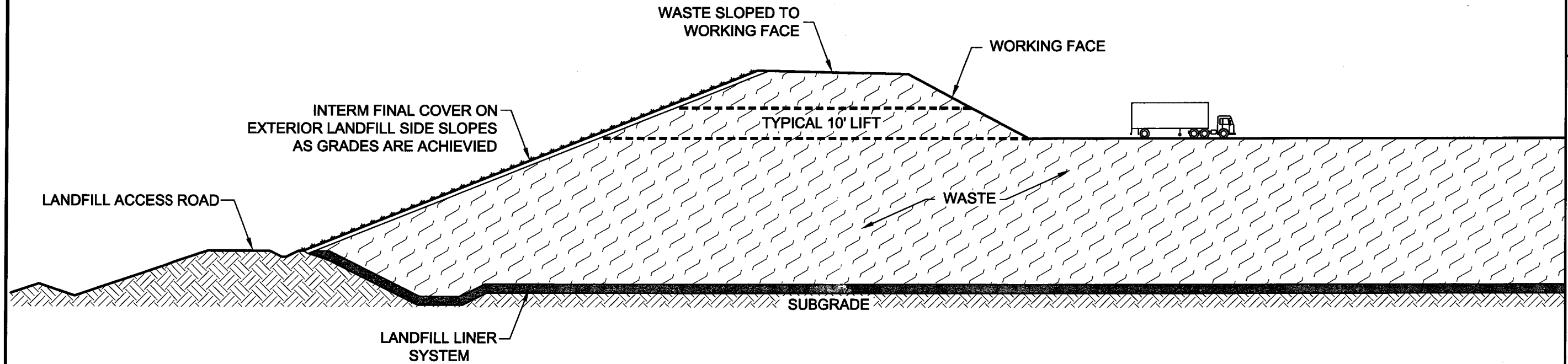
**4 FINAL LANDFILL SECTION**  
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GENERAL  
FILL PROGRESSION SECTIONS  
DWG. NO. 00016-148b  
FIGURE 4



1  
5 | 5

## SCHEMATIC OPERATIONAL DETAIL

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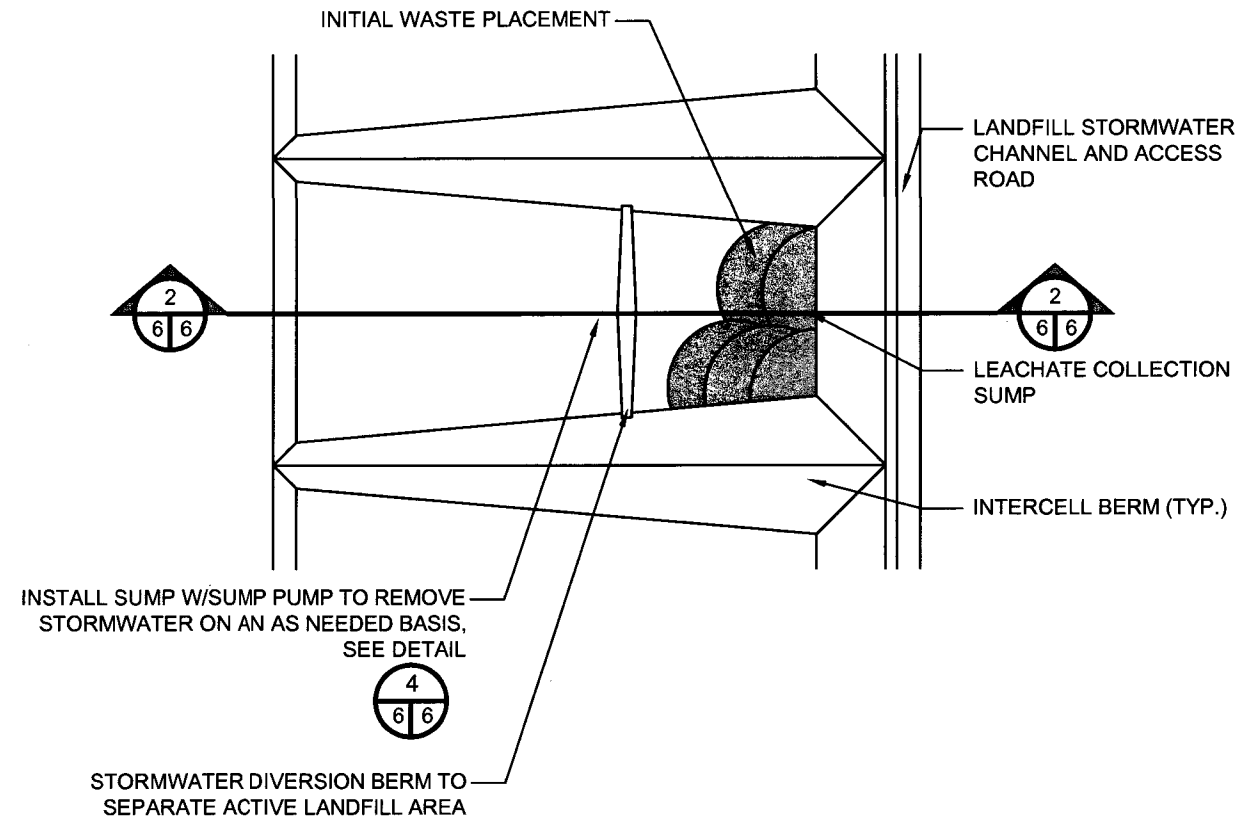
NEW YORK

ERIE COUNTY

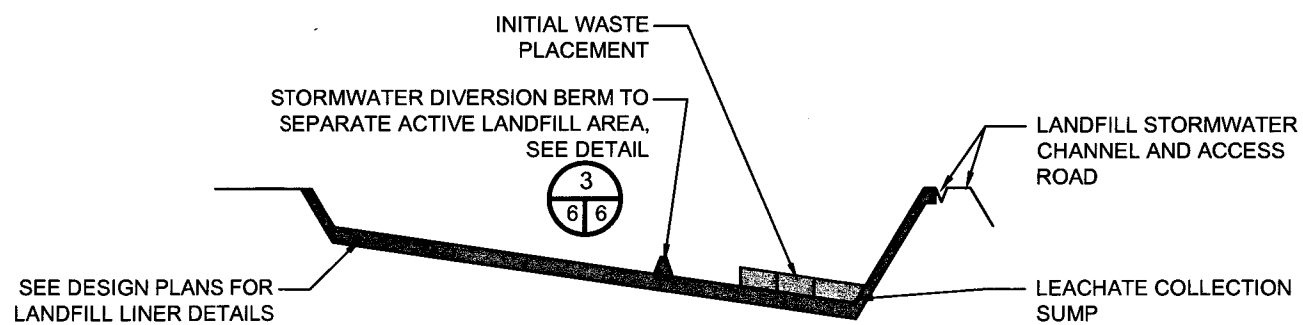
SCHEMATIC OPERATIONAL DETAIL

FIGURE 5

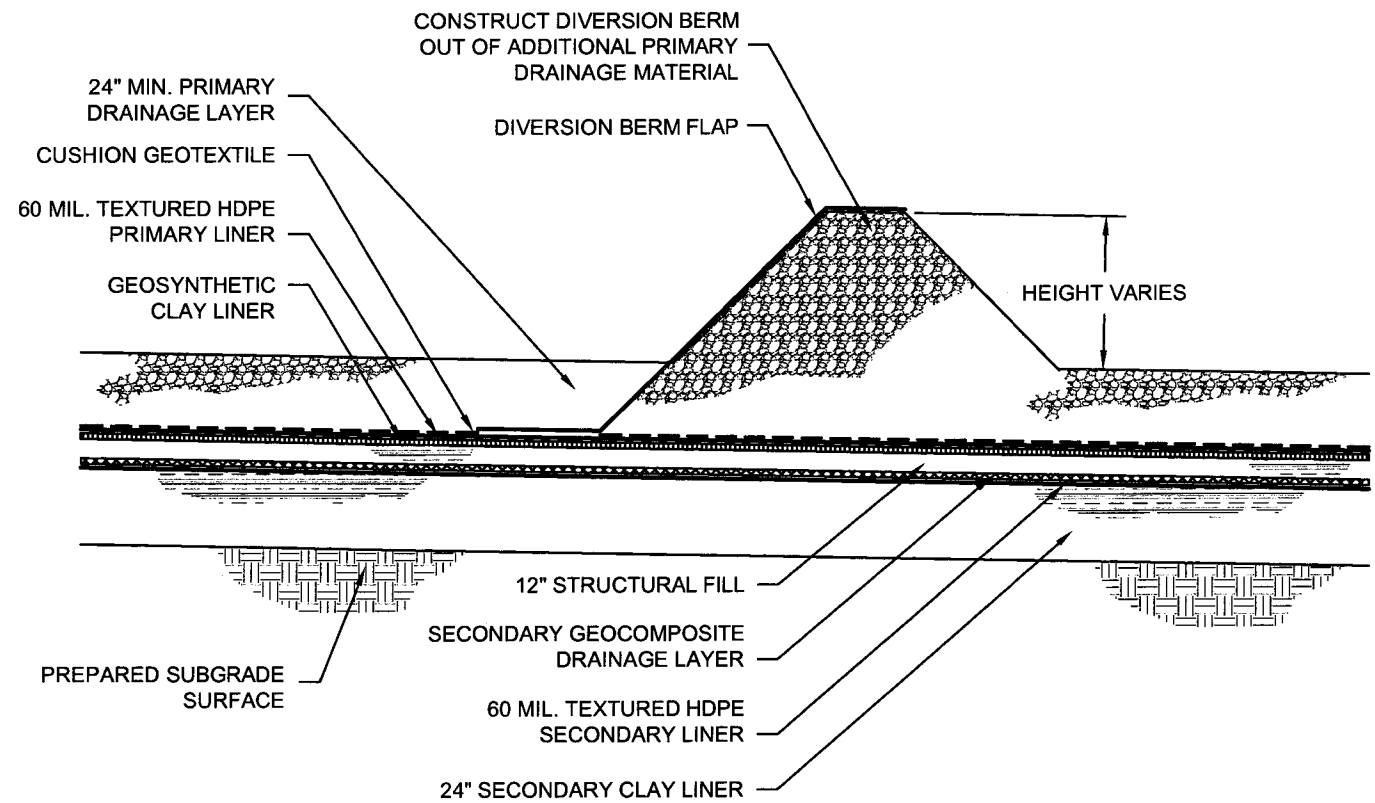
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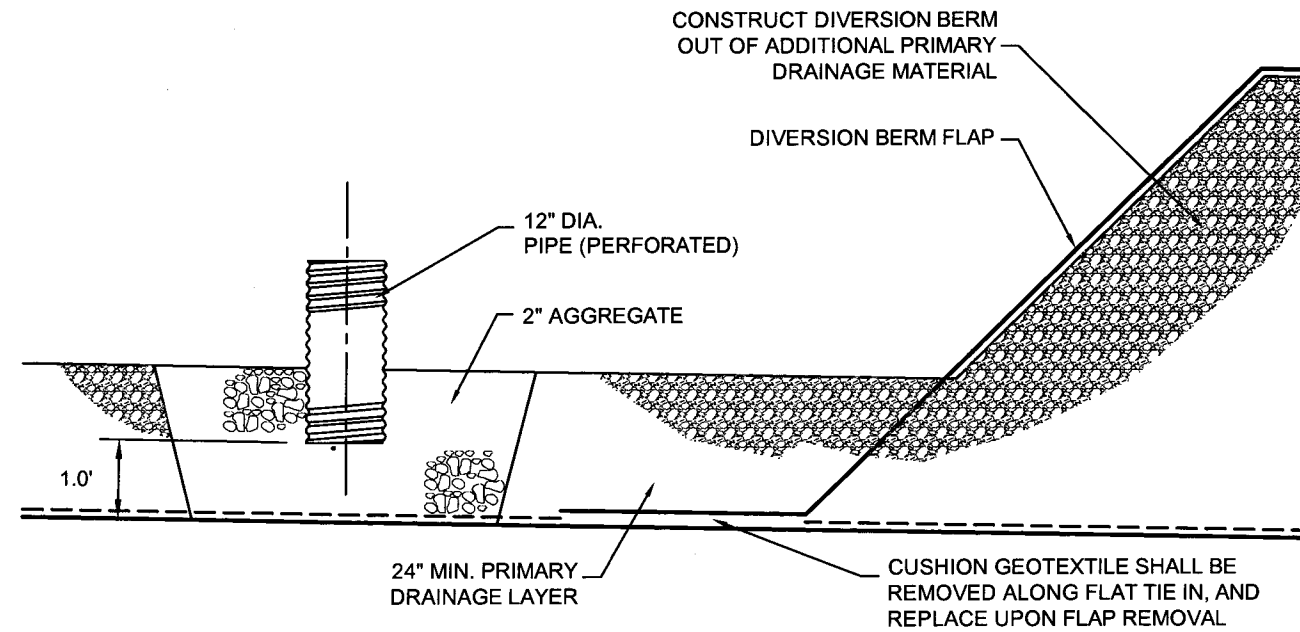
**1 TYPICAL CELL W/STORMWATER DIVERSION BERM**  
SCALE: N.T.S.



**2 SECTION THRU DIVERSION BERM**  
SCALE: N.T.S.



**3 TYPICAL DIVERSION BERM DETAIL**  
SCALE: N.T.S.



**4 TYPICAL SUMP**  
SCALE: N.T.S.

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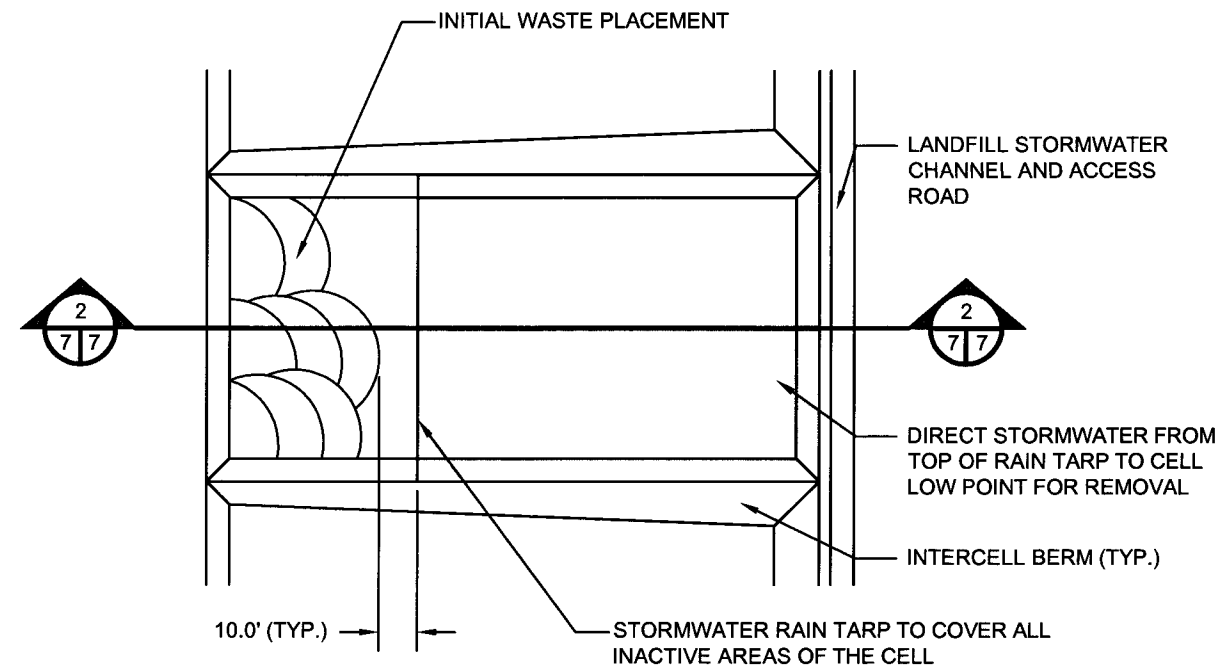
**CHAFFEE FACILITY**  
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**STORMWATER DIVERSION BERM**

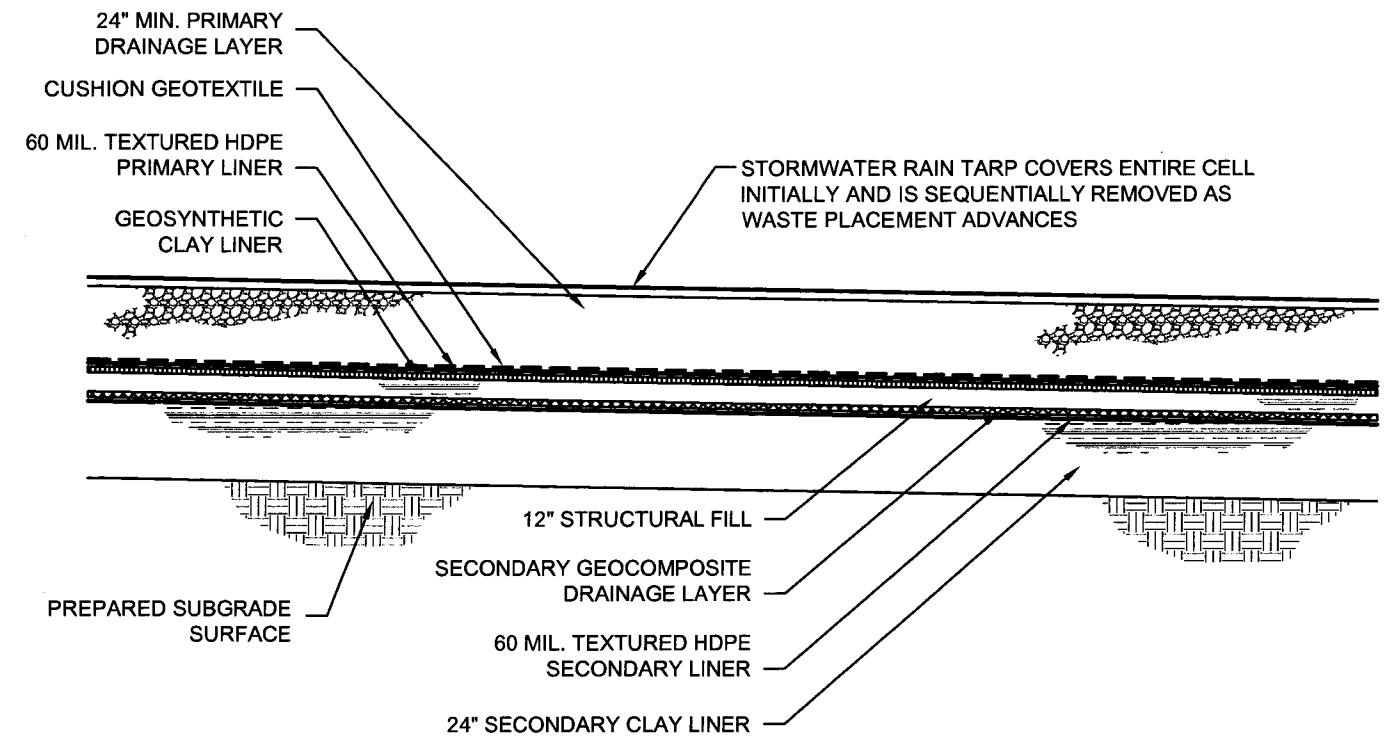
FIGURE 6

DWG. NO. 00016-280a

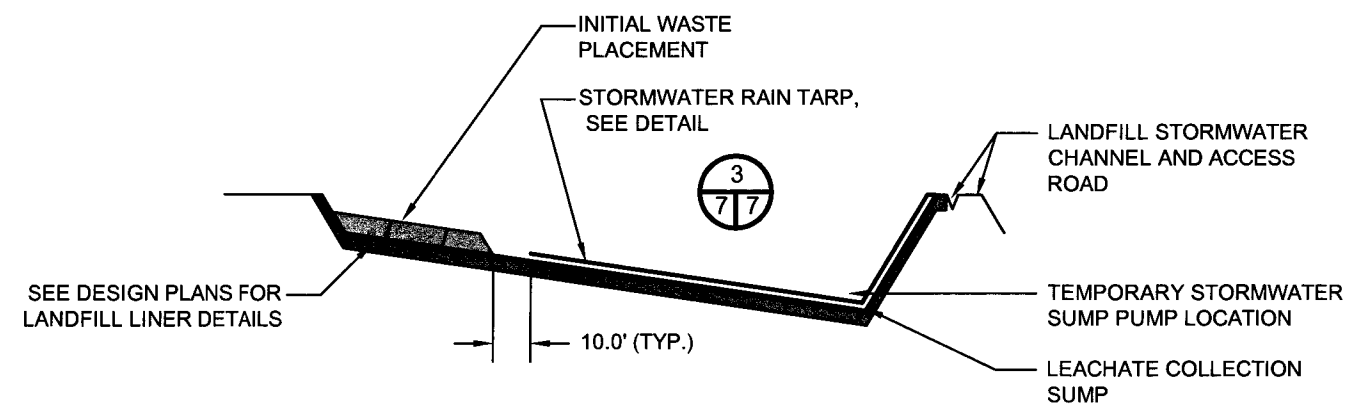




**1**  
7/7  
**TYPICAL CELL W/STORMWATER RAIN TARP**  
SCALE: N.T.S.



**3**  
7/7  
**TYPICAL RAIN TARP DETAIL**  
SCALE: N.T.S.



**2**  
7/7  
**SECTION SHOWING RAIN TARP**  
SCALE: N.T.S.

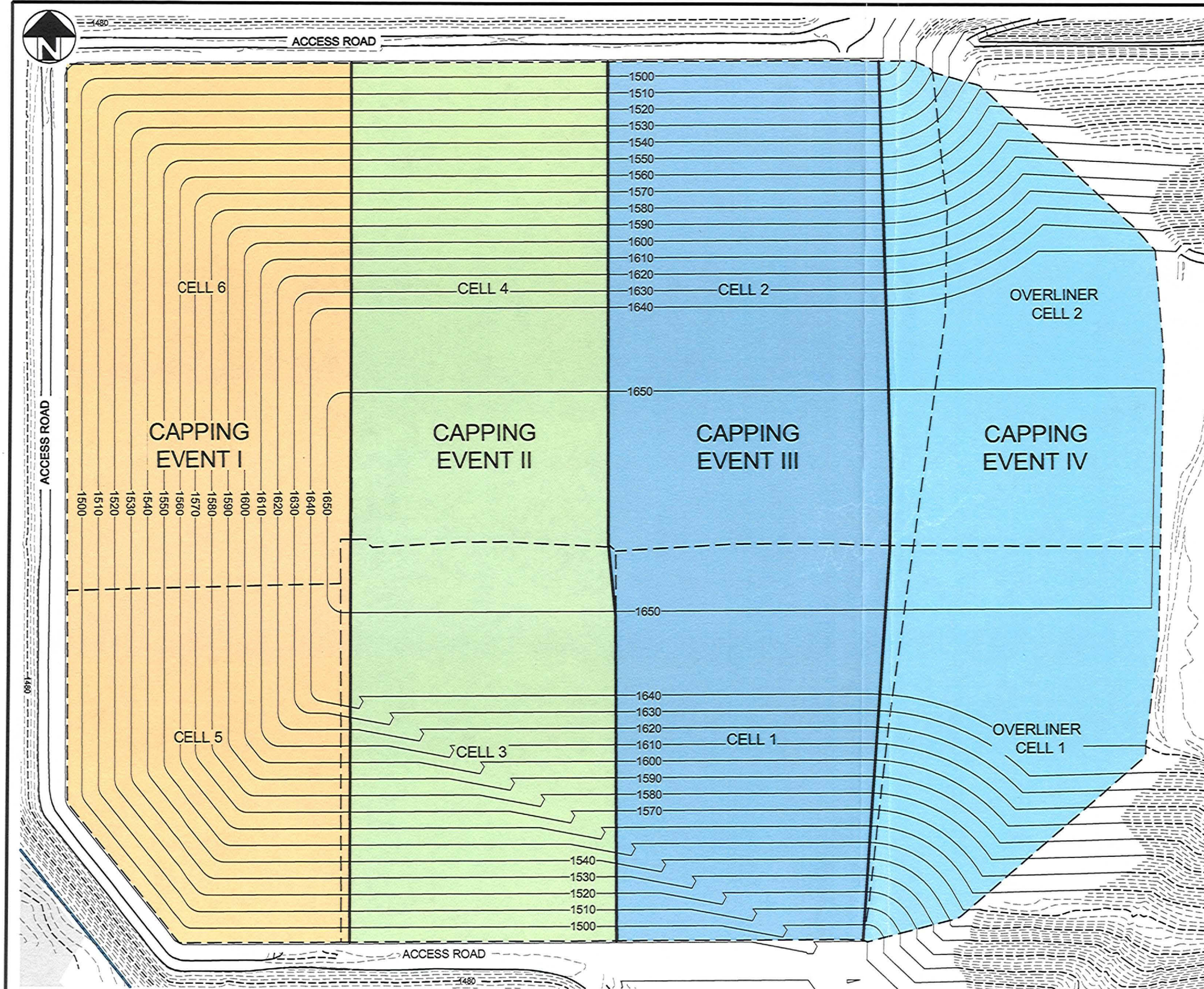
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**STORMWATER RAIN TARP**  
**FIGURE 7**  
DWG. NO. 00016-280b





## LEGEND

---	1480	---	EXISTING CONTOURS
---		---	CELL BOUNDARIES
---	1640	---	TOP OF WASTE
			CAPPING EVENT I
			CAPPING EVENT II
			CAPPING EVENT III
			CAPPING EVENT IV

YEAR	CELL CONSTRUCTION	CAPPING EVENT
2007	CELL 5 & 6	NONE
2008	NONE	NONE
2009	CELL 4	NONE
2010	NONE	NONE
2011	CELL 3	NONE
2012	NONE	NONE
2013	NONE	NONE
2014	CELL 2	NONE
2015	NONE	NONE
2016	NONE	NONE
2017	CELL 1	NONE
2018	NONE	NONE
2019	NONE	NONE
2020	NONE	NONE
2021	CELL 2 OVERLINER	NONE
2022	NONE	NONE
2023	NONE	EVENT I
2024	CELL 1 OVERLINER	NONE
2025	NONE	EVENT II
2026	NONE	NONE
2027	NONE	EVENT III
2028	NONE	NONE
2029	NONE	EVENT IV

### NOTES:

- As filling progresses interim final cover will be placed on surfaces as they reach final grades to allow settlement prior to placement of the final cover.
- The anticipated cell construction schedule is based on a waste receipt rate of 425,000 tons per year.

NOTE:  
UNAUTHORIZED ALTERATION OR ADDITION TO ANY  
SURVEY, DRAWING, DESIGN, SPECIFICATION, PLAN, OR  
REPORT IS A VIOLATION OF SECTION 7209 PROVISION 2 OF  
THE NEW YORK STATE EDUCATION LAW.

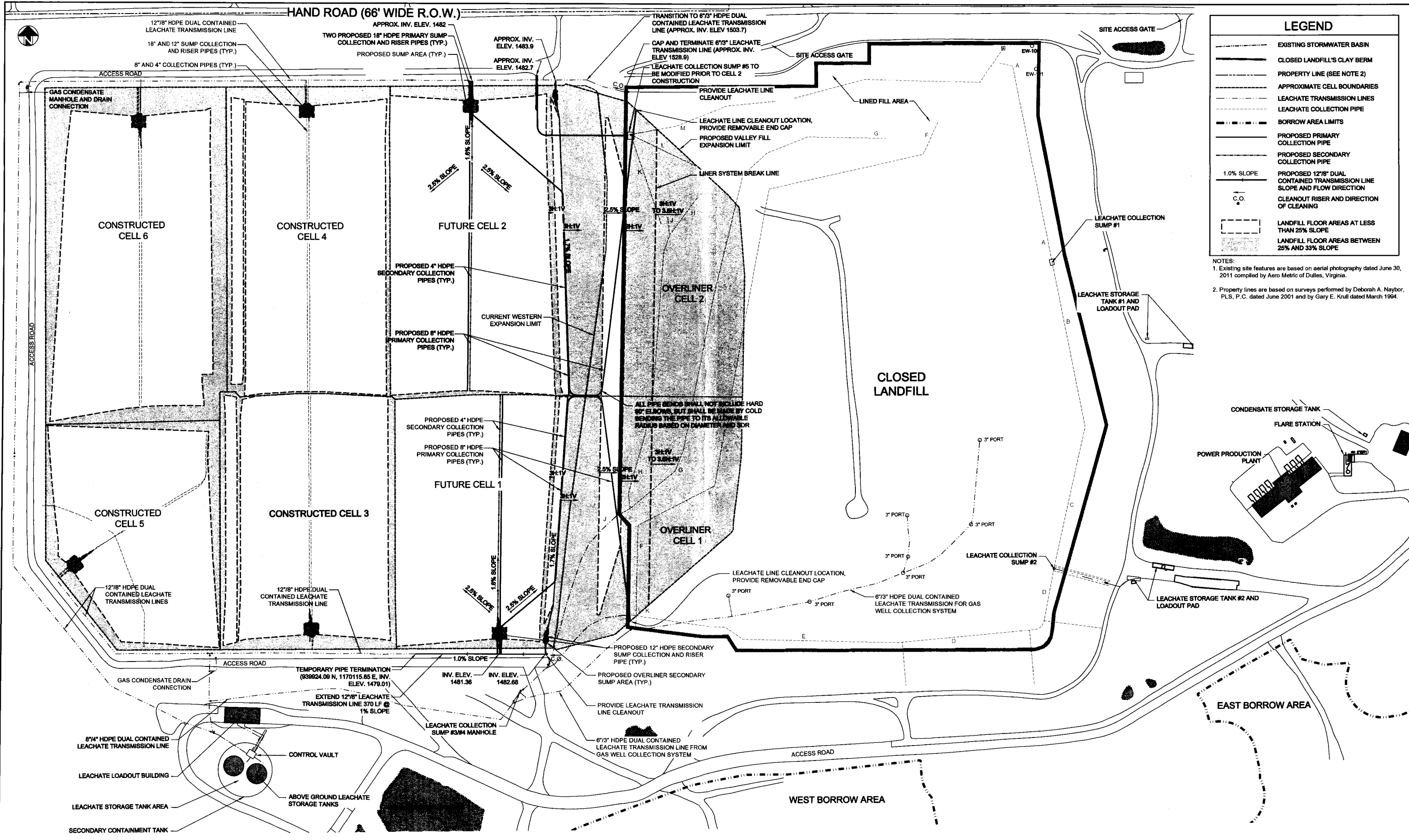
**McMahon & Mann**  
Consulting Engineers, P.C.  
2495 MAIN STREET, SUITE 432  
BUFFALO, NY 14214  
(716) 834-8932  
FAX: (716) 834-8934

**CHAFFEE FACILITY**  
**O & M MANUAL**  
NEW YORK  
ERIE COUNTY

**PROPOSED CAPPING  
SEQUENCE**

DWG. NO. 00016-547  
FIGURE 8





**LEGEND**

EXISTING STORMWATER BASIN

CLOSED LANDFILL'S CLAY BERM

PROPERTY LINE (SEE NOTE 2)

APPROXIMATE CELL BOUNDARIES

LEACHATE TRANSMISSION LINES

LEACHATE COLLECTION PIPE

BORROW AREA LIMITS

PROPOSED PRIMARY COLLECTION PIPE

PROPOSED SECONDARY COLLECTION PIPE

PROPOSED 12" HDPE DUAL CONTAINED TRANSMISSION LINE SLOPE AND FLOW DIRECTION

CLEANOUT RISER AND DIRECTION OF CLEANING

LANDFILL FLOOR AREAS AT LESS THAN 25% SLOPE

LANDFILL FLOOR AREAS BETWEEN 25% AND 33% SLOPE

NOTES:  
1. Existing site features are based on aerial photography dated June 30, 2011 compiled by Aero Metric of Dulles, Virginia.  
2. Property lines are based on surveys performed by Deborah A. Naybor, PLS, P.C. dated June 2001 and by Gary E. Krull dated March 1994.

SCALE: N.T.S.

REDUCED

NOTE:  
UNAUTHORIZED ALTERATION OR ADDITION TO ANY SURVEY, DRAWING, DESIGN, SPECIFICATION, PLAN, OR REPORT IS A VIOLATION OF SECTION 7209 PROVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

**McMahon & Mann**  
Consulting Engineers, P.C.

2495 MAIN STREET, SUITE 432  
BUFFALO, NY 14214

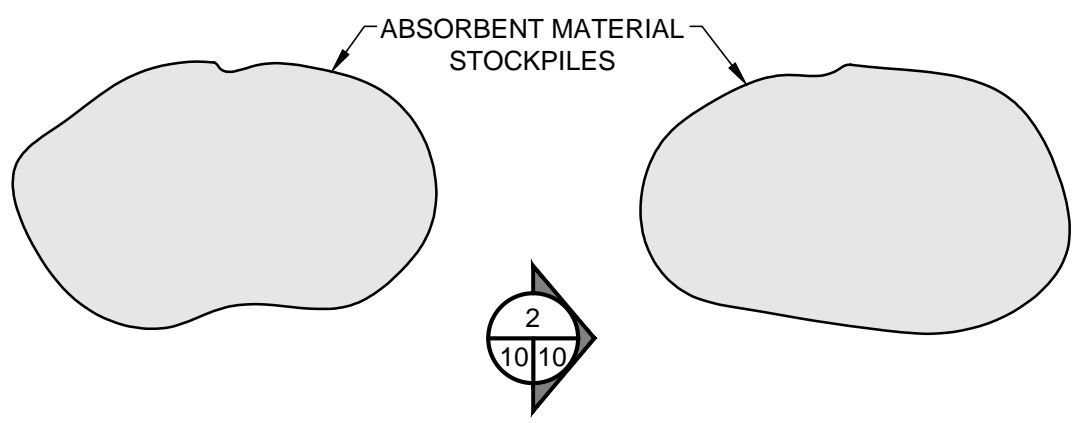
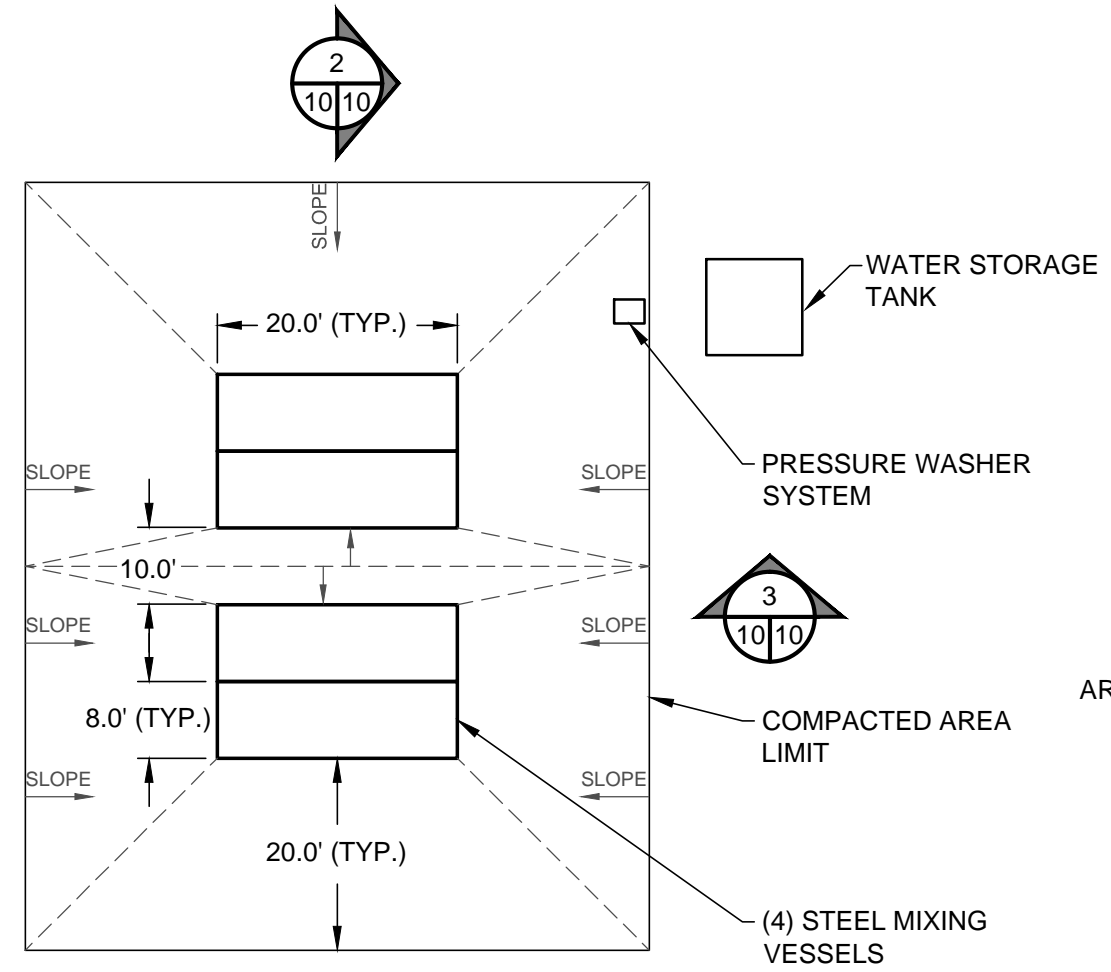
(716) 834-8932  
FAX: (716) 834-8934

CHAFFEE FACILITY  
O & M MANUAL

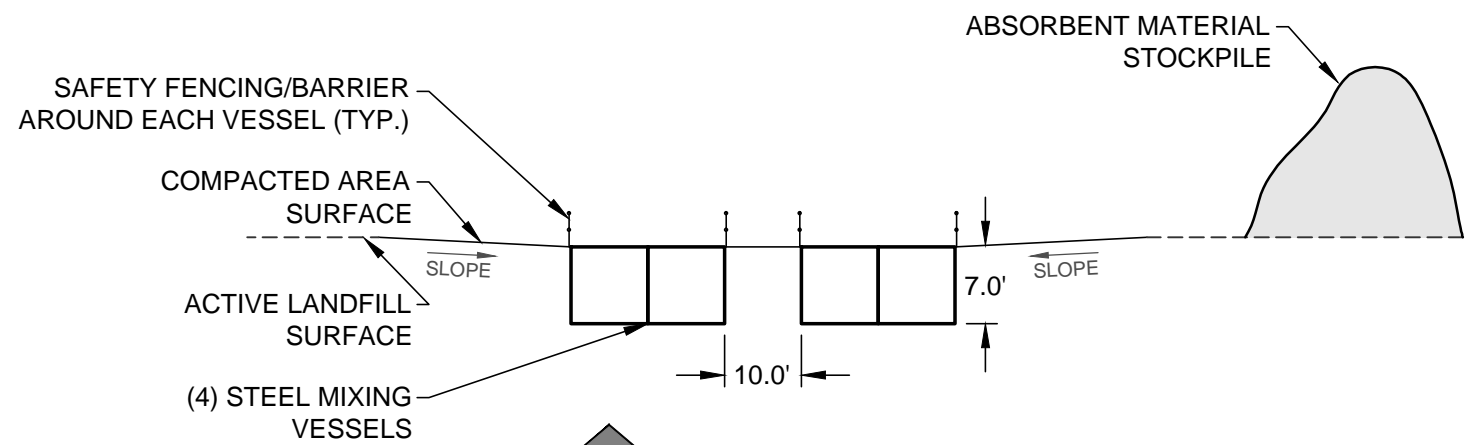
ERIE COUNTY  
NEW YORK

PERMITTED AND PROPOSED LEACHATE  
COLLECTION AND TRANSMISSION PLAN

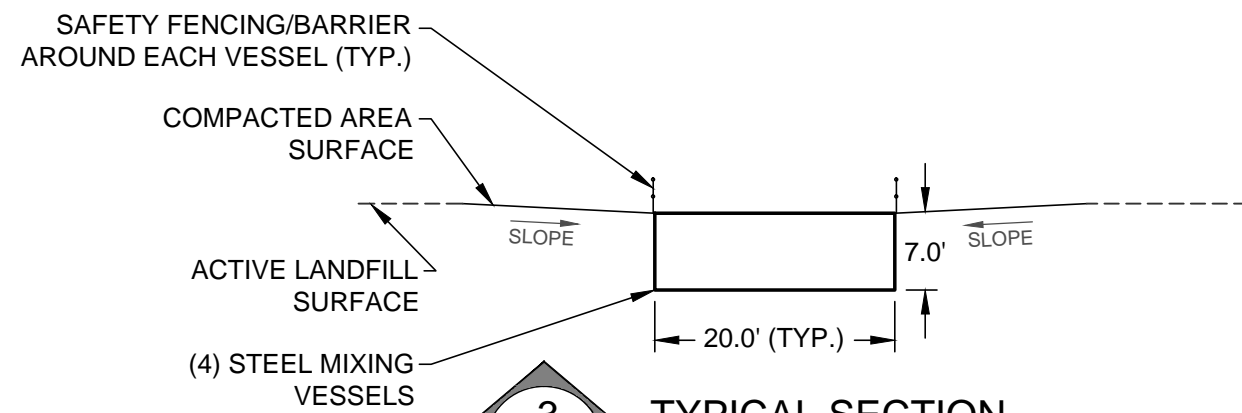
DWG. NO.00016-518a  
FIGURE 9



**1 MIXING VESSEL PLAN**  
SCALE: N.T.S.



**2 TYPICAL SECTION**  
SCALE: N.T.S.



**3 TYPICAL SECTION**  
SCALE: N.T.S.

NOTE:  
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TO ANY SURVEY, DRAWING, DESIGN,  
SPECIFICATION, PLAN, OR REPORT IS A  
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## **APPENDIX A**

### **Leachate Sumps/Storage Tanks**

- 1. Sump1/Tank1**
- 2. Sump2/Tank 2**
- 3. Tank 3/4**
- 4. Tank 5**
- 5. Gas Condensate Knockout Tank**
- 6. R-972-01 Recommended Practice,  
Addition of Supplemental Anodes to STI-  
P3 UST's**

## **APPENDIX A -1**

### **Sump1/Tank1**

## Leachate Tank #1

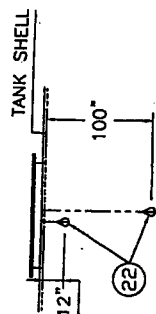
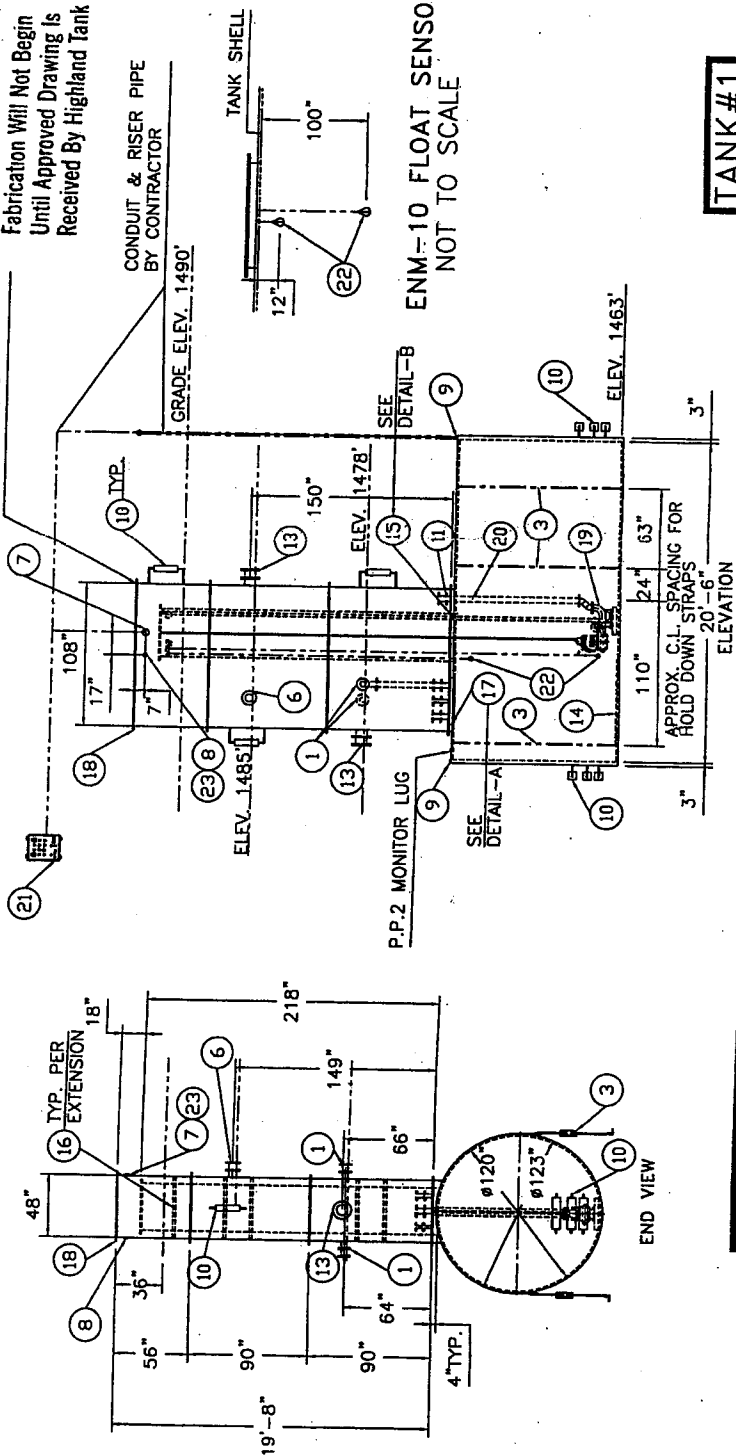
Feet	Gallons
28.5'	0
28.4'	15.5
28.3'	43.8
28.2'	80.2
28.1'	123.2
28'	171.7
27.9'	225.1
27.8'	410.4
27.7'	479.4
27.6'	551.6
27.5'	626.8
27.4'	704.9
27.3'	785.7
27.2'	954.7
27.1'	1042.7
27'	1132.9
26.9'	1319.5
26.8'	1415.6
26.7'	1513.7
26.6'	1613.4
26.5'	1714.8
26.4'	1817.9
26.3'	1922.4
26.2'	2028.4
26.1'	2135.8
26'	2354.6
25.9'	2465.9
25.8'	2578.4
25.7'	2692.2
25.6'	2922.3
25.5'	3038.9
25.4'	3156.5
25.3'	3275.0
25.2'	3394.3
25.1'	3514.4
25'	3756.8
24.9'	3879.0
24.8'	4001.9
24.7'	4249.3
24.6'	4373.9
24.5'	4498.9
24.4'	4624.3
24.3'	4750.1
24.2'	4876.3
24.1'	5002.8
24'	5129.6
23.9'	5383.9
23.8'	5509.1
23.7'	5638.9
23.6'	5766.5
23.5'	6022.1

Feet	Gallons
23.4'	6149.9
23.3'	6277.6
23.2'	6532.9
23.1'	6660.3
23'	6787.5
22.9'	6914.6
22.8'	7041.4
22.7'	7294.1
22.6'	7419.9
22.5'	7545.3
22.4'	7670.3
22.3'	7794.8
22.2'	8042.2
22.1'	8165.1
22'	8287.3
21.9'	8408.9
21.8'	8649.9
21.7'	8769.2
21.6'	8887.6
21.5'	9005.2
21.4'	9121.9
21.3'	9237.5
21.2'	9465.8
21.1'	9578.2
21'	9689.5
20.9'	9799.5
20.8'	9908.3
20.7'	10121.7
20.6'	10266.3
20.5'	10329.3
20.4'	10430.7
20.3'	10628.5
20.2'	10724.7
20.1'	10819.0
20'	10911.3
19.9'	11001.5
19.8'	11175.2
19.7'	11258.5
19.6'	11339.2
19.5'	11417.3
19.4'	11492.5
19.3'	11633.7
19.2'	11699.3
19.1'	11761.2
19'	11819.0
18.9'	11921.0
18.8'	11963.9
18.7'	1200.4
18.6'	12028.6
18.5'	12044.1

DETAIL-A  
NOT TO SCALE

(2)FDRN-0-9AO 42"x42"  
FLYGT ACCESS HATCH  
(TO BE FABRICATED TO  
ACCEPT ACCESS HATCHES)  
SEE DETAIL-C

**Fabrication Will Not Begin  
Until Approved Drawing Is  
Received By Highland Tank**



**DETAIL-B  
NOT TO SCALE**

5	08-07-01	MAILED 17 15	04 DEC. 0104130-81	06
4	08-01-01	CHANGED EXTENSION NUMBER 15	01 DEC. 0104130-81	06
3	07-11-01	CHANGED 758 TO 753 & REMOVED ALARM PANEL, HANA 12	01 DEC. 0104130-81	06
2	07-10-01	ADDED 2 28 TO COMPONENT SUPP	01 DEC. 0104130-81	06
1	06-27-01	MAILED PLANNED FITNESS TO CUSTOMER REQUEST	01 DEC. 0104130-81	06

## REVISIONS



# Highland Tank

12000 GALLON S.T.I.P. 3 UNDERGROUND  
DOUBLE WALL TYPE II 360

**CUSTOMER: BENCHMARK ENVIRONMENTAL  
BUFFALO, NY**

PROJECT: CHAFFEE LANDFILL  
SARDINIA, NY

QUOTE NO: 70928

SCALE:	DATE:	DWG. BY:	CHK'D BY:	DWG. NO.:
1/8"=1'-0"	06-15-01	TR		0102137-B

TANK #1

SEE ATTACHED DWG.010613D-B1 FOR GENERAL NOTES & FITTING SCHEDULE

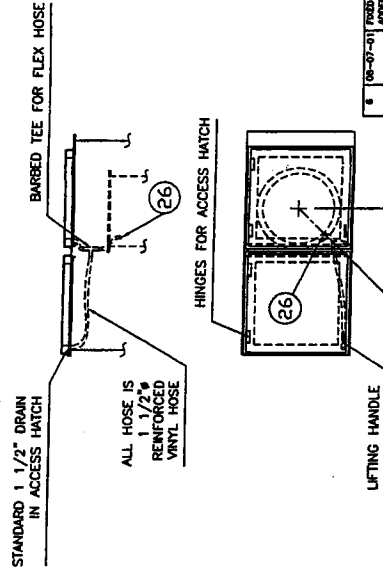


CAPACITY : 12000 GALLONS  
TYPE : II 360 DOUBLE WALL, S.T.I.P. 3, UNDERGROUND  
NO. REQ. : (1)  
MATERIAL : MILD CARBON STEEL  
TEST : 5 P.S.I.  
MIN. GAUGE OR THICKNESS (PER U.L. 58) :  
INNER HEADS : 5/16" OUTER HEADS : 1/4"  
INNER SHELL : 5/16" OUTER SHELL : 1/4"  
PAINT :  
INTERIOR : ULTRALINER AM SP-10 BLAST (15 MILS)  
EXTERIOR : SP-6 BLAST, COAT WITH 15 MILS. (D.P.)  
CORROSCOTE PLUS PER S.T.I.P. 3 SPEC  
CONSTRUCTION : FLAT FLANGED HEADS, LAP WELD ALL  
INTERIOR & EXTERIOR SEAMS  
APPROVED LABELS : U.L. 58, S.T.I.P. 3

- NOTE :

ALL RIGHTS RESERVED. THIS DRAWING OR ANY PART THEREOF MUST NOT BE REPRODUCED IN ANY FORM WITHOUT THE WRITTEN PERMISSION OF HIGHLAND TANK.

HIGHLAND TANK SHALL BE RESPONSIBLE ONLY FOR ITEMS INDICATED ON THIS FABRICATION DRAWING UNLESS OTHERWISE NOTED. CUSTOMER IS RESPONSIBLE FOR VERIFYING CORRECTNESS OF SIZE / LOCATION OF FITTINGS , ACCESSORIES & COATINGS SHOWN ON THIS DRAWING



DETAIL-D  
NOT TO SCALE

6	08-07-01	POSD 11 BY CHANGING TO ISOLATED SPOOL	D06
5	08-01-01	CHANGES TO FITTING SEAL TO MATCH DWG. ON MANWAY	D00
		EXTENSIONS & TUGS	
4	07-11-01	REMOVED ALUMI PANEL 32	D08
		CHANGED F8 TO F23	
3	07-10-01	ADDED F8 TO FITTING SCHEDULE	D08
2	8-22-01	CHANGED GENERAL NOTES & FITTING SEAL TO MATCH DWG.	D08
1	8-22-01	TOOK OUT NOTE1	
		CHANGED GENERAL NOTES & NOTE1	D08

BENCHMARK ENVIRONMENTAL  
BUFFALO, NY  
CHAFFEE LANDFILL  
SARDINIA, NY

70928

1/8"=1'-0" 06-15-01 DB 010613D-B1

TANK #1



# Madison Chemical Industries Inc.



## CORROCOTE II ULTRALINER

### TECHNICAL DATA

### HIGH PERFORMANCE POLYURETHANE TANK LINING SYSTEM

#### THE PRODUCT AND ITS USES

Corrocote II UltraLiner is a zero VOC, plural component, instant setting, 100% solids polyurethane coating system. It is specifically formulated to protect storage tanks from internal abrasion and corrosion. Corrocote II UltraLiner cures to form a tough, durable, non-leaching polyurethane plastic, offering superior temperature and chemical resistance.

Corrocote II UltraLiner is a primerless system which can be sprayed to any desired thickness in a single multi-pass coat at any ambient temperature. Corrocote II UltraLiner cuts application costs by improving productivity and dramatically increasing throughput. Corrocote II UltraLiner is used to line petrochemical storage tanks, oil/water separators, secondary containment dykes and chemical storage vessels. It can be used at higher in-service temperatures than other polyurethane coatings; consult your Madison representative for details.

**Corrocote Ultraliner (CM)** is a ceramic modified version of Corrocote II UltraLiner that offers excellent abrasion resistance and is ideal for highly abrasive or high flow applications.

**Corrocote Ultraliner (AM)** is an anti-microbial version of Corrocote II UltraLiner that offers protection against bacterial attack. Although the standard formulation is not susceptible to bacteria attack, the EPA Registered Anti-microbial Agent in Corrocote II Ultraliner (AM) provides for extended service life in wastewater application.

#### TECHNICAL INFORMATION

PROPERTY	TEST DESCRIPTION	RESULTS
Application Temperatures	N/A	-40°C(-40°F) to 65°C(150°F)
Initial Setting Time	@ 70°F/20°C	1 minute (snap set), 5 minute. (fast set)
Curing Time Before Handling	@ 70°F/20°C	5 minute (snap set), 15 minute (fast set)
Ultimate Cure	@ 70°F/20°C	4 days
Recoat Time	@ 70°F/20°C	up to 30 minutes (snap set), 1 hour (fast set)
Solids Content	ASTM D-1259	100%
Volatile Organic Compounds (VOCs)	ASTM D-2369	0 grams / litre
Theoretical coverage	N/A	40 m <sup>2</sup> /litre/25 microns (1604 ft <sup>2</sup> /US gal/mil)
Adhesion to steel	ASTM D-4541 (SSPC-SP5)	greater than 2000 p.s.i.
Adhesion to concrete	ASTM D-4541	greater than cohesive strength of concrete
Adhesion to ductile iron	ASTM D-4541	greater than 2000 p.s.i.
Hardness	ASTM D-2240 Shore D	75 +/- 5
Flexibility	ASTM D-522 (15 mils)	180° over 2" mandrel
Abrasion Resistance	ASTM D-4060 (Taber CS-17)	35 mg loss @ 1 kg per 1000 cycles 15 mg loss (CM version)
Permeability	ASTM E-96B (15 mils)	0.002 perm inches
Resistance to Cathodic Disbondment	ASTM G8 (STP 28 days)	Excellent; less than 10 mm radius
Chemical Resistance	ASTM D-543	Excellent; see Chemical Resistance Chart
Dielectric strength	ASTM D-149	greater than 200 volts per mil
Surface Resistivity	ASTM D-257	1 x 10 <sup>14</sup> ohms per cm <sup>2</sup>
Water Absorption	ASTM D-471	less than 3%
Impact Resistance	ASTM G-2794 (20 mils)	Very Good; greater than 50 in. lbs.
Ultraviolet Resistance	ASTM G-53	Will darken and chalk
Service Temperature	ASTM D-870, ASTM D-2485	-40°C(-40°F) to 90°C(195°F) Wet -40°C(-40°F) to 125°C(250°F) Dry
Colors		Off-White, Black, Medium Gray

NOTE: All statements, technical information and recommendations contained herein are typical of results obtained under laboratory conditions and are not intended to be used as contract specifications. For specification guidelines please contact Madison Chemical.

# Highland Nylon Hold Down Straps

*The World's Easiest Hold Down Strap System!*



**Highland Tank**

## Highland Tank

### Nylon Hold-down Straps

The latest tank innovation from the nation's leading manufacturer - Highland Tank. Nylon Straps are designed to help secure tanks underground in areas having ground water.

*Strap liners are not needed!* If installed correctly, there are not any metallic components in the strap system that can make contact with the tank.

Hold-down Straps are made from 3" wide 100% nylon webbing. Highland's Nylon Straps are fabricated with a large reinforced loop at each end for connecting to your concrete anchors. Included with each strap is a length of 1/2" diameter wire rope and two cable clamps for attaching the strap to one side of your concrete anchoring. A hook-to-hook turnbuckle is used for attaching the strap to the anchoring on the other side of the tank.

Tank installation instructions should be referenced for specific strap requirements.

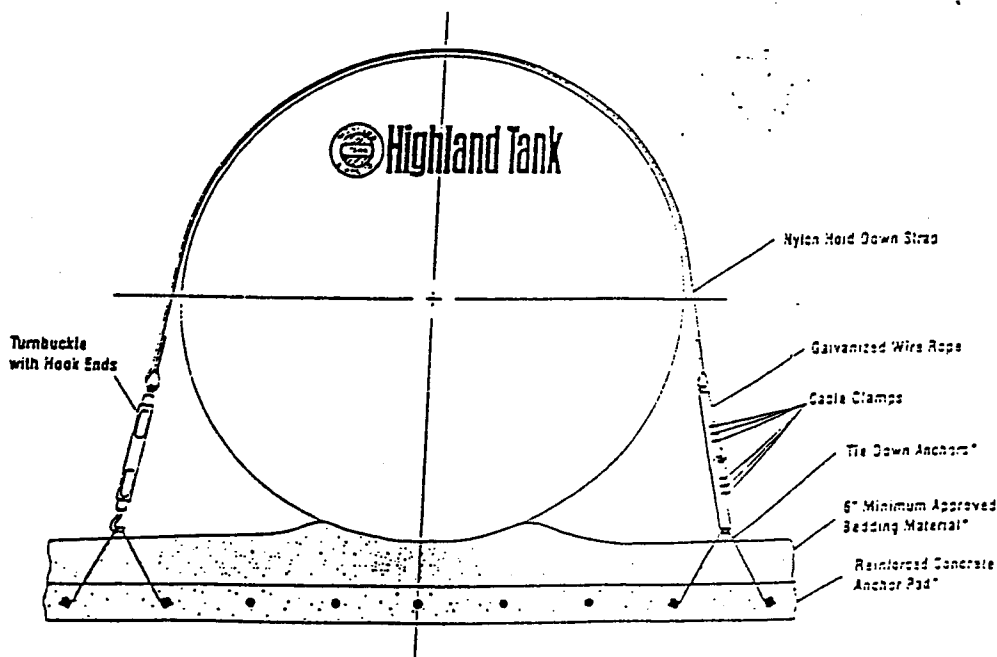
*These straps are designed for and must be used in a system that has adequately sized concrete anchoring to counteract the tank's natural buoyant forces. Nylon Straps are intended for underground use ONLY.*

### Installations Instructions

- Open turnbuckle the whole way.
- Lay nylon strap over tank.
- Insert one hook end of turnbuckle through one loop of nylon strap.
- Hook other end of turnbuckle through tie-down anchor (by contractor) on one side of tank.
- Go to other side of tank.
- Wrap 1/2" wire rope through loop and end of nylon strap and through tie-down anchor (by contractor). Insert thimble at each juncture.
- Create a loop with one end of wire rope using (3) 1/2" cable clamps and insert thimble.
- Pull other end of wire rope through loop, insert thimble to create an interlocking loop. Draw tight and secure second loop with (3) 1/2" cable clamps.
- Return to turnbuckle side of tank and tighten turnbuckle to secure tank.



Tank Dia.	Turn-Buckle Dia.	Strap Length
4'0"	3/4"	89"
5'4"	3/4"	124"
6'0"	1"	137"
8'0"	1"	194"
10'0"	1-1/4"	242"
10'6"	1-1/4"	258"
12'0"	1-1/4"	294"



One Highland Road  
Stoystown, PA 15563  
814-393-5701  
FAX 393-6125

99 West Elizabethtown Road  
Manheim, PA 17545  
717-664-0600  
FAX 664-0617

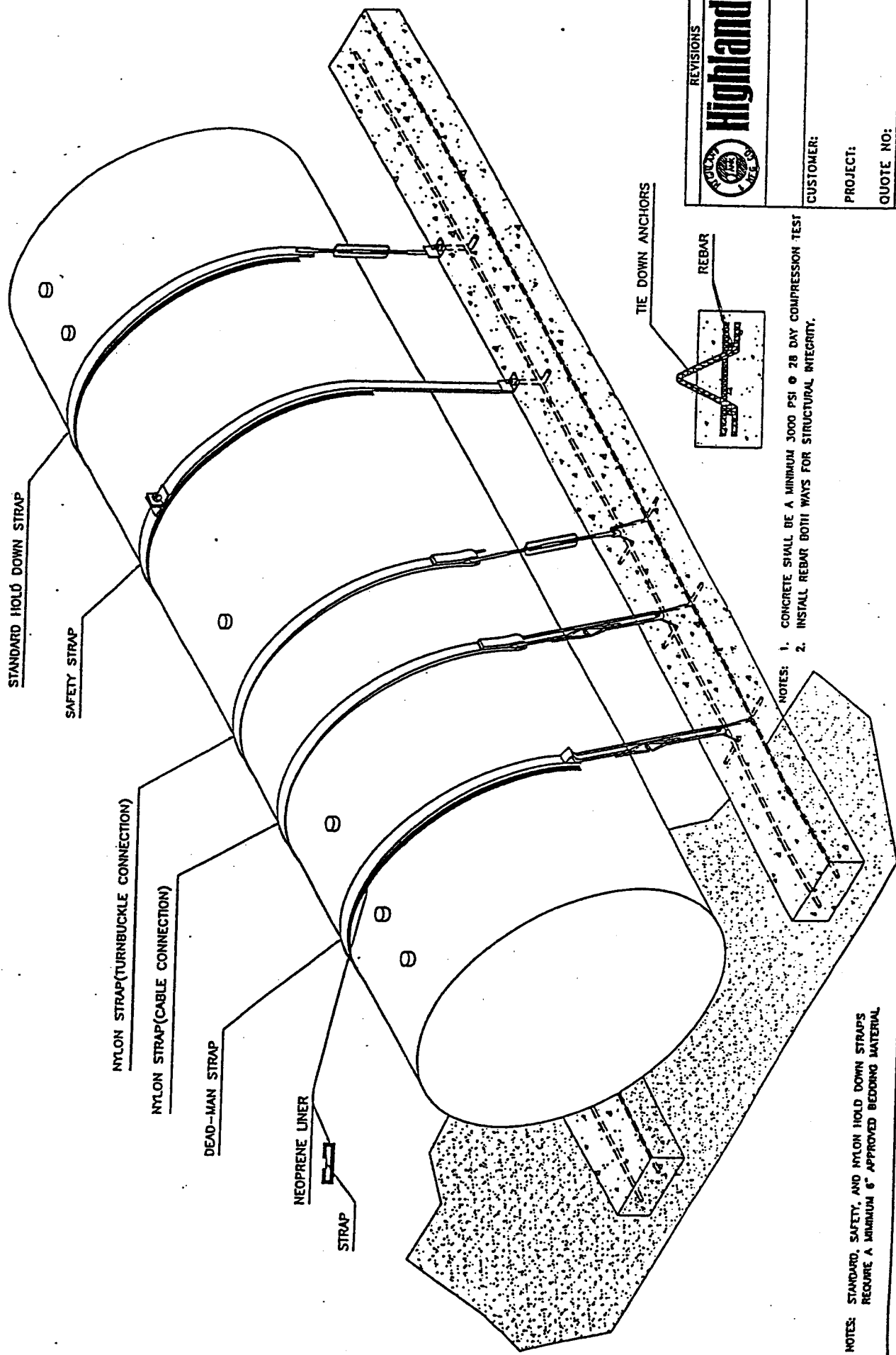
958 19th Street  
Watervliet, NY 12189  
518-273-0801  
FAX 273-1365

2225 Chestnut Street  
Lebanon, PA 17042  
717-664-0602  
FAX 664-0631

2700 Patterson Street  
Greensboro, NC 27407  
336-218-201  
FAX 218-1292

354 Route 108  
Somersworth, NH 03873  
603-692-2012  
FAX 692-2014

© Highland Tank - HT-1049-1/89



REVISIONS

**Highland Tank**

QUOTE NO. 30000

CUSTOMER:

PROJECT:

DATE: 01/10/00

BY: JRM

CHK: JRM

DATE: 01/10/00

- NOTES:
1. CONCRETE SHALL BE A MINIMUM 3000 PSI @ 28 DAY COMPRESSION TEST
  2. INSTALL REBAR BOTH WAYS FOR STRUCTURAL INTEGRITY.

NOTES: STANDARD, SAFETY, AND NYLON HOLD DOWN STRAPS REQUIRE A MINIMUM 6" APPROVED BEDDING MATERIAL.

## CP-3127

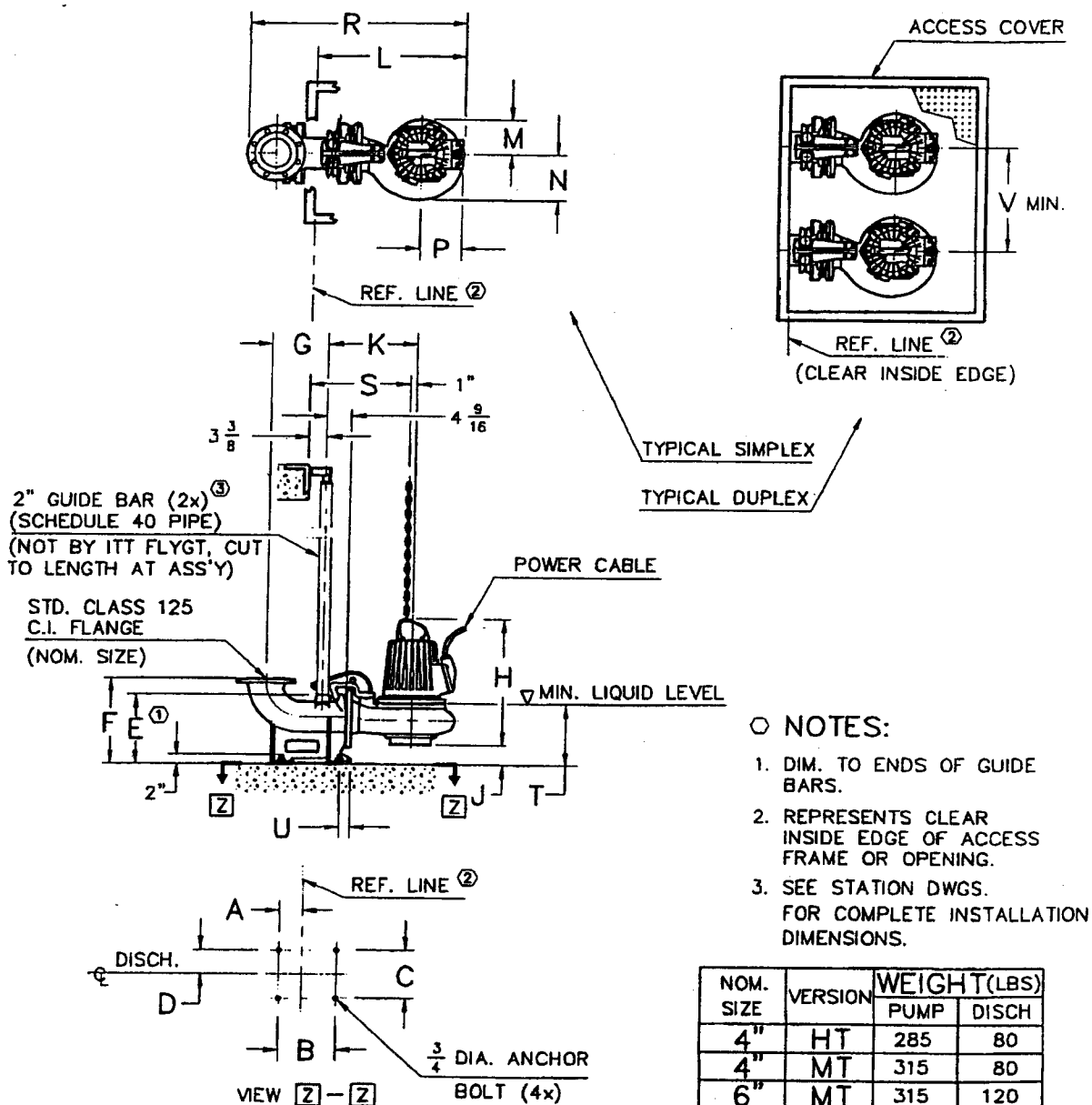
Section 4



## OUTLINE DIMENSIONS

Issued: 3/96

Supersedes: 6/94



## NOTES:

1. DIM. TO ENDS OF GUIDE BARS.
2. REPRESENTS CLEAR INSIDE EDGE OF ACCESS FRAME OR OPENING.
3. SEE STATION DWGS. FOR COMPLETE INSTALLATION DIMENSIONS.

NOM. SIZE	VERSION	WEIGHT(LBS)	
		PUMP	DISCH
4"	HT	285	80
4"	MT	315	80
6"	MT	315	120
8"	LT	330	145

ALL DIMENSIONS IN INCHES

NOM. SIZE	VERSION	DIMENSIONAL CHART																		
		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V
4"	HT	2 3/4	9 3/4	7 3/4	3 3/4	10 1/2	15 3/4	10	25	3 1/4	16 3/4	28 1/2	7 1/2	9 1/4	8 1/2	39 1/2	19	11	2 3/4	20
4"	MT	2 3/4	9 3/4	7 3/4	3 3/4	10 1/2	15 3/4	10	26	3	16 3/4	28 1/2	7 1/2	8 1/2	8 1/2	39 1/2	19	12	2 3/4	20
6"	MT	4 1/2	11	9 3/4	4 3/4	14 1/2	17 3/4	11	26	4 1/2	16 3/4	28 1/2	7 1/2	9 1/2	8 1/2	41 1/2	19	13	2 1/2	21 1/2
8"	LT	5 1/2	11	9 3/4	4 3/4	15	17 3/4	12 1/2	26 1/2	4 1/2	18 1/2	30 1/2	7 1/2	10	8 1/2	45 1/2	20 1/2	14	2 1/2	21 1/2

## CP-3127

Section 5

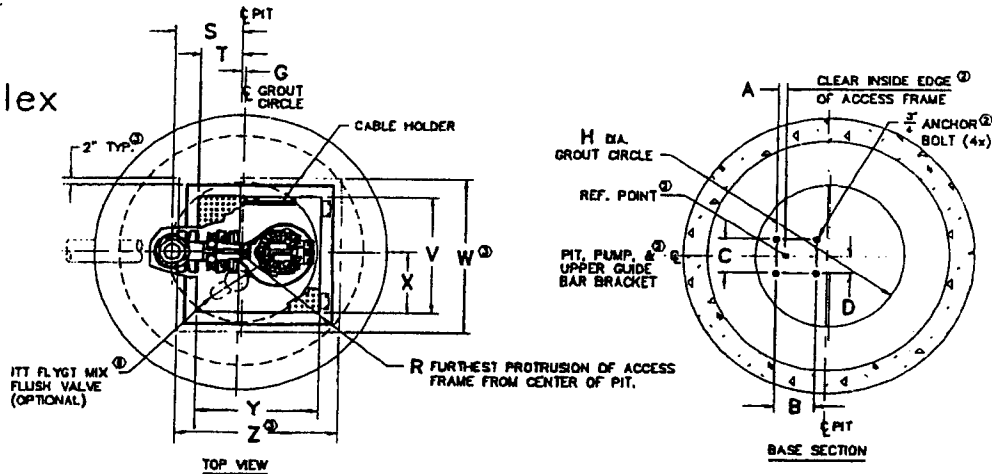


Lift Station Dimensions

Issued: 4/96

Supersedes: 6/94

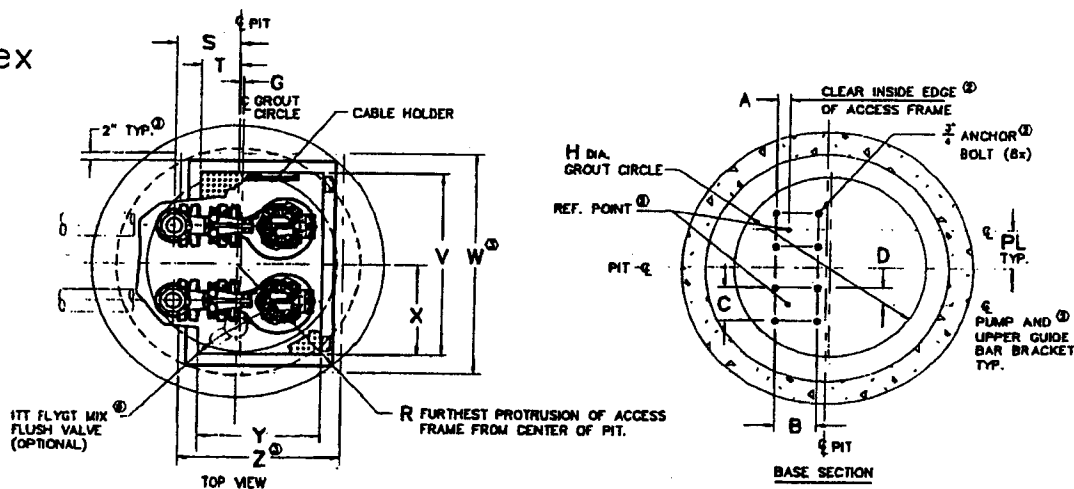
Simplex



ALL DIMENSIONS IN INCHES

DIMENSIONAL CHART																									
NOM. SIZE	VERSION	STATION													COVER										
		A	B	C	D	F	G	H	R	S	T	U	C	V	M	W	SIZE				V	W	X	Y	Z
4"	HT	2 1/2	9	7 1/2	3 1/2	15 1/2	1	38	29	17	10 1/2	60	11 1/2	13	FAPS-34 x 31				30	41	15	30	44	3	
4"	MT	2 1/2	9	7 1/2	3 1/2	15 1/2	1	38	29	17	10 1/2	60	11 1/2	14	FAPS-34 x 31				30	41	15	30	44	3	
6"	MT	4 1/2	11	9 1/2	4 1/2	17 1/2	2	37	31	15 1/2	8	60	14	15	FAPS-34 x 31				30	41	15	30	44	3	
8"	LT	5 1/2	11	9 1/2	4 1/2	17 1/2	1	42	43	20	11 1/2	72	19 1/2	16	FAPS-47 x 43				42	53	22	42	57	3	

Duplex



ALL DIMENSIONS IN INCHES

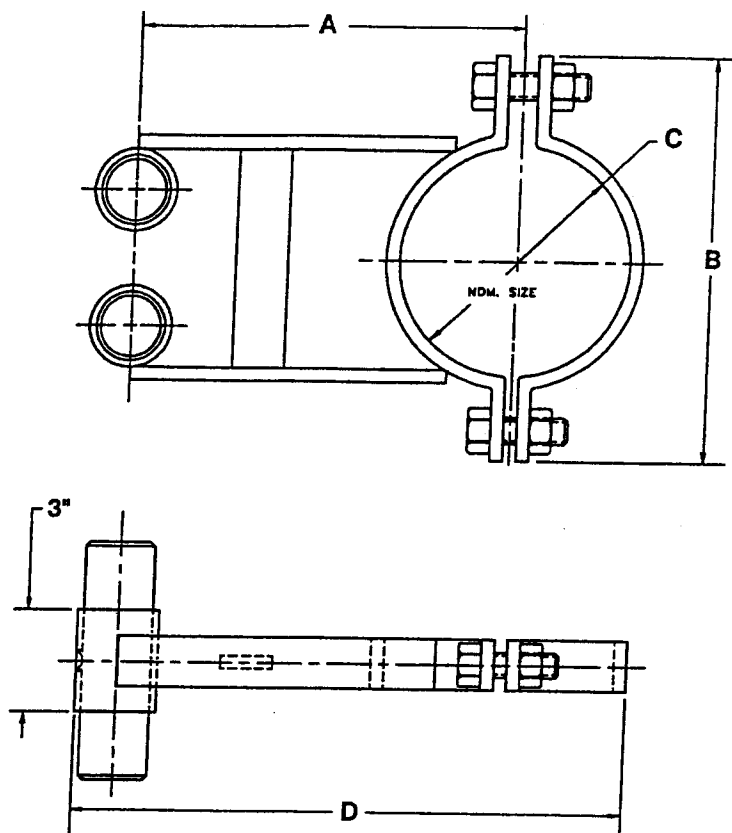
DIMENSIONAL CHART																								
NOM. SIZE	VERSION	STATION															COVER							
		A	B	C	D	F	G	H	R	S	T	U	C	V	M	W	PL	SIZE	V	W	X	Y	Z	AD
4"	HT	2 1/2	9	7 1/2	3 1/2	15 1/2	1	47	36	15 1/2	9 1/2	60	11 1/2	13	10		FAPS-34 x 49	48	59	28	30	44	3	
4"	MT	2 1/2	9	7 1/2	3 1/2	15 1/2	1	47	38	15 1/2	9 1/2	60	11 1/2	14	10		FAPS-34 x 49	48	59	26	30	44	3	
6"	MT	4 1/2	11	9 1/2	4 1/2	17 1/2	1	52	39	14	8 1/2	72	14	15	11		FAPS-34 x 49	48	58	27	30	44	3	
8"	LT	5 1/2	11	9 1/2	4 1/2	17 1/2	1	55	41	18 1/2	9 1/2	72	19 1/2	16	11		FAPS-40 x 49	48	58	27	36	50	3	

PAGE	SECTION
<b>10</b>	<b>10</b>
ISSUED	SUPERSEDES
9/95	6/94

## Intermediate Guide Bar Brackets (for steel pipe)

**NOTE:**

These Steel Clamps  
are designed to fit  
Steel Pipe only.



All dimensions (inches)

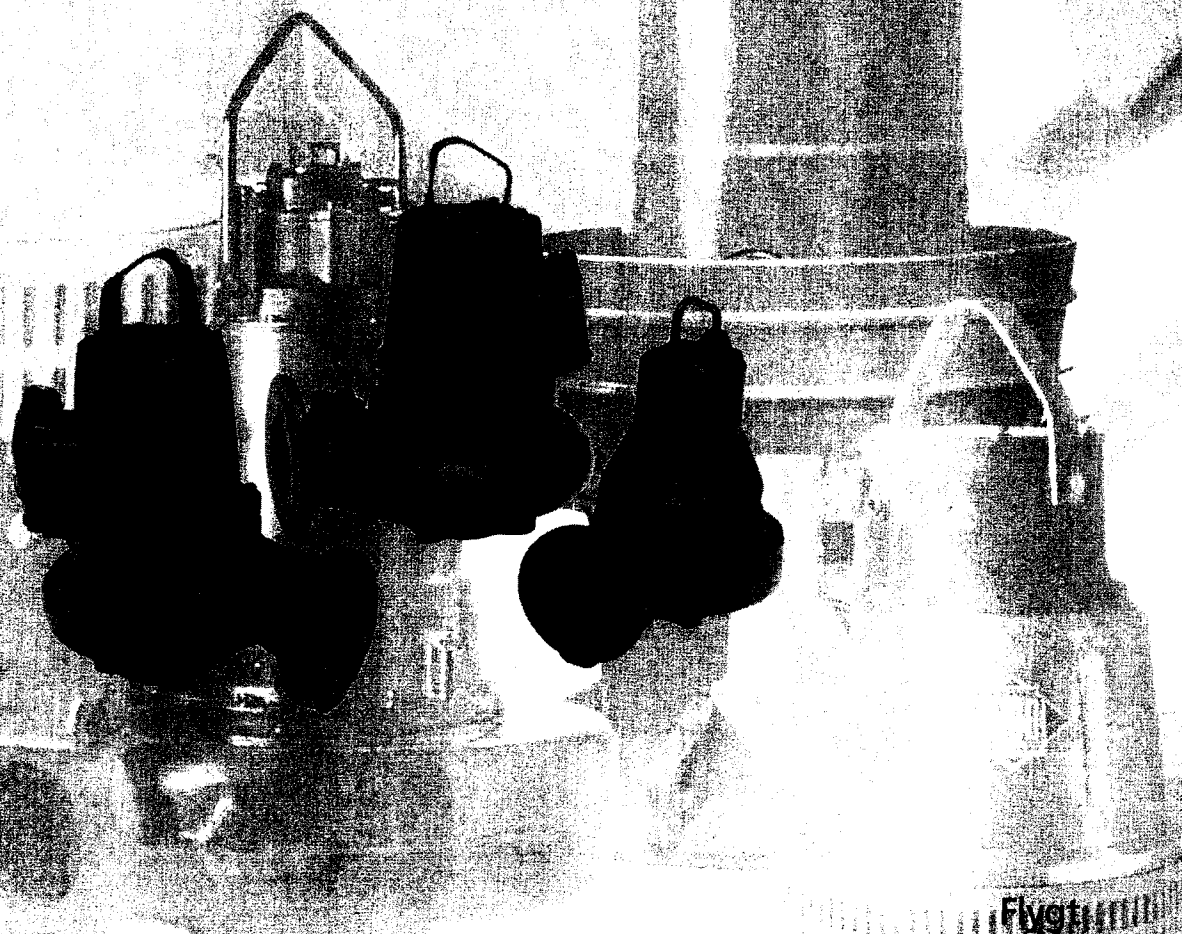
Intermediate Guide Bar Bracket	Part Number			A	B	C	D
	Steel	304 SS	316 SS				
4" DP-3080, C/D/FP-3085, CP/FP-3102, CP-3127, 3140	14-58 42 01	14-58 44 13	14-58 44 14	9-7/8	8-9/16	4	13-1/8
6" CP-3102, CP/FP-3127, CP-3140, CP/FP-3152	14-58 42 02	14-58 44 15	14-58 44 16	11	11-5/8	6	15-3/8
6" CP-3201, 3170	14-58 44 41	**	**	11	11-5/8	6	15-7/8
8" CP-3127, 3152	14-58 42 03	14-58 44 17	14-58 44 18	12-3/16	13-7/8	8	17-9/16
8" CP-3170, 3201, 3300	14-58 44 01	**	**	12-1/8	13-7/8	8	18
8" CP-3231	14-58 44 10	**	**	14-13/16	13-7/8	8	20-11/16
10" CP-3140, 3152	14-58 42 04	14-58 44 19	14-58 44 43	14-1/8	17	10	20-5/8
10" CP-3170, 3201	14-58 44 03	**	**	14-1/8	16-7/8	10	21-1/8
12" CP-3170, 3201, 3300	14-58 44 04	**	**	17-1/8	18-15/16	12	25-1/8
12" CP-3306, 3312	14-58 44 05	**	**	17-3/4	18-15/16	12	25-3/4
14" CP-3300	14-58 44 06	**	**	18-1/8	21	14	27-1/8
14" CP-3306, 3312, 3356	14-58 44 12	**	**	18-3/4	21	14	27-3/4
20" CP-3531, 3501	14-58 44 07	**	**	21-5/8	28	20	33-3/4
24" CP-3602	14-58 44 08	**	**	24	33-1/2	24	38-1/8
32" CP-3800**							

\*\* Contact Flygt Engineering

**FLYGT**

# Installation, care and maintenance

3085/3102/3127





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# SAFETY

This manual contains basic information on the installation, operating and maintenance and should be followed carefully. It is essential that these instructions are carefully read before installation or commissioning by both the installation crew as well as those responsible for operation or maintenance. The operating instructions should always be readily available at the location of the unit.

## Identification of safety and warning symbols



### General Danger:

Non-observance given to safety instructions in this manual, which could cause danger to life have been specifically highlighted with this general danger symbol.



### High Voltage:

The presence of a dangerous voltage is identified with this safety symbol.

## WARNING!

Non-observance to this warning could damage the unit or affect its function

## Qualifications of personnel

An authorized (certified) electrician and mechanic shall carry out all work.

## Safety regulations for the owner/operator

All government regulations, local health and safety codes shall be complied with.

All dangers due to electricity must be avoided (for details consult the regulations of your local electricity supply company).

## Unilateral modification and spare parts manufacturing

Modifications or changes to the unit/installation should only be carried out after consulting with ITT Flygt.

Original spare parts and accessories authorized by the manufacturer are essential for compliance. The use of other parts can invalidate any claims for warranty or compensation.

## Dismantling and re-assembly

If the pump has been used to pump hazardous media, care must be taken that, when draining the leakage, personnel and environment are not endangered.

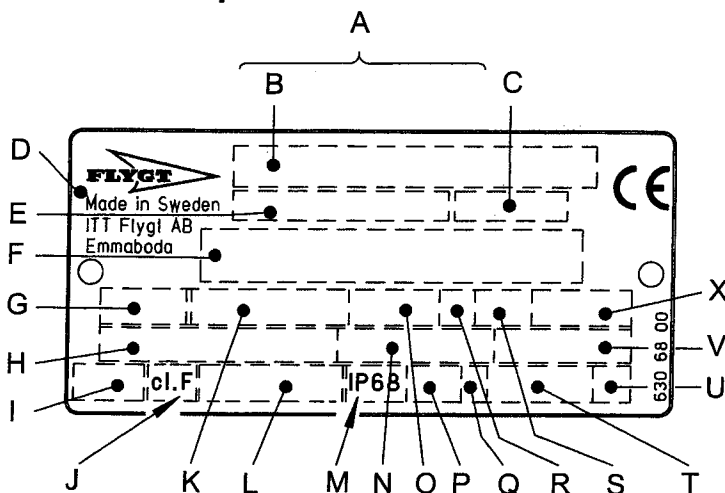
All waste and emissions such as used coolant must be appropriately disposed of. Coolant spills must be cleaned up and emissions to the environment must be reported.

The pumping station must be kept tidy and in good order at all times.

All government regulations shall be observed.

# DATA PLATE INTERPRETATION

## General data plate

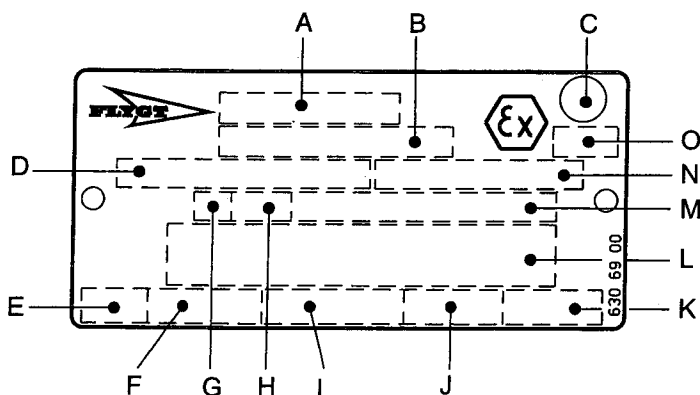


- A Serial number
- B Product code + Number
- C Curve code / Propeller code
- D Country of origin
- E Product number
- F Additional information
- G Phase; Type of current; Frequency
- H Rated voltage
- I Thermal protection
- J Thermal class
- K Rated shaft power
- L International standard
- M Degree of protection
- N Rated current
- O Rated speed
- P Max. submergence
- Q Direction of rotation: L=left, R=right
- R Duty class
- S Duty factor
- T Product weight
- U Locked rotor code letter
- V Power factor
- X Max. ambient temperature

## Approval plates

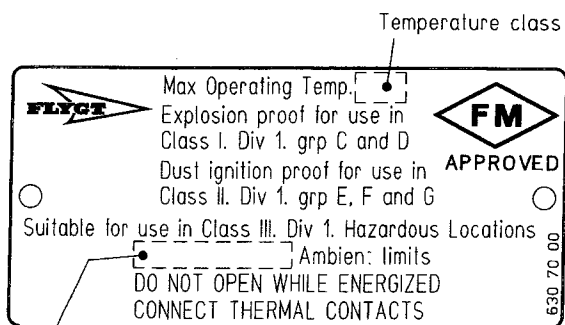
These approval plates apply to an explosion-proof submersible Flygt pump.  
The plates are used together with the general data plate on the pump.

**EN:** European Norm  
ATEX Directive  
EN 50014, EN 50018, EN 1127-1  
⊕ II 2 G EEx dII T4



- A Approval
- B Approval authority + Approval Number
- C Approval for Class I
- D Approved drive unit
- E Stall time
- F Starting current / Rated current
- G Duty class
- H Duty factor
- I Input power
- J Rated speed
- K Controller
- L Additional information
- M Max. ambient temperature
- N Serial number
- O ATEX marking

**FM:** Factory Mutual  
Class I Div. I Grp C and D  
Class II and III Div. I Grp E, F and G



Max. ambient temperature

## Introduction

Thank you for buying a submersible Flygt pump. In this Installation, Care and Maintenance manual you will find general information on how to install and service the 3085, 3102 or 3127 pump to give it a long and reliable life. In the Parts List you will find all the specific technical data for your pump.

## Application

This Installation, Care and Maintenance manual applies to a submersible Flygt pump. If you have bought an Ex-approved pump (please see approval plate on your pump or Parts List) special handling instructions apply as described in this document.

Depending on the hydraulic end, the pump is intended to be used for:

- pumping of waste water
- pumping of light liquid manure and urine
- pumping of sludge
- pumping of ground water
- pumping of sewage if the solids need to be cut into small pieces.

The pumps must not be used in highly corrosive liquids. See pH limits below.

The pump is available for permanent installation in a sump or portable installation with hose connection and stand.

In some applications, the pump is also available for a dry stationary installation on a base stand directly connected to the inlet and outlet lines.

For further information on applications, contact your nearest Flygt representative.

## Specific technical data

For specific technical data regarding your pump, please see Parts List.

## General technical data

**Liquid temperature:** max. 40°C (104°F). The pump can be operated at full load only if at least half the stator housing is submerged.

The pump can be equipped for operation at temperatures up to 90°C (195°F). At increased temperatures, the pump must be completely submerged when operated at full load.

Higher temperatures than 40°C (104°F) are not permitted for Ex-approved pumps.

**Liquid density:** max. 1100 kg/m<sup>3</sup> (9.2 lb per US gal.)

**The pH of the pumped liquid:** 6—13 (cast iron pumps).

**The pH of the pumped liquid:** 3—14 (stainless steel pumps).

**Depth of immersion:** max. 20 m (65 ft).



- In some installations and at certain operating points on the performance curve, the noise level of 70 dB or the noise level specified for the actual pump may be exceeded.
- Only Ex-approved pumps may be used in an explosive or flammable environment.

## Warranty claim

Flygt pumps are high quality products with expected reliable operation and long life. However, should the need arise for a warranty claim, please contact your Flygt representative.

# GENERAL DESIGN OF A FLYGT PUMP

## Design

The pump is a submersible, electric motor-driven product.

### 1. Impeller

The pump is available with a wide range of impellers for different applications and capacities.

### 2. Shaft seals

The pump has two mechanical face seals – one inner and one outer, with an intermediate oil housing.

### 3. Shaft

The shaft is delivered with the rotor as an integral part. Shaft material: stainless steel.

### 4. Bearings

The support bearing of the rotor consists of a single-row ball bearing.

The main bearing of the rotor consists of a two-row angular contact ball bearing.

### 5. Oil housing

The oil lubricates and cools the seals and acts as a buffer between the pump housing and the electric motor.

### 6. Motor

Squirrel-cage 1-phase or 3-phase induction motor for 50 Hz or 60 Hz.

The motor can be started by direct on-line or star-delta starting.

The motor can be run continuously or intermittently with a maximum of 15 evenly spaced starts per hour.

Flygt motors are tested in accordance with IEC 34-1.

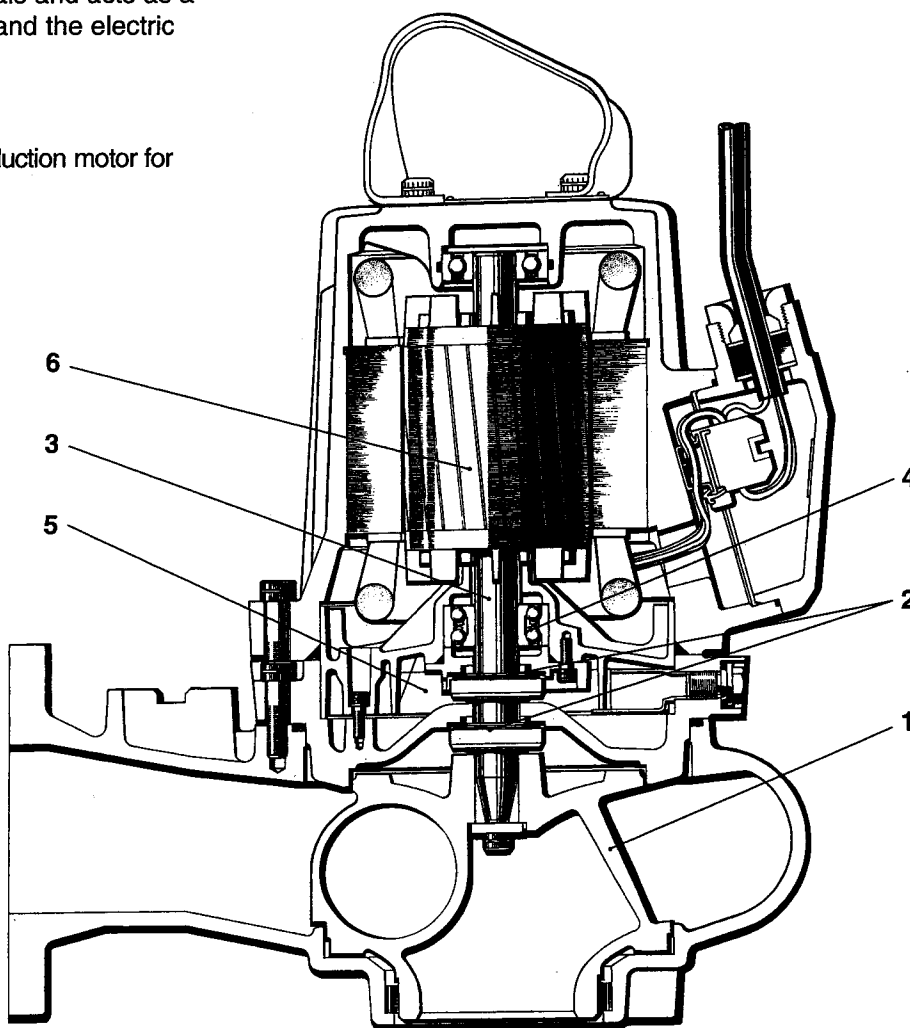
The stator is insulated in accordance with class F (155°C, 310°F). The motor is designed to deliver its rated output at  $\pm 5\%$  variation from the rated voltage. Without overheating the motor,  $\pm 10\%$  variation from the rated voltage can be accepted provided that the motor does not run continuously at full load. The motor is designed to operate at a voltage imbalance of up to 2% between the phases.

### Monitoring equipment

The stator incorporates thermal contacts connected in series.

The pump can be equipped with sensors for sensing water in the oil\* and/or stator housing.

\*Not applicable to Ex-approved pumps.



# INSTALLATION

## Handling equipment

Lifting equipment is required for handling the pump.



- **Stay clear of suspended loads.**
- **Always lift the pump by its lifting handle - never by the motor cable or the hose.**

The minimum height between the lifting hook and the floor shall be sufficient to lift the pump out of the sump.

The lifting equipment shall be able to hoist the pump straight up and down in the sump, preferably without the need for resetting the lifting hook.

Oversize lifting equipment could cause damage if the pump should stick when being lifted.

Make sure that the lifting equipment is securely anchored.

## General recommendations

To ensure proper installation, please see the dimensions on the dimensional drawing in the Parts List.

**NOTE!** The end of the cable must not be submerged. It must be above flood level, as water may penetrate through the cable into the junction box or the motor.

Check that the lifting handle and chain are in good condition.

For automatic operation of the pump (level control), it is recommended that the level regulators be used at low voltage. The data sheet delivered with the regulators gives the permissible voltage. Local rules may specify otherwise.

Clean out all debris from the sump before the pump is lowered down and the station is started.



**Special rules apply to installation in explosive atmosphere.**

- **Intrinsically safe circuits are normally required (Ex i) for the automatic level control system by level regulators.**
- **Minimum stop level should be according to the dimensional drawing.**
- **The pump must never run dry.**

## Safety precautions

In order to minimize the risk of accidents in connection with the service and installation work, the following rules should be followed:

1. Never work alone. Use a lifting harness, safety line and a respirator as required. Do not ignore the risk of drowning!
2. Make sure there are no poisonous gases within the work area.
3. Check the explosion risk before welding or using electric hand tools.
4. Do not ignore health hazards. Observe strict cleanliness.
5. Bear in mind the risk of electrical accidents.
6. Make sure that the lifting equipment is in good condition.
7. Provide a suitable barrier around the work area, e.g a guard rail.
8. Make sure you have a clear path of retreat!
9. Use safety helmet, safety goggles and protective shoes.
10. All personnel who work with sewage systems must be vaccinated against diseases to which they may be exposed.
11. A first-aid kit must be close at hand.
12. Note that special rules apply to installation in explosive atmosphere.

Follow all other health and safety rules and local codes and ordinances.

# ELECTRICAL CONNECTIONS



- Before starting work on the pump, make sure that the pump and the control panel are isolated from the power supply and cannot be energized.
- If the pump is equipped with automatic level control, there is a risk of sudden restart.
- All electrical equipment must be earthed. This applies to both pump equipment and any monitoring equipment. Failure to heed this warning may cause a lethal accident. Make sure that the earth lead is correctly connected by testing it.
- If persons are likely to come into physical contact with the pump or pumped media (liquid), e.g. on construction sites and farms, the earthed (grounded) socket must have an additional earth-(ground-) fault protection device (GFI) connected.  
When pumping near a lake (jetties, beaches, ponds, fountains etc) a safety-distance of at least 20 m (65 ft) between the person and the pump is applicable.  
The pump must never be placed directly into a swimming pool. If used in connection with swimming pools, special safety regulations apply.



## NOTE for Ex version

- Electrical connections on the explosion-proof motor must be made by authorized personnel.  
Flygt disclaims all responsibility for work done by untrained, unauthorized personnel.
- The pump may be used only in accordance with the approved motor data stated on the pump's plates.
- Thermal contacts must be connected to protection circuit intended for that purpose according to the approval of the product.

All electrical work shall be carried out under the supervision of an authorized electrician.

Local codes and regulations shall be complied with.

Check on the data plate which voltage supply is valid for your pump.

Check that the main voltage and frequency agree with the specifications on the pump data plate.

If the pump can be connected to different voltages, the connected voltage is specified by a yellow sticker.

Connect the motor cable to the starter equipment as illustrated in the wiring diagrams.

## Conductors that are not in use must be isolated.

The cable should be replaced if the outer sheath is damaged. Contact a Flygt service shop.

Make sure that the cable does not have any sharp bends and is not pinched.

Under no circumstances may the starter equipment be installed in the sump.

**NOTE!** For safety reasons, the earth conductor should be approx. 50 mm (2.0") longer than the phase conductors. If the motor cable is jerked loose by mistake, the earth conductor should be the last conductor to come loose from its terminal. This applies to both ends of the cable.

Thermal contacts are incorporated in the stator. The thermal contacts can be connected to max 250 V, breaking current max 4 A. Flygt recommends that they be connected to 24 V over separate fuses to protect the other automatic equipment.

Make sure that the pump is correctly earthed (grounded).

When using a variable-frequency-drive (VFD) the shielded cable (type NSSHÖU.../3E+St) should be used. Contact your Flygt representative and ask your VFD-supplier for electrical limitations.

## ELECTRICAL CONNECTIONS

Remember that the starting current in direct on-line starting can be up to six times higher than the rated current. Make sure that the fuses or circuit breakers are of the proper rating.

The Parts List gives rated current. Fuse rating and cable shall be selected in accordance with local rules and regulations. Note that with long cables, the voltage drop in the cable must be taken into consideration, since the motor's rated voltage is the voltage that is measured at the terminal board in the pump.

The overload protection (motor protection breaker) for direct on-line starting shall be set to the motor rated current as given on the data plate.

Check the phase sequence in the mains with the phase sequence indicator.

If intermittent operation is prescribed (see Data Plate), the pump shall be provided with control equipment that provides such operation.

### Single phase operation

The Flygt single phase pumps must be equipped with a starter which has start and run capacitors.

A special Flygt designed starter is required for the operation of single phase pumps. The connection of the motor cable to the starter is shown in the wiring diagram.

**NOTE!** It is not possible to change the direction of rotation of a single phase pump by changing the cable conductors on the starter. Please contact your nearest Flygt representative.

### Monitoring equipment

A plate in the junction box shows if the pump is equipped with sensors.

**CLS-30** is a leakage sensor for sensing water in the oil housing and initiates an alarm when the oil contains 30% water. Oil change is recommended after the alarm. If the sensor initiates an alarm shortly after the oil is changed, contact your nearest Flygt representative. The CLS sensor is installed in the bearing housing and goes down into the oil housing. The sensor is not applicable to Ex-approved pumps.



**CLS sensor body made of glass.  
Handle with care.**

The **FLS** sensor consists of a small float switch for sensing water in the stator housing. Its design makes it suitable for pumps in vertical installations. The FLS sensor is installed in the bottom of the stator housing.

The two sensors, CLS and FLS, can be used in the same pump. They are connected in parallel. Follow the instructions for monitoring equipment.

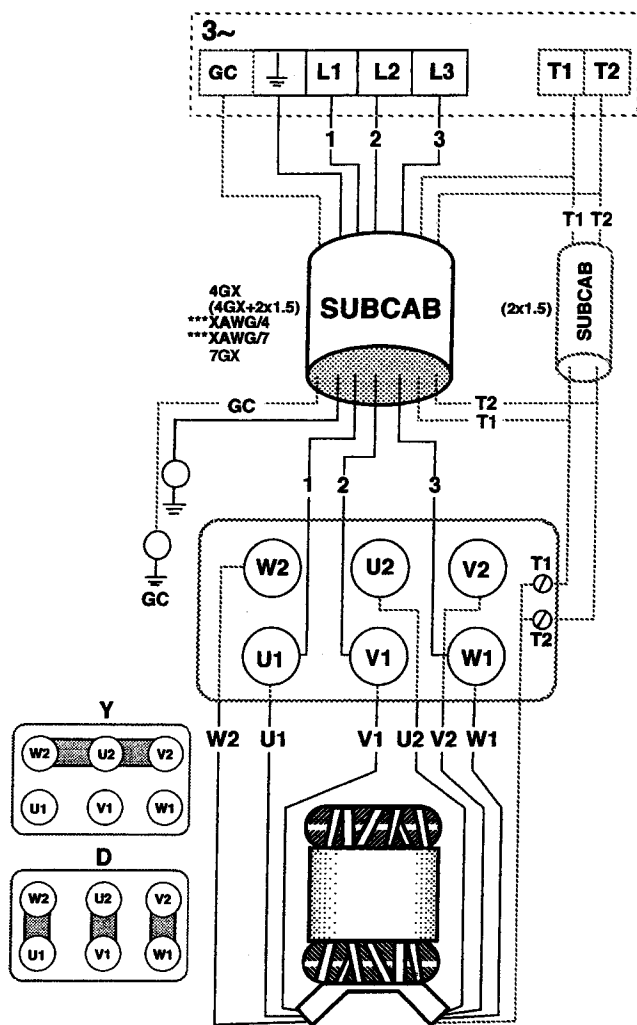
The **MiniCas II** is a monitoring relay to which CLS and/or FLS are connected.

Check:

- signals and tripping function.
- that relays, lamps, fuses and connections are intact.

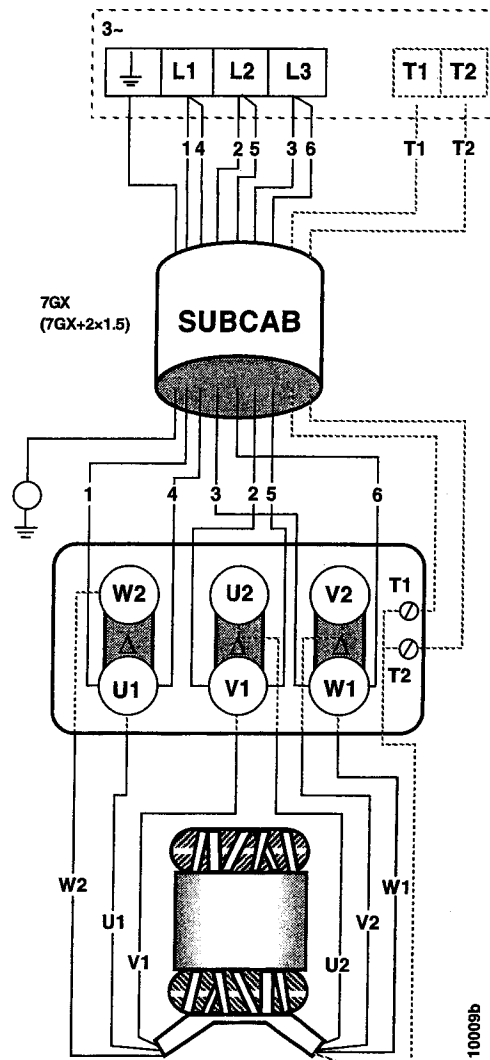
Replace defective equipment.

# CABLE CHART



## 3-phase, direct-on-line starting

	Conductors	Connection starter
<b>SUBCAB 4Gx</b> ***SUBCAB xAWG/4 H07RN-F 4Gx BIHF 4Gx silicon	1 brown ***red 2 blue ***white 3 black ***black yellow/green	L1 L2 L3 earth
<b>SUBCAB 4Gx+2x1,5</b>	1 brown 2 blue 3 black yellow/green T1 black T2 black	L1 L2 L3 earth T1* T2*
<b>SUBCAB 7Gx</b> H07RN-F 7Gx SO7E6E5-F 7x2,5	1 black 2 black 3 black 4 black 5 black 6 black yellow/green	L1 L2 L3 cut off T1* T2* earth
<b>For Canada/USA</b> ***SUBCAB xAWG/7	red white black yellow yellow/green orange blue	L1 L2 L3 GC** earth T1* T2*
<b>Stator leads</b>	U1 = red V1 = brown W1 = yellow	V2 = blue W2 = black U2 = green



## 3-phase, direct-on-line, Δ

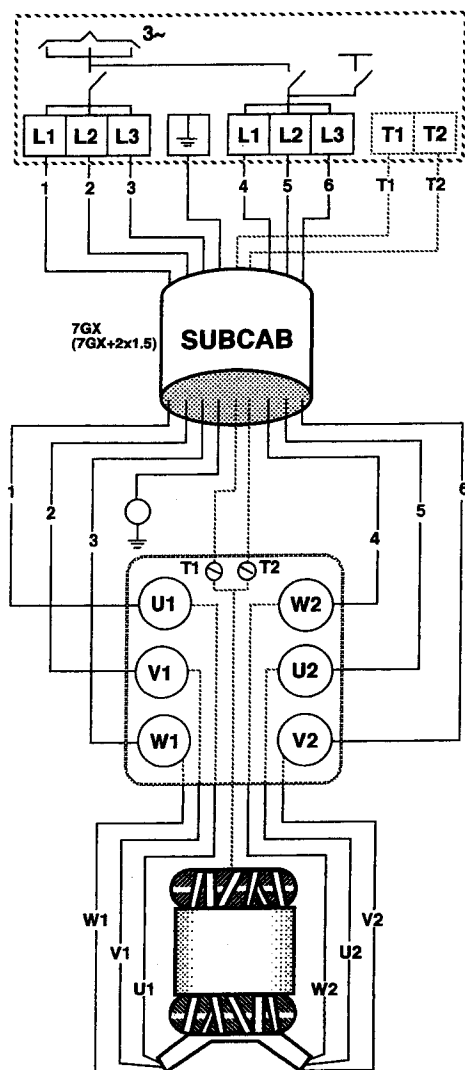
	Conductors	Connection starter
<b>SUBCAB 7Gx</b> SO7E6E5-F 7x2,5	1 black 2 black 3 black 4 black 5 black 6 black yellow/green	L1 L2 L3 L1 L2 L3 earth
<b>SUBCAB 7Gx+2x1,5</b>	1 black 2 black 3 black 4 black 5 black 6 black	L1 L2 L3 L1 L2 L3
	T1 black T2 black yellow/green	T1* T2* earth
<b>Stator leads</b>	U1 = red V1 = brown W1 = yellow	V2 = blue W2 = black U2 = green

\* Terminal for connection of thermal contacts in the motor and monitoring equipment.  
 \*\* GC = Ground Check  
 \*\*\* SUBCAB/AWG

SUBCAB is a registered trademark of ITT Flygt AB for electrical cables.



# CABLE CHART



## 3-phase, star-delta starting

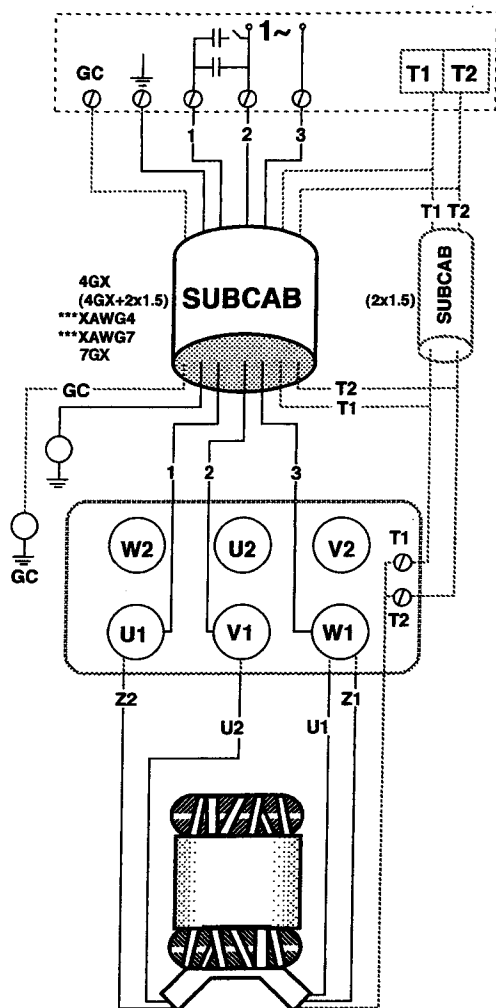
	Conductors	Connection starter
<b>SUBCAB7Gx</b> <b>SO7E6E5-F 7x2.5</b>	1 black	L1
	2 black	L2
	3 black	L3
	4 black	L1
	5 black	L2
	6 black	L3
	yellow/green	earth
<b>SUBCAB7Gx+2x1,5</b>	1 black	L1
	2 black	L2
	3 black	L3
	4 black	L1
	5 black	L2
	6 black	L3
	T1 black	T1*
	T2 black	T2*
	yellow/green	earth

## Stator leads

U1 = red	V2 = blue
V1 = brown	W2 = black
W1 = yellow	U2 = green

\* Terminal for connection of thermal contacts in the motor and monitoring equipment.

# CABLE CHART



## Single phase

**SUBCAB 4Gx**  
**\*\*\*SUBCAB xAWG/4**  
**H07RN-F4Gx**  
**BIHF 4Gx silicon**

Conductors	Connection starter
1 brown ***red	1
2 black ***black	2
3 blue ***white	3
yellow/green	earth

**SUBCAB 4Gx+2x1,5**

1 brown	1
2 black	2
3 blue	3
yellow/green	earth
T1 black	T1*
T2 black	T2*

**SUBCAB 7Gx**

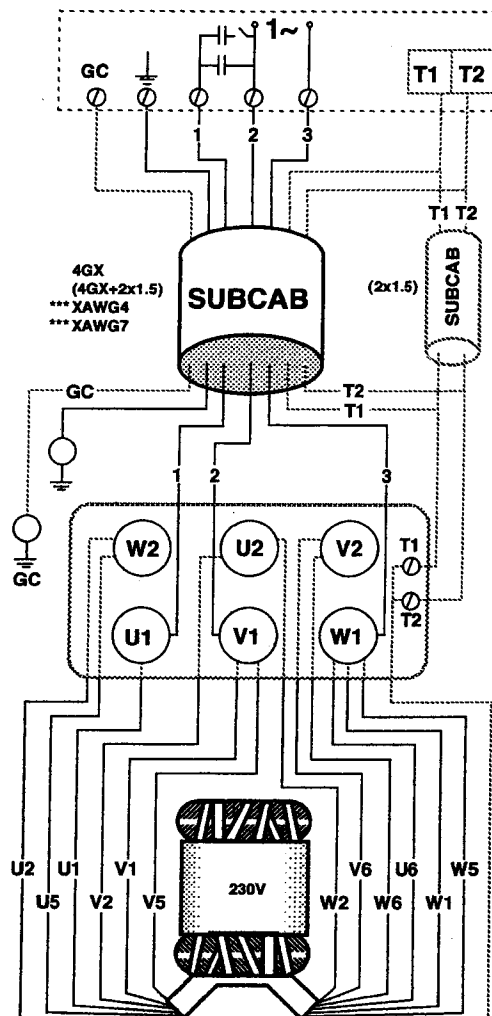
1 black	1
2 black	2
3 black	3
4 black	cut off
5 black	T1*
6 black	T2*
yellow/green	earth

**For Canada/USA**  
**\*\*\*SUBCAB xAWG/7**

red	1
black	2
white	3
yellow	GC**
yellow/green	earth
orange	T1*
blue	T2*

## Stator leads

U1 = red	U2 = brown
Z1 = yellow	Z2 = black



## Stator leads

U1 = red	U5 = red
V1 = brown	V5 = brown
W1 = yellow	W5 = yellow
U2 = green	U6 = green
V2 = blue	V6 = blue
W2 = black	W6 = black

\* Terminal for connection of thermal contacts in the motor and monitoring equipment.  
 \*\* GC = Ground Check

\*\*\* SUBCAB/AWG

## TRANSPORTATION AND STORAGE

The pump can be transported and stored in a vertical or horizontal position.



- Always lift the pump by its lifting handle – never by the motor cable or the hose.
- Make sure that the pump cannot roll or fall over and injure people or damage property.

The pump is frostproof as long as it is operating or is immersed in the liquid. If the pump is raised when the temperature is below freezing, the impeller may freeze.

The pump shall be run for a short period after being raised in order to discharge all remaining water.

A frozen impeller can be thawed by allowing the pump to stand immersed in the liquid for a short period before it is started. Never use a naked flame to thaw the pump.

For longer periods of storage, the pump must be protected against moisture and heat. The impeller should be rotated occasionally (for example every other month) to prevent the seals from sticking together.

After a long period of storage, the pump should be inspected before it is taken into operation. Pay special attention to the seals and the cable entry.

Follow the instructions under the heading "Before starting".

## OPERATION

### Before starting



- Before starting work on the pump, make sure that the pump is isolated from the power supply and cannot be energized.
- Make sure that the pump cannot roll or fall over and injure people or damage property.

Check that the visible parts on the pump and installation are undamaged and in good condition.

Check the oil level in the oil housing.

Remove the fuses or open the circuit breaker and check that the impeller can be rotated freely.

Check that the monitoring equipment (if any) works.

Check the direction of rotation. The impeller shall rotate clockwise, as viewed from above. When started, the pump will jerk in the opposite direction to the direction in which the impeller rotates. See the figure.

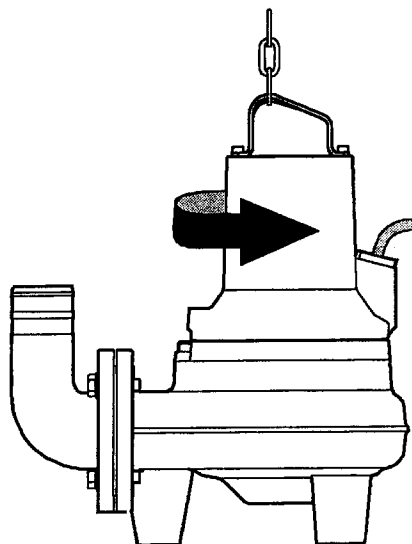
In the case of dry installation, check the direction of rotation through the inlet elbow access cover.

Transpose two phase leads if the impeller rotates in the wrong direction (3 ~).



In some installations the pump surface and the surrounding liquid may be hot. Bear in mind the risk of burn injuries.

### Starting jerk



Watch out for the starting jerk, which can be powerful.



**Before starting work on the pump, make sure that the pump is isolated from the power supply and cannot be energized.**

**This applies to the control circuit as well.**



## **NOTE for Ex version**

**All work on the explosion-proof motor section must be performed by personnel authorized by Flygt.**

**Flygt disclaims all responsibility for work done by untrained, unauthorized personnel.**



**Make sure that the pump cannot roll or fall over and injure people or damage property.**

The following points are important in connection with work on the pump:

- Make sure that the pump has been thoroughly cleaned.
- Beware of the risk of infection.
- Follow local safety regulations.

The pump is designed for use in liquids which can be hazardous to health. In order to prevent injury to the eyes and skin, observe the following points when working on the pump:

- Always wear goggles and rubber gloves.
- Rinse the pump thoroughly with clean water before starting work.
- Rinse the components in water after dismantling.
- The oil housing may be under pressure. Hold a rag over the oil screw (oil plug) to prevent splatter.

Proceed as follows if hazardous chemicals have splashed into your eyes:

- Rinse your eyes immediately in running water for 15 minutes. Hold your eyelids apart with your fingers.
- Contact an eye specialist.

On your skin:

- Remove contaminated clothes.
- Wash your skin with soap and water.
- Seek medical attention, if required.

## **Inspection**

Regular inspection and preventive maintenance ensure more reliable operation.

The pump should be inspected at least once a year, but more frequently under severe operating conditions.

Under normal operating conditions, the pump should have a major overhaul in a service shop at least every third year for permanent installation and every year for portable pumps. This requires special tools and should be done by an authorized service shop.

If the seals have been replaced an inspection of the oil is recommended after one week of operation.

**NOTE!** Regular check of the condition of the lifting handle and chain is important.

## **Inspection of hot water applications**

Pumps in hot water applications shall undergo inspection or overhaul at a service shop as follows, depending on the time they have been submerged in the hot water:

Temp.	Mode of operation	Inspection	Shop overhaul
≤70°C (160°F)	Continuous	1000 hours	4000 hours
≤70°C (160°F)	Intermittent	twice a year	once a year
≤90°C (195°F)	Cont./Int.	6 times a year	twice a year

# OIL CHANGE



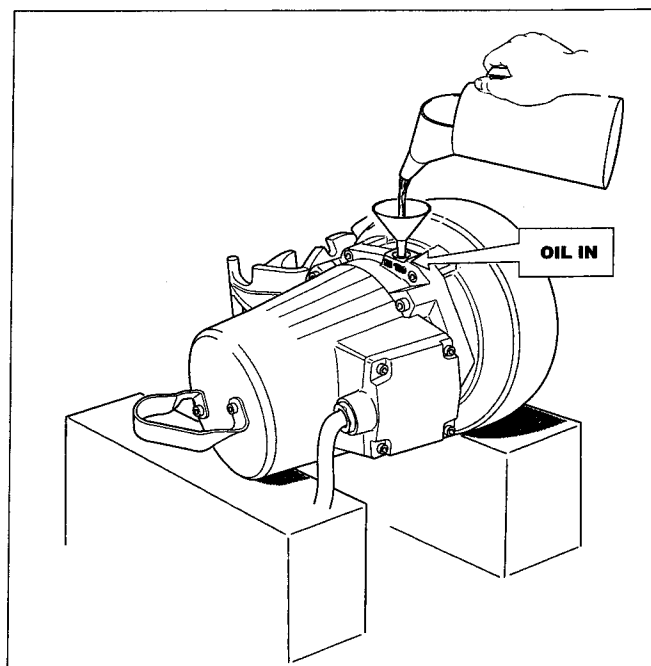
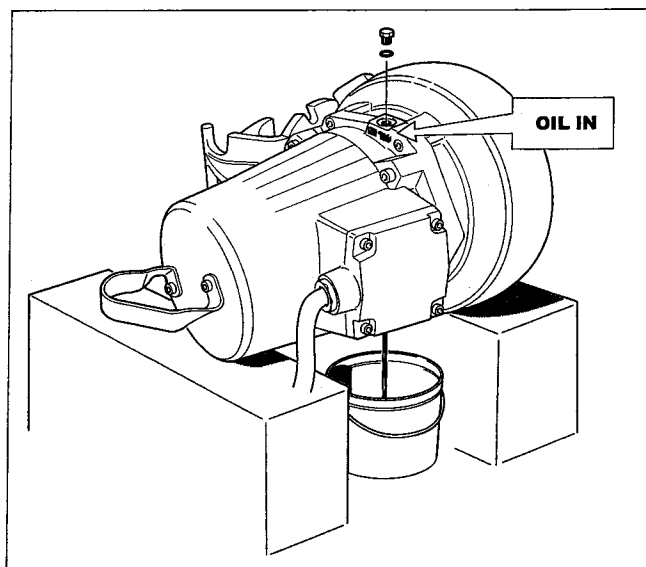
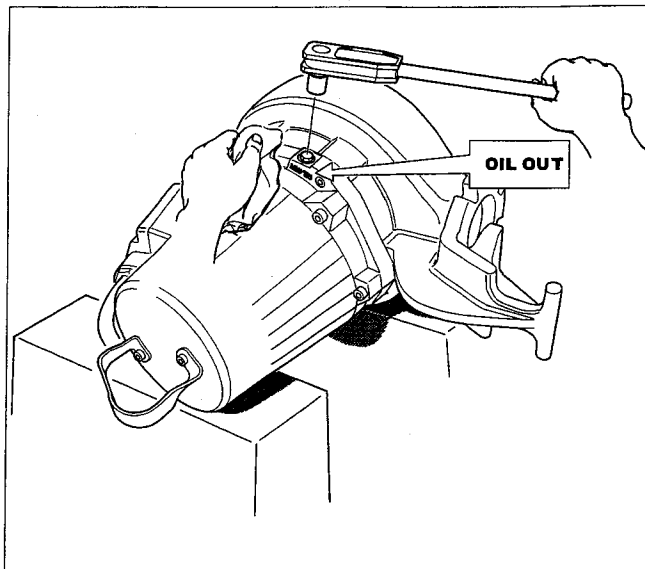
The oil housing may be under pressure. Hold a rag over the oil plug to prevent splatter.

1. Lay the pump on its side on a bench or over two supports. Unscrew the oil housing screw (oil plug) marked "oil out". Emptying the oil must be done through the "oil out" hole.
2. Turn the pump. Unscrew the "oil in" oil hole screw/plug. In order to drain out all oil, the pump must be raised upright for a short while during drainage.
3. Replace the O-rings under the oil housing screws (plugs) with new ones.

4. Install the "oil out" screw/plug and fill with oil through the other hole. It is important that the oil be added through the hole marked "oil in" since the oil housing must contain some air for pressure equalization. The pump should be tilted slightly and put down again horizontally in order to get the full amount of oil in.

A paraffin oil with viscosity close to ISO VG15 is recommended (e.g. Mobil Whiterex 309). The pump is delivered from factory with this type of oil.

In applications where poisonous properties are of less concern, a mineral oil with viscosity up to ISO VG32 can be used.



Approx. oil quantity		
	l	US quarts
3085	1.0	1.1
3085.280/290	0.8	0.8
3102	1.0	1.1
3127	2.0	2.1

# SERVICE LOG

Most recent service date	Pump No.	Hours of operation	Remarks	Sign.

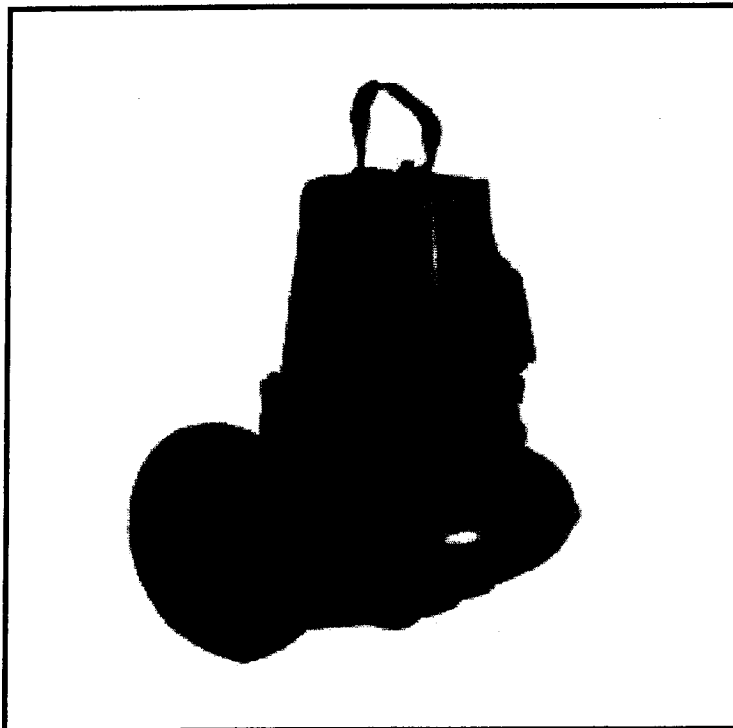




# **FLYGT SUBMERSIBLE PUMP**

**PARTS LIST CP 3127 HT**

**SERIAL NO 3127.090 0210089**



**ITT FLYGT CORPORATION  
35 NUTMEG DRIVE**

**TRUMBULL, CT 06611  
USA  
TELEPHONE NO: 716-4260280**

Flygt



**ITT Industries**

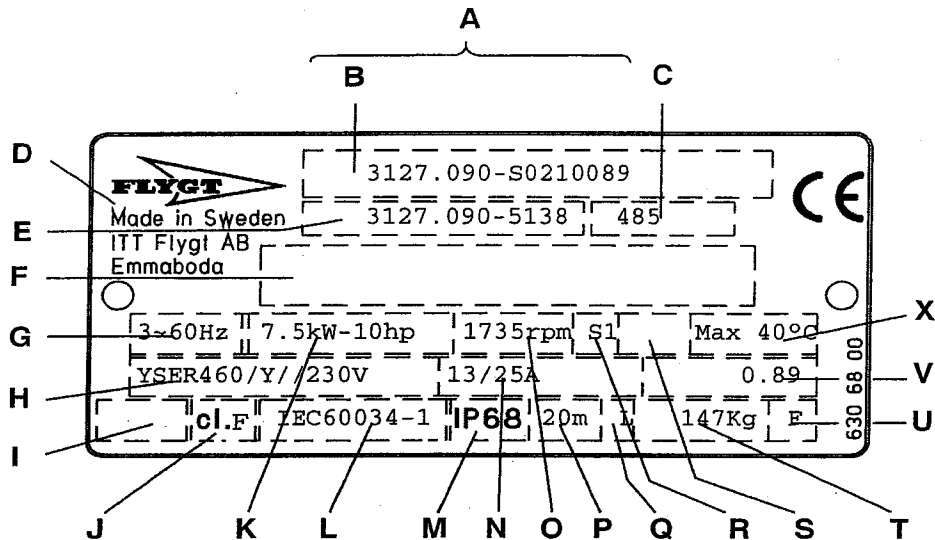


# 

FLYGT CP 3127 HT

DATE: 2002-01-15

SERIAL NO: 3127.090 0210089



### Dataplate interpretation:

- |  |  |
|--|--|
| <b>A</b> Serial number                     | <b>M</b> Degree of protection                  |
| <b>B</b> Product code + Number             | <b>N</b> Rated current                         |
| <b>C</b> Curv code / Propeller code        | <b>O</b> Rated speed                           |
| <b>D</b> Country of origin                 | <b>P</b> Max. submergence                      |
| <b>E</b> Product number                    | <b>Q</b> Direction of rotation R=right, L=left |
| <b>F</b> Additional information            | <b>R</b> Duty class                            |
| <b>G</b> Phase; Type of current; Frequency | <b>S</b> Duty factor                           |
| <b>H</b> Rated voltage                     | <b>T</b> Product weight                        |
| <b>I</b> Thermal protection                | <b>U</b> Locked rotor code letter              |
| <b>J</b> Thermal class                     | <b>V</b> Power factor                          |
| <b>K</b> Rated shaft power                 | <b>X</b> Max. ambient temperature              |
| <b>L</b> International standard            |  |
- (1 kg = 2.2 pound, 1 Lit=0.26 US gallon, 1 l = 0,22 UK gallon)

### Recommended spare parts:

See REC. column: **A** = Parts for inspection and maintenance  
**B** = Parts for major overhaul

For service;

To ensure long operating life use Flygt Bearing Grease 90 20 61 (Cartridge).  
 Lubrication kit 84 15 40 contains two 90 20 61 and one 84 15 30 (Grease gun).

The O-ring kit contains a full set of O-rings. Position no 800.

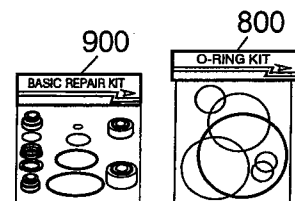
The Basic Repair kits contain both inner and outer Mechanical seals, bearings and a O-ring kit. Position no 900.

A complete set of tools can be ordered for repair and maintenance work, i.e. standard hand tools and special tools for seal change and hydraulic-end use.

Order:

This partlist can be used as an order form by marking out the number of parts in the Qty/Order column.

Please send or fax the form to your Flygt representative.



## PARTS LIST

**FLYGT CP 3127 HT**

**SERIAL NO 3127.090 0210089**

Item no	Partno	Rec	Denomination	Qty/ord.
1	477 11 01	(s)	Lifting handle	1
2	83 03 23	B (s)	Socket head screw	2
3	630 68 00		Data plate USE 6306801 AS SPARE PART	2
6	83 02 58	B	Socket head screw M5X12-A4-70	2
8	279 29 00	B	Earthing plate	1
9	82 21 73	(s)	Drive screw 4X5-A4-70	2
9	82 21 73	(s)	Drive screw 4X5-A4-70	4
9	82 21 73	(s)	Drive screw 4X5-A4-70	4
10	443 53 01		Stator housing	1
11	83 03 27	(s)	Socket head screw	4
14	630 70 00		Certificate plate FM APPROVED	2
15	550 22 00		Connection plate (FLS)	1
15	559 92 00		Connection plate	1
16	82 80 86	B (s)	O-ring 239,3X5,7 FPM	1
17	83 31 80	B	Ball bearing 6207 Z/C3 35X72X17	1
18	443 66 04		Shaft unit	1
19	309 44 12		Stator 21-12-4a	1
22	83 45 59		Cable tie 200X2,4 PA 6/6 -55+105	1
23	94 21 06	B	Motor cable SUB10AWG/3-2-1GC 20-22	13.5 m
24.1	435 56 00		Cable entry unit	1
24.6	82 17 61		Screw TAPTITE-M6X12	4
24.7	83 42 96		Cable lug 4-6 MM2;M6	2
24.8	83 44 23		Closed end splice 5.1-10,5;L=40	3
24.8	83 44 24		Closed end splice 2.5-6(AWG 12-10)L=17.5	1
25	443 50 01		Entrance cover	1
26	83 03 01	(s)	Socket head screw	4
27	82 80 98	AB (s)	O-ring 129,5X3,0 FPM	1
27	82 80 98	AB (s)	O-ring 129,5X3,0 FPM	1
28.2	83 53 30		Terminal clamp	6
28.4	83 53 33		End plate	1
28.6	83 53 31		End support 35X15	2
28.7	443 68 00		Rail	1
28.8	83 95 18		Marking strip	2
28.9	427 13 00		Marking tape	1
30	443 69 00	B	Lead through	1

Ordered by:

Company:.....Ref:.....Tel:.....Date:.....

## PARTS LIST

Item no	Partno	Rec	Denomination	Qty/ord.
30.2	81 98 45		Socket head screw	1
30.3	82 35 13		Washer	3
31	439 44 01		Screw	3
32	596 07 00		Washer	3
33	82 17 64		Screw TAPTITE-M6X20	7
34	82 50 60		Lock washer DUBO NR 301	3
37	504 78 07		Cable unit	1
38	518 89 02		Leakage detect.unit (FLS)	1
40	443 55 11		Bearing holder	1
41	83 37 60	B	Ball bearing 3307/C3 TOL.P6 35X80X34,9	1
42	82 79 18	B (s)	O-ring 78,0X4,0 FPM	1
43	614 49 00		Bearing cover	1
44	593 70 03	B	Mechanical seal	1
45	83 03 48	(s)	Socket head screw M12X40-A4-70	5
46	604 47 00		Oil housing bottom	1
47	443 49 00		Sleeve	1
48	82 72 95	AB (s)	O-ring 19,2X3,0 FPM	2
48	82 72 95	AB (s)	O-ring 19,2X3,0 FPM	4
49	428 22 05	B (s)	Inspection screw SS	2
53	593 70 03	B	Mechanical seal	1
59	436 10 00		Ring	1
61	380 91 00		Guiding claw	1
62	81 41 58		Hexagon head bolt M12X45-A2-70	4
64	439 18 00		Impeller	1
67	465 14 22		Pump housing	1
70	338 13 06	(s)	Washer	1
72	84 42 54		Socket head screw MC6S 12X40-2343	1
73	314 88 54	AB (s)	Ring	1
75	80 70 63	B	Parallel key	1
120	82 27 28		Lock nut M10-A4-70	2
121	80 95 07		Stud 10X45-A2-70	2
122	433 56 00		Cover	1
123	502 53 00		Gasket	1
800	80 32 33		O-rings kit 3127.090,170,180,890	1
800	80 32 74		O-rings kit 3127.090/180F,D,SUP.HT	1
900	601 89 07		Basic repair kit	1
900	601 89 08		Basic repair kit	1
900	601 89 09		Basic repair kit	1
900	601 89 10		Basic repair kit	1
	90 17 52		Paraffin oil	2 l
	90 20 54		Bearing grease ESSO UNIREX N3	0.03 kg

Ordered by:

Company:.....Ref:.....Tel:.....Date:.....

## PARTS LIST

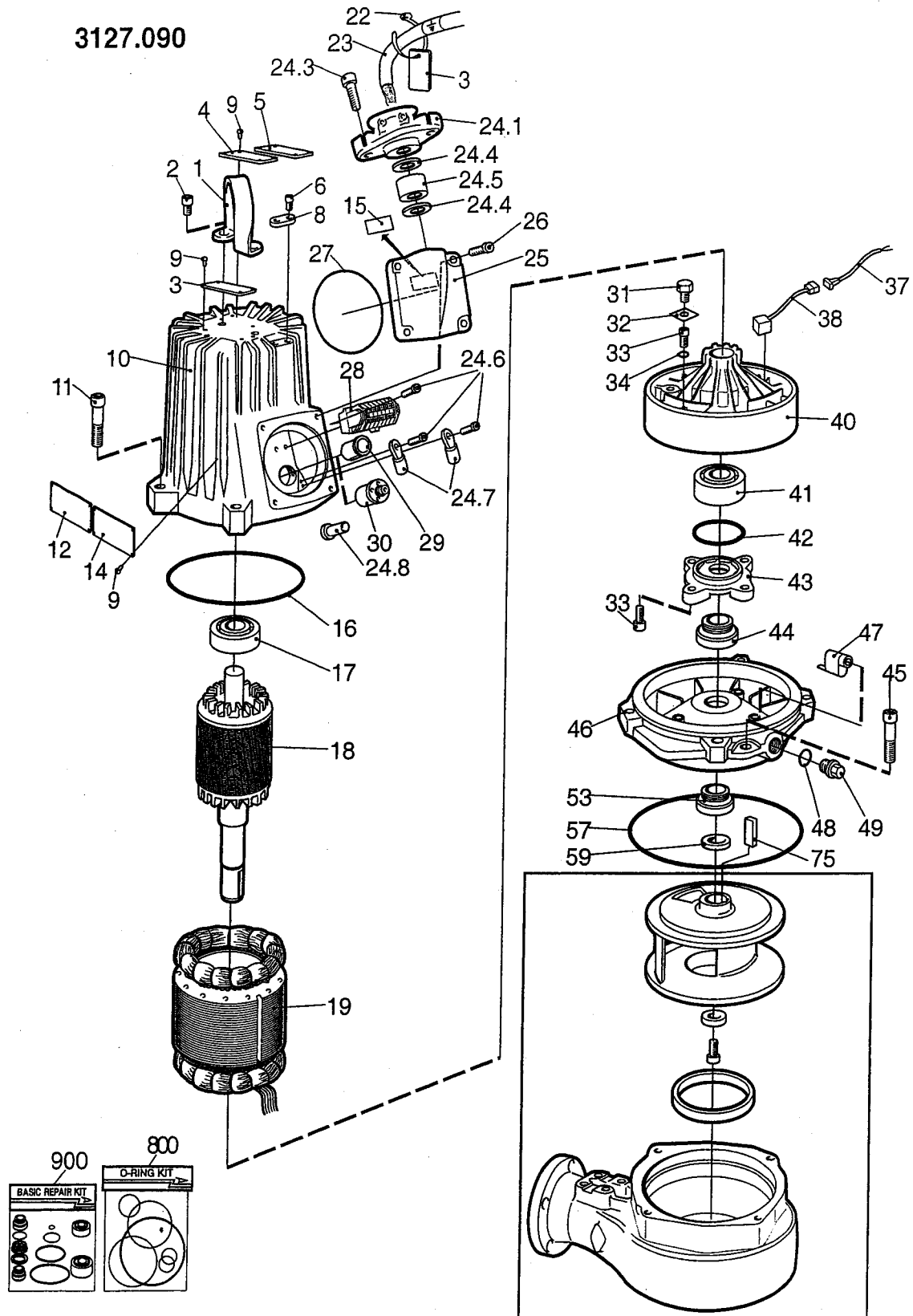
Item no	Partno	Rec	Denomination	Qty/ord.
	82 42 72	(s)	Washer 34,5X52X2-A4-70	4
	82 81 03	(s)	O-ring 49,5X3,0 FPM	1
	83 03 46	(s)	Socket head screw M12X30-A4-70	2
	84 18 02	(s)	Seal sleeve (20)-23	2
	597 87 01	(s)	Entrance flange SS	1
	597 98 00	(s)	Ring	1
	633 11 01	(s)	Gland screw	1
	640 31 03S	(s)	Nipple	1
...	.....		.....	....
...	.....		.....	....
...	.....		.....	....
...	.....		.....	....

Ordered by:

Company:.....Ref:.....Tel:.....Date:.....

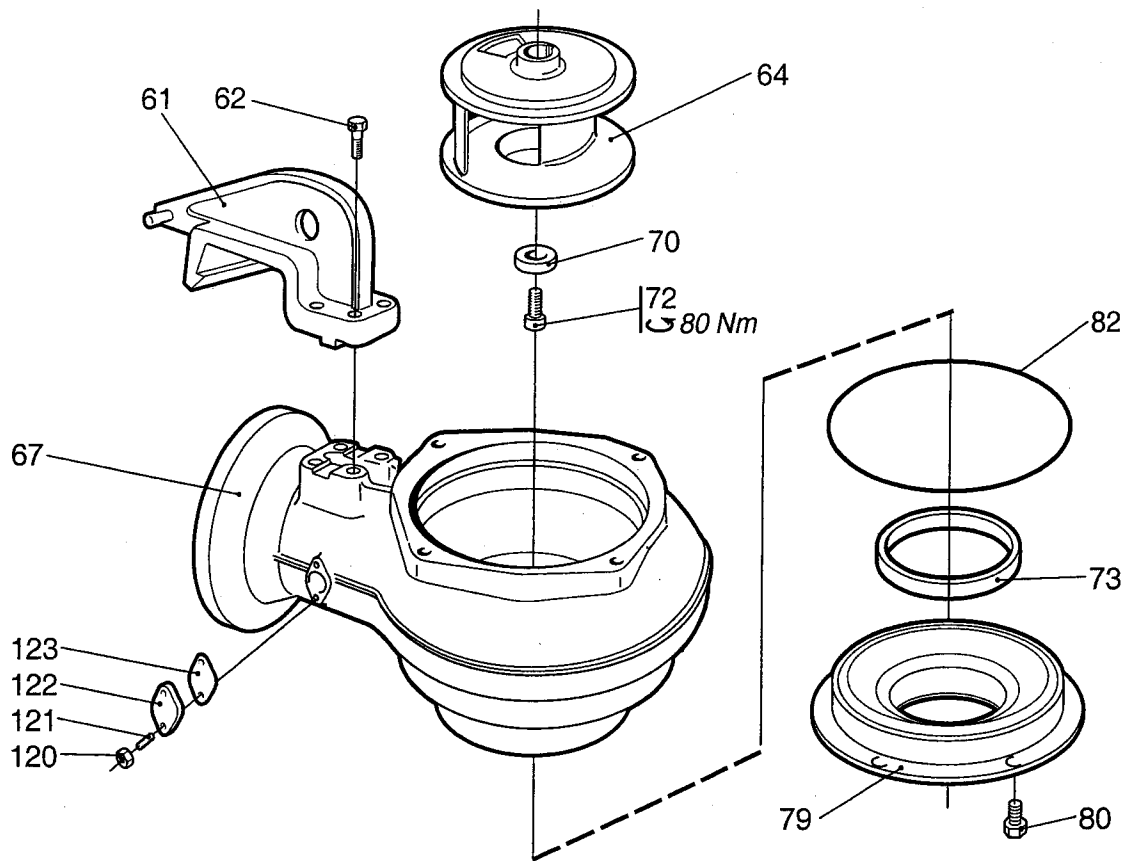
# EXPLODED VIEW

3127.090



## HYDRAULIC PARTS

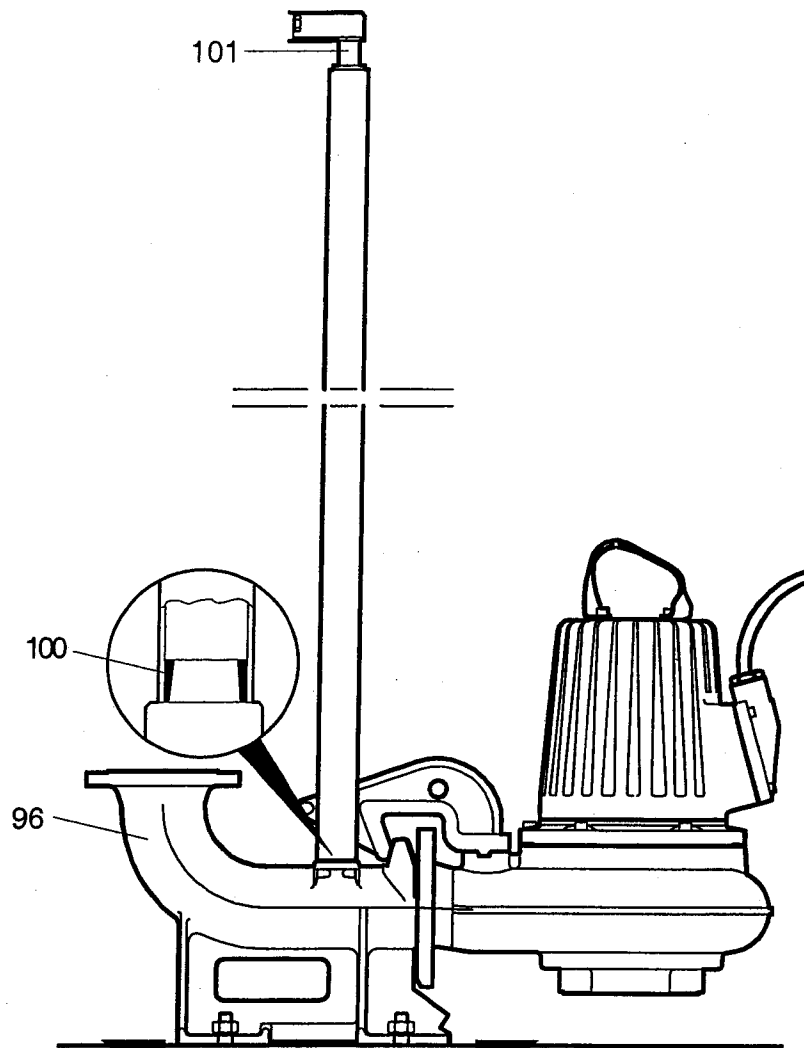
### CP 3127 HT



30220

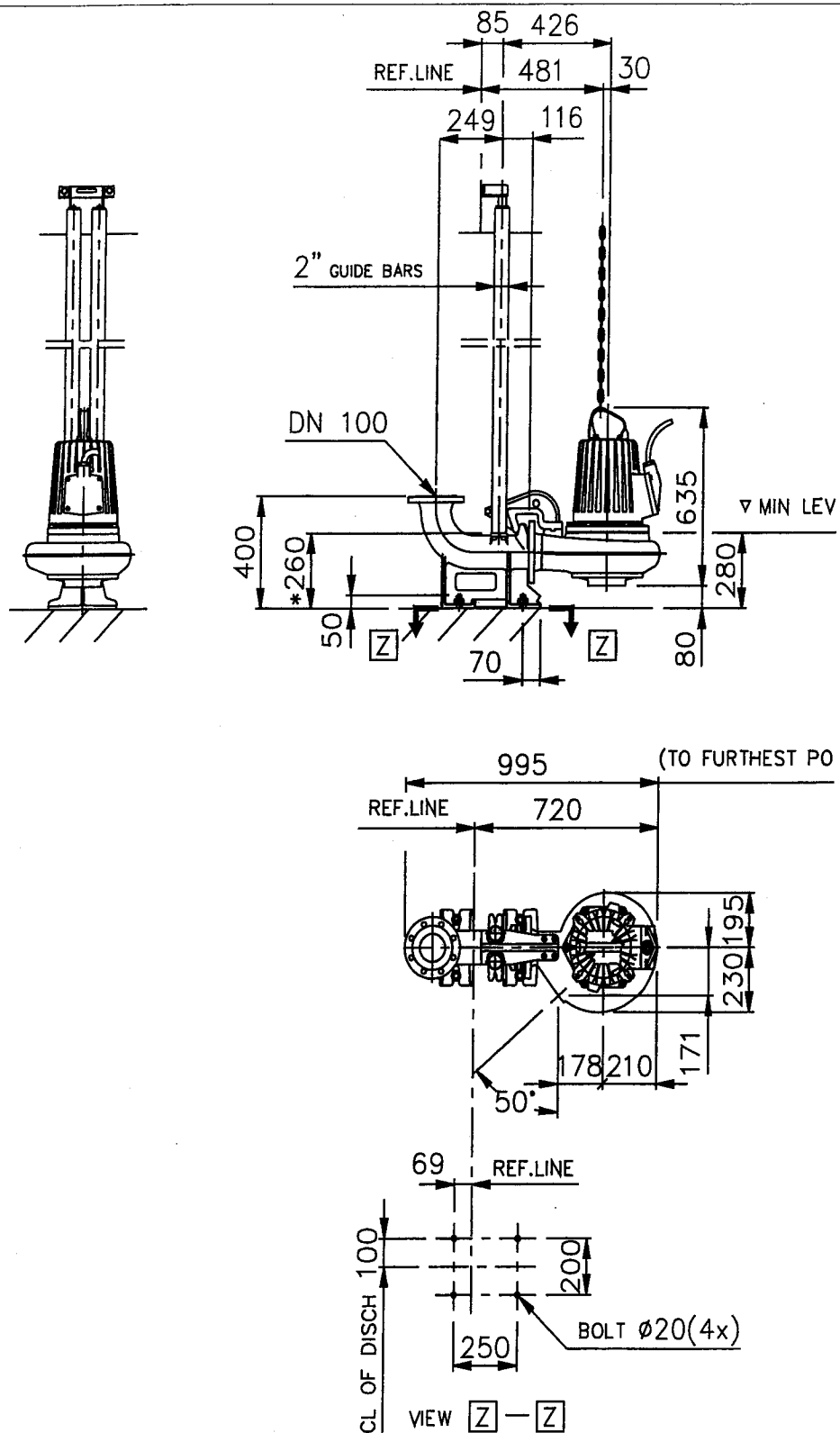
## CONNECTION

CP, NP 3127.090/180/980



30741

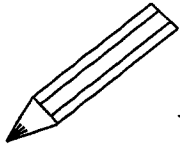
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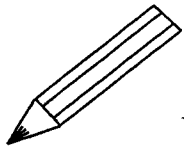
EQUIPPED WITH IMPELLER: 461, 467 OR 480-485.  
 \* DIMENSION TO ENDS OF GUIDE BARS

5388800d

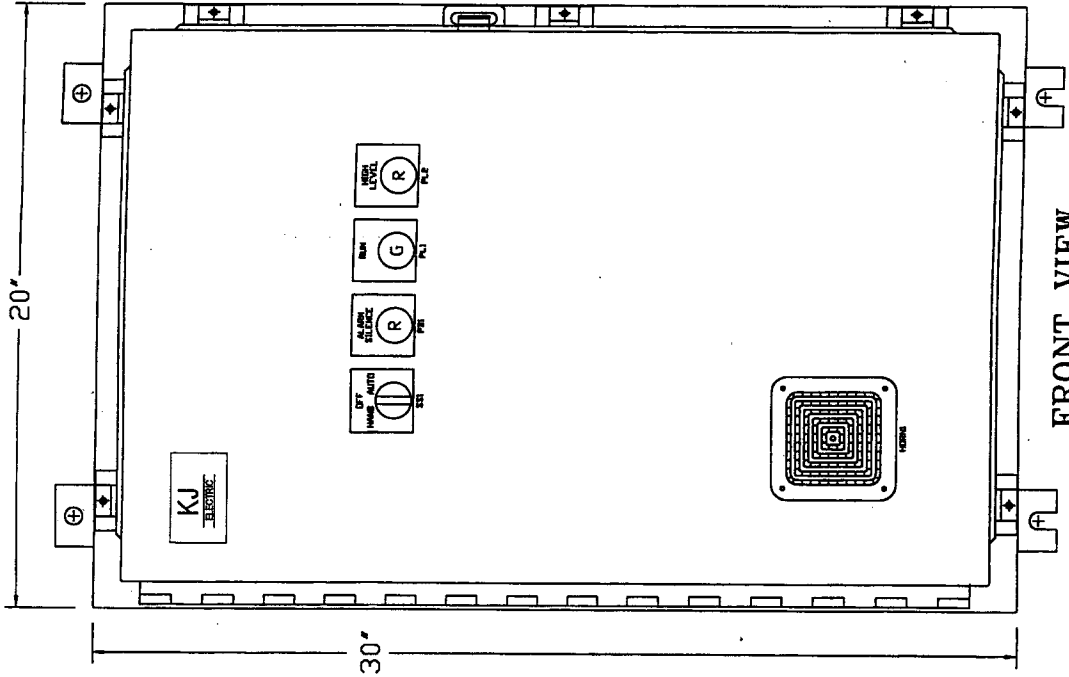




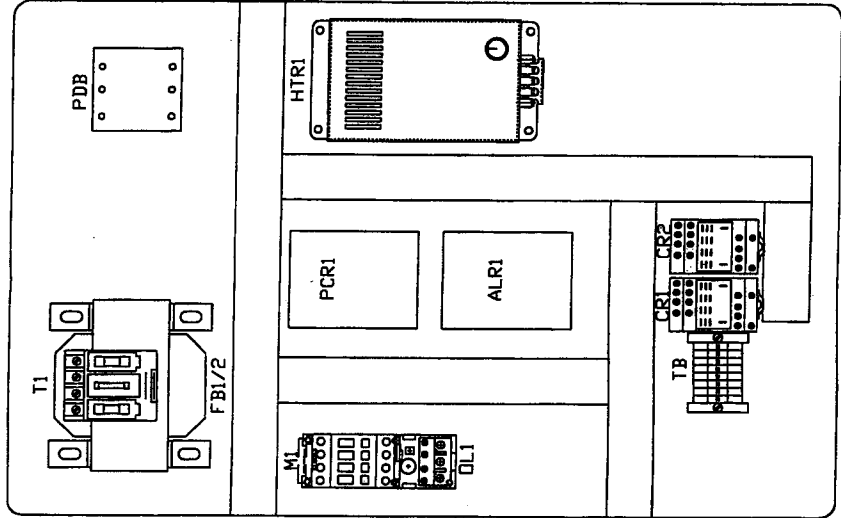
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A series of horizontal dotted lines for handwriting practice, spanning the width of the page.

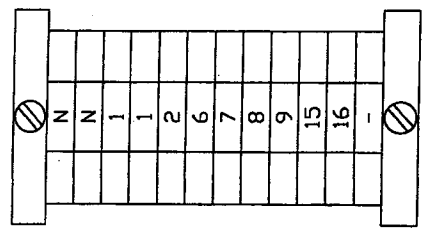


FRONT VIEW



SUBPANEL

TERMINAL STRIP  
DETAIL

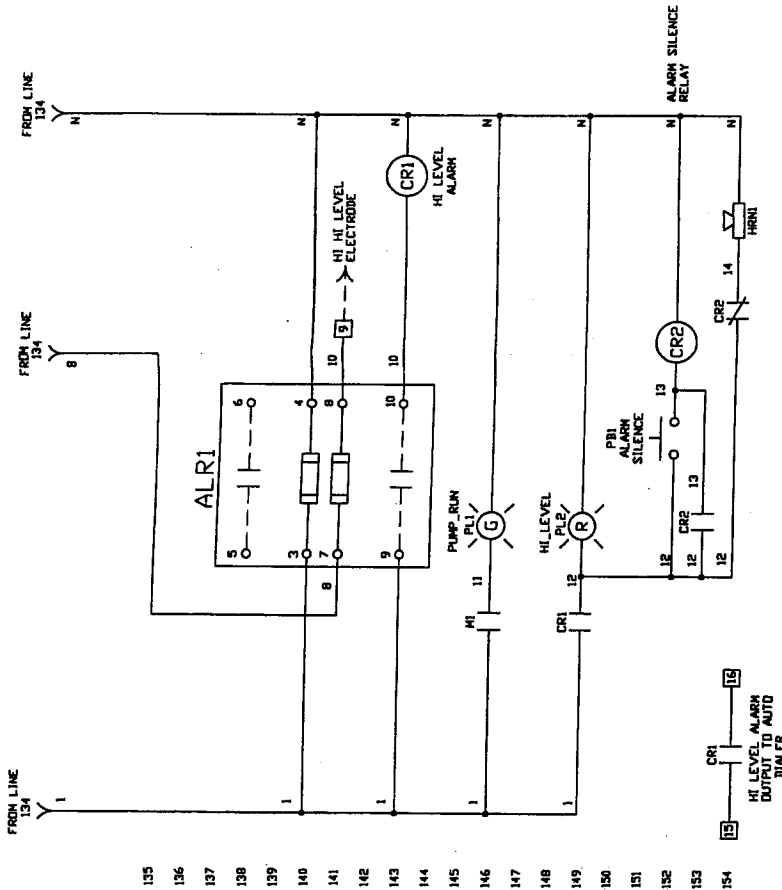
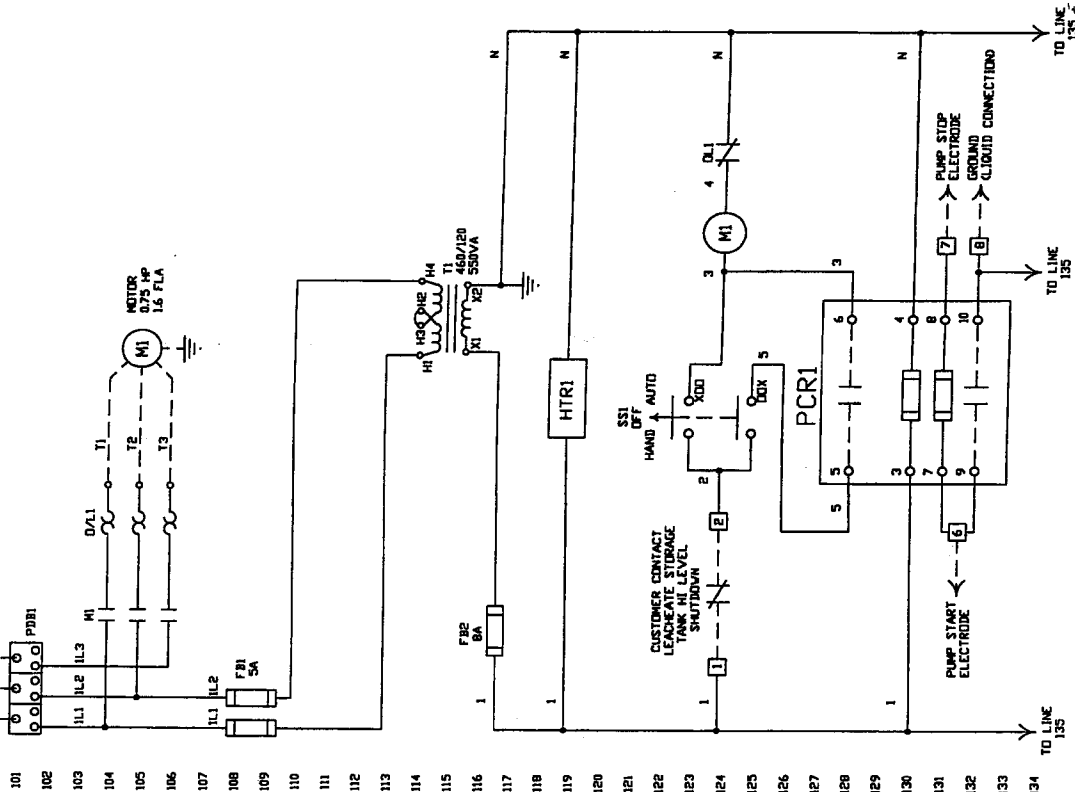


ITEM	REQ'D	CATALOG NUMBER	MFR	DESCRIPTION
ENCLOSURE	1	135-SCF-300200SS1P	SAGINAW	ENCLOSURE 750W 4X
ENCLOSURE	1	135-SCF-30020	SAGINAW	PANEL
RELAY	1	312-CL000310TJ	G.E.	CONTACTOR 120V COIL
RELAY	1	308-CR104P122R	G.E.	RED PILOT LIGHT
RELAY	1	308-CR104P122G	G.E.	GREEN PILOT LIGHT
RELAY	1	308-CR104P122B	G.E.	3 POS 2NO 2S
RELAY	1	312-RT1H	G.E.	OL RELAY 1.3-1.9 AMPS
RELAY	1	308-CR104P122B10	G.E.	RED EXTENDED PUSHBUTTON
RELAY	10	113-C383K254	C-H	TERMINAL
RELAY	2	113-C383K254	C-H	TERMINAL END PLATE
RELAY	2	113-C383K254	C-H	TERMINAL END STOP
RELAY	2	113-C383K254	C-H	DIY RAIL (1 PETER LG)
RELAY	2	113-C383K254	C-H	14 BLADE SOCKET DIN RAIL
RELAY	2	113-C383K254	C-H	120VAC 4 POLE 14 BLADE RELAY
RELAY	1	148-1500001-88-00-X	B/W	INDUCTION RELAY 2NO
RELAY	1	148-1500001-88-00-X	B/W	INDUCTION RELAY 1NO/1NC
RELAY	4	148-6013M6	B/W	SS PROBE
RELAY	2	148-6012-CG-2	B/W	CORD GRIP (2) FOR 1/2"NEF
RELAY	1	306-360-120-30	FEDERAL	HORN 120V
RELAY	1	306-360-120-30	FEDERAL	CASKEET KIT
RELAY	1	148-D-4H4001B	HOFFMAN	400W 120V HEATER
RELAY	1	307-2550-3PB	H-D	TRANSFORMER
RELAY	1	303-63163	FERRAZ	POWER DIST BLOCK
RELAY	2	303-ATP45	FERRAZ	5A FUSE
RELAY	1	303-62C5	FERRAZ	8A GLASS FUSE

1	AS BUILT	9-15-01
2	REVISION	9-15-01
3	DATE	
TITLE: CHAFFEE PUMP CONTROL PANEL		
CUSTOMER: SLC ENVIRONMENTAL SVC.		
<b>K.J. ELECTRIC</b>		
5804 EAST MOLLOY RD. SYRACUSE, N.Y. 13211		
(315) 454-6566 FAX (315) 454-6564		
DWN	CHK	DATE
GLH	LFP	9-15-01
REV	DWG. NO.	
1		
P863-1		SH 1
		DF 2

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CUSTOMER SUPPLIED  
460V 3Ø 60Hz



1	AS BUILT	9-15-01	SH 2
0	ORIGINAL	8-29-01	DF 2
0	REVISION		
DATE			
TITLE: CHAFFEE PUMP CONTROL PANEL			
CUSTOMER: SLC ENVIRONMENTAL SVC.			
K.J. ELECTRIC			
5894 EAST MOLLOY RD. SYRACUSE, N.Y. 13211			
(315) 454-5535 FAX (315) 454-5564			
DWN CHK	DATE	REV	DWG. NO.
GLH LFP	9-15-01	1	P863-2

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***EPG Companies Inc.***

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**Operations & Maintenance  
Manual**

**FOR**

**Marcy Excavation Company,  
Inc.**

**Chaffee Landfill**

**EPG Job #03-6244**

# ***EPG Companies Inc.***

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## **Operations and Maintenance Index**

### **Marcy Excavation Company Inc. - Chaffee Landfill**

#### **EPG Job # 03-6244**

Bulletin	1055	List of Equipment
Drawing	05773	Series 5 SurePump™
Bulletin	0335e	Engineer's Specification EPG WSDPT SurePump™ Wheeled Sump Drainer for side slope riser installations with built-in level sensor
Bulletin	0480d	Materials of Construction
Bulletin	0130c	EPG Sump Drainer Vent Tube / Check Valve Installation Instructions
Bulletin	0680a	EPG SurePump™ with LevelMaster™ Level Sensor Disassembly / Assembly Operation & Maintenance Instructions
Bulletin	0691	EPG SurePump™ with LevelMaster™ Level Sensor Replacement Instructions for Level Sensor in Wheeled Sump Drainer
Bulletin	0790	Test Equipment
Bulletin	0780a	Troubleshooting Guide
Bulletin	6090a	Wire Cable Clamp Installation Instructions
Bulletin	0370a	Storage Information
Form	200	SurePump™ Installation Record
Bulletin	0060a	Engineer's Specification EPG Series L925PT PumpMaster™ Controller
Form	117	Attachment to Bulletin 0060a
Drawings	05900-0250	L925PT Control Panel Schematics
Information	1 Page	Meter Default Settings
Bulletin	3360	Caution
Bulletin	8000	EPG Controllers With Intrinsically Safe Circuit(s) Field Installation Instructions
Bulletin	0121b	Engineer's Specification EPG LevelMaster™ Submersible Level Sensor
Bulletin	0690c	EPG LevelMaster™ Level Sensor Operation & Maintenance Instructions
Bulletin	0526	EPG LevelMaster™ Level Meter Model 2551A-SDHH Operations & Set Up Instructions
Bulletin	6160	S3070-PT Transducer Simulator Operation
Bulletin	6165	S3070-PT Transducer Simulator Test Procedure
Drawing	03626-0500	BJBP 500 Breakout Junction Box for Motor Lead

# ***EPG Companies Inc.***

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Drawing	02523-0605	BJBL 600B Breakout Junction Box for Level Sensor
Bulletin	3300a	Type "F" PVC Suction and Transfer Hose
Bulletin	0285	Model NW Stainless Steel Discharge Adapter
Photo	A	Front Panel Layout
Photo	B	Inner Door Layout
Photo	C	Back of Inner Door Layout
Photo	D	Back Panel Layout
Bulletin	0200c	Limited Warranty

# ***EPG Companies Inc.***

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## **List of Equipment**

**Marcy Excavation Company Inc. – Chaffee Landfill**

**EPG Job # 03-6244**

- |        |   |
|--------|---|
| 1 each | WSDPT 5-2<br>SurePump patented, wheeled, stainless steel sump drainer with a 1/2 HP 460 VAC 3 phase motor. Includes a 180' jacketed motor lead 12GA, submersible level sensor with 180' lead, 1.5" X 1" reducing coupling, and a 160' length of 1/8" stainless steel suspension cable with clamps.          |
| 1 each | L925PT<br>PumpMaster™ control panel to operate 1ea. 1/2 HP 460 VAC 3 phase motor. Includes 1ea. LevelMaster™ level control meter, 5ea. push to test light, 1ea. lightning arrestor, 1ea. common alarm dry contact, and 1ea. top mounted high level alarm light. Enclosure is rated NEMA 4X stainless steel. |
| 1 each | BJBP 500<br>Breakout Box, NEMA 4X non-metallic enclosure, for motor lead junction with connection terminals.  |
| 1 each | BJBL 600B<br>Breakout Box, NEMA 4X non-metallic enclosure, junction box for level sensor with desiccant dryer, bellows, and connection terminals  |
| 1 each | Discharge Hose<br>1" Discharge Hose Length 180', Polypropylene Cam & Groove Fittings, and Stainless Steel Hose Clamps.  |
| 1 each | NW1SS<br>Disconnect, 1" Stainless Steel Adapter.  |
| 1 each | 4415<br>Anti siphon valve.  |

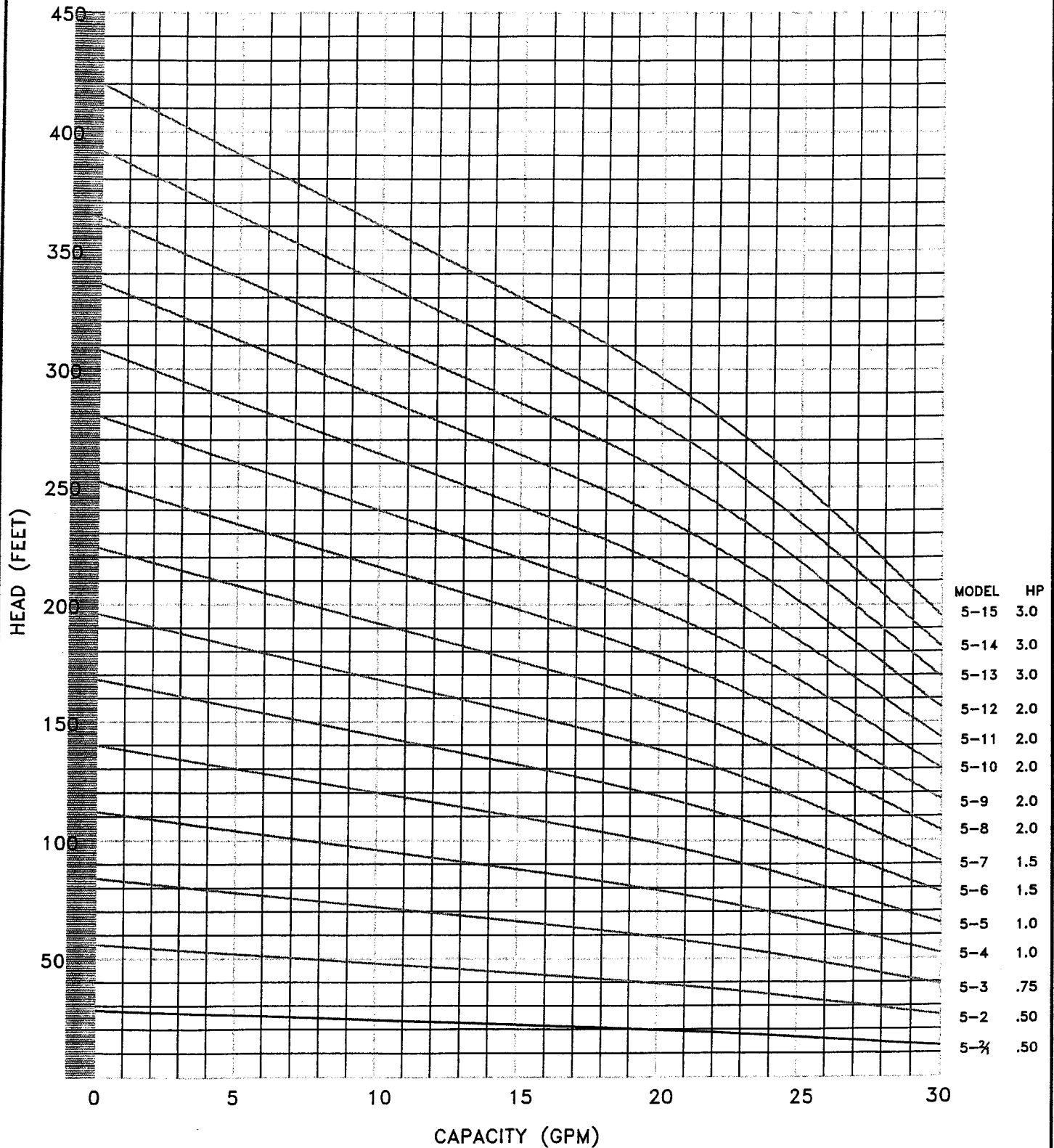




## SERIES 5 SurePump™

Flow Range 15-30 GPM

60 Hz



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

## Materials of Construction

### EPG SurePump™

	STANDARD
Check Valve Housing	304 Stainless Steel
Check Valve	304 Stainless Steel
Check Valve Seat	E-Glide™
Diffuser Chamber	304 Stainless Steel
Impeller Seal Ring	E-Glide™
Impeller	304 Stainless Steel
Motor Adapter	304 Stainless Steel
Inlet Screen	304 Stainless Steel
Pump Shaft	304 Stainless Steel
Coupling	329/420/431 Stainless Steel
Fasteners	304 Stainless Steel
Bearings	E-Glide™

### FRANKLIN ELECTRIC MOTORS

	1/3 to 2 HORSEPOWER POLLUTION RECOVERY	3 to 10 HORSEPOWER NI-RESIST
End Bell Castings	304 Stainless Steel over Iron	Ni-Resist Type 1B
Stator Shell	301 Stainless Steel	316 Stainless Steel
Shaft Extension	303 Stainless Steel	17-4 Stainless Steel
Fasteners	316 Stainless Steel	316 Stainless Steel
Seal Cover	Tefzel	316 Stainless Steel
Shaft Seal	Viton	Viton, Carbon, Ceramic Face Seal
Diaphragm	Viton	Type 200 Hydrin
Diaphragm Plate	304 Stainless Steel	304 Stainless Steel
Diaphragm Spring	302 Stainless Steel	302 Stainless Steel
Diaphragm Cover	316 Stainless Steel	316 Stainless Steel
Slinger	Viton	Nitrile Rubber
Lead Sleeve	316 Stainless Steel	316 Stainless Steel
Lead Jam Nut	316 Stainless Steel	316 Stainless Steel
Lead Potting	Epoxy	Epoxy
Lead Bushing	Viton	Viton

## EPG Sump Drainer Vent Tube / Check Valve

## INSTALLATION INSTRUCTIONS

EPG's patented sump drainer\* enables a submersible pump to pump down and restart in applications that would normally cause the pump to air lock.

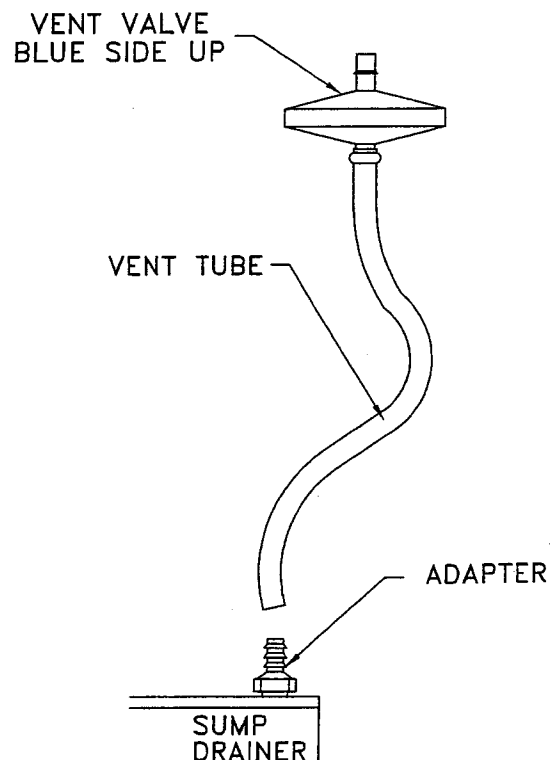
Critical to the operation of the sump drainer is the installation of the vent tube and air check valve. The vent tube / check valve assembly has two functions. First, as the sump drainer fills with fluid the vent tube assembly allows air trapped inside of the sump drainer to escape, allowing the sump drainer to completely fill with fluid. When the sump drainer pump starts the vent assembly then closes, allowing the pump to draw liquid through the screen at the opposite end of the sump drainer. The closed check valve enables the pump to continue pumping even though the fluid level in the sump is below the normal intake of the pump.

The vent tube may be tied off to the pump discharge line. The vent check valve will operate correctly even if submerged.

### INSTALLATION

Refer to Figure 1 for help in completing this procedure.

1. Slip the free end of the plastic vent tube onto the adapter on the top of the sump drainer.
2. Verify the open end of the check valve is labeled "VAC".
3. As you lower the sump drainer into the sump, uncoil the vent tube and fasten it to the discharge pipe. We recommend you keep the check valve above the fluid level. The check valve will work if it is submerged, but can foul with particles in the fluid.



\* U.S. Patent #4,966,534 and 4,992,030

Figure 1. Vent Tube / Check Valve Assembly

## **EPG SurePump™ with LevelMaster™ Level Sensor Disassembly / Assembly**

## **OPERATION & MAINTENANCE INSTRUCTIONS**

**NOTE:** Refer to Table B for list of tools needed for disassembly, assembly, and testing.

1. Place the pump on a suitable work surface with blocks to prevent the pump from rolling. Remove the vent tube by pulling straight out from the top. In cold weather it is better to unscrew the vent hose barb adaptor with tube attached rather than trying to pull the tube off the hose barb.
2. Unscrew the cord restraint nuts and pull inserts out about two (2) feet along the motor lead and level sensor lead. Loosen the insert from the wires so they are free to move through the cord restraint.
3. Mark the alignment of the tube and top (check for factory alignment marks). Center punch new marks in top and tube if factory marks can not be found. The alignment marks will make reassembly easier.
4. Remove the three (3) cap screws that secure the tube to the top and carefully pull the top, with pump and motor attached, out of the tube. Do not hammer, pry, or pound on tube or top. Allow the sensor lead wire to slide through the cord restraint.
5. Remove the three (3) socket head setscrews from the level sensor housing on the bottom of the tube. Carefully pull the level sensor up and out from the bottom of the tube. Carefully remove the sensor lead wire by pulling the controller end back through the top. Cover the end of the sensor lead wire with tape to prevent moisture and dirt from entering. If the sensor is unused or put into storage, remove the dryer from the controller and install on end of vent tube during storage period.
6. Remove the nuts (4) that secure the motor to the pump and pull the motor from the pump. Do not remove the motor lead from the motor unless it will be replaced with a new lead. It is recommended that a new motor lead be used whenever the old lead is removed from the motor because of possible damage to the lead or distortion of the rubber seal that may prevent resealing.
7. Unscrew the motor lead nut from the motor. Work the lead back and forth to loosen seal and unplug the lead from the motor connector. Remove the lead by pulling the controller end back through the top.
8. Unscrew the pump assembly from the top using cloth strap wrenches to prevent damage to the metal surfaces.

### **CAUTION**

Do not attempt to disassemble level sensor or pump motor. Any disassembly will void the warranty.

## ASSEMBLY

1. Apply pipe sealing compound to the top threads and screw the pump to the top. To prevent damage to the top sealing surface or the pump bowls, tighten pump to top using cloth strap wrenches.
2. Slide motor and pump together and align motor shaft splines to pump splines by turning the motor shaft. Align the motor lead connector with the cutaway in the pump flange. Secure motor to pump with four (4) nuts.
3. Slide the long end of the motor lead through the cord restraint cap and nut in the top. Insert plug into the motor connector. Tighten motor lead connector nut to secure lead to motor.
4. Inspect upper and inside surface of tube and remove any sharp edges or burrs. Wipe surface of tube and top to remove any dirt, sand, or metal filings. Remove the O-ring and clean sealing groove in the top. If original O-ring installation used a spacer / shim between the top and O-ring, clean the shim and reinstall into the sealing groove in the top.
5. Carefully slide level sensor lead wire through the top cord restraint and nut.

### CAUTION

Use care while handling the level sensor lead wire to prevent damage to the conductors and center vent tube.

6. Slide the level sensor and center it within the sensor housing at the bottom of the tube. Secure it with the three (3) socket head setscrews. To prevent damage to the sensor case, do not over tighten the setscrews.
7. Position the tube vertically and carefully slide the pump and motor assembly into the tube. Guide the assembly past the sensor lead wire to prevent crushing or cutting the lead wire. Remove slack from the sensor lead wire by pulling the lead wire out through the top.
8. Install a new top O-ring and liberally apply white petroleum jelly (Vaseline or equivalent) to the O-ring and cover sealing surfaces. Align the screw holes in the top with the holes in the tube and carefully slide the top into the tube making sure that the O-ring is not damaged.
9. Remove the slack from the motor lead and sensor lead wire. Secure the top to the tube with three (3) cap screws. Tighten cap screws until sealing grease starts to bead out from the top-to-tube joint. Do not over tighten.
10. Secure motor lead and sensor lead wire with the cord restraint nuts. Tighten the nut until the edge of the insert can be seen on the inside edge. Install vent hose.

## SEAL TEST PROCEDURE

**NOTE:** Refer to Figure 2.

1. Install mechanical plug into the discharge pipe connection located in pump top. Tighten to recommended specifications. Refer to Table A.
2. Connect gage tubing to vent fitting.
3. Connect magnehelic gage to gage tubing.
4. Fill five gallon pail with water to the rim.
5. Place pump assembly, as depicted on Figure 2, in the filled five gallon pail.
6. Observe the magnehelic gage. The pressure should read about 5" W.C. and hold steady.
  - a. If the pressure holds steady, the pump is ready to be installed. Remove the gauge tubing and the mechanical plug.
  - b. If the gauge pressure does not hold steady, there is an air leak in the top assembly.
    - b.1. Remove the pump assembly from the five gallon pail and refill the pail with water.
    - b.2. Mix a solution of soap and water in a hand pump spray application bottle and spray the top assembly.
    - b.3. Place the pump assembly in the five gallon pail and observe the top assembly for bubbles to determine point of the seal leak.
    - b.4. Make necessary adjustments to the pump assembly and repeat items b.1. through b.3. until the leak has been corrected and the gauge pressure holds steady.

## INSTALLATION

1. Remove the gage tubing and the mechanical plug and install the vent tube with vent valve.
2. Run the level sensor lead wire to the PumpMaster™ control panel or breakout box and connect the sensor RED wire to the (-) terminal and BLACK wire to the (+) terminal. Connect the level sensor vent tube to the dryer and check for kinks and crushed areas in the tube connection area. The vent tube must be open to allow atmospheric pressure change compensation in the sensor.
3. Repeat bucket test to verify level sensor operation.
4. Install pump into place.
5. Check the level sensor readings before running pump. The LevelMaster meter should indicate the proper depth of the sensor when immersed in liquid. If the meter shows -34.7 the lead wires connections are reversed, not connected or damaged. Be certain to check correct voltages at the controller and measure the resistance of the motor lead and motor to assure proper wiring.

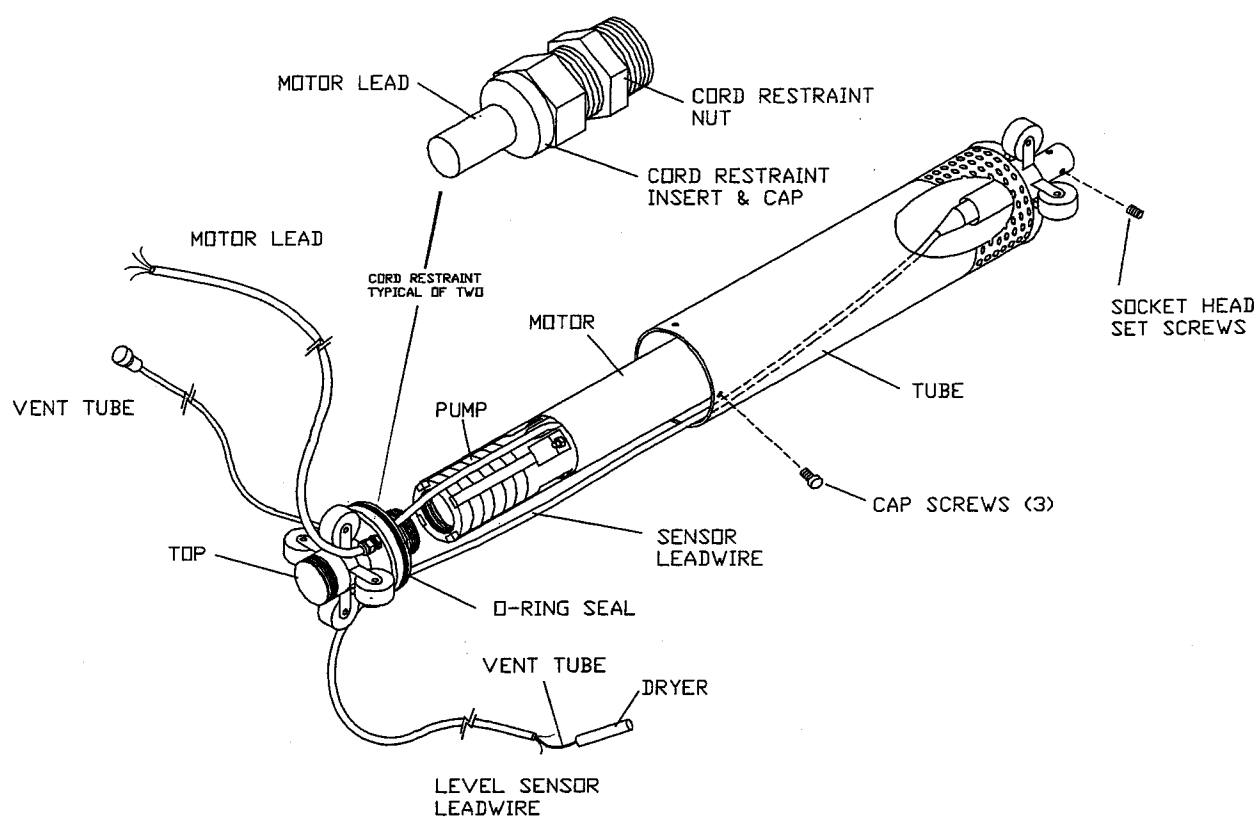
**Table A****MECHANICAL PLUG SPECIFICATION**

Nominal Pipe Size	Maximum Allowable Back Pressure PSIG		Tightening Torque
	Air	Water	
1"	5	110	20 in. lbs.
1.25"	5	100	30 in. lbs.
1.5"	5	70	5 ft. lbs.
2"	5	40	10 ft. lbs.
3"	5	30	12 ft. lbs.

**Table B****TOOLS AND ITEMS REQUIRED FOR  
MAINTENANCE OF EPG SUREPUMP**

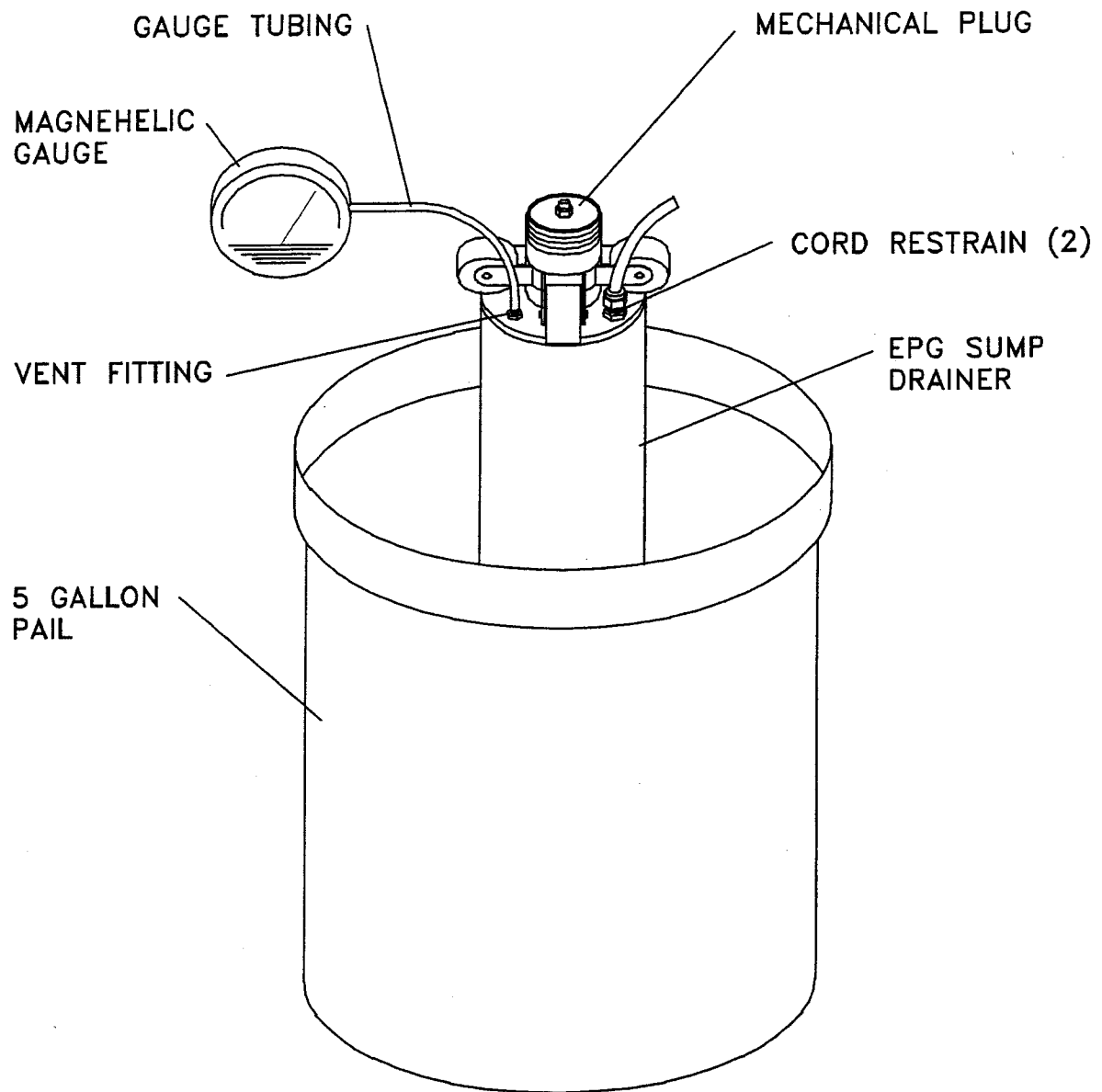
- \* 0-32 Screw with 5/16" hex head
- \* 5/16" Nut driver
- \* 10-32 x 5/16" long stainless steel set screw
- \* 3/32" Allen wrench
- \* .0005" Shim stock (blue)
- \* O-ring set 4, 5, and 6
- \* White petroleum jelly (Vaseline)
- \* Anti-seize compound
- \* Small channel lock pliers
- \* Magnehelic gage (Model 2010)
- \* Scissors to cut shim stock
- \* Flat blade screwdriver
- \* 1/2" Open end wrench
- \* 24" of 1/4" OD nylon tubing
- \* Mechanical plug set -- 1", 1.25", 1.5", 2", and 3"
- \* Torque wrench

## Figure 1





**Figure 2**



## EPG SurePump™ with LevelMaster™ Level Sensor

## REPLACEMENT INSTRUCTIONS FOR LEVEL SENSOR IN WHEELED SUMP DRAINER

1. Use a 15/16 open end wrench to loosen and then remove the cord restraint nut (2).
2. Slide the cord restraint nut (2) and the grommet (3) off of the level sensor cable (1).
3. Use a 3/32" hex key to loosen the three set screws (4) from the locking collar.
4. Tie a string to the top end of the level sensor cable (1) and use electrician's tape to secure the string. Remove desiccant dryer from vent tube and close vent tube with tape.
5. Push several inches of the level sensor cable (1) into the sump drainer. Pull the level sensor holder (8) and the level sensor (6) out of the locking collar (5).
6. Pull the level sensor cable (1) through the sump drainer to a point where the electrician's tape can be removed.

**CAUTION:** Do not pull the string through the sump drainer, it will be used to assist installation of the new level sensor.

7. Use the 3/32" hex key to loosen the four set screws (7) in the level sensor holder (8) and remove the level sensor.
8. Remove the string from the level sensor cable (1).
9. Remove the foam protective cover from the new level sensor.

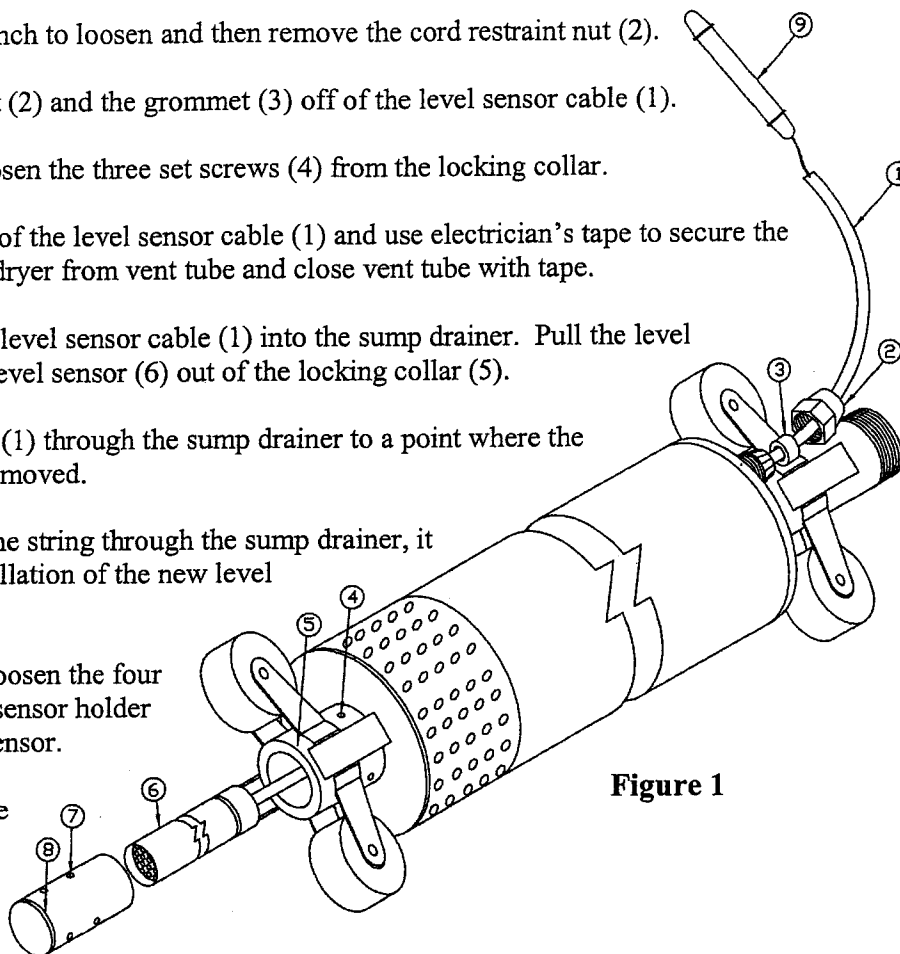


Figure 1

10. Remove the desiccant dryer tube (9) and seal the vent tube with electrician's tape.

**CAUTION:** The vent tube must have a dessicant dryer installed at all times or be sealed with electrician's tape. It is very important not to allow any dirt or moisture to enter the vent tube.

11. Place the new level sensor (6) in the level sensor holder (8). Secure the four set screws with the 3/32 hex key and torque to a maximum of seven-inch pounds.

**CAUTION:** Do not over tighten the set screws. Over tightening can damage the level sensor. Seven-inch pounds torque will secure the level sensor (6) in place.

12. Tie the string to the new level sensor cable end (1) and use electrician's tape to secure the string.
13. At the sump drainer's discharge end, pull the string and level sensor cable (1) through the sump drainer until the level sensor holder (8) is seated in the locking collar (5).

**CAUTION:** Do not pull the cable tight. Allow two to three inches of slack in the sump drainer.

14. Insure the level sensor holder (8) is securely seated in the locking collar (5) and tighten the three set screws (4). Torque to 15-inch pounds.
15. Remove the electrician's tape and string from the level sensor cable.
16. Reinstall the grommet (3) and the cord restraint nut (2). Tighten with the 15/16 open end wrench
17. Remove the tape from the vent tube and reinstall the dryer (9).

**Tools/Equipment needed:**

- 15/16 open end wrench
- 3/32 hex key
- String-2 or 3 feet longer than the sump drainer
- Electrician's tape
- Torque wrench with inch pound scale

## **TEST EQUIPMENT**

To insure proper installation, EPG recommends the following instruments. When working with electrical circuits, use caution to avoid electrical shock.

**Megohmmeter:** To measure insulation value of motor and motor leads to ground. The higher the reading, the better.

**Ohmmeter:** (Must be able to read less than 1 ohm) To measure resistance winding to winding in motor, check quality of any connections made in motor circuit to test coils of relays and continuity of circuits.

**Volt Meter:** To verify correct supply voltage and measure system requirements when running.

**Clamp on Amp Meter:** To measure current draw in system.

## TROUBLESHOOTING GUIDE

FAULT	POSSIBLE CAUSE	HOW TO CHECK	HOW TO CORRECT
Pump or blower does not run.	No electricity at controller.	Check for voltage at controller.	If no voltage at controller, check for cause. Contact power company if voltage is incorrect.
	Fuses are blown or circuit breakers are tripped.	Check fuses for correct size and check for loose, dirty, or corroded connections in fuse receptacle, terminal strip and at splice points.	Replace with proper fuse or reset circuit breaker. If new fuses blow or circuit breaker trips, the electrical installation, motor and leads must be checked.
	Motor starter overloads have tripped out.	Check for voltage on line and load side of starter. Check megohm value of motor and lead.	Reset heaters or replace. Inspect starter for other damage. If heater trips again, check the supply voltage. Replace motor or lead as needed.
	Motor and/or cable are defective.	Turn off voltage, disconnect drop leads from controller to the motor. Measure the lead-to-lead resistances with ohmeter (RX-1). Measure lead-to-ground values with megohm meter. Record measured values.	If open winding or ground is found, remove pump and recheck values at the surface. Repair or replace motor or cable.

FAULT	POSSIBLE CAUSE	HOW TO CHECK	HOW TO CORRECT
	Starter does not energize.	Energize control circuit and check for voltage at the holding coil.	If no voltage, check control circuit. If voltage, check holding coil for shorts. Replace bad coil.
	Defective controls.	Check all sensors and safety switches for operation. Inspect contact in control devices.	Replace worn or defective parts.
	Defective capacitor. (Single phase only.)	Turn off voltage, discharge capacitor. Check with megohm meter. Record measured values.	Replace if defective.
<b>Pump runs but does not deliver liquid.</b>	Liquid level in sump is too low or sump infiltration rate is reduced or intranded gas.	Check sump draw down.	See pump data sheet for minimum submergence values.
	Vent valve not installed or improperly installed.	Make sure valve is attached to the to of the sump drainer and that it is not installed backward.	Replace valve if missing. Reverse valve if installed upside down.
	Inlet strainer is clogged.	Install pressure gauge, start pump, gradually close the discharge valve and read pressure at shutoff.	Remove pump and inspect for blockage. Clean screen as needed. Inspect check valve for blockage. Rinse out pump and reinstall.

FAULT	POSSIBLE CAUSE	HOW TO CHECK	HOW TO CORRECT
	Pump is defective or worn.	Same as description above.	Convert PSI to feet (PSI x 2.31 ft/PSI = ____ ft.), add elevation from pressure gauge to liquid level to the converted pressure reading. Refer to specific pump curve for shutoff head for that pump model. If calculated value is close to curve, pump is probably OK. If not, remove pump & inspect.
<b>Pump runs continuously.</b>	Leak in system.	Check system for leaks.	Replace damaged pipes or repair leaks.
	Worn pump.	Install pressure gauge, start pump, gradually close the discharge valve and read pressure at shut-off.	Pull pump and inspect. Replace worn impellers, bearings or other close fitting parts.
	Loose or broken motor shaft.	Little or no liquid will be delivered if the pump/motor coupling is loose or if the motor shaft has sheared off.	Check for damaged shafts if coupling is loose and replace worn or defective units.
	Pump intake or impellers blocked.	Restricted flow may indicate a clogged intake screen or partially blocked impellers. Pump may be installed in mud or sand.	Clean screen and reset pump. It may be necessary to clean impellers.

FAULT	POSSIBLE CAUSE	HOW TO CHECK	HOW TO CORRECT
<b>Pump runs but at reduced capacity.</b>	Wrong rotation.	Check for proper electrical connection in control box.	Correct wiring and change leads as required.
	Leak in system.	Check system for leaks.	Replace damaged pipes or repair leaks.
	Pump strainer or check valve is clogged.	Remove pump and inspect.	Clean, repair, rinse out and re-install pump. It may be necessary to take pump apart and clean impellers. Check discharge line for any obstructions.

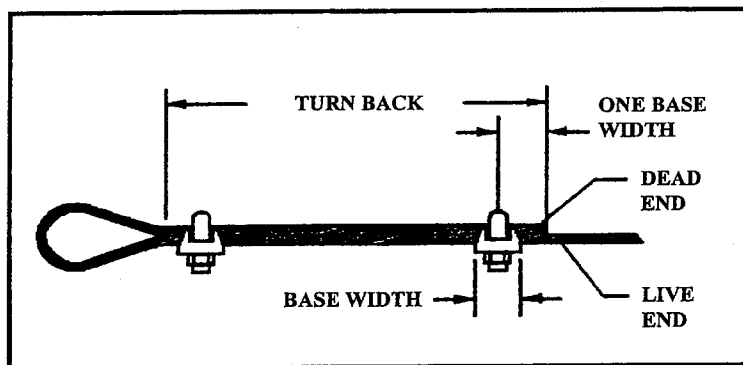


## Wire Cable Clamp

## INSTALLATION INSTRUCTIONS

### Recommended Method of Applying Clamps to get Maximum Holding Power

1. *Turn back* the specified amount of cable from the loop. Apply the first clamp one base width from the dead end of the wire cable (U-bolt over dead end - live end rests in clamp saddle). Tighten nuts evenly to recommended torque.
2. *Apply the next clamp* as near the loop as possible. Turn on nuts firm, take up rope slack, and tighten nuts evenly to recommended torque.
3. Do not use clamps on plastic coated wire rope.
4. Never use clamps to connect two straight lengths of wire rope.



### Attaching Clamps

A termination made in accordance with instruction and using the number of clamps shown has an approximate 80% efficiency rating. This rating is based upon the catalog breaking strength of wire rope.

### Number of Clamps Recommended

Clamp Size Inches	Minimum No. of Clamps	Amount of Cable to Turn Back in Inches	Breaking Strength FT/LBS	Clamp Torque FT/LBS	Cable Strength with Clamps FT/LBS
1/8	2	3 1/4	1,760	4.5	1400
3/16	2	3 3/4	3,700	7.5	2960
1/4	2	4 3/4	6,400	15	5120

## STORAGE INFORMATION

### SUREPUMP™

1. The ideal storage condition for SurePump is in a warm dry location. Although SurePump will tolerate a light freeze, temperatures should not fall below -3°C (27°F). Repeated freezing and thawing should be avoided to prevent possible loss of motor fluid.
2. Limit storage time to less than two years if storage area temperatures exceed 100°F. Limit storage time to one year or less if storage area temperatures exceed 130°F.
3. To prevent motor seal damage and/or fluid loss, always store SurePumps vertically.

### LEVELMASTER™

1. IMPORTANT: During any short or long term storage, to prevent moisture damage to internal components, the desiccant dryer must be installed on the vent tube of the submersible level sensor signal cable. Store in a warm dry location to prevent internal condensation in the meter enclosure.
2. If the level sensor is installed in a SurePump, pump must be stored in a vertical position. Coil the sensor signal cable and place in a box or protected area to prevent damage to the signal cable. Do not stack heavy items on top of level sensor signal cable.
3. Make certain that the desiccant dryer is attached to the end of the level sensor vent tube. Inspect dryer periodically and replace if crystals are pink or white.

### PUMPMASTER™ CONTROLS

1. To prevent condensation/moisture damage within the control cabinet, store the PumpMaster in a warm dry location.
2. Check that the corrosion inhibitor cartridge is installed in the interior of the cabinet. If the PumpMaster control will be stored for over six months, contact EPG Companies Inc. for additional corrosion inhibitor cartridges

#### NOTE

The non-volatile memory of level and flow meters may deteriorate if left without power for periods greater than one year. If storage times are expected to exceed one year contact EPG Companies Inc. for special precautions.

## SurePump™ Installation Record

EPG Job No. \_\_\_\_\_

**Installer's Name** \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Zip \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

Contact name \_\_\_\_\_

**Owner's Name** \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Zip \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

Contact name \_\_\_\_\_

Sump Name/ ID \_\_\_\_\_ Date Installed \_\_\_\_\_

Leachate or Condinsate Temp \_\_\_\_\_ °F Or °C

**Pump:**

Model No. \_\_\_\_\_

Rating: \_\_\_\_\_ GPM@ \_\_\_\_\_ Ft. TDH

HP \_\_\_\_\_ Voltage \_\_\_\_\_ Phase \_\_\_\_\_

Actual Pump Delivery \_\_\_\_\_ GPM@ \_\_\_\_\_ PSI

Operating Cycle \_\_\_\_\_ ON (Min/Hr) \_\_\_\_\_ OFF (Min/Hr)

(Circle Min. or Hr. as appropriate)

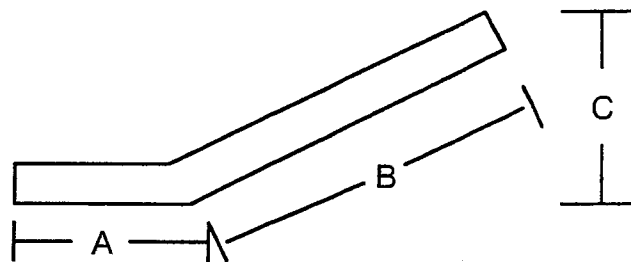
**Side Slope Riser Information:**

Slope \_\_\_\_\_ :1

Length of riser Pipe (A+B) \_\_\_\_\_ ft.

Vertical Distance = Sump to  
Top of Riser Pipe (C) \_\_\_\_\_ ft.

Riser ID \_\_\_\_\_ SDR \_\_\_\_\_

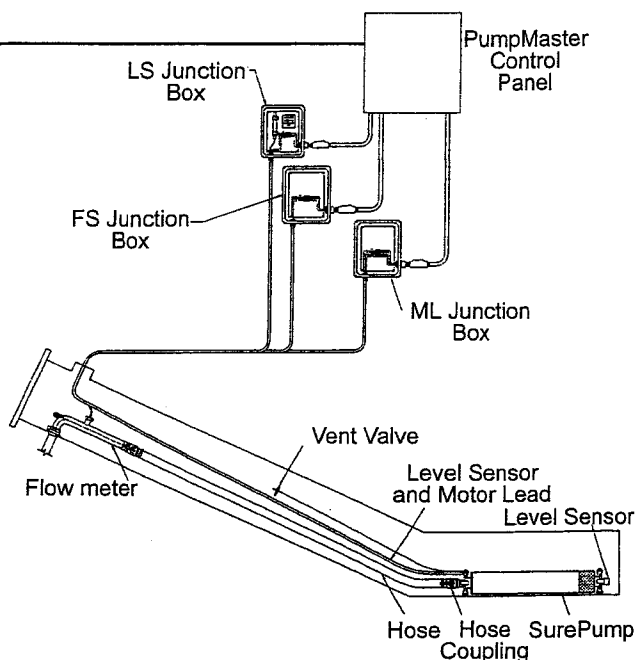
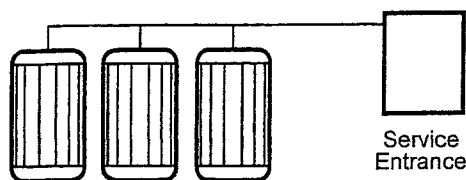
Distance From Top of Riser  
Pipe to Controller \_\_\_\_\_ ft.**Power supply:**

Cable: Service Entrance to Control Distance \_\_\_\_\_ ft Wire Size \_\_\_\_\_ AWG/MCM

Copper \_\_\_\_\_ Jacketed \_\_\_\_\_ Aluminum \_\_\_\_\_ Individual conductors \_\_\_\_\_

Cable: Control to Motor \_\_\_\_\_ ft \_\_\_\_\_ AWG/MCM

Copper \_\_\_\_\_ Jacketed \_\_\_\_\_



## Transformer:

KVA \_\_\_\_\_ #1 \_\_\_\_\_ #2 \_\_\_\_\_ #3

## Initial Megs - Before Installation

Motor & lead T1 \_\_\_\_\_ T2 \_\_\_\_\_ T3 \_\_\_\_\_

## Final Megs - After Installation After Running for 15 min

Motor, leads & cable T1 \_\_\_\_\_ T2 \_\_\_\_\_ T3 \_\_\_\_\_

## Incoming Voltage:

No Load L1-L2 \_\_\_\_\_ L2-L3 \_\_\_\_\_ L1-L3 \_\_\_\_\_

Full Load L1-L2 \_\_\_\_\_ L2-L3 \_\_\_\_\_ L1-L3 \_\_\_\_\_

## Running Amps:

### Hookup:1

Full Load L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_ % unbalanced \_\_\_\_\_

### Hookup:2

Full Load L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_ % unbalanced \_\_\_\_\_

### Hookup:3

Full Load L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_ % unbalanced \_\_\_\_\_

Ground wire size \_\_\_\_\_ AWG/MCM

DC Ground Current \_\_\_\_\_ mA Ground Test \_\_\_\_\_ Ohms

Motor Surge Protection \_\_\_\_\_ Yes \_\_\_\_\_ No

## Control Panel:

Model # \_\_\_\_\_

### Short Circuit Device

Circuit Breaker \_\_\_\_\_ Rating \_\_\_\_\_ Setting \_\_\_\_\_  
Fuses \_\_\_\_\_ Type \_\_\_\_\_ Rating \_\_\_\_\_  
\_\_\_\_\_ Standard \_\_\_\_\_ Time Delay \_\_\_\_\_

### Controls are Grounded to:

\_\_\_\_\_ Motor  
\_\_\_\_\_ Rod  
\_\_\_\_\_ Power Supply

### Start Overloads:

Set at \_\_\_\_\_ amps

Company \_\_\_\_\_

Date \_\_\_\_\_

## **ENGINEER'S SPECIFICATION**

## **EPG WSDPT SurePump™ Wheeled Sump Drainer** for side slope riser installations with built-in level sensor

Furnish and install 1 centrifugal submersible EPG WSDPT SurePump Wheeled Sump Drainer(s) (U.S. patented), Model WSDPT 5 - 2 with 2 impeller stages. Each unit shall be suitable for side slope riser installation. Each unit shall come with a 1/2 HP, submersible electric motor for operation on 460 Volts, 3 phase, 60 Hertz service with 180 feet of power cable. Each SurePump Wheeled Sump Drainer shall have a 1 inch MNPT threaded discharge nozzle and be capable of delivering 25 GPM at 34 feet of TDH. Each SurePump will be fitted with 160 feet of stainless steel lifting cable of sufficient strength to permit removal of the unit.

### **DESIGN**

Each SurePump Wheeled Sump Drainer shall be capable of pumping contaminated ground water for spill recovery, leachate, condensate, and purge applications. A removable transmitter mount (patent pending) shall be installed at the center bottom of the Sump Drainer for liquid level control. The Sump Drainer shall permit the unit to "pump down" to within 8 inches of the sump bottom without any loss of performance or damage to the pump. External "priming" shall not be required nor allowed. The Sump Drainer shall be equipped with a vent valve to assist with the evacuation of air from the Sump Drainer.

### **MATERIALS**

Major components shall be made of 304 stainless steel, seal rings are to be made of E-Glide™, and bearings are to be E-Glide. In addition, all fasteners shall be 304 stainless steel.

### **CHECK VALVE**

Each unit shall include a built-in check valve with non-metallic seat, and housing and disc of 304 stainless steel.

### **SHAFT**

The shaft shall be of 304 stainless steel and rotate on E-Glide bearings that are fluid lubricated.

### **DIFFUSER CHAMBER**

The diffuser chambers for each impeller shall be 304 stainless steel and fitted with E-Glide impeller seal rings.

### **IMPELLERS**

The impeller(s) shall be closed and consist of 304 stainless steel.

### **MOTOR**

The motor shall be a submersible, hermetically sealed Franklin motor in Pollution Recovery construction. The motor shall be designed for continuous duty, capable of sustaining up to 100 starts per day. The motor shall be connected to the pump via a motor adaptor and coupling in 304 stainless steel. Single phase motors in 1/2 HP to 1 HP only shall have thermal protection in the motor windings to protect the windings from overload. The unit will restart automatically after the motor cools down. Larger horsepower single phase motors and three phase motors shall have thermal protection located in the control panel that is manually reset.

### **MOTOR LEAD WIRE**

The lead wire shall be no-splice with EPG's "CP" waterproof and chemically resistant jacket over 600 Volt insulation and be of the length specified.

## ENGINEER'S SPECIFICATION

## EPG Series L925PT PumpMaster™ Controller 3Ø CONTROL PANEL

Furnish one EPG Companies Inc., UL listed 508A/698A, Series L925PT controller to operate pump motor and auxiliary equipment in manual or automatic mode. The control panel enclosure shall be NEMA type 4x – stainless steel.

The enclosure shall be equipped with a window in the outer door, an inner door, a stainless steel drip shield, and a tamper resistant latch. The NEMA 4 (standard) enclosure is finished with polyester urethane paint. The NEMA 4X (optional) enclosure can be either stainless steel or non-metallic.

The control system will operate from a 460 Volt, 60 Hertz, three phase power supply. Pump control components will be sized to operate pump motor of specified horsepower.

The control panel shall include the following as standard features:

- \* Main Disconnect Switch: The main disconnect switch shall be 40 Amp rated and will prevent opening of the control panel while power is on, and includes 460 Volt, 2 Amp dual element fuses.
- \* "Hand-Off-Auto" Selector Switch: Allows manual or automatic operation of the pump motor. The selector switch shall be a heavy duty, oil tight, NEMA 4 rated switch mounted on the inner door. The hand position shall be momentary with a spring return.
- \* Motor Starter: The motor starter shall be sized to the pump motor horsepower, and shall be equipped with built in single phasing protection and ambient compensated, quick trip adjustable thermal overloads.
- \* Control Transformer: A transformer with fused primary and secondary shall isolate the control circuit from the power circuit and provide easier and safer field wiring of accessories. It shall lower incoming voltage to 120 Volts.
- \* Run Light: Indicates energization of motor circuit. It shall be heavy duty, oil tight, NEMA 4 rated and shall have a voltage surge suppressor built in to prolong lamp life. The light shall be mounted on the inner door and will be green in color.
- \* Motor Overload Light: Indicates motor not running due to overload condition. It shall be heavy duty, oil tight, NEMA 4 rated and shall have a voltage surge suppressor built in to prolong lamp life. The light shall be mounted on the inner door and will be red in color.
- \* LevelMaster™ Level Control: The LevelMaster level control meter shall be mounted on the inner door. The meter shall have a digital readout and the capability to monitor and maintain liquid levels as well as output a high level alarm. It shall also provide a high-high level alarm fail safe feature that shuts off the pump motor. The high-high alarm may indicate level sensor failure or a problem with the pump. Level control shall be accurate to within 0.1 inch.
- \* Level Simulator: The level simulator shall be mounted on the inner door. The level simulator is a built-in test circuit designed to simulate a 4-20 mA load to assist in level meter setup and troubleshooting.
- \* Intrinsically Safe Barrier: The level sensor circuit shall be by protected by an intrinsically safe barrier.
- \* Heater with Adjustable Thermostat: A heater with adjustable thermostat shall promote even distribution of heat and elimination of hot spots and condensation. It shall also maintain the minimum temperature required for the operation of the LevelMaster level control meter. The heater element shall be mounted in space between the sub-panel and the back of the enclosure and provide a minimum of 100 inches square of heating area.
- \* Lightning Arrestor: Shall be grounded, metal-to-metal, to water strata. When properly grounded, the lightning

arrestor will protect electrical equipment against lightning induced surges.

- \* Terminal Strip: Labeled and numbered terminal strip provides easy connection of external components.
- \* Corrosion Inhibitor Emitter: Inclusion of an industrial corrosion inhibitor emitter shall protect internal components of control panel from corrosion for up to one year and shall be replaceable.
- \* Options are available to meet specific needs.

## SYSTEM LOGIC AND FUNCTION

The controller is designed to start and stop a pump using the LevelMaster level control meter with a submersible pressure transmitter. The pump starts at the pump start level set point and continues to run until the liquid level decreases to the pump stop level set point as programmed in the LevelMaster level control meter. If the liquid level rises to the high level alarm set point, a high level alarm will be annunciated. If the liquid level rises to the high-high level fail-safe set point, the pump motor will shut off. The pressure transmitter level sensor shall have a range of 0 to 11.5 feet with a 4-20 mA output signal.

# ***EPG Companies Inc.***

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## **ATTACHMENT TO BULLETIN 0060a**

### **ENGINEER'S SPECIFICATION**

#### **EPG L925PT Controller**

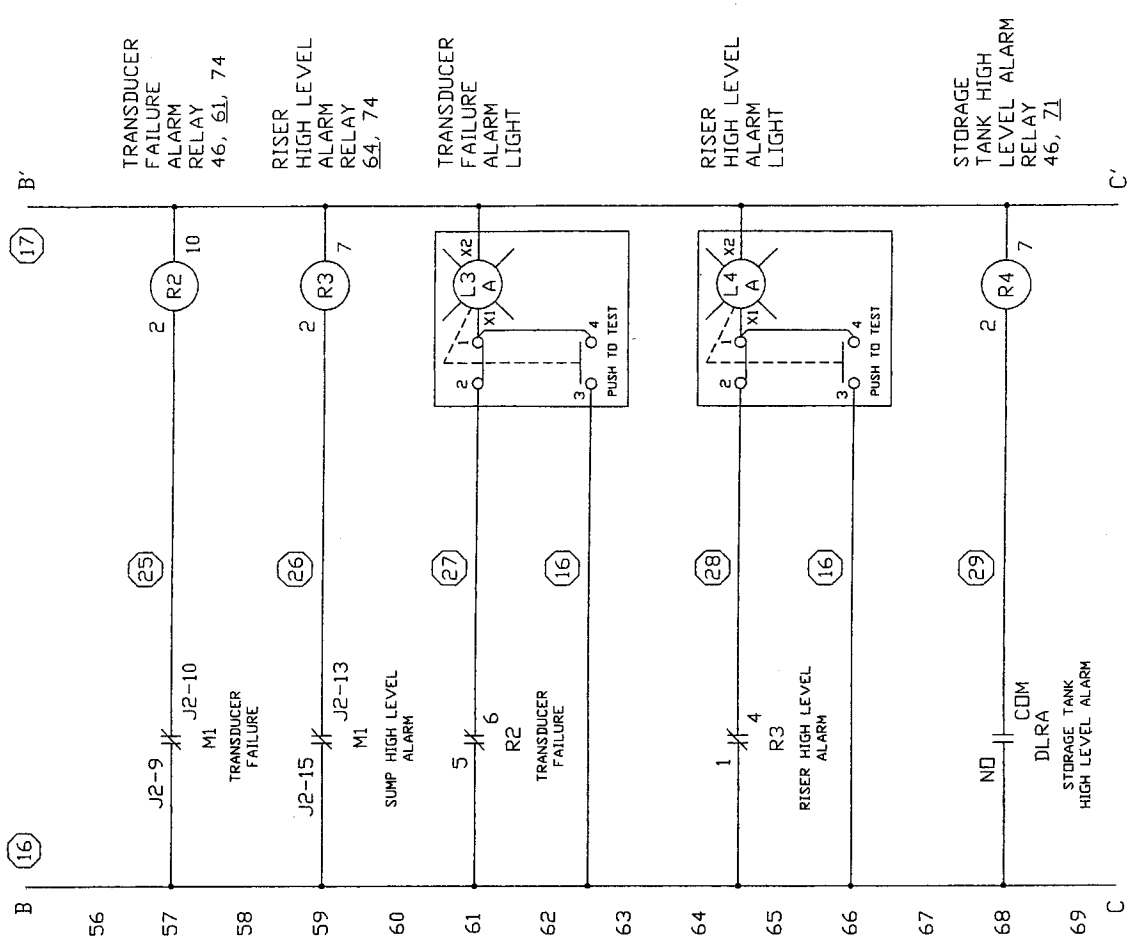
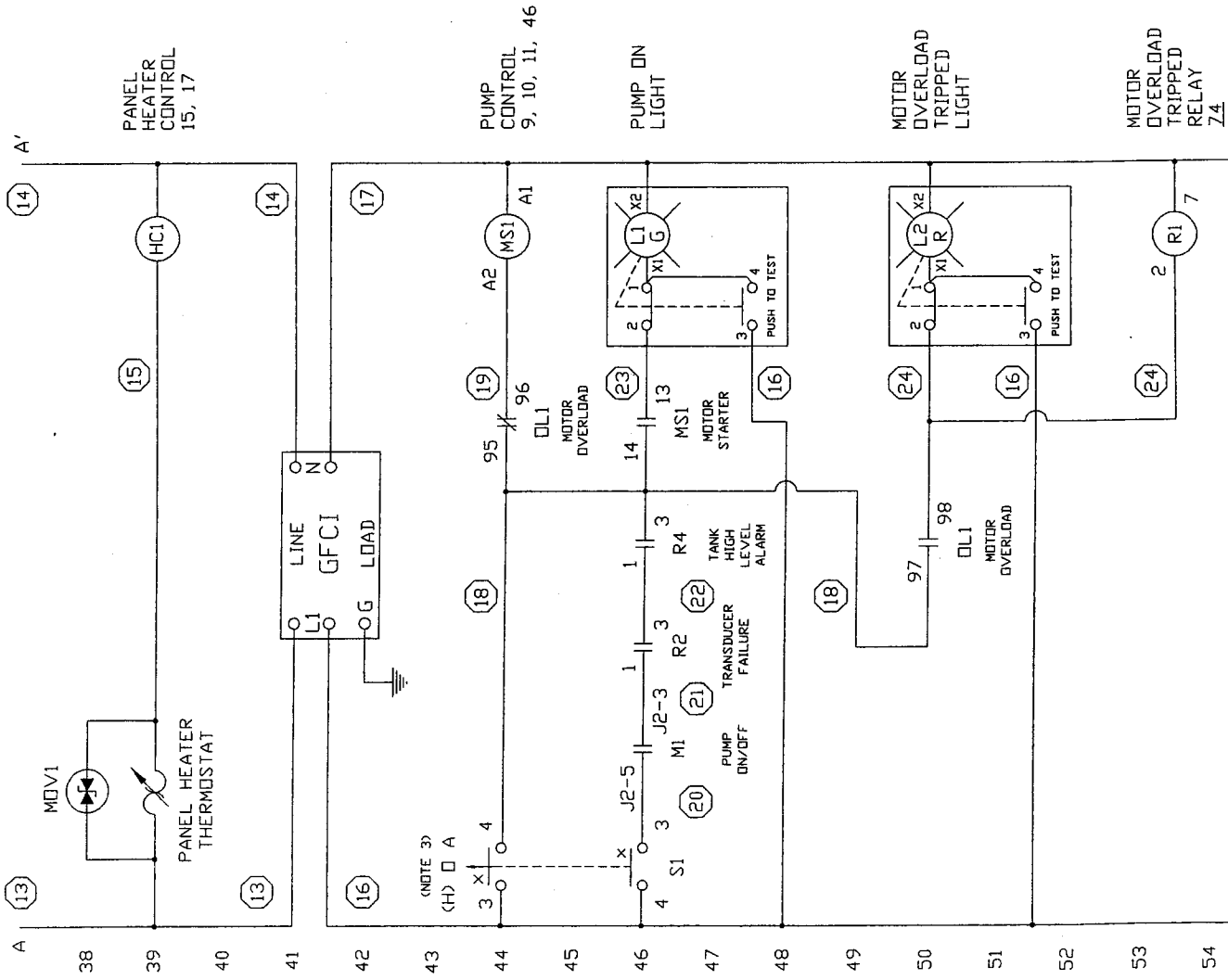
#### **3Ø Control Panel**

#### **EPG Job #03-6244**

These controllers include the following optional features:

- 5ea. push to test light.
- 1ea. lightning arrestor.
- 1ea. common alarm dry contact.
- 1ea. top mounted high level alarm light.



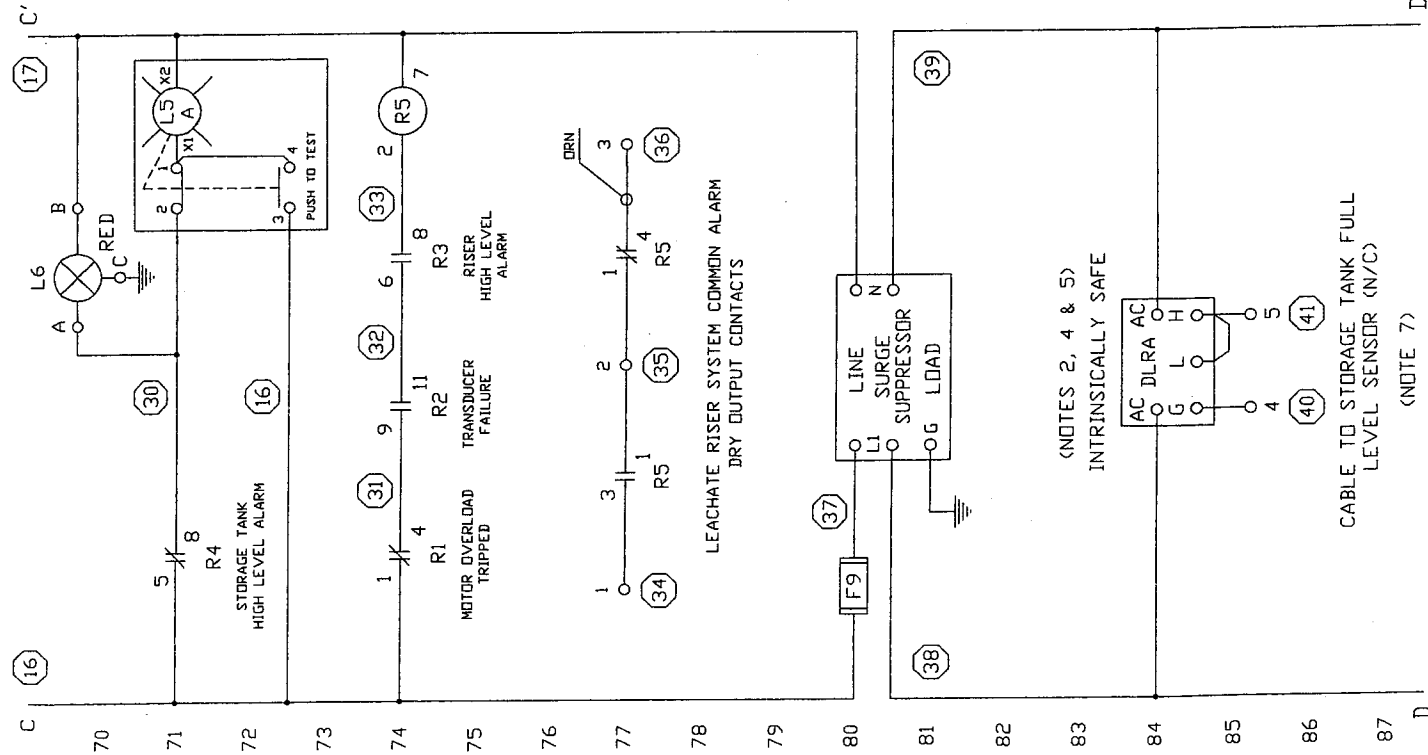


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 NOTICE \* © EPG Companies Inc. 2003  
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 TOLERANCES  
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 L925PT CONTROL PANEL  
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 DATE 06-20-03  
 DRAWING NO. 05900-0251

FOR NOTES AND REVISIONS SEE SHEET 1

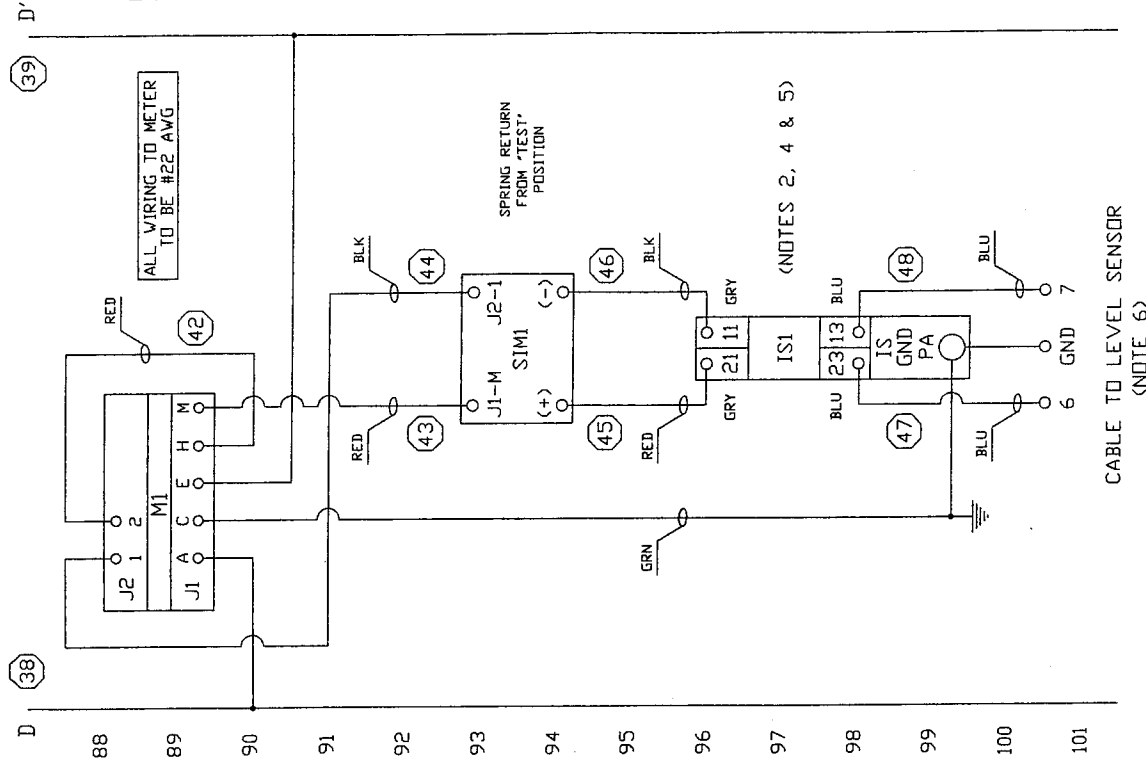
AS BUILT





LAST WIRE NUMBER USED: 48  
FOR NOTES AND REVISIONS  
SEE SHEET 1

**AS BUILT**



JOB No. 03-6244

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TOLERANCES (EXCEPT AS NOTED)

REVISIONS

DATE

BY

REVISIONS

DATE

BY

EPG COMPANIES

L925PT CONTROL PANEL

460VAC 3Ø SH 3 OF 3

FUNCTIONAL

DATE

BY

REVISIONS

05900-0252

EPG LevelMaster Pump controller

Panel S/N: 03-6244

Meter S/N: \_\_\_\_\_

**Primary Leachate Meter**

Default setting - Operating Parameters - Setup Code 35

Meter Designation(s): M1

Parameter	Value	Operation
Pr Hi	28	Turns Pump on when level on meter reads <u>28</u> ".  
Pr Lo	16	Turns Pump off when level on meter reads <u>16</u> ".  
AL H1	34	Turns High Level Light on when meter reads <u>34</u> ".  
Hy Hi	1	Keeps High Level Light on until level drops <u>1</u> " below AL Hi.  
AL H2	150	Turns Pumps off if meter reads 150" or greater. Indicates a possible sensor failure.  
Hy H2	0	Not used.

Default Settings - Sensor Parameters - Setup Code 25

Parameter	Value	Operation
dp	8888.8	Sets Meter to read in 0.1"
OFFSET	-34.6	Provides a "0" reading when sensor inputs 4.0ma
SCALE	0.8656	Converts current input into inches - 1.0ma = 8.656 inches.

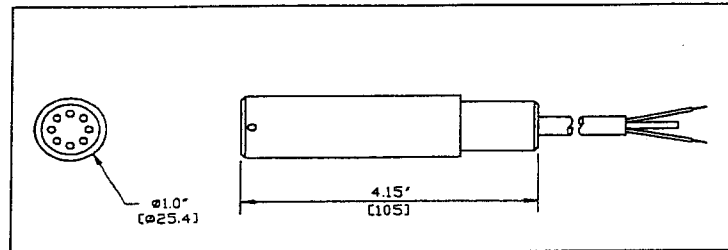
**AS BUILT**

## **CAUTION**

EPG submersible level sensors are designed for rugged use. However, care should be taken to protect these devices from over pressure and sudden impact. When lowering the level sensor into a liquid, penetrate the surface slowly and only to the depth that the unit is designed for. Do not drop or wash with high pressure since this may damage the unit.

## ENGINEER'S SPECIFICATION

## EPG LevelMaster™ Submersible Level Sensor



### GENERAL FEATURES

- \* **Application:** The LevelMaster sensor is designed specifically to work with the EPG SurePump™, but its durability, accuracy and weight make it the logical choice for stand alone level applications. The chemical resistant jacketed cable with water block contains a vent tube for atmospheric pressure compensation.
- \* **Ranges Available:** 0-13" through 0-460' models are standard. Call EPG for other ranges available.
- \* **Accuracy:** The LevelMaster sensor has built-in temperature compensation as well as precise calibration giving an accuracy of  $\pm 1.0\%$  at ambient temperature and a combined repeatability and hysteresis error of  $\pm 0.125\%$ .
- \* **Fully Submersible:** The LevelMaster sensor is fully submersible in any liquid compatible with 316 stainless steel and the chemical resistant polyurethane cable jacket. It is designed for submergence at depths greater than operating level without sustaining damage. Call EPG for more severe service.
- \* **Self-Sealing Cable:** If a cut occurs in the outer jacket of the cable, a water block feature just inside the outer jacket will self-seal in most cases guarding against the incursion of water.
- \* **Superior Noise Immunity:** Designed for heavy duty use in hostile environments, the LevelMaster sensor gives outstanding noise immunity. Unlike transducers, whose signals may be distorted by outside interference, the LevelMaster sensor utilizes a conditioned compensated 4-20 mA output to maximize signal strength and accuracy. The sensor also features a shielded lead to help prevent signal disruption from outside sources.

### PERFORMANCE

- \* **Depth Range:** 0-26" thru 0-690' (0-2 PSI thru 0-300 PSI)
  - \* **Static Accuracy<sup>1</sup>:**  $\pm 1.0\%$  BFS/LSL maximum
  - \* **Thermal Error<sup>2</sup>:** 0.05% FSO/°C worst case
  - \* **Proof Depth:** 1.5 X rated depth
  - \* **Burst Depth:** 2.0 X rated depth
  - \* **Resolution:** Infinitesimal
1. Static accuracy includes the combined errors due to nonlinearity, hysteresis and non-repeatability on a Best Fit Straight Line basis, at 25°C per ISA S51.1.
  2. Thermal error is the maximum allowable deviation from the Best Fit Straight Line due to a change in temperature, per ISA S51.1.

## ELECTRICAL

- \* Excitation: 10 to 40 VDC, Red = (+) excitation, Black = (-) excitation
- \* Input Current: 20 mA maximum
- \* Output: 4-20 mA (2 wire)
- \* Zero offset (max): 4-20 mA,  $\pm 12$ mA
- \* Output impedance: <10 ohms
- \* Insulation resistance: 100 megohms at 50VDC
- \* Circuit protection: Polarity, surge & shorted output
- \* Power supply rejection:  $\leq \pm 0.05\%$  FSO/VDC (mA output)
- \* Electrical termination: 2-24 AWG conductors in a shielded cable with sensor breather and polyurethane jacket

## ENVIRONMENTAL

- \* Compensated temp range: 0° to 50°C
- \* Operating temp range: -20° to 70°C

## PHYSICAL

- \* Dimensions: Nominal diameter of 1.0" X 4.15" length
- \* Weight: 7 oz. (not including cable)
- \* Cable: Polyurethane jacketed shielded cable with polyethylene vent tube and Kevlar tension members
- \* Wetted materials: 316 SS, Viton
- \* Mounting provision: Suspended by cable

**MODEL** {Call EPG for other ranges available – specify length (---)}

PART #	DESCRIPTION	RANGE
PT05X---	Submersible Pressure Transmitter	0-11'
PT07X---	" " "	0-16'
PT10X---	" " "	0-23'
PT20X---	" " "	0-46'
PT25X---	" " "	0-57'

## OPTIONS

- \* Tefzel® Cable: Used for highly corrosive environments
- \* Titanium Housing: Used for highly corrosive environments
- \* Lightning Protection: Protects against transient voltages and lightning associated surges up to 20,000 amperes with proper grounding
- \* Temperature Sensor: A sensor with 4-20 mA output for temperature (0-50°C) is available –  
Excitation: 9-30 VDC, White = (+) excitation, Green = (-) excitation

## **EPG Controllers With Intrinsically Safe Circuit(s)**

## **Field Installation Instructions**

**PURPOSE:** Provide instructions to install EPG control panels with Intrinsically Safe (IS) Circuits wired to EPG Level Sensors, EPG Flow Sensors, and Single and Dual Level Float Sensors.

### **PROCEDURE:**

Familiarize yourself with the electrical components and the panel electrical schematics. Read these instructions thoroughly before attempting installation of intrinsically safe circuits. Reference: Installation of intrinsically safe instrument systems in CLASS I HAZARDOUS LOCATIONS, ANSI/ISA-RP 12.6-1987, SECTION 4.5.4.

Install in accordance with Article 504 of the National Electrical Code.

This control panel and its intrinsically safe circuit(s) must be connected to a ground system with very low impedance (1 OHM or less) per NEC 504-50 and 250-50.

See control panel drawings for device wiring. Only simple apparatus (NEC 504-2) and those specifically called out in the controller drawing are to be connected to the intrinsically safe circuit(s). The attached drawings show specific device wiring for level, flow, single level float and dual level float sensors

Where intrinsically safe circuits enter or exit a hazardous (classified) area, a means must be provided to prevent the passage of gases or vapors per NEC 501-5. A seal device must be installed to conduit entering the enclosure and then filled with appropriate sealant.

Wiring of intrinsically safe circuits shall be physically separated from non-intrinsically safe circuits per NEC 504. Do not run intrinsically safe and non-intrinsically safe circuits in the same conduit.

Do not exceed maximum cable lengths stated in the control panel drawings.

Field wiring supplied by others is to have 600 Volt insulation rating.

Conductors of intrinsically safe circuits must be separated by at least 5" from conductors of any non-intrinsically safe circuits

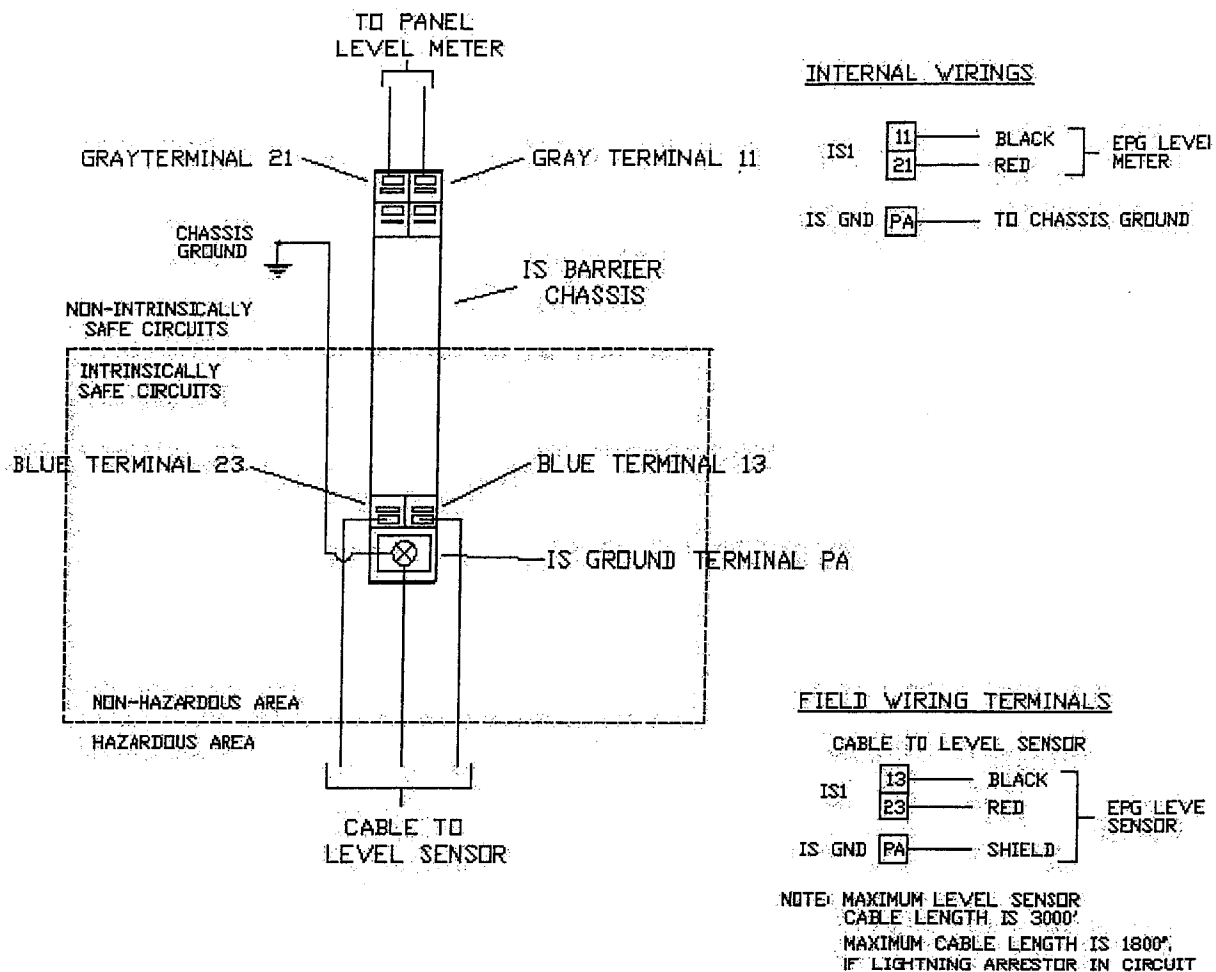
If field wiring is terminated in field supplied junction boxes there must be a minimum of 8" between intrinsically safe and non-intrinsically safe field wiring terminals.

Do not substitute parts. Use only the same make, model and part number as originally supplied.

Replace fuses only with fuses of same type and rating.

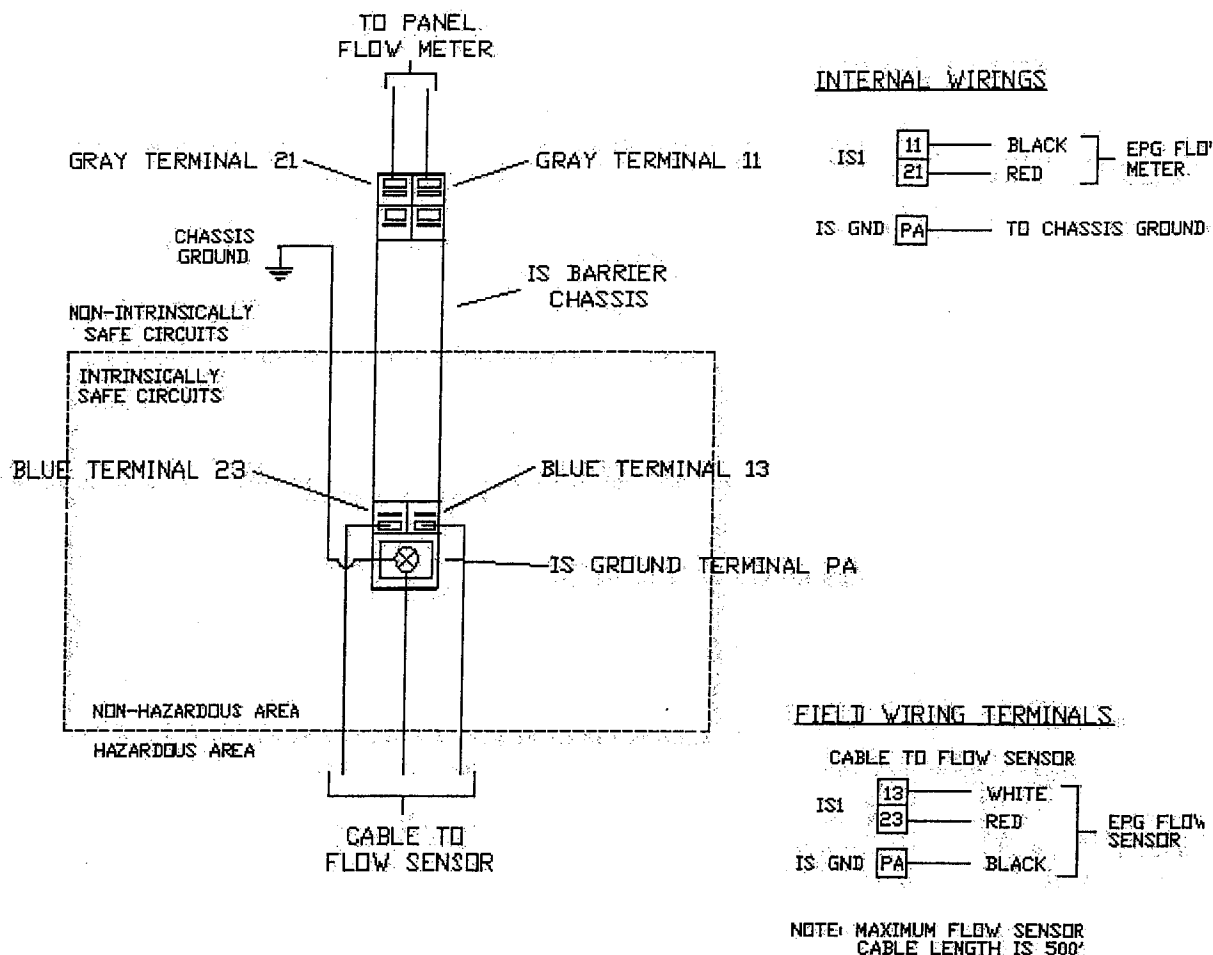


## I.S. BARRIER – LEVEL SENSOR



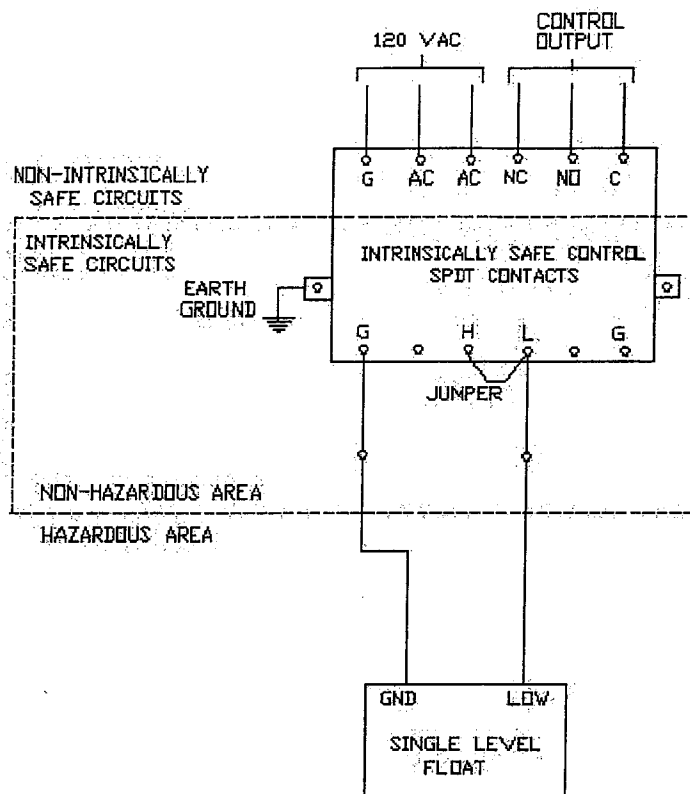
- NOTE: 1. PROVIDES INTRINSICALLY SAFE CIRCUIT EXTENSIONS FOR USE IN CLASS 1 GROUPS C & D HAZARDOUS LOCATIONS WHEN CONNECTED PER EPG BULLETIN 8000.
2. REFERENCE INSTALLATION OF INTRINSICALLY SAFE SYSTEMS IN CLASS 1 HAZARDOUS LOCATIONS, ANSI/ISA-RP 12.6-1987, SECTION 4.5.4.
3. WARNING SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
4. INSTALL IN ACCORDANCE WITH ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE.
5. MAXIMUM CABLE LENGTH TO EPG LEVEL SENSOR IS 3000 FEET. MAXIMUM LENGTH IS 1800 FEET IF LIGHTNING ARRESTOR IN CIRCUIT.

## I.S. BARRIER - FLOW SENSOR

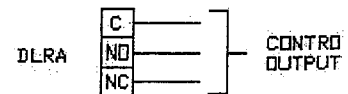


- NOTE: 1. PROVIDES INTRINSICALLY SAFE CIRCUIT EXTENSIONS FOR USE IN CLASS 1 GROUPS C & D HAZARDOUS LOCATIONS WHEN CONNECTED PER EPG BULLETIN 8000.
2. REFERENCE INSTALLATION OF INTRINSICALLY SAFE SYSTEMS IN CLASS 1 HAZARDOUS LOCATIONS, ANSI/ISA-RP 12.6-1987, SECTION 4.5.4.
3. WARNING SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
4. INSTALL IN ACCORDANCE WITH ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE.
5. MAXIMUM CABLE LENGTH TO EPG FLOW SENSOR IS 500 FEET.

## I.S. RELAY BARRIER – SINGLE LEVEL

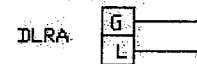


### INTERNAL WIRINGS



### FIELD WIRING TERMINAL:

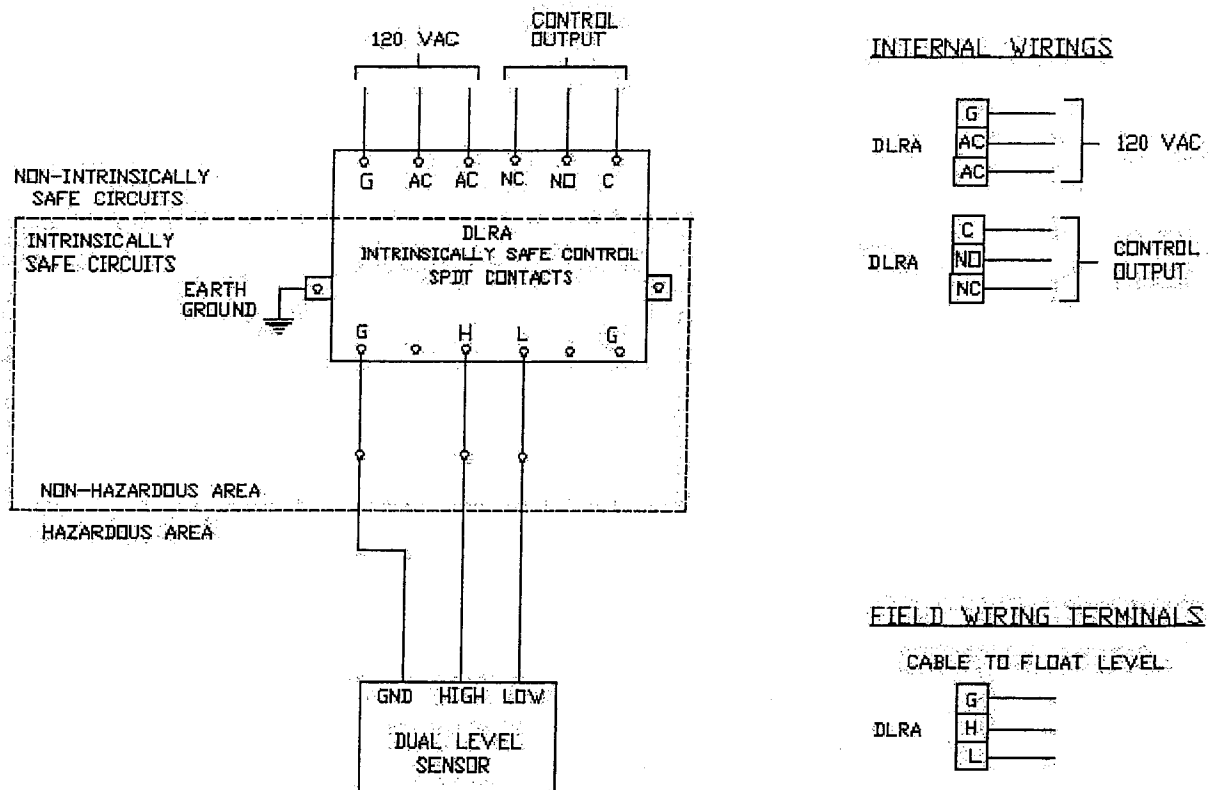
CABLE TO FLOAT LEVEL



NOTE: MAXIMUM CABLE LENGTH TO LEVEL FLOAT IS 901

- NOTE: 1. PROVIDES INTRINSICALLY SAFE CIRCUIT EXTENSIONS FOR USE IN CLASS 1 GROUPS A, B, C, & D HAZARDOUS LOCATIONS WHEN CONNECTED PER EPG BULLETIN 8000.
2. REFERENCE INSTALLATION OF INTRINSICALLY SAFE SYSTEMS IN CLASS 1 HAZARDOUS LOCATIONS, ANSI/ISA-RP 12.6-1987, SECTION 4.5.4.
3. WARNING SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
4. INSTALL IN ACCORDANCE WITH ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE.
5. MAXIMUM CABLE LENGTH TO LEVEL FLOAT SENSOR IS 900 FEET.

## I.S. RELAY BARRIER - DUAL LEVEL



- NOTE: 1. PROVIDES INTRINSICALLY SAFE CIRCUIT EXTENSIONS FOR USE IN CLASS 1 GROUPS A, B, C, & D HAZARDOUS LOCATIONS WHEN CONNECTED PER EPG BULLETIN 8000.
2. REFERENCE INSTALLATION OF INTRINSICALLY SAFE SYSTEMS IN CLASS 1 HAZARDOUS LOCATIONS, ANSI/ISA-RP 12.6-1987, SECTION 4.5.4.
3. WARNING SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
4. INSTALL IN ACCORDANCE WITH ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE.
5. MAXIMUM CABLE LENGTH TO LEVEL FLOAT SENSOR IS 900 FEET.

## **EPG LevelMaster™ Level Sensor**

## **OPERATION & MAINTENANCE INSTRUCTIONS**

### **Characteristics of the LevelMaster Level Sensor**

EPG Companies Inc. LevelMaster level sensor is a submersible pressure transmitter. The pressure transmitter is a precision measurement device that incorporates isolated diaphragm sensors that are specifically designed for use with hostile fluids and gases. The sensor utilizes a silicon pressure cell that has been fitted into a stainless steel package with a stainless steel barrier diaphragm. The sensor assembly is housed in a rugged 316 stainless steel case.

The device features a high performance internal signal conditioning. Standard output is 4 to 20 mA. All units have surge and reverse polarity protection.

All EPG transmitters are permanently etched with wiring information, part number (P/N), serial number (S/N), date of manufacture (DOM), range, excitation, and output.

All EPG transmitters are designed for rugged use. However, care should be taken to protect these devices from overpressure and sharp impact. When lowering submersible pressure transmitters into a liquid, penetrate the surface slowly and only to the depth necessary. Do not drop the unit from above the surface. All transmitters can be cleaned by rinsing them in mild detergent. Do not pressure wash.

### **Vent Filter / Water Vapor Trap**

The vent filter and water vapor trap is a replaceable vent tube dehumidifier intended for use with the submersible pressure transmitters. This device is specifically designed to protect sensitive electronic components from mildew, corrosion, rust, and other forms of deterioration while at the same time preventing the formation of a liquid column.

Vent filters should be changed when they are 85% spent. Do not remove the old filter until a new one is available. The number one failure mode is moisture and corrosion damage due to lack of maintenance of the vent filter. The vent filter connects to the existing vent tube as it exits the cable at the junction box via a tube.

Replacement vent filters can be ordered by calling EPG at 800-443-7426. The vent filter and water vapor trap can be exposed to air, industrial gases, refrigerants, organic liquids, and solvents. However, they should not be used when ammonia is present.

### **Specifications**

Most installations of submersible pressure transmitters connect the cable directly to the control panel or to a breakout box (junction box). From this breakout box, end users must run cable to the required instrumentation. Specifications for the polyurethane or Tefzel jacketed cable is as follows:

- \* Excitation: 10 to 40 VDC, Red = (+) excitation, Black = (-) excitation
- \* Input Current: 20 mA maximum
- \* Output: 4-20 mA (2 wire)
- \* Zero offset (max): 4-20 mA,  $\pm 12$ mA
- \* Output impedance: <10 ohms
- \* Insulation resistance: 100 megohms at 50VDC
- \* Circuit protection: Polarity, surge & shorted output
- \* Power supply rejection:  $<\pm 0.05\%$  FSO/VDC (mA output)
- \* Electrical termination: 2-24 AWG conductors in a shielded cable with sensor breather, water block, and polyurethane jacket
- \* Compensated temp range: 0° to 50°C
- \* Operating temp range: -20° to 70°C
- \* Dimensions: Nominal diameter of 1.0" X 4.15" length
- \* Weight: 7 oz. (not including cable)
- \* Cable: Polyurethane jacketed shielded cable with polyethylene vent tube and Kevlar tension members
- \* Wetted materials: 316 SS, Viton
- \* Mounting provision: Suspended by cable

## Polyurethane Cable

The standard cable is polyurethane and will handle most environments and has a self-sealing feature. If a cut occurs in the outer jacket of the cable, a water block feature below the outer jacket will self-seal in most cases to guard against the incursion of water.

## Chemical Resistance of Polyurethane

Potable Water, Waste Water, Borax, Butane, Animal Fat, Carbonic Acid, Citric Acid, Cod Liver Oil, Corn Oil, Glycerin, Glycol, Mineral Oils, Potassium Nitrate, Potassium Sulfate, Silicone Oils, Stoddard Solvent, Tannic Acid (10), Tartaric Acid, Turbine Oil, and most Leachate.

## Tefzel® Cable

Optional Tefzel cable is recommended for use in highly corrosive environments. It offers additional resistance in corrosive environments over the standard polyurethane cable.

## Chemical Resistance of Tefzel

Acetic Acid (Glacial), Acetic Anhydride, Acetone, Aluminum Chloride, Anti-Freeze, Bromine, Calcium Chloride, Calcium Hydroxide, Chlorine, Copper Chloride, Ferrous Chloride, Hydrochloric Acid, Ketones, Lacquer Thinners, Leachate, and Sulfuric Acid.

## **Cable Lengths**

The maximum length of cable to be used with the submersible pressure transmitter is up to 10,000 feet.

## **OPTIONS**

- \* Titanium Housing:                      Used for highly corrosive environments
- \* Lightning Protection:                Protects against transient voltages and lightning associated surges up to 20,000 amperes
- \* Temperature Sensor:                A sensor with 4-20 mA output for temperature (0-50°C) is available –  
Excitation: 9-30 VDC, White = (+) excitation, Green = (-) excitation.

## EPG LevelMaster™ Level Meter

Model 2551A-SDHH

## OPERATION & SET UP INSTRUCTIONS

The EPG LevelMaster system uses a submersible pressure transmitter to detect changes in fluid levels and a programmable meter featuring a digital LED display and front panel keypad to monitor and control fluid levels. The user can program the desired control parameters for a single pump and one other high level control function. The LevelMaster display is in inches unless otherwise programmed. During a pumping and/or an alarm condition, the display alternates between the message and the current liquid level reading. The message indicates which function is active (see below).

### GENERAL SETUP OPERATIONS

**IMPORTANT:** During setup, if two (2) minutes elapse without a keypad entry the meter automatically returns to the run mode without the entered changes being stored. **DO NOT USE FINGERNAIL OR OTHER SHARP OBJECT TO PROGRAM METER. DAMAGE TO KEYPAD MAY RESULT.**

DISPLAY	INSTRUCTION
SETUP	At this prompt, enter the lockout code (35) in order to enter the set point setup mode.
Pr H1	At this prompt, followed by the current setting, select the Pump Relay High set point. This is the pump ON set point.
Pr Lo	At this prompt, followed by the current setting, select the Pump Relay Low set point. This is the pump OFF set point.
AL H1	At this prompt, followed by the current setting, select the Alarm High Relay set point. This is the high level alarm set point.
Hy H1	At this prompt, followed by the current setting, select the hysteresis for the Alarm High Relay set point. This value, when subtracted from the high level alarm set point, sets the disengage point for the high alarm condition.
AL H2	At this prompt, followed by the current setting, select the Alarm High-High Relay set point. This is the high-high alarm level set point and is factory set.
Hy H2	At this prompt, followed by the current setting, select the hysteresis for the Alarm High-High Relay set point. This value, when subtracted from the high-high level alarm set point, sets the disengage point for the high-high alarm condition and is factory set.

DISPLAY	MESSAGE
P	Pump relay activated. Display alternates with current level.
H1P	High alarm & pump relay activated. Display alternates with current level.
H1PH2	High-High alarm & pump relay deactivated. Display alternates with current level.



## SET UP PROCEDURES FOR SIMPLEX OPERATION – SDHH METER

STEP NO.	ACTION
1	Push SETUP/ENTER button. Wait for the meter to display 0.
2	Push arrow buttons to set a value of 35 on meter display. Push SETUP/ENTER.
3	Meter shows <b>Pr H1</b> (pump ON set point) followed by current value.
4	Push arrow buttons to set the desired level for pump ON. Push SETUP/ENTER button.
5	Meter shows <b>Pr Lo</b> (pump OFF set point) followed by current value.
6	Push arrow buttons to set the desired pump OFF level. Push SETUP/ENTER button.
7	Meter shows <b>AL H1</b> (High Level Alarm) followed by current value.
8	Press arrow buttons to set desired high level alarm point. Push SETUP/ENTER button.
9	Meter shows <b>Hy H1</b> . Press arrow buttons to select value. Push SETUP/ENTER button.
10	Meter shows <b>AL H2</b> (High-High level alarm set point) followed by current value. Factory setting is 150.0". <b>NOTE: This fail safe feature shuts off the pump if the level sensor fails and should not be changed in the field.</b>
11	Meter shows <b>Hy H2</b> . Press arrow buttons to select value of 0.0". Not used.
12	Push SETUP/ENTER button. Meter shows <b>RUN</b> .

### EXAMPLE:

If the desired levels for the pump were:

Pump ON	18.0"
Pump OFF	12.0"
High Level Alarm	30.0"
High Level Alarm Hys.	1.0"

Complete steps 1 – 3 above.

Select **18.0** with arrow buttons for the **Pr H1** value. Push SETUP/ENTER.

**Pr Lo** is displayed, select **12.0** with the arrow buttons for the Pump OFF value. Push SETUP/ENTER.

**AL H1** is displayed, select **30.0** with the arrow buttons for the High Alarm value. Push SETUP/ENTER.

**Hy H1** is displayed, select **1.0** with the arrow buttons for the High Level Alarm OFF value (value determined by subtracting from high-level-alarm set-point). Push SETUP/ENTER.

## INSTALLATION NOTES AND TROUBLESHOOTING

**BACKGROUND:** Numerous installations of the EPG LevelMaster system have proven its long-term reliability. The majority of malfunctions of the LevelMaster system are the result of improper installation and handling of the pressure transmitter sensor. During new installations, be certain to check for any shipping damage, loose controller connections or parts that may have come loose during shipment.

### **CAUTION**

Do not use any other programming codes other than setup code (35).

SYMPTOM / DISPLAY	PROBABLE CAUSES	HOW TO CORRECT
Continuous above full scale reading (above 139"), or Continuous reading.	If pump has been off for a long period of time, liquid level may actually be quite high. Loose connections in circuit.  Short circuit in sensor lead wire or connector or circuit.  Faulty sensor.	Reprogram meter if above 150" or pull pump up slightly to initiate pump start.  Repair connections in controller.  Inspect for shorted connections at breakout box (junction box) and at controller. If connections are good, replace sensor.  Replace sensor.
-34.6 reading.	Lead wire damaged or reversed connections.  Open circuit in sensor lead wire or controller connections.  Faulty power supply in meter.	Check schematic, repair connections.  Replace sensor and lead wire. Test IS barrier and meter with simulator.  Replace meter.
Erratic readings.	Damaged sensor lead wire.  Improper connections.  Faulty meter.	Check schematic, repair connections.  Replace sensor and lead wire.  Test meter with simulator. If faulty meter, replace meter.
Pump starts at normal reading, runs for a few seconds and stops.	Low liquid recovery rate. Screen on pump may be clogged.  Sump clogged or plugged.	Remove pump and clean screen. May also need to disassemble pump and clean pump impellers.  Remove pump and clean out sump.

## FACTORY SETTINGS

LevelMaster Model SDHH Meter

Panel S/N: \_\_\_\_\_

Meter S/N: \_\_\_\_\_

Meter Designation: \_\_\_\_\_

### Operating Parameters – Setup Code 35

PARAMETER	VALUE	OPERATION
Pr H1	inches	Turns Pump ON when level on meter reads _____
Pr Lo	"	Turns Pump OFF when level on meter reads _____
AL H1	"	Turns High Level Light ON when level on meter reads _____
Hy H1	"	Keeps High Level Light ON until level until level drops _____ below AL H1
AL H2	150.0	Turns Pump OFF when level meter reads <u>150.0"</u> or greater Indicates a probable level sensor failure
Hy H2	0.0	Not used

NOTE: If the up arrow is pressed any time that the meter is operating, the highest level that the meter has observed since power was applied will be displayed.

## **S3070-PT TRANSDUCER SIMULATOR Operation**

The model 3070-PT Transducer Simulator is a device designed for the express purpose of testing an EPG LevelMaster™ level controller circuit while temporarily bypassing the existing level sensor. In the "Run" (normal operation) mode liquid level in the sump applies pressure on the level sensor. The sensor converts that force into an electrical signal. The electrical signal is transmitted by the sensor cable to the level meter where it is converted into a liquid level display.

The "Test" mode simulates a level sensor signal. Rotating the potentiometer changes the electrical signal forcing the system to function as if a level sensor were in the circuit. Varying the electrical signal changes the level meter display in the same manner in which the level sensor signal would effect the system. By turning the simulator knob slowly clockwise from top to bottom the meter will display each set point such as start, stop and alarms. With the toggle switch turned back to the "Run" position the potentiometer is removed from the circuit and the level sensor controls according to the set points. Meter values register actual liquid level.

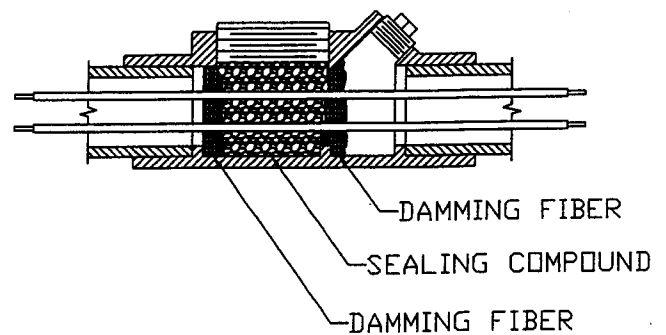
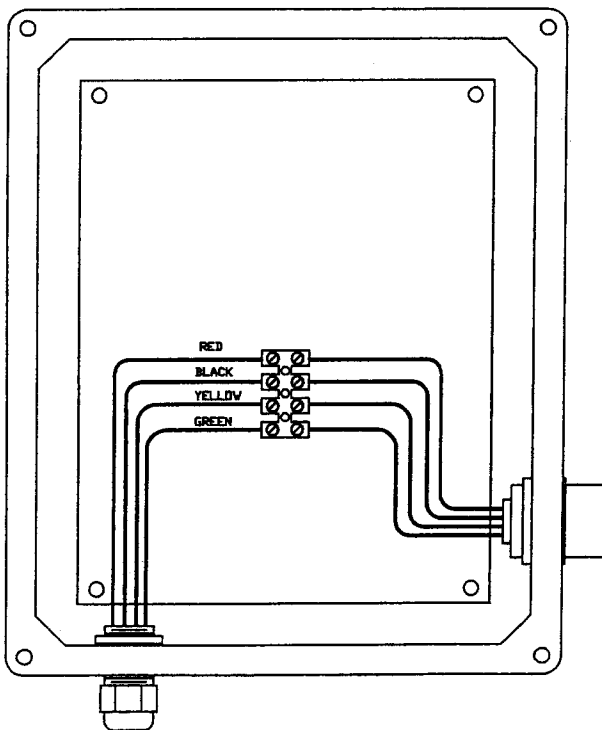
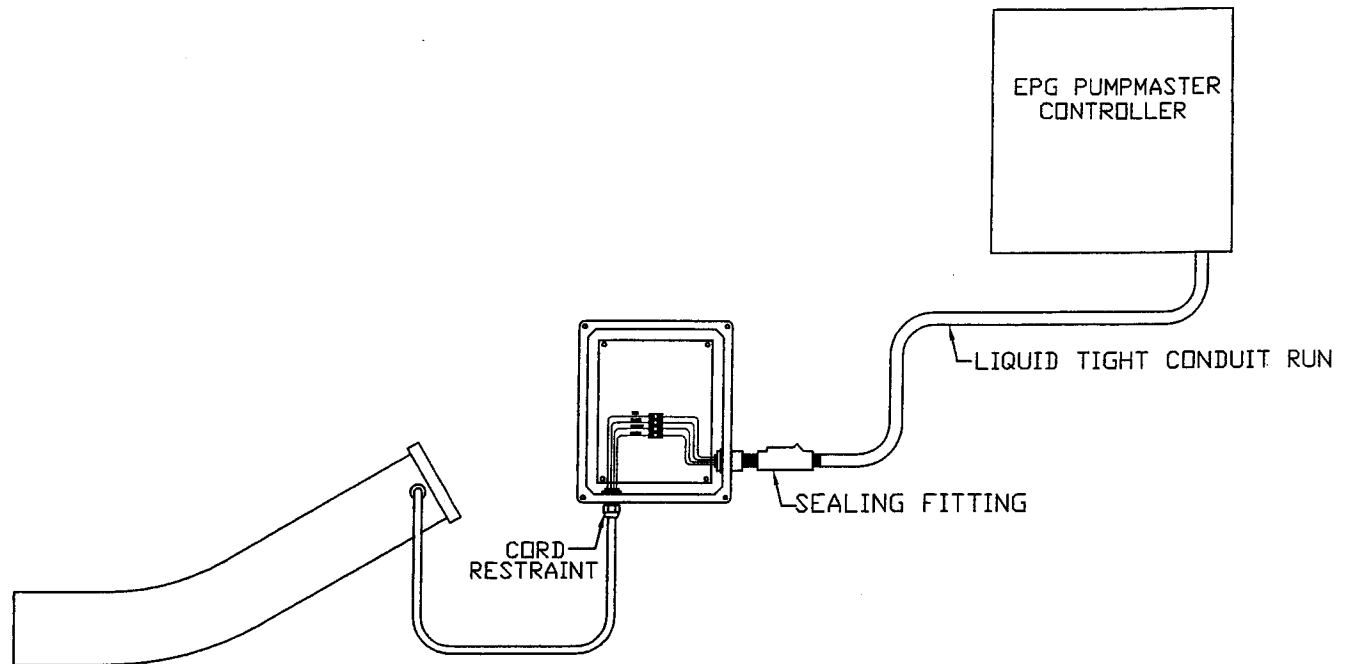
**"CAUTION"**, care must be taken when using this device in "Test" mode to avoid damaging the motor by running it dry. In normal test mode the pump switches should be off.

## **S3070-PT TRANSDUCER SIMULATOR TEST PROCEDURE**

1. When the toggle switch is in the "Run" position the controls should function normally.
2. When the toggle switch is in the "Test" position (pressure transducer temporarily removed from the control circuit) the level meter should display the liquid level. By turning the simulator knob slowly clockwise from top to bottom the meter will display each set point such as start, stop, and alarms. Care must be taken when using this device in the "Test" mode to avoid damaging the motor by running it dry. In normal test mode the pump switches should be off.
3. Make sure that the potentiometer has full travel (270 degrees maximum) in both clockwise and counter-clockwise directions.
4. Make sure that all of the wires on the rear of the simulator (wires 200, 201, 202, 203) are connected in the proper position.
5. Replace the transducer simulator if it does not function as described above.

# BJBP 500

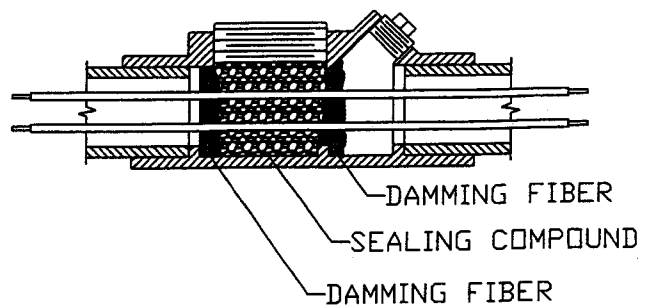
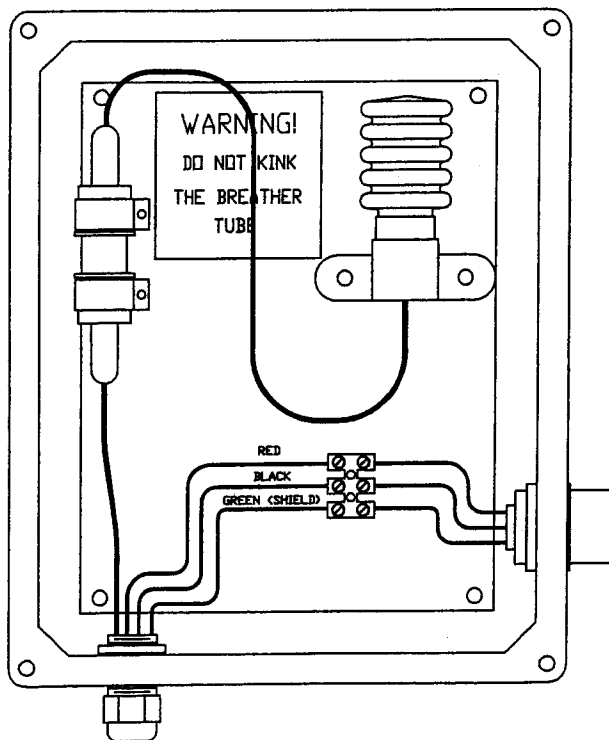
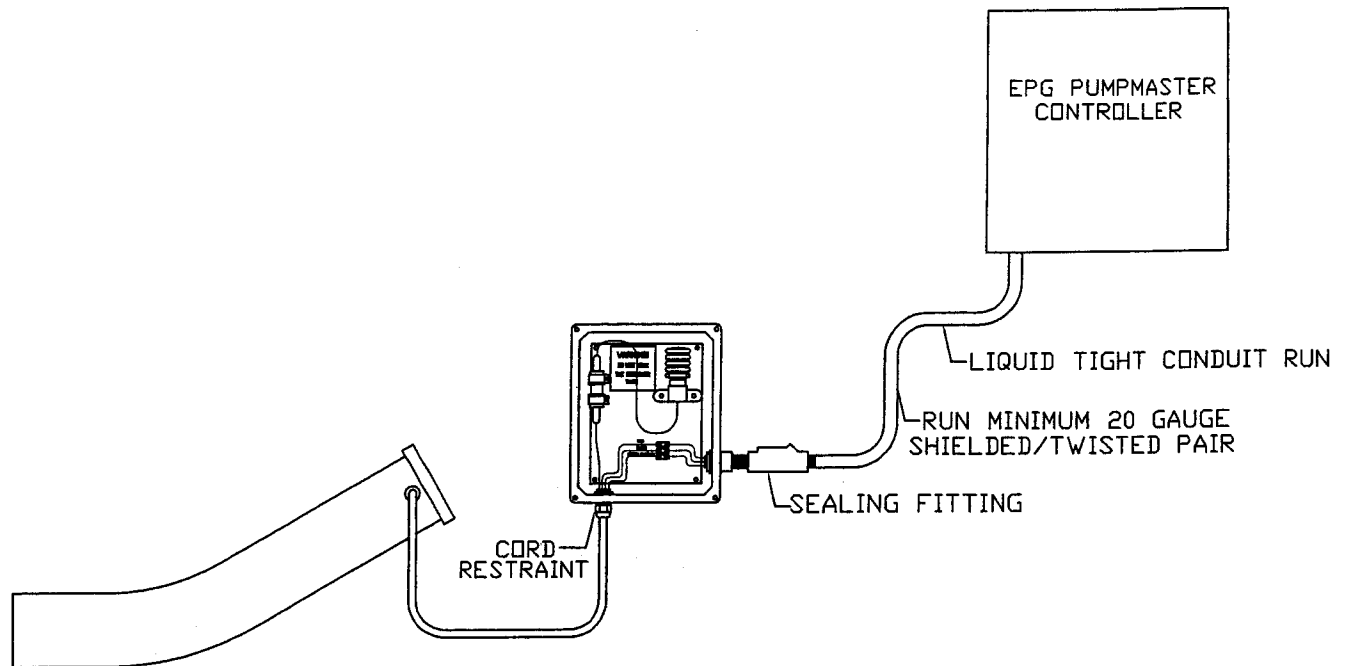
## BREAKOUT JUNCTION BOX FOR MOTOR LEAD



* NOTICE * © EPG Companies Inc. 2002				
REFERENCE				
EPG COMPANIES				
TYPICAL INSTALLATION				
TOLERANCES	REVISIONS		DESIGN	
(EXCEPT AS NOTED)	NO.	DATE	BY	DATE
DECIMAL	1			
FRACTIONAL	2			
ANGULAR	3			
	4			
	5			
DRAWN			C.A.S.	SCALE NONE
CHECKED			C.A.S.	DATE 05/07/02
APP'D			DATE	03626-050

# BJBL 600B

## BREAKOUT JUNCTION BOX FOR LEVEL SENSOR



* NOTICE * © EPG Companies Inc. 2002				
REFERENCE				
EPG COMPANIES				
TYPICAL INSTALLATION				
TOLERANCES	REVISIONS			
EXCEPT AS NOTED	NO.	DATE	BY	
DECIMAL	1			
FRACTIONAL	2			
ANGULAR	3			
	4			
	5			
DESIGN		SCALE	NONE	
DRAWN		DATE	05/07/02	
CHK'D		APP'D	02523-0601	

## TYPE "F" PVC SUCTION AND TRANSFER HOSE

**APPLICATIONS:** General purpose suction, construction, mining, irrigation lines, wellpoint systems, liquid fertilizer transfer, leachate transfer in landfills.

**FEATURES:** General purpose PVC suction and transfer hose. Smooth bore allows full flow. Rigid polyvinyl chloride, in general, shows excellent resistance to acids, alkalis, aqueous solutions of salts, and many organic solvents and oils. Plasticized PVC is attacked by certain chlorinated hydrocarbons, aromatics, esters, ketones, aldehydes, phenols, and strong oxidizing agents.

This chemical resistance is based on tests of specimens conducted by completely submerging the hose sample in the listed chemical or reagent. In critical applications, it is suggested that greater reliance be placed on actual field experience or that testing be performed under conditions of stress, exposure, temperature and duration which can be related to the anticipated application.

**DESCRIPTION:** Clear flexible with gray helix.

**SERVICE TEMPERATURE:** -4° F to 150° F static condition,  
14° F to 104° F dynamic condition

### TYPE F SPECIFICATIONS

Series	ID Inch	OD Inch	Working Pressure (PSI)		Vacuum Rating Inch HG		Min. Bend Rad. Inch @ 68°F	Max. Lgth. Feet	Approx. Wt. Lbs./100 Ft.
			68°F	104°F	68°F	104°F			
F 075	¾"	0.94	115	75	Full	28	3	100	17
F 100	1"	1.26	90	65	Full	28	3	100	22
F 125	1¼"	1.51	90	65	Full	26	4	100	32
F 150	1½"	1.79	90	65	Full	26	5	100	41
F 200	2"	2.38	90	65	Full	26	7	100	71
F 250	2½"	2.89	70	48	Full	26	8	100	89

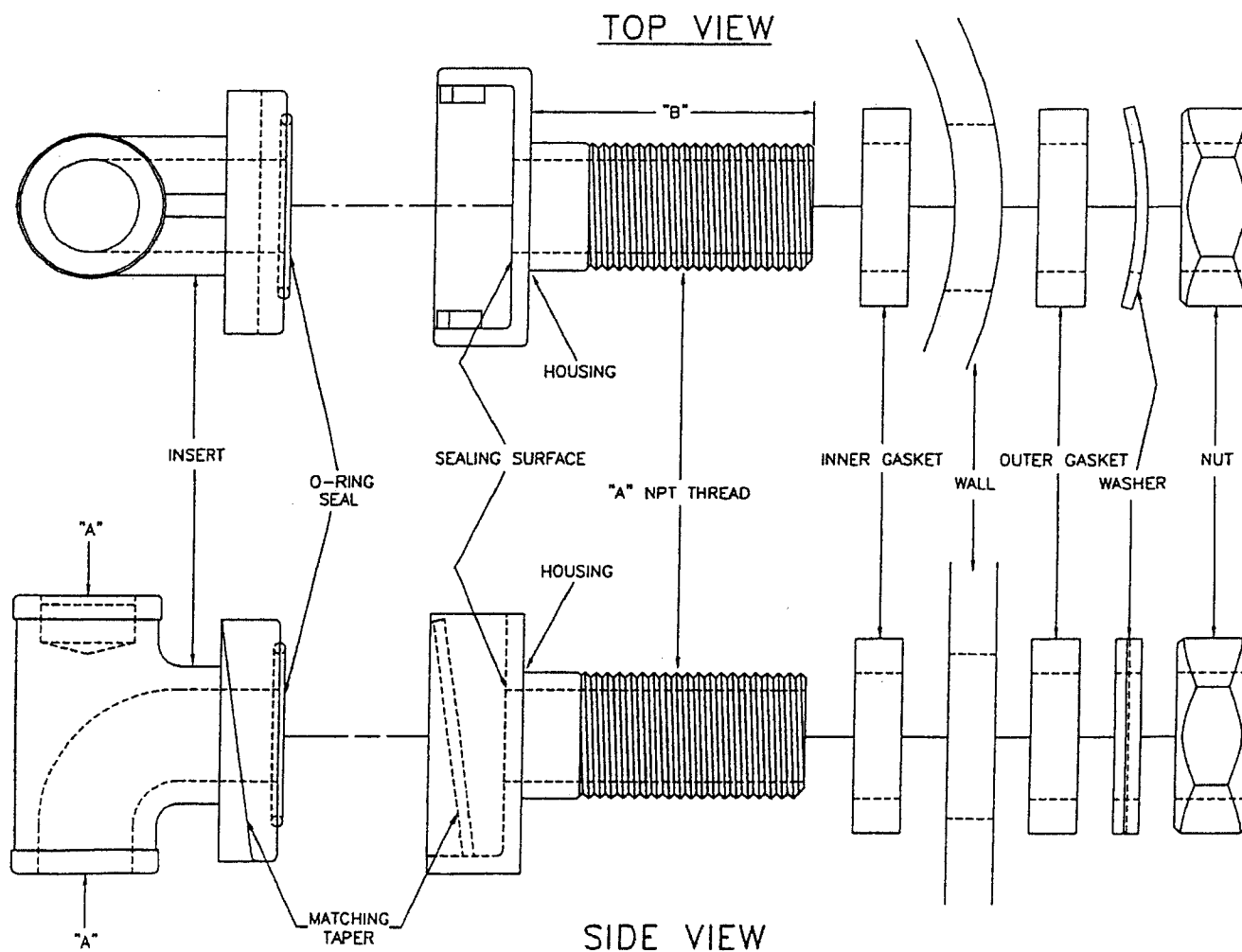


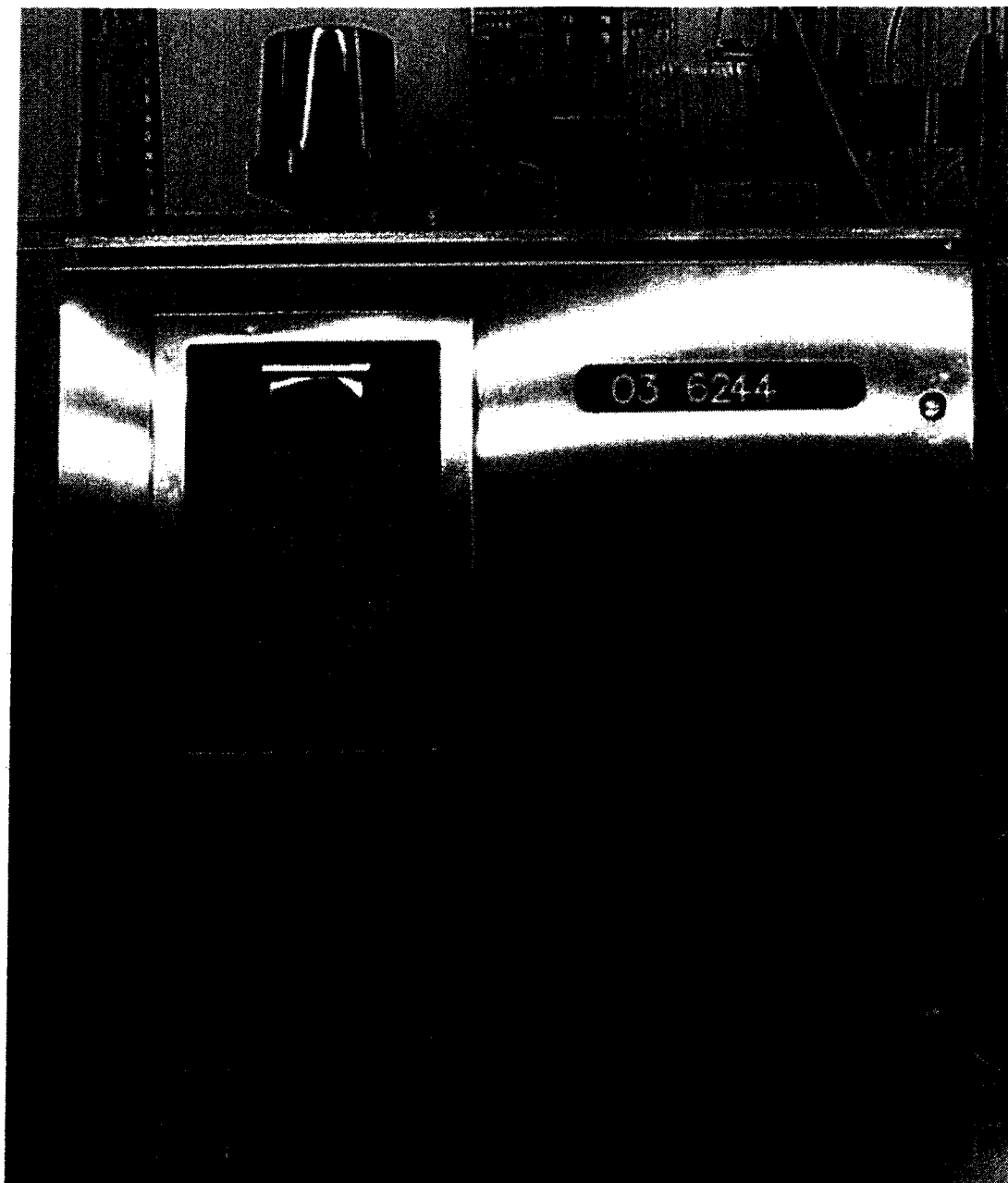
# Model NW Stainless Steel Discharge Adapter

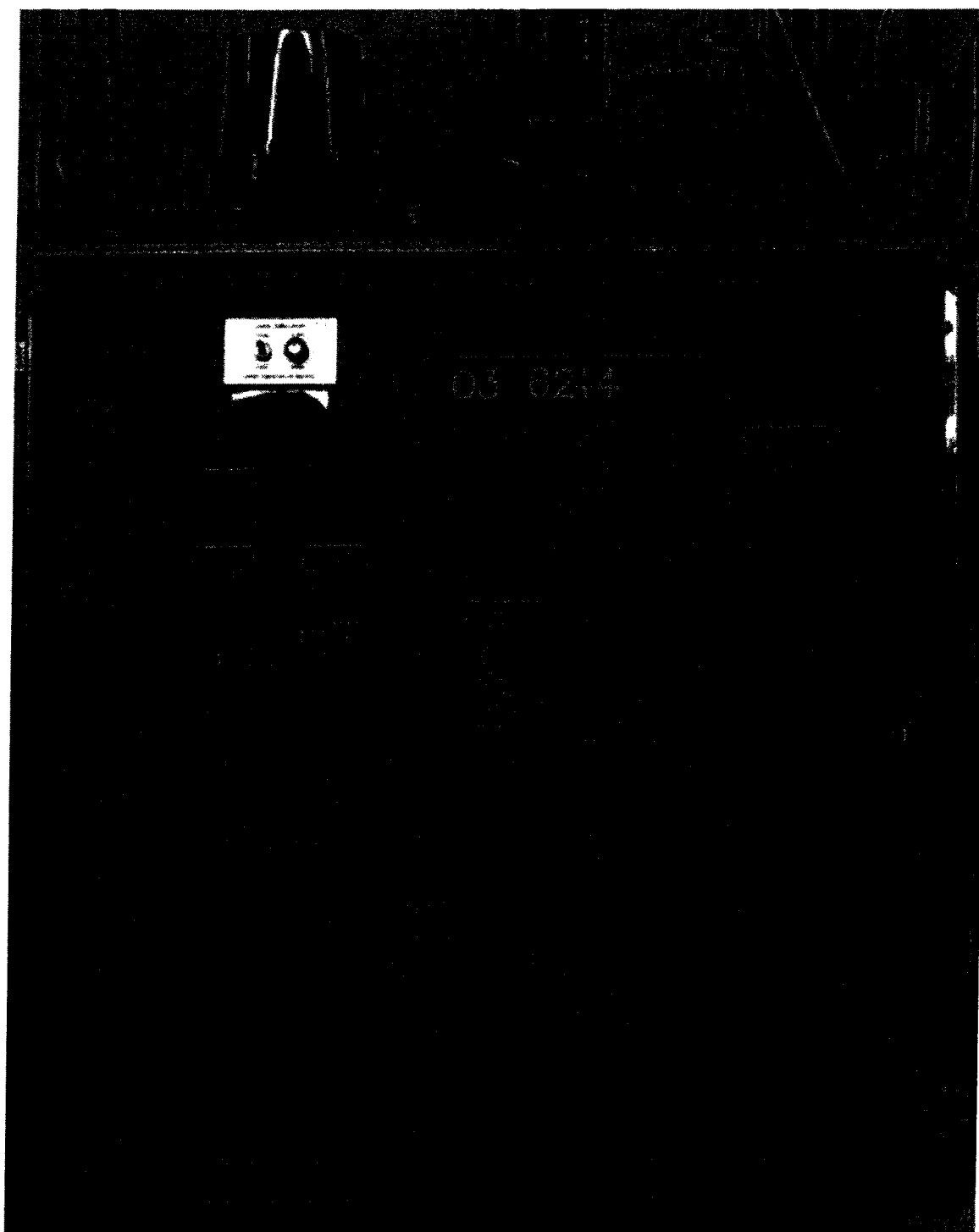
**For Leachate, Monitoring, and Remediation Piping Applications**

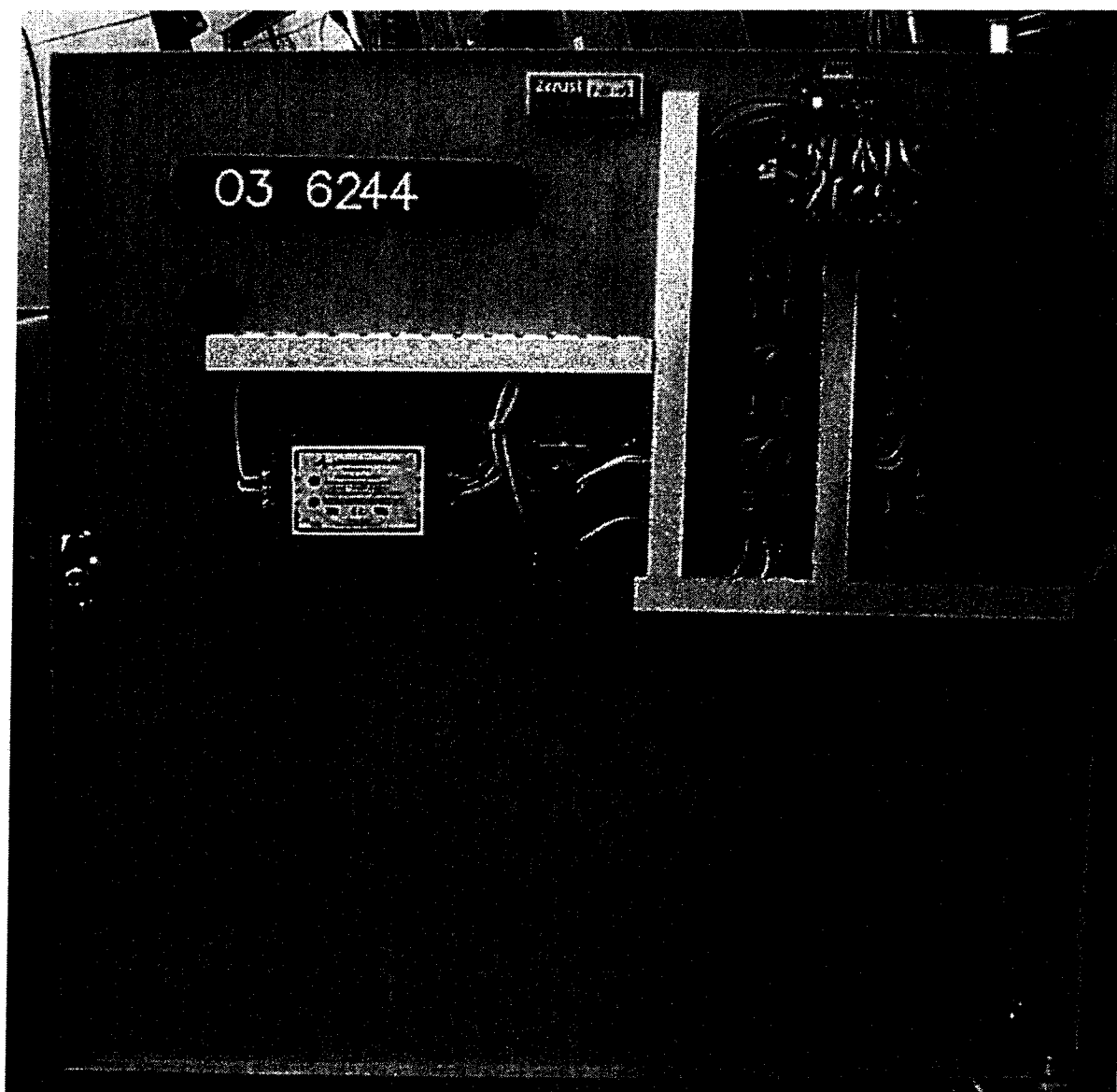
MODEL	"A"	"B"	Minimum I.D.
NW1SS	1" NPT	4"	8"
NW1.25SS	1.25" NPT	4"	8"
NW1.5SS	1.5" NPT	4"	8"
NW2SS	2" NPT	5"	8"
NW3SS	3" NPT	6.25"	12"

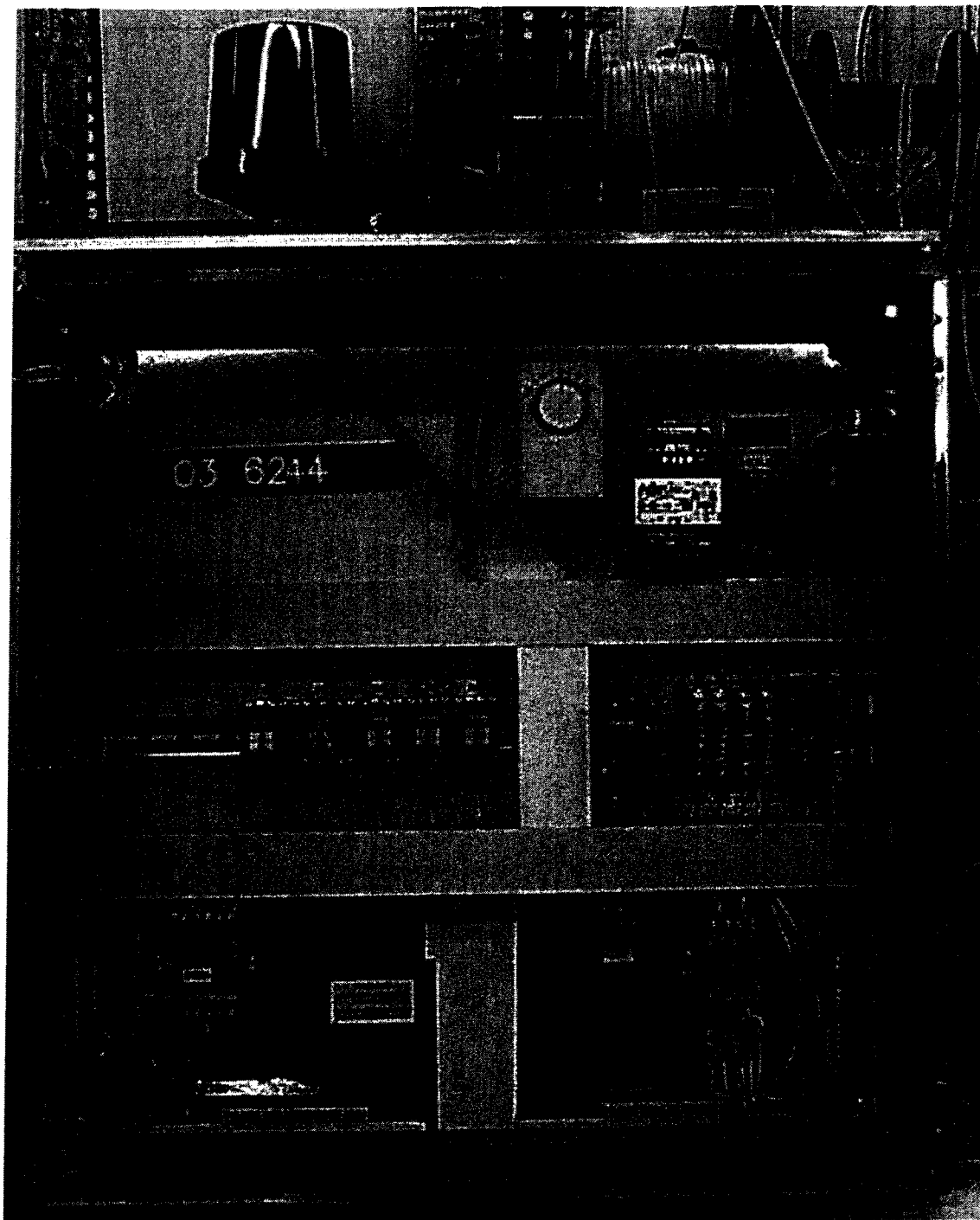
- 304 stainless steel construction
- Insert and housing are tapered for easy installation and removal
- O-Ring seal
- EPDM gasket for inner and outer wall seal
- Extended length nipple on housing allows adapter to fit from 1/4" to 3" thick wall pipe
- 1", 1.25", 1.5", 2", 3" NPT sized fittings for pump pipe, lift out pipe and discharge pipe











## **LIMITED WARRANTY**

This agreement shall be deemed to have been entered into in the State of Minnesota, and shall be construed in accordance with the laws of the State of Minnesota, including Minnesota's enactment of the Uniform Commercial Code. Buyer hereby stipulates and agrees that Hennepin County, Minnesota shall be the proper jurisdiction for adjudicating all claims and controversies arising from this agreement.

Products manufactured by EPG Companies Inc. are warranted for a period of 12 months from date of installation or eighteen (18) months from date of manufacture\* to be free from defects of materials and workmanship. It is expressly agreed that the exclusive remedy under this warranty is limited solely to the repair or replacement, at the sole discretion of EPG, of the part that failed. The cost of labor for any field repairs is not covered by this warranty. EPG Companies will not be liable for any damage or wear due to abnormal conditions or improper installation.

Products not manufactured by EPG Companies Inc. are covered by the original manufacturer's warranty, which EPG Companies passes through to the purchaser. The actual manufacturer will make warranty determination.

To have a defective part repaired or replaced, you must return the defective product to EPG Companies. Please call (800) 443-7426 or (763) 424-2613 to obtain a Return Goods Authorization (RGA) number. Send defective product (freight prepaid) with RGA #, description of installation, installation data and failure date to EPG Companies Inc., 19900 County Rd. 81, Maple Grove, MN 55311.

EPG Companies will not be held liable for any incidental or consequential damages, losses or expenses incurred from installation, use or any other reason. THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING IMPLIED WARRANTIES OF EITHER FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY, WHICH EXTEND BEYOND THOSE SPECIFICALLY LISTED HERE.

If equipment is to be stored for a period greater than six months, proper storage precautions must be taken if the warranty is to be maintained. Please call EPG Companies for specific requirements regarding product storage.

The following is a partial list of items, which will void the warranty:

- Opening the motor for any reason.
- Using undersized electrical wire.
- Making unauthorized circuit changes. Please call EPG Companies before making any changes.
- Operating a three phase submersible motor from single phase power through a phase converter unless 3-leg ambient-compensated quick trip overload protectors are used and complete details are sent in writing to EPG Companies.

\* To qualify for the delayed installation warranty you must contact EPG Companies Inc., at (800) 443-7426 or (763) 424-2613 within 60 days of purchase.

50 Fountain Plaza, Suite 1350  
Buffalo, New York 14202  
Phone: (716) 856-0599  
Fax: (716) 856-0583



www.benchmarkusa.com

To: MIKE GLASNER

From: GARY HURN

OF WMNY

Date: 12/19/01

Fax No: 496-5505

Time: 3:45 PM

Phone:

Pages: 2

Re:

CC:

☐ Urgent ☐ For Review ☐ For Your Information ☐ Please Comment ☐ Please Reply

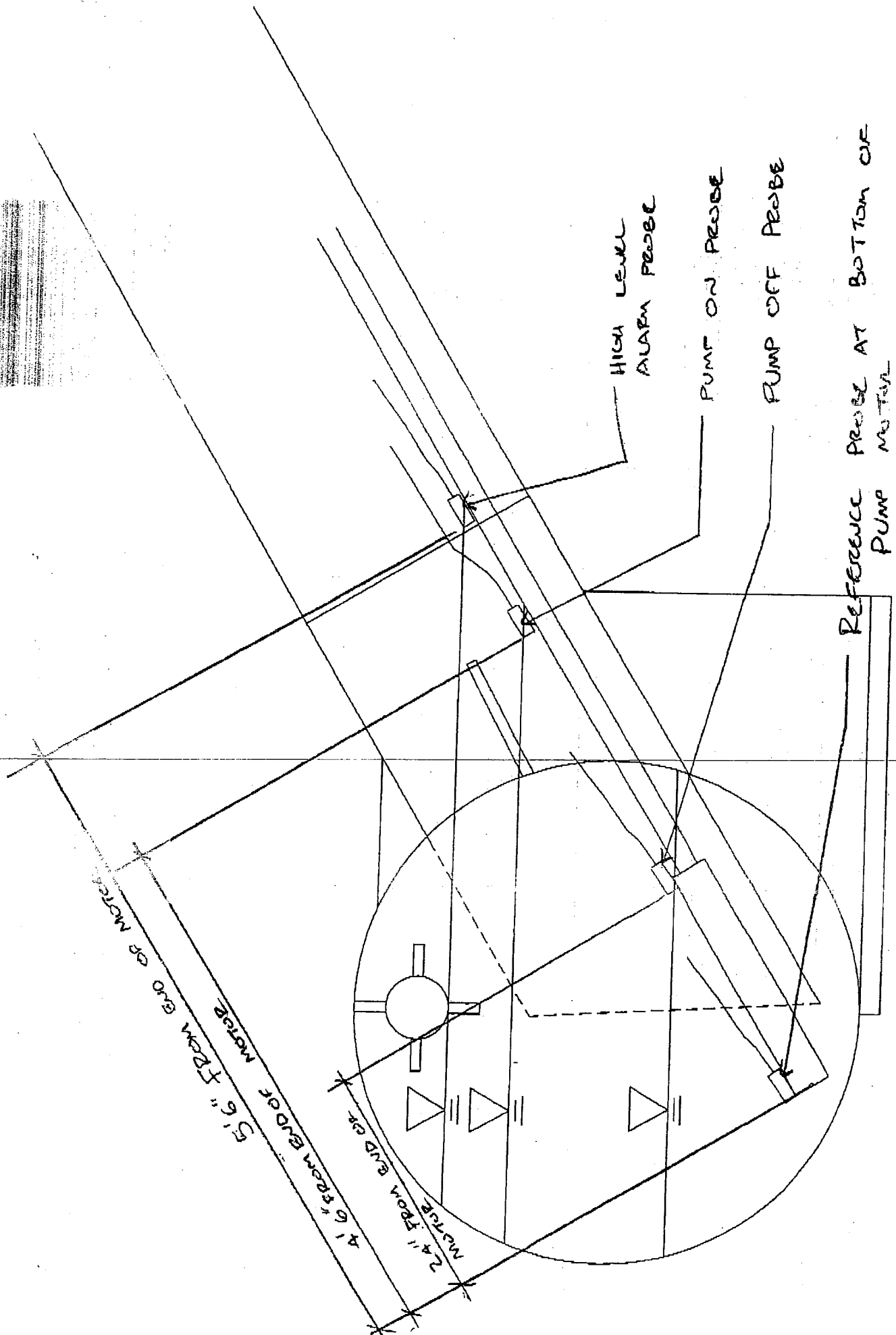
Message:

NEW LEACHATE TANK #1 SUMP LEVEL  
PROBE SETTINGS BASED ON AS-BUILT  
INFORMATION.

PLEASE CALL IF YOU HAVE ANY QUESTIONS.

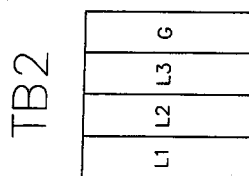
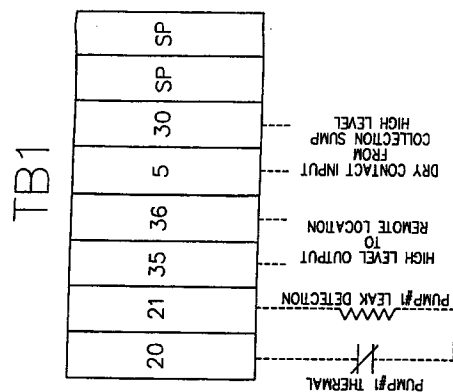
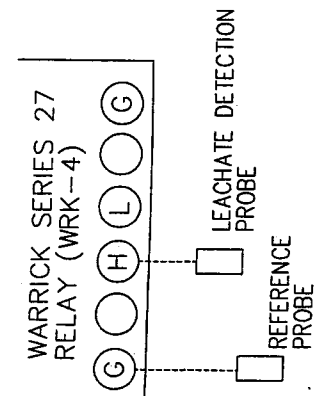
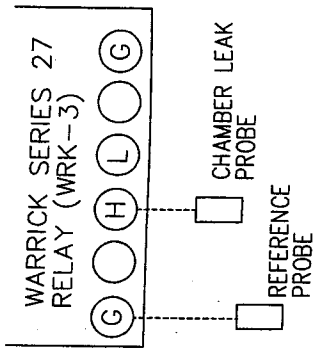
#### Privilege & Confidentiality Notice

This information in this telecopy is intended for the named recipients only. It may contain privileged and confidential information. If you have received this telecopy in error, please notify us immediately by a collect call to (716) 856-0599 and return the original to sender by mail. We will reimburse you for postage. Do not disclose the contents to anyone.  
Thank you.



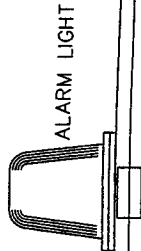






460 VAC, 3 PHASE, 60 HZ

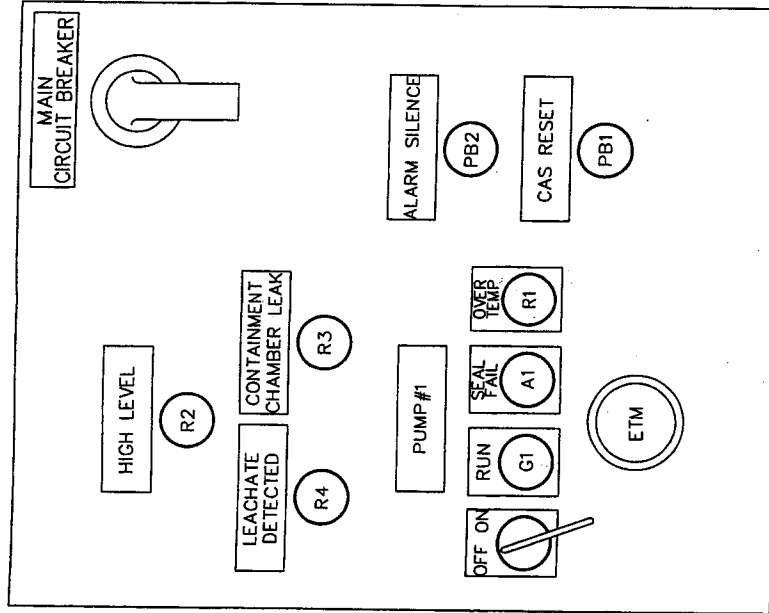
[illegible]



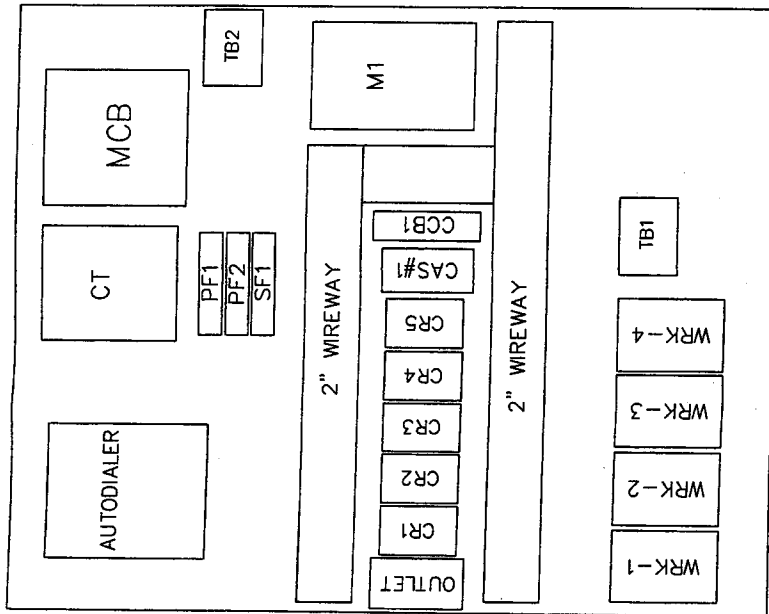
ALARM LIGHT

ALARM HORN

**ENCLOSURE**  
(30" x 24" x 12")  
NEMA 4X STAINLESS STEEL



**INNER DOOR**  
ALUMINUM



**BACK PANEL**

W.M. WAGNER SALES CO., INC.		CARROLLTOWN, PENNSYLVANIA	
REV		DATE	
3	AS BUILT	8/20/01	RBH
2	REVISION	8/01/01	MTM
1	REVISION	7/11/01	RBH
0	INFO/FILES	8/18/01	RBH
PROJECT NO.		JOB #	
W.M. WAGNER SALES CO., INC.		WC-2948	



# Sensaphone® 1104

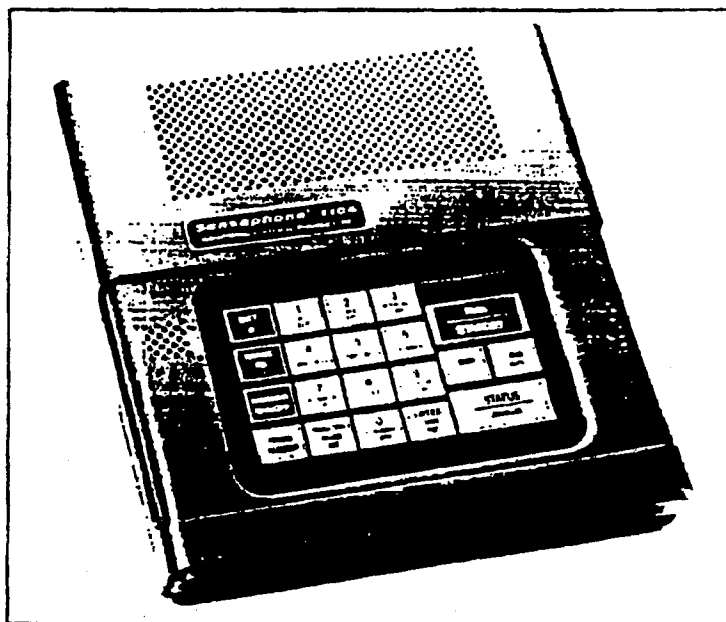
## Desktop Monitoring System

**Environmental/Process monitoring  
over telephone lines with full  
programming capabilities**

- ☐ The versatile Model 1104 is designed for programming flexibility
- ☐ Variable alarm recognition and "listen-in" time, with alarm disable, security code access, remote sensing, and other programming features
- ☐ Monitors power, temperature, and other important environmental conditions to protect computers, equipment, and processes
- ☐ Automatically contacts you at up to 4 locations if unsafe conditions occur
- ☐ Allows you to contact your system using any telephone, to receive status reports and listen-in to on-site sounds
- ☐ Helps you detect problems before they turn into disasters

Now you can protect your equipment and processes even when you can't be there - The Sensaphone 1104 monitors your computer rooms, equipment centers, offices, or any unattended facility to detect power failures, temperature extremes, intrusions, water incursion, sounds such as smoke and burglar alarms, and other conditions of your choice.

Alerts you immediately if problems arise - The Sensaphone 1104 automatically contacts you by phone at up to four different phone numbers, to alert you of unsafe conditions. The system communicates in voice-synthesized English, and even lets you "listen-in" to actual on-site sounds.



### CONDITIONS MONITORED:

Temperature  
Humidity  
Electricity  
Water Incursion  
Smoke  
Sound  
Windows &  
Doors  
...and more!

## ALERT

**UP TO 4 DIAL-OUT NUMBERS:**  
If unsafe conditions occur, the Sensaphone will automatically dial up to four numbers in sequence to advise you of the problem. Numbers may be up to 32 digits each, with your choice of pulse or tone dial-out.



COMMUNICATES OVER  
STANDARD PHONE  
LINES

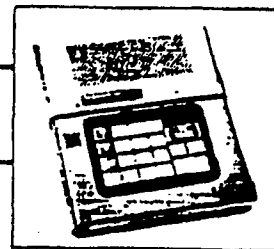
Call-in for periodic status reports on all monitored conditions, using any telephone. The Sensaphone communicates in simple voice-synthesized English.

## Phonetics, Inc.

901 Tryens Road, Aston, Pa 19014 610-558-2700 FAX: 610-558-0222  
<http://www.phonetics-monitoring.com/>

See reverse side for a list of the Sensaphone's outstanding features and capabilities.

# Sensaphone<sup>®</sup> 1104



Ideal for a variety of applications - The Sensaphone is useful wherever there is a need for monitoring of temperature, humidity, or other conditions. Sensors and input devices are available to suit a wide range of applications.

- ☐ HVAC Equipment
- ☐ Computer rooms
- ☐ Refrigeration and freezers
- ☐ Health care centers
- ☐ Offices
- ☐ Warehouses
- ☐ Livestock and egg/poultry
- ☐ Home & property
- ☐ Greenhouses
- ...and many others!

## BUILT-IN FEATURES

- ☐ 4 User-selectable inputs, temperature or dry-contact
- ☐ Microphone monitors high sound alarms and enables remote listen-in
- ☐ AC Power failure sensing with variable recognition time
- ☐ Battery condition monitor
- ☐ Clock

## ADVANCED CAPABILITIES

- ☐ User Programmable: Alarm recognition time, Call delay, Inter-call delay, Message repetitions
- ☐ Temperature sensing in Fahrenheit (-20°F to 150°F), or Celsius (-29°C to 65°C)
- ☐ Individual temperature input calibration
- ☐ Nonvolatile memory for all programmed parameters

## VERSATILE DIAL-OUT CAPABILITIES

- ☐ Alert sensors trigger pulse or tone dialout automatically
- ☐ Dials up to 4 numbers, up to 32 digits each
- ☐ Continues dialing numbers in sequence, until acknowledged
- ☐ Call Progress: Intelligently detects ringing or busy signal
- ☐ Intelligent dial out to beepers and pagers

## EASY CONTROL ACCESS:

- ☐ Keypad for local programming and status report
- ☐ Unit can be called from any phone to verify status of all monitored conditions
- ☐ Local or remote enabling/disabling of all dial-out conditions
- ☐ Can share a single phone line with an answering machine, allowing full operation of both units
- ☐ Programmable security code access

## SPECIFICATIONS

**Size:** 7½" W, 2" H, 8½" D

**Power Requirements:** 120 VAC 60Hz 15W

**Batteries:** (6) 1.5 Volt "D" cell alkaline (not included)

**Telephone Interface:** FCC approved RJ-11 plug-in modular connector with 6' cord

**Operating Range:** Unit should be kept between 32° F and 120° F.

**Temperature Sensing Range:** -20° F to 150° F with remote temperature sensor.

**Shipping Weight:** 4 lbs.

**NRTL listed for compliance with U.L. Standard 1459.**

*Technical data subject to change without notice*

We'd like to show you how the Sensaphone 1104 can help you monitor your equipment and facilities. Give us a call to find out more! Or, listen to an actual Sensaphone report by calling 610-558-4591.

# Phonetics, Inc.

901 Tryens Road, Aston, Pa 19014 610-558-2700 FAX: 610-558-0222



© 1995 Phonetics, Inc.  
Sensaphone<sup>®</sup> is a registered trademark of Phonetics, Inc.

## **APPENDIX A -2**

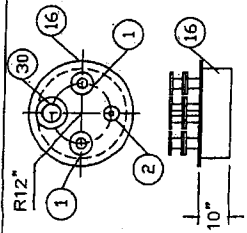
### **Sump2/Tank 2**

**Leachate Holding Tank # 2**

<b><u>field</u></b> <b><u>measure</u></b> <b>(feet)</b>	<b><u>tank</u></b> <b><u>volume</u></b> <b>(gallons)</b>	<b><u>Leachate</u></b> <b><u>Discharge</u></b> <b>(gallons)</b>		<b><u>field</u></b> <b><u>measure</u></b> <b>(feet)</b>	<b><u>tank</u></b> <b><u>volume</u></b> <b>(gallons)</b>	<b><u>Leachate</u></b> <b><u>Discharge</u></b> <b>(gallons)</b>	
19.5	4325	0	pump off	16.0	14525	10200	
19.4	4580	255		15.9	14825	10500	
19.3	4840	515		15.8	15125	10800	
19.2	5100	775		15.7	15425	11100	
19.1	5375	1050		15.6	15725	11400	
19.0	5650	1325		15.5	16025	11700	
18.9	5920	1595		15.4	16320	11995	
18.8	6205	1880		15.3	16610	12285	
18.7	6470	2145		15.2	16910	12585	
18.6	6760	2435		15.1	17200	12875	
18.5	7040	2715		15.0	17490	13165	
18.4	7325	3000		14.9	17775	13450	
18.3	7620	3295		14.8	18060	13735	
18.2	7900	3575		14.7	18345	14020	
18.1	8190	3865		14.6	18630	14305	
18.0	8490	4165		14.5	18910	14585	
17.9	8780	4455		14.4	19185	14860	
17.8	9090	4765		14.3	19455	15130	
17.7	9370	5045		14.2	19725	15400	
17.6	9680	5355		14.1	19995	15670	
17.5	9970	5645		14.0	20260	15935	
17.4	10275	5950		13.9	20520	16195	
17.3	10580	6255		13.8	20775	16450	
17.2	10875	6550		13.7	21030	16705	
17.1	11185	6860		13.6	21280	16955	
17.0	11480	7155		13.5	21525	17200	
16.9	11790	7465		13.4	21770	17445	
16.8	12090	7765		13.3	22000	17675	
16.7	12395	8070		13.2	22235	17910	
16.6	12700	8375		13.1	22460	18135	
16.5	13000	8675		13.0	22685	18360	
16.4	13310	8985		12.9	22900	18575	high level
16.3	13620	9295					
16.2	13920	9595					
16.1	14225	9900					

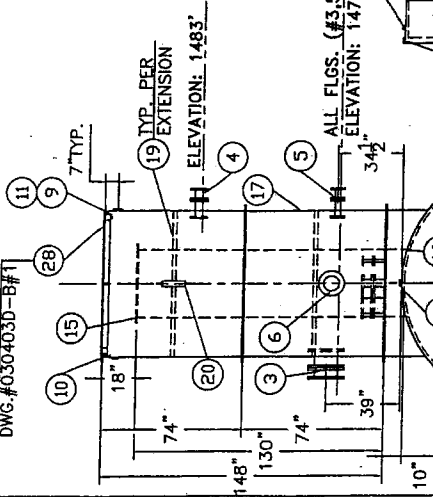
**Note: field measurement taken from top of leachate level to top of 36" steel riser**



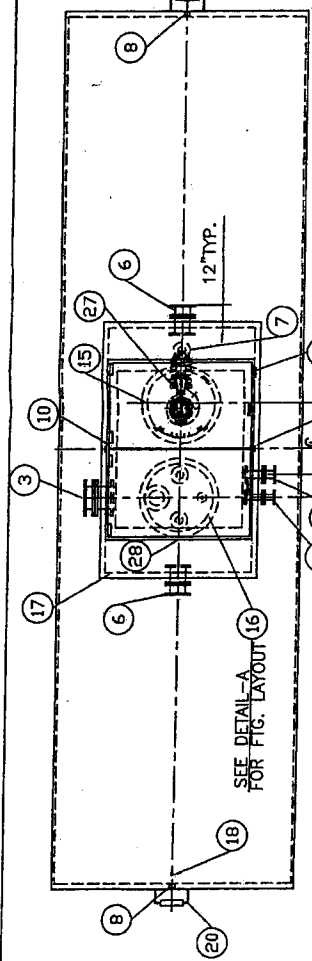


DETAIL-A  
NOT TO SCALE

SEE NOTE: 1 ON  
DWG. #030403D-B#1



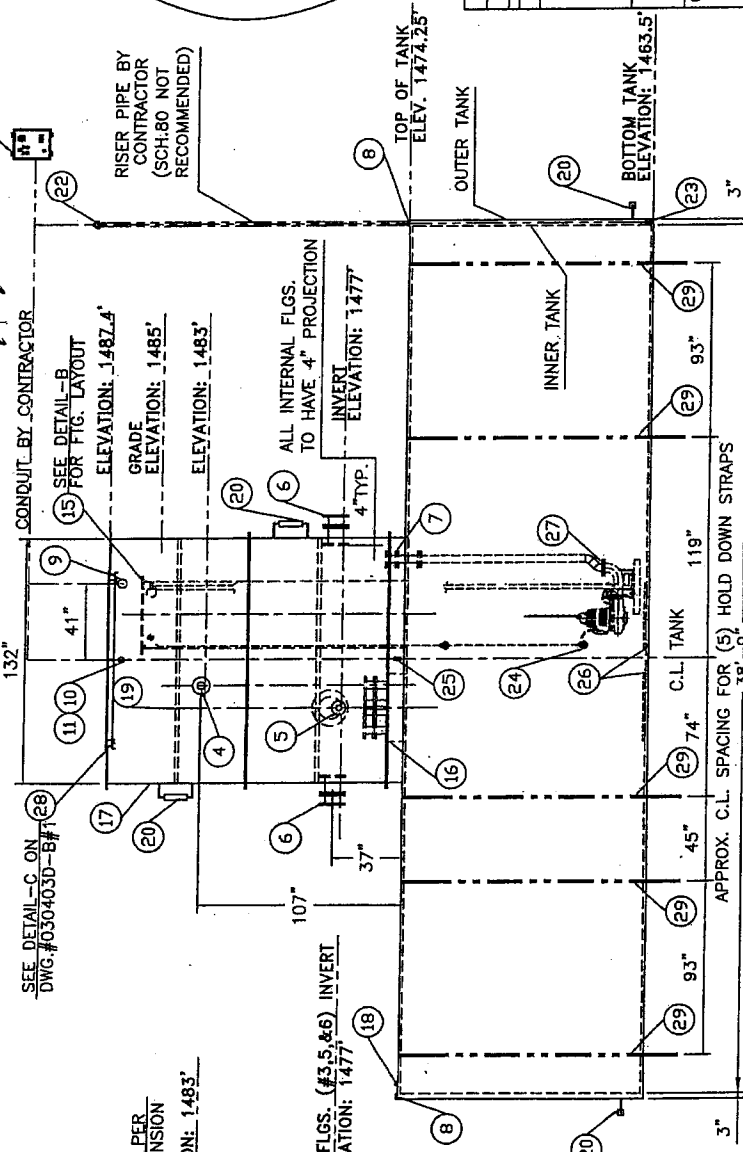
END VIEW



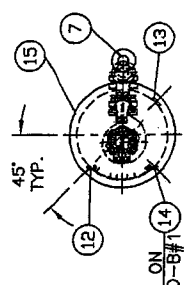
PLAN VIEW

Fabrication Will Not Begin  
Until Approved Drawing Is  
Received By Highland Tank

APPROVED  
*Michael Brown*  
Date: 5/2/03

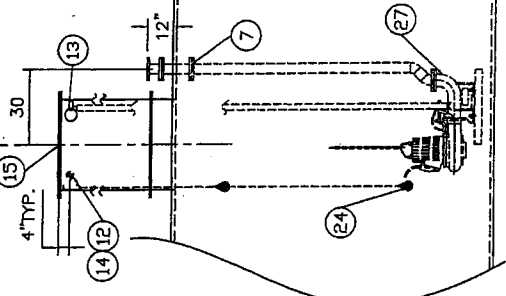


ELEVATION



SEE DETAIL-C ON  
DWG. #030403D-B#1

C.L. MANWAY



DETAIL-B  
NOT TO SCALE

RISER PIPE BY  
CONTRACTOR  
(SCH.80 NOT  
RECOMMENDED)

ALL INTERNAL FLGS.  
TO HAVE 4" PROJECTION  
INVERT  
ELEVATION: 1477'

TOP OF TANK  
ELEV. 1474.25'

OUTER TANK

INNER TANK

BOTTOM TANK  
ELEVATION: 1463.5'

APPROX. C.L. SPACING FOR (5) HOLD DOWN STRAPS  
38"-9"

		25000 GALLON S.T.I.P. 3 UNDERGROUND DOUBLE WALL TYPE II 360 (CHANNEL) CUSTOMER: WASTE MANAGEMENT CHAFFEE, NY PROJECT: CHAFFEE LANDFILL CHAFFEE, NY
QUOTE NO: 84433 SCALE: 3/16"=1'-0" DATE: 04-07-03 DWG. BY: DB CHECKED BY:		DWG. NO: 030403D-B DB

REFERENCE DWG# 030403D-B#1 FOR  
PROVIDED EQUIP. & GENERAL NOTES

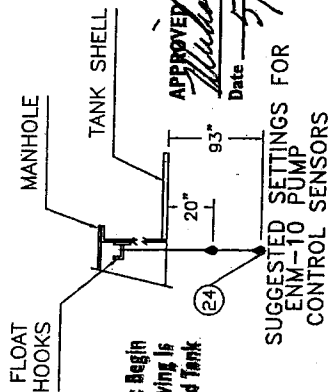
# PROVIDED EQUIPMENT

1. 4" 150# R.F.S.O. FLG. W/ ISOLATED SPOOL
2. 1 1/2" 150# R.F.S.O. FLG. W/ ISOLATED SPOOL
3. 12" 150# R.F.S.O. FLG. W/ ISOLATED SPOOL FOR  
& INTERNAL FLG. IN CONTAINMENT CHAMBER
4. 4" 150# R.F.S.O. FLG. W/ ISOLATED SPOOL
5. 3" 150# R.F.S.O. FLG. W/ ISOLATED SPOOL
6. 8" 150# R.F.S.O. FLG. W/ ISOLATED SPOOL
7. 4" 150# R.F.S.O. FLG. W/ ISOLATED SPOOL
8. 3" NPT W/ 3"x2" NYLON BUSHING (LEAK DETECTION)
9. 5" NPT W/ 5"x4" NYLON BUSHING FOR PUMP WIRING
10. 3" NPT W/ 3"x2" NYLON BUSHING FOR PUMP WIRING
11. 3" NPT W/ 3"x2" NYLON BUSHING FOR LEAK SENSOR WIRING  
IN CONTAINMENT CHAMBER
12. 3" NPT W/ 3"x2" NYLON BUSHING FOR SENSOR WIRING
13. 5" NPT W/ 5"x4" NYLON BUSHING FOR PUMP WIRING
14. 1 1/2" NPT FOR ACCESS HATCH DRAIN SEE DETAIL-C
15. 36" 6" MANWAY W/ 10" COLLAR & BOLT-ON EXTENSION  
SPLIT SAME AS CONTAINMENT CHAMBER (SHIPPED LOOSE)
16. 36" 6" MANWAY W/ 10" COLLAR
17. 132"x78" (APPROX.) RECT. CONTAINMENT CHAMBER W/ 10" HIGH COLLAR &  
BOLT-ON EXTENSION (SHIPPED LOOSE) NOT TO PENETRATE INNER TANK  
(SEE NOTE:1)
18. P.P.-2 MONITOR LUG
19. 4 x2 x1/4" TUBING FOR CONTAINMENT CHAMBER BRACING
20. MAGNESIUM ANODES PER S.T.I.P.-3 SPEC.
21. "SPECIAL" NEMA4X (3PH-60HZ-460V-10HP) CUSTOM CONTROL PANEL
22. HTSC-2A PVC CAP FOR 2" PIPE
23. HTLP-1.5 1 1/2" LIQUID ONLY SENSOR (W/ 50' OF CABLE) FOR  
INTERSTITIAL SPACE
24. ENM-10 FLOATS W/ 40' OF CABLE
25. HTLP-1.5 1 1/2" LIQUID ONLY SENSOR (W/ 50' OF CABLE) FOR  
CONTAINMENT CHAMBER
26. STRIKER PLATES TYP.
27. ITT FLYGT PUMP CP3127.990 SUBMERSIBLE 3000 SERIES INDUSTRIAL PUMP,  
485 IMPELLER CODE, (3PH-60HZ-460V-10HP), 175GPM@50 TDH, 1735 RPM,  
FLUID LEAK SENSOR, 50' OF CABLE, 2" SLIDE RAIL PACKAGE, UPPER GUIDE BAR  
BRACKET, INTERMEDIATE GUIDE BAR BRACKETS, LIFTING CHAIN, & CHAIN FITTING KIT, REINFORCED  
W/ STAINLESS STEEL HARD PIPING, S.S. 45° ELBOWS, & S.S. FLANGES
28. 72"x96" FLYGT ACCESS HATCH (SHIP TO HIGHLAND TANK TO BE MOUNTED  
IN CONTAINMENT CHAMBER) [SEE NOTE:1]
29. 126" 6" HOLD DOWN STRAPS W/ TB UL58 TYPE II W/ LINERS
30. 8" 150# R.F.S.O. FLG. W/ ISOLATED SPOOL

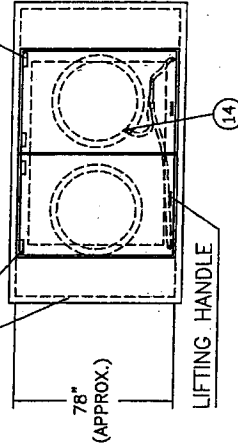
NOTE: 1  
ALL RIGHTS RESERVED. THIS DRAWING OR ANY PART THEREOF MUST  
NOT BE REPRODUCED IN ANY FORM WITHOUT THE WRITTEN PERMISSION  
OF HIGHLAND TANK.  
HIGHLAND TANK SHALL BE RESPONSIBLE ONLY FOR ITEMS INDICATED.  
THIS FABRICATION DRAWING UNLESS OTHERWISE NOTED, CUSTOMER  
IS RESPONSIBLE FOR VERIFYING CORRECTNESS OF SIZE / LOCATION  
OF FITTINGS, ACCESSORIES & COATINGS SHOWN ON THIS DRAWING

# GENERAL NOTES

CAPACITY : 25000 GALLONS  
TYPE : DOUBLE WALL TYPE II 360 (CHANNEL),  
S.T.I.P. 3, UNDERGROUND  
NO. REQ. : (1)  
MATERIAL : MILD CARBON STEEL  
TEST : 5 P.S.I.  
MIN. GAUGE OR THICKNESS (PER U.L.58):  
INNER HEADS : 3/8"  
INNER SHELL : 3/8"  
OUTER HEADS : 1/4"  
OUTER SHELL : 1/4"  
PAINT : INTERIOR : SP-10 BLAST; ULTRALINER (15 MILS)  
W/ ANTI-MICROBIAL ADDITIVE  
EXTERIOR : SP-6 BLAST, COAT WITH 15 MILS OF  
POLYURETHANE PER S.T.I.P. 3 SPECS.  
CONSTRUCTION : FLAT FANGED HEADS, LAP WELD ALL  
INTERIOR & EXTERIOR SEAMS  
APPROVED LABELS : U.L. 58, S.T.I.P. 3  
OPERATING PRESSURE-- ATMOSPHERIC

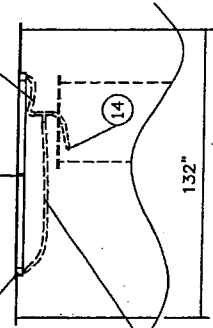


HINGES FOR ACCESS HATCH



STANDARD 1 1/2" DRAIN  
IN ACCESS HATCH

BARBED TEE FOR FLEX HOSE



DETAIL-C  
NOT TO SCALE

NO.	DESCRIPTION	DATE	BY
1	ISSUED FOR FABRICATION	04-07-03	DB
2	CHANGED TO INCLUDE UPPER GUIDE BAR	04-07-03	DB
3	CHANGED TO INCLUDE UPPER GUIDE BAR	04-07-03	DB
4	CHANGED TO INCLUDE UPPER GUIDE BAR	04-07-03	DB
5	CHANGED TO INCLUDE UPPER GUIDE BAR	04-07-03	DB



25000 GALLON S.T.I.P. 3, UNDERGROUND  
DOUBLE WALL TYPE II 360 (CHANNEL)

CUSTOMER: WASTE MANAGEMENT  
CHAFEE, NY

PROJECT: CHAFEE LANDFILL  
CHAFEE, NY

QUOTE NO: 84433

SCALE: 1/4"=1'-0"  
DATE: 04-07-03  
DWG. BY: DB  
CHK'D BY: BHI  
030403D-BHI

REFERENCE DWG# 030403D-B FOR  
FITTING LAYOUT & FITTING CALLOUT

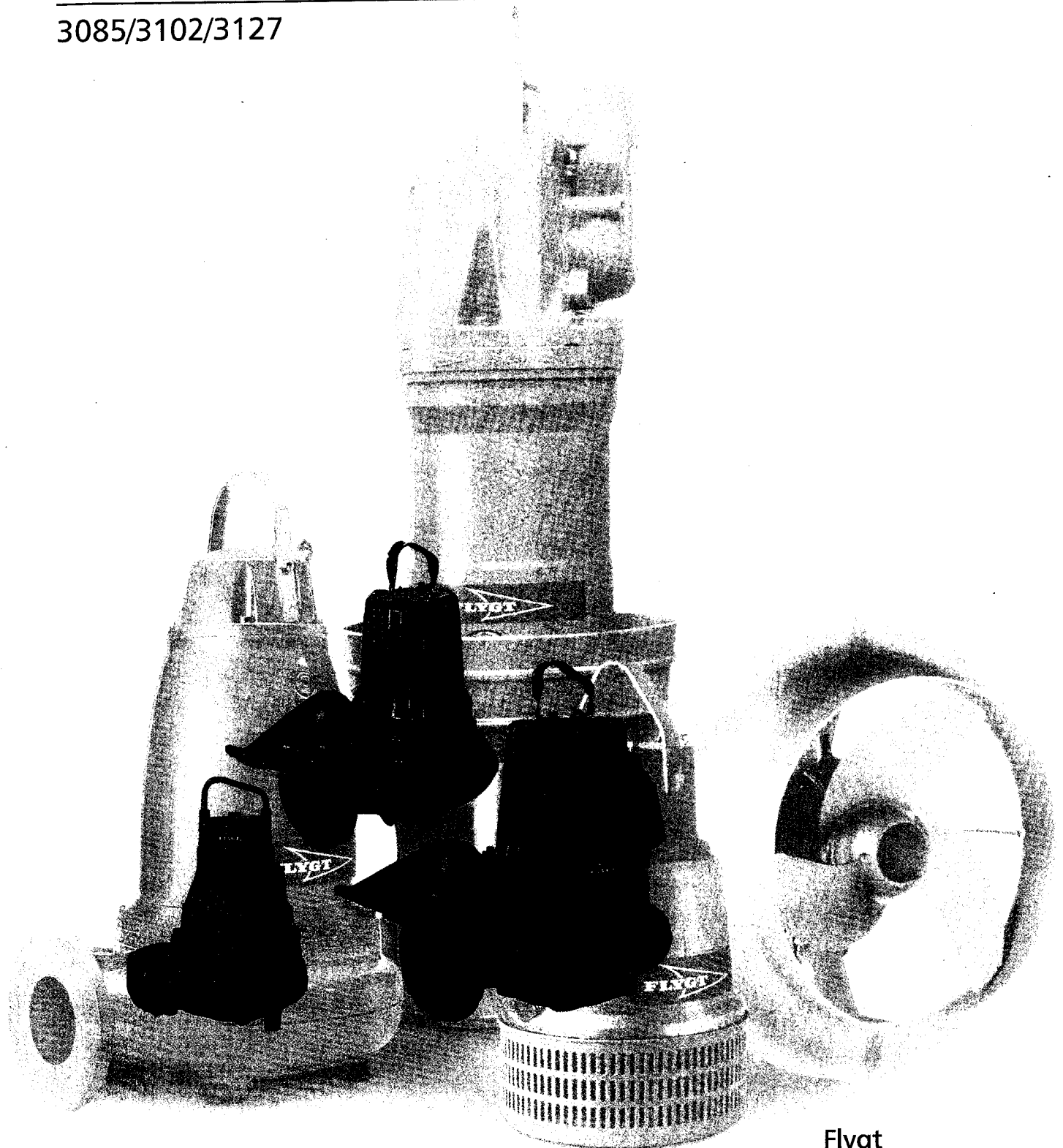




# Installation, care and maintenance

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3085/3102/3127



Flygt

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 ITT Industries

<b>Safety</b> _____	<b>2</b>	<b>Cable chart</b> _____	<b>10</b>
<b>Data plate interpretation</b> _____	<b>4</b>	<b>Transportation and storage</b> _____	<b>14</b>
<b>Product description</b> _____	<b>5</b>	<b>Operation</b> _____	<b>14</b>
<b>General design of an ITT Flygt pump</b> _____	<b>6</b>	<b>Care and maintenance</b> _____	<b>15</b>
<b>Installation</b> _____	<b>7</b>	<b>Oil change</b> _____	<b>17</b>
<b>Electrical connections</b> _____	<b>8</b>		

This manual contains basic information on the installation, operating and maintenance and should be followed carefully. It is essential that these instructions are carefully read before installation or commissioning by both the installation crew as well as those responsible for operation or maintenance. The operating instructions should always be readily available at the location of the unit.

#### Identification of safety and warning symbols



##### **General Danger:**

Non-observance given to safety instructions in this manual, which could cause danger to life have been specifically highlighted with this general danger symbol.



##### **High Voltage:**

The presence of a dangerous voltage is identified with this safety symbol.

#### **WARNING!**

Non-observance to this warning could damage the unit or affect its function

#### **Qualifications of personnel**

An authorized (certified) electrician and mechanic shall carry out all work.

#### **Safety regulations for the owner/operator**

All government regulations, local health and safety codes shall be complied with.

All dangers due to electricity must be avoided (for details consult the regulations of your local electricity supply company).

#### **Unilateral modification and spare parts manufacturing**

Modifications or changes to the unit/installation should only be carried out after consulting with ITT Flygt.

Original spare parts and accessories authorized by the manufacturer are essential for compliance. The use of other parts can invalidate any claims for warranty or compensation.

#### **Dismantling and re-assembly**

If the pump has been used to pump hazardous media, care must be taken that, when draining the leakage, personnel and environment are not endangered.

All waste and emissions such as used coolant must be appropriately disposed of. Coolant spills must be cleaned up and emissions to the environment must be reported.

The pumping station must be kept tidy and in good order at all times.

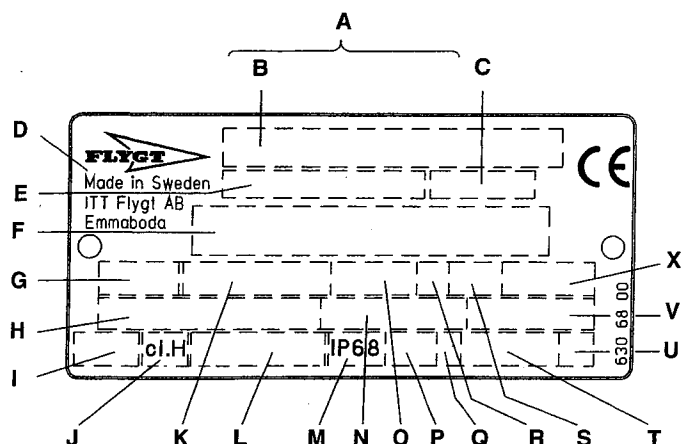
All government regulations shall be observed.



## NOTES FOR EX-PRODUCTS

- Only Ex-approved pumps may be used in an explosive or flammable environment.
- Do not open the pump when an explosive gas atmosphere may be present.
- Before starting work on the pump, make sure that the pump and the control panel are isolated from the power supply and can not be energized. This applies to the control circuit as well.
- All mechanical work on the explosion-proof motor section must be performed by personnel authorized by ITT Flygt.
- Electrical connection on the explosion-proof motor must be made by authorized personnel.
- Thermal contacts must be connected to protection circuit intended for that purpose according to the approval of the product.
- The pump may be used only in accordance with the approved motor data stated on the data plates.
- Intrinsically safe circuits are normally required (Ex i) for the automatic level control system by level regulator if mounted in zone 0.
- This equipment must be installed in conformity to prescriptions in international or national rules ( IEC/EN 60079-14 ).
- The maintenance operation must be made in conformity to the international or national standards ( IEC/EN 60079-17).
- The yield stress of fastener elements in the product must be in conformity with the value specified in the table for "Material of fastener" on the approval drawing or the parts specified in the part list for the product.
- According to the ATEX directive the Ex-pump must never run dry or snore. Permitted minimum water level, see dimensional drawing for the pump.
- The user must know about the risks due the electric current and the chemical and physical characteristics of the gas and/or vapours present in hazardous areas.
- ITT Flygt disclaims all responsibility for work done by untrained, unauthorized personnel.

## General data plate

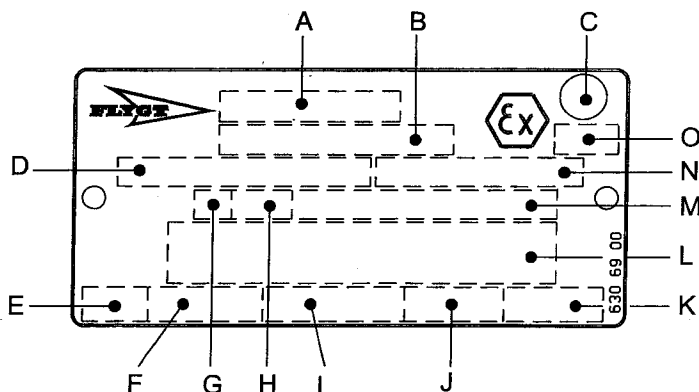


- A Serial number
- B Product code + Number
- C Curve code / Propeller code
- D Country of origin
- E Product number
- F Additional information
- G Phase; Type of current; Frequency
- H Rated voltage
- I Thermal protection
- J Thermal class
- K Rated shaft power
- L International standard
- M Degree of protection
- N Rated current
- O Rated speed
- P Max. submergence
- Q Direction of rotation: L=left, R=right
- R Duty class
- S Duty factor
- T Product weight
- U Locked rotor code letter
- V Power factor
- X Max. ambient temperature

## Approval plates

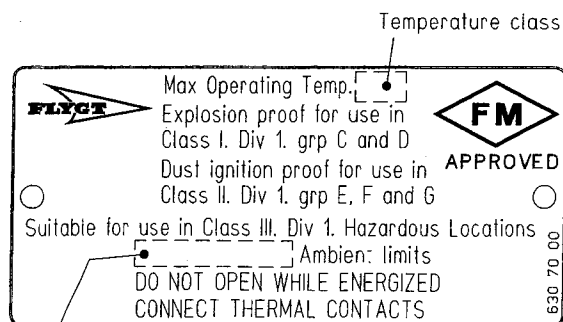
These approval plates apply to an explosion-proof submersible Flygt pump.  
The plates are used together with the general data plate on the pump.

EN: European Norm  
ATEX Directive  
EN 50014, EN 50018, EN 1127-1  
Ex II 2 G EEx dII T4



- A Approval
- B Approval authority + Approval Number
- C Approval for Class I
- D Approved drive unit
- E Stall time
- F Starting current / Rated current
- G Duty class
- H Duty factor
- I Input power
- J Rated speed
- K Controller
- L Additional information
- M Max. ambient temperature
- N Serial number
- O ATEX marking

FM: Factory Mutual  
Class I Div. I Grp C and D  
Class II and III Div. I Grp E, F and G



Max. ambient temperature

## Introduction

Thank you for buying a submersible ITT Flygt pump. In this Installation, Care and Maintenance manual you will find general information on how to install and service the 3085, 3102 or 3127 pump to give it a long and reliable life. In the Parts List you will find all the specific technical data for your pump.

## Application

This Installation, Care and Maintenance manual applies to a submersible ITT Flygt pump. If you have bought an Ex-approved pump (please see approval plate on your pump or Parts List) special handling instructions apply as described in this document.

Depending on the hydraulic end, the pump is intended to be used for:

- pumping of waste water
- pumping of light liquid manure and urine
- pumping of sludge
- pumping of ground water
- pumping of sewage if the solids need to be cut into small pieces.

The pumps must not be used in highly corrosive liquids. See pH limits below.

The pump is available for permanent installation in a sump or portable installation with hose connection and stand.

In some applications, the pump is also available for a dry stationary installation on a base stand directly connected to the inlet and outlet lines.

For further information on applications, contact your nearest ITT Flygt representative.

## Specific technical data

For specific technical data regarding your pump, please see Parts List.

## General technical data

**Liquid temperature:** max. 40°C (104°F). The pump can be operated at full load only if at least half the stator housing is submerged.

The pump can be equipped for operation at temperatures up to 90°C (195°F). At increased temperatures, the pump must be completely submerged when operated at full load.

Higher temperatures than 40°C (104°F) are not permitted for Ex-approved pumps.

**Liquid density:** max. 1100 kg/m<sup>3</sup> (9.2 lb per US gal.)

**The pH of the pumped liquid:** 5.5 - 14 (cast iron pumps).

**The pH of the pumped liquid:** 3—14 (stainless steel pumps).

**Depth of immersion:** max. 20 m (65 ft).



- In some installations and at certain operating points on the performance curve, the noise level of 70 dB or the noise level specified for the actual pump may be exceeded.

- NOTE for Ex-version page 3.

## Warranty claim

ITT Flygt pumps are high quality products with expected reliable operation and long life. However, should the need arise for a warranty claim, please contact your ITT Flygt representative.



## Design

The pump is a submersible, electric motor-driven product.

### 1. Impeller

The pump is available with a wide range of impellers for different applications and capacities.

### 2. Shaft seals

The pump has two mechanical face seals – one inner and one outer, with an intermediate oil housing.

### 3. Shaft

The shaft is delivered with the rotor as an integral part. Shaft material: stainless steel.

### 4. Bearings

The support bearing of the rotor consists of a single-row ball bearing.

The main bearing of the rotor consists of a two-row angular contact ball bearing.

### 5. Oil housing

The oil lubricates and cools the seals and acts as a buffer between the pump housing and the electric motor.

### 6. Motor

Squirrel-cage 1-phase or 3-phase induction motor for 50 Hz or 60 Hz.

The motor can be started by direct on-line or star-delta starting.

The motor can be run continuously or intermittently with a maximum of 15 evenly spaced starts per hour.

ITT Flygt motors are tested in accordance with IEC 34-1.

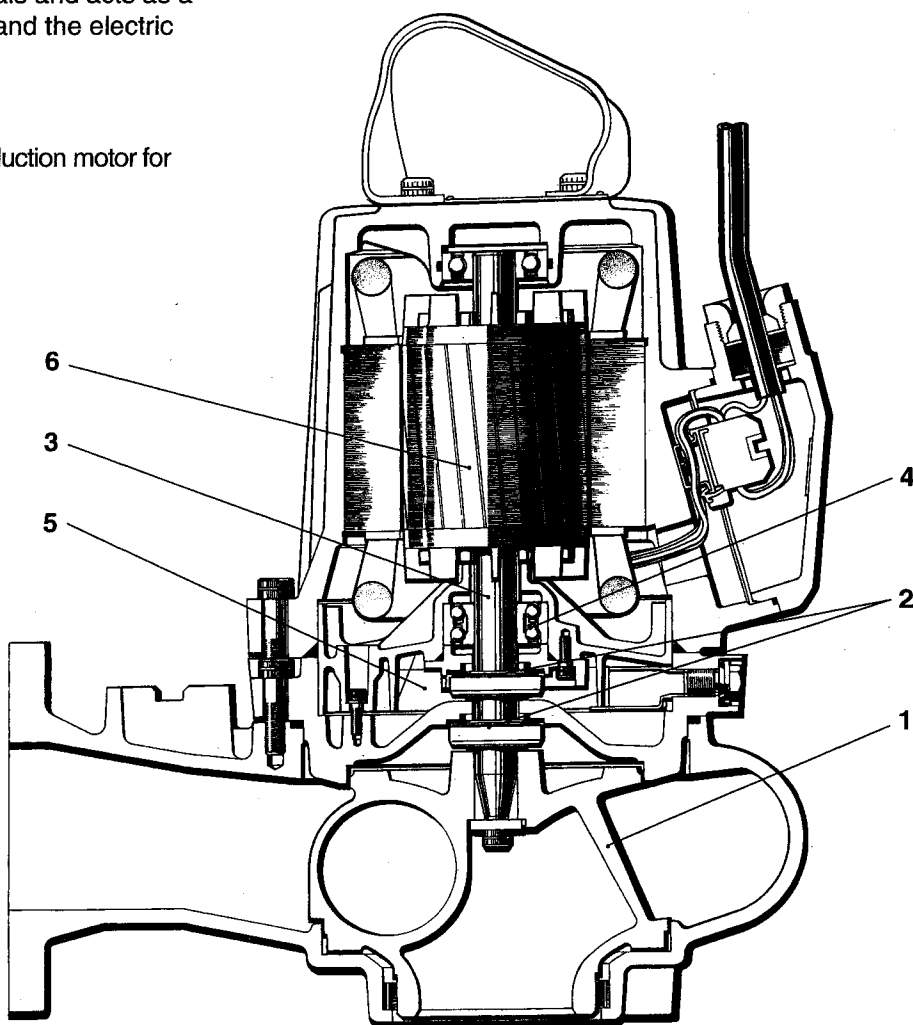
The stator is insulated in accordance with class H (180°C; 360°F). The motor is designed to deliver its rated output at  $\pm 5\%$  variation from the rated voltage. Without overheating the motor,  $\pm 10\%$  variation from the rated voltage can be accepted provided that the motor does not run continuously at full load. The motor is designed to operate at a voltage imbalance of up to 2% between the phases.

### Monitoring equipment

The stator incorporates thermal contacts connected in series.

The pump can be equipped with sensors for sensing water in the oil\* and/or stator housing.

\*Not applicable to Ex-approved pumps.



## Handling equipment

Lifting equipment is required for handling the pump.



- Stay clear of suspended loads.
- Always lift the pump by its lifting handle - never by the motor cable or the hose.

The minimum height between the lifting hook and the floor shall be sufficient to lift the pump out of the sump.

The lifting equipment shall be able to hoist the pump straight up and down in the sump, preferably without the need for resetting the lifting hook.

Oversize lifting equipment could cause damage if the pump should stick when being lifted.

Make sure that the lifting equipment is securely anchored.

## General recommendations

To ensure proper installation, please see the dimensions on the dimensional drawing in the Parts List.

**NOTE!** The end of the cable must not be submerged. It must be above flood level, as water may penetrate through the cable into the junction box or the motor.

Check that the lifting handle and chain are in good condition.

For automatic operation of the pump (level control), it is recommended that the level regulators be used at low voltage. The data sheet delivered with the regulators gives the permissible voltage. Local rules may specify otherwise.

Clean out all debris from the sump before the pump is lowered down and the station is started.



**NOTE for Ex version page 3.**

- Minimum stop level should be according to the dimensional drawing.
- The pump must never run dry.

## Safety precautions

In order to minimize the risk of accidents in connection with the service and installation work, the following rules should be followed:

1. Never work alone. Use a lifting harness, safety line and a respirator as required. Do not ignore the risk of drowning.
2. Make sure there are no poisonous gases within the work area.
3. Check the explosion risk before welding or using electric hand tools.
4. Do not ignore health hazards. Observe strict cleanliness.
5. Bear in mind the risk of electrical accidents.
6. Make sure that the lifting equipment is in good condition.
7. Provide a suitable barrier around the work area, e.g a guard rail.
8. Make sure you have a clear path of retreat!
9. Use safety helmet, safety goggles and protective shoes.
10. All personnel who work with sewage systems must be vaccinated against diseases to which they may be exposed.
11. A first-aid kit must be close at hand.
12. Note that special rules apply to installation in explosive atmosphere.

Follow all other health and safety rules and local codes and ordinances.



- Before starting work on the pump, make sure that the pump and the control panel are isolated from the power supply and cannot be energized.
- If the pump is equipped with automatic level control, there is a risk of sudden restart.
- All electrical equipment must be earthed. This applies to both pump equipment and any monitoring equipment. Failure to heed this warning may cause a lethal accident. Make sure that the earth lead is correctly connected by testing it.
- If persons are likely to come into physical contact with the pump or pumped media (liquid), e.g. on construction sites and farms, the earthed (grounded) socket must have an additional earth-(ground-) fault protection device (GFI) connected.  
When pumping near a lake (jetties, beaches, ponds, fountains etc) a safety-distance of at least 20 m (65 ft) between the person and the pump is applicable.  
The pump must never be placed directly into a swimming pool. If used in connection with swimming pools, special safety regulations apply.



NOTE for Ex version page 3.

All electrical work shall be carried out under the supervision of an authorized electrician.

Local codes and regulations shall be complied with.

Check on the data plate which voltage supply is valid for your pump.

Check that the main voltage and frequency agree with the specifications on the pump data plate.

If the pump can be connected to different voltages, the connected voltage is specified by a yellow sticker.

Connect the motor cable to the starter equipment as illustrated in the wiring diagrams.

#### **Conductors that are not in use must be isolated.**

The cable should be replaced if the outer sheath is damaged. Contact an ITT Flygt service shop.

Make sure that the cable does not have any sharp bends and is not pinched.

Under no circumstances may the starter equipment be installed in the sump.

**NOTE!** For safety reasons, the earth conductor should be approx. 50 mm (2.0") longer than the phase conductors. If the motor cable is jerked loose by mistake, the earth conductor should be the last conductor to come loose from its terminal. This applies to both ends of the cable.

Thermal contacts are incorporated in the stator. The thermal contacts can be connected to max 250 V, breaking current max 4 A. ITT Flygt recommends that they be connected to 24 V over separate fuses to protect the other automatic equipment.

Make sure that the pump is correctly earthed (grounded).

When using a variable-frequency-drive (VFD) the shielded cable (type NSSHÖU.../3E+St) should be used in order to fulfil European CE requirements. Contact your ITT Flygt representative and ask your VFD-supplier for electrical limitations.

Remember that the starting current in direct on-line starting can be up to six times higher than the rated current. Make sure that the fuses or circuit breakers are of the proper rating.

The Parts List gives rated current. Fuse rating and cable shall be selected in accordance with local rules and regulations. Note that with long cables, the voltage drop in the cable must be taken into consideration, since the motor's rated voltage is the voltage that is measured at the terminal board in the pump.

The overload protection (motor protection breaker) for direct on-line starting shall be set to the motor rated current as given on the data plate.

Check the phase sequence in the mains with the phase sequence indicator.

If intermittent operation is prescribed (see Data Plate), the pump shall be provided with control equipment that provides such operation.

## Single phase operation

The ITT Flygt single phase pumps must be equipped with a starter which has start and run capacitors.

A special ITT Flygt designed starter is required for the operation of single phase pumps. The connection of the motor cable to the starter is shown in the wiring diagram.

**NOTE!** It is not possible to change the direction of rotation of a single phase pump by changing the cable conductors on the starter. Please contact your nearest ITT Flygt representative.

## Monitoring equipment

A plate in the junction box shows if the pump is equipped with sensors.

**CLS-30** is a leakage sensor for sensing water in the oil housing and initiates an alarm when the oil contains 30% water. Oil change is recommended after the alarm. If the sensor initiates an alarm shortly after the oil is changed, contact your nearest ITT Flygt representative. The CLS sensor is installed in the bearing housing and goes down into the oil housing. The sensor is not applicable to Ex-approved pumps.



**CLS sensor body made of glass.  
Handle with care.**

The **FLS** sensor consists of a small float switch for sensing water in the stator housing. Its design makes it suitable for pumps in vertical installations. The FLS sensor is installed in the bottom of the stator housing.

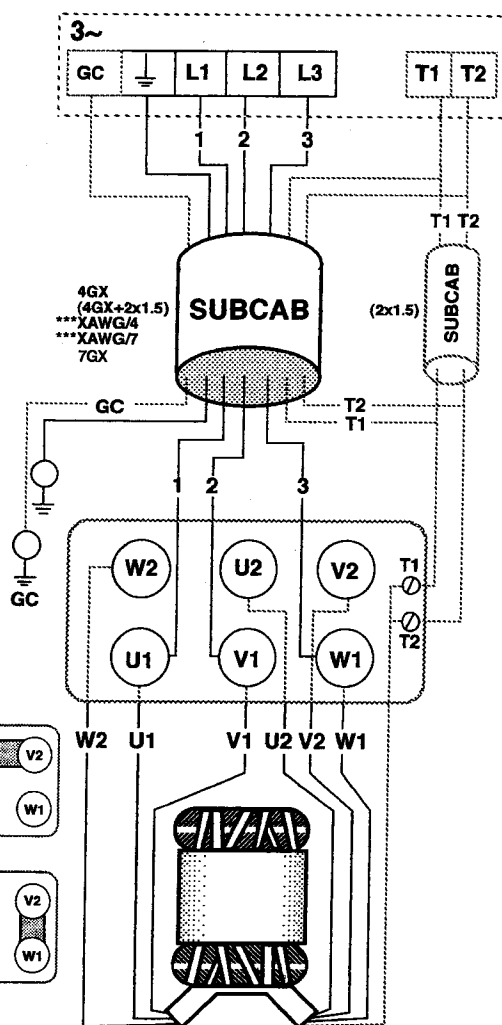
The two sensors, CLS and FLS, can be used in the same pump. They are connected in parallel. Follow the instructions for monitoring equipment.

The **MiniCas II** is a monitoring relay to which CLS and/or FLS are connected.

Check:

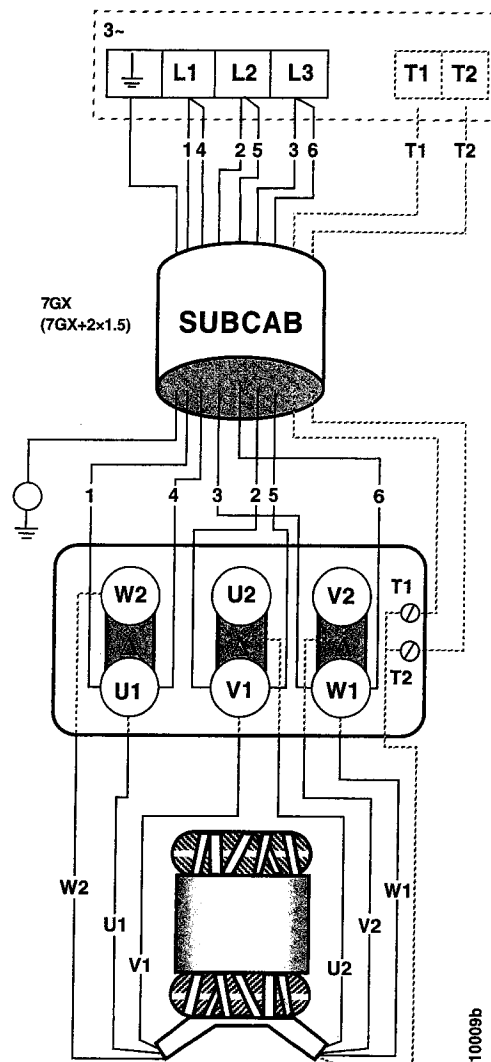
- signals and tripping function.
- that relays, lamps, fuses and connections are intact.

Replace defective equipment.



### 3-phase, direct-on-line starting

	Conductors	Connection starter
<b>SUBCAB 4Gx</b>	1 brown ***red	L1
<b>***SUBCAB xAWG/4</b>	2 blue ***white	L2
<b>H07RN-F4Gx</b>	3 black ***black	L3
<b>BIHF 4Gx silicon</b>	yellow/green	earth
<b>SUBCAB 4Gx+2x1,5</b>	1 brown	L1
	2 blue	L2
	3 black	L3
	yellow/green	earth
	T1 black	T1*
	T2 black	T2*
<b>SUBCAB 7Gx</b>	1 black	L1
<b>H07RN-F7Gx</b>	2 black	L2
<b>SO7E6E5-F7x2,5</b>	3 black	L3
	4 black	T1*
	5 black	T2*
	6 black	cut off
	yellow/green	earth
<b>For Canada/USA</b>	red	L1
<b>***SUBCAB xAWG/7</b>	white	L2
	black	L3
	yellow	GC**
	yellow/green	earth
	orange	T1*
	blue	T2*
<b>Stator leads</b>	U1 = red	V2 = blue
	V1 = brown	W2 = black
	W1 = yellow	U2 = green



### 3-phase, direct-on-line , 2 // connected cores

	Conductors	Connection starter
<b>SUBCAB 7Gx</b>	1 black	L1
<b>SO7E6E5-F7x2,5</b>	2 black	L2
	3 black	L3
	4 black	L1
	5 black	L2
	6 black	L3
	yellow/green	earth
<b>SUBCAB 7Gx+2x1,5</b>	1 black	L1
	2 black	L2
	3 black	L3
	4 black	L1
	5 black	L2
	6 black	L3
	T1 black	T1*
	T2 black	T2*
	yellow/green	earth

#### Stator leads

U1 = red	V2 = blue
V1 = brown	W2 = black
W1 = yellow	U2 = green

\* Terminal for connection of thermal contacts in the motor and monitoring equipment.

\*\* GC = Ground Check

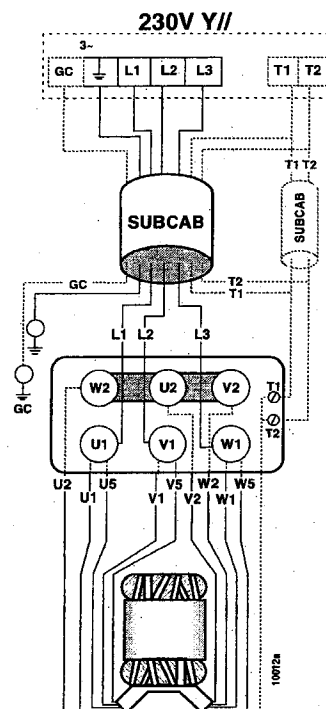
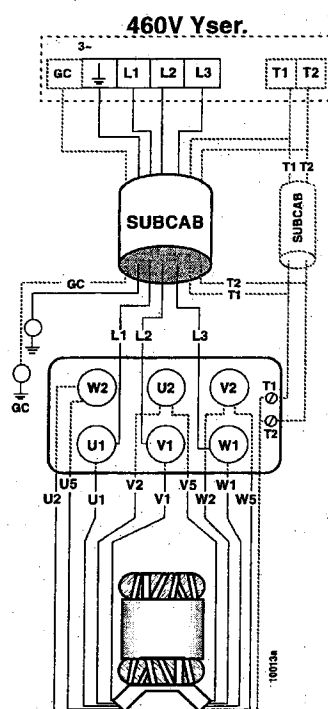
\*\*\* SUBCAB/AWG

SUBCAB is a registered trademark of ITT Flygt AB for electrical cables.

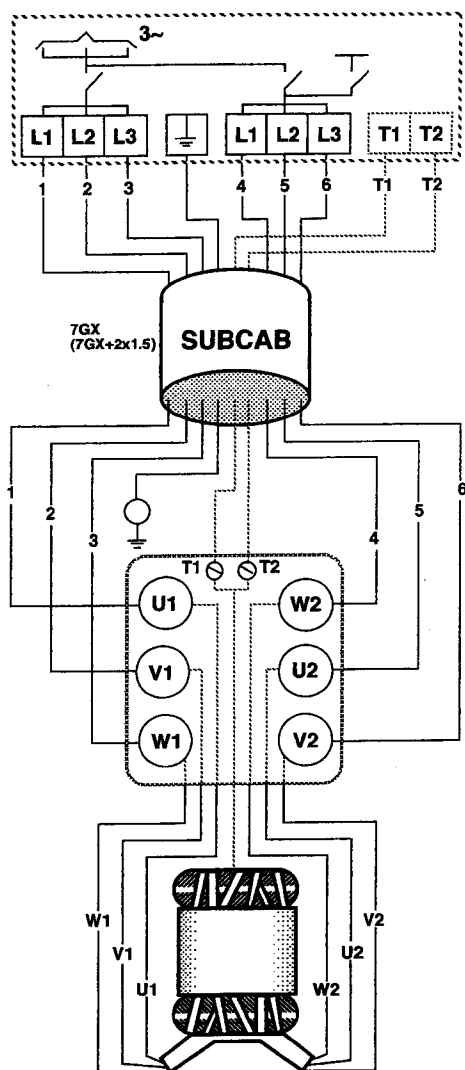
10009b

**Please see this page instead of page 13!**

# CABLE CHART



Mains	Lead	Pump terminal board	Mains	Lead	Pump terminal board
L1	Brown/(Red*)	U1	L1	Brown/(Red*)	U1
L2	Blue (White*)	W1	L2	Blue (White*)	W1
L3	Black (Black*)	V1	L3	Black (Black*)	V1
Earth (ground)	Yellow/Green	⊥	Earth (ground)	Yellow/Green	⊥
Groundcheck (GC)	Yellow*)		Groundcheck (GC)	Yellow*)	
Stator leads <b>460V-Y SER</b> connection:			Stator leads <b>230V-Y//</b> connection:		
Stator lead		Pump terminal board	Stator lead		Pump terminal board
U1, red		U1	U1, red		U1
W2, black		V2	U5, red		U1
V1, brown		V1	V1, brown		V1
U2, green		W2	V5, brown		V1
W1, yellow		W1	W1, yellow		W1
V2, blue		U2	W5, yellow		W1
V5, brown		U2	U2, green		W2
W5, yellow		V2	V2, blue		U2
U5, red		W2	W2, black		V2
Control	Cable lead		Control	Cable lead	
T1	T1/orange*		T1	T1/orange*	
T2	T2/blue*		T2	T2/blue*	



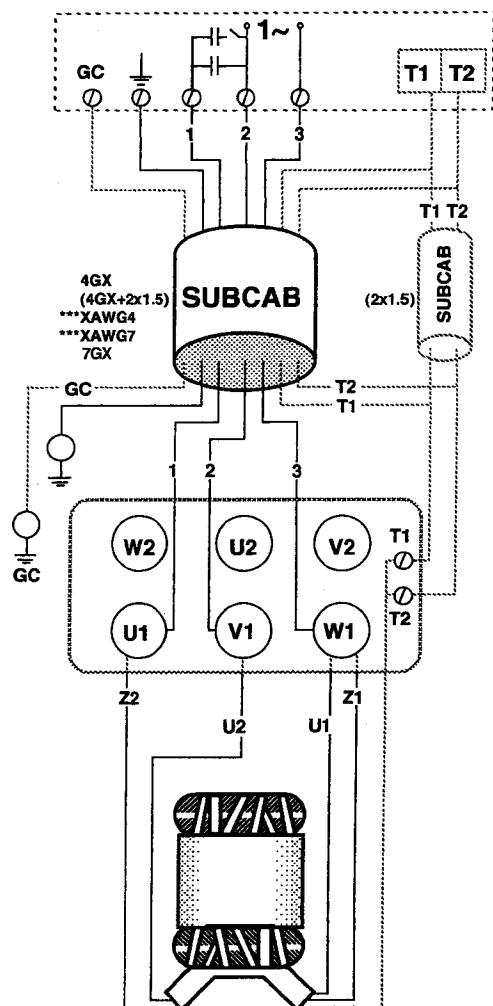
### 3-phase, star-delta starting

	Conductors	Connection starter
SUBCAB 7Gx HCRS07E6E5-F7x2.5	1 black	L1
	2 black	L2
	3 black	L3
	4 black	L1
	5 black	L2
	6 black	L3
	yellow/green	earth
SUBCAB 7Gx+2x1,5	1 black	L1
	2 black	L2
	3 black	L3
	4 black	L1
	5 black	L2
	6 black	L3
	T1 black	T1*
	T2 black	T2*
	yellow/green	earth

### Stator leads

U1 = red	V2 = blue
V1 = brown	W2 = black
W1 = yellow	U2 = green

\* Terminal for connection of thermal contacts in the motor and monitoring equipment.



## Single phase

**SUBCAB 4Gx**  
**\*\*\*SUBCABxAWG/4**  
**H07RN-F4Gx**  
**BIHF 4Gx silicon**

**SUBCAB 4Gx+2x1,5**

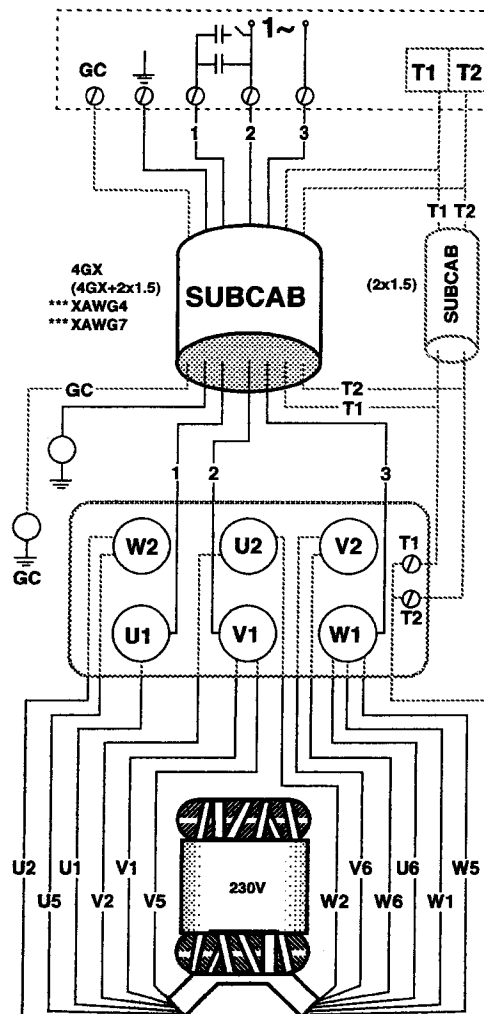
**SUBCAB 7Gx**

**For Canada/USA**  
**\*\*\*SUBCABxAWG/7**

## Stator leads

Conductors	Connection starter
1 brown ***red	1
2 black ***black	2
3 blue ***white	3
yellow/green	earth
1 brown	1
2 black	2
3 blue	3
yellow/green	earth
T1 black	T1*
T2 black	T2*
1 black	1
2 black	2
3 black	3
4 black	T1*
5 black	T2*
6 black	cut off
yellow/green	earth
red	1
black	2
white	3
yellow	GC**
yellow/green	earth
orange	T1*
blue	T2*

U1 = red	U2 = brown
Z1 = yellow	Z2 = black



## Stator leads

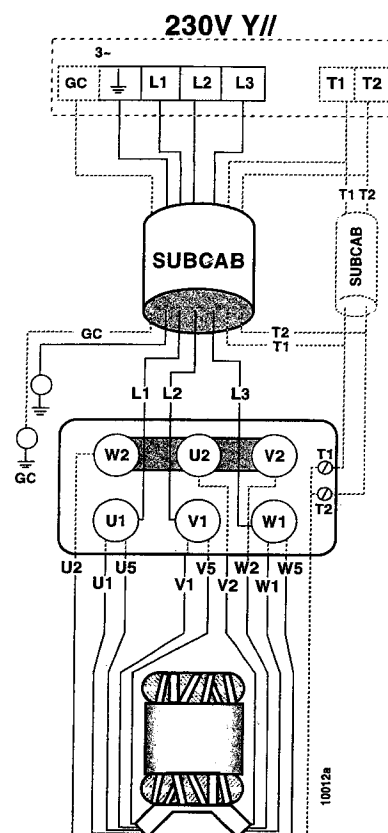
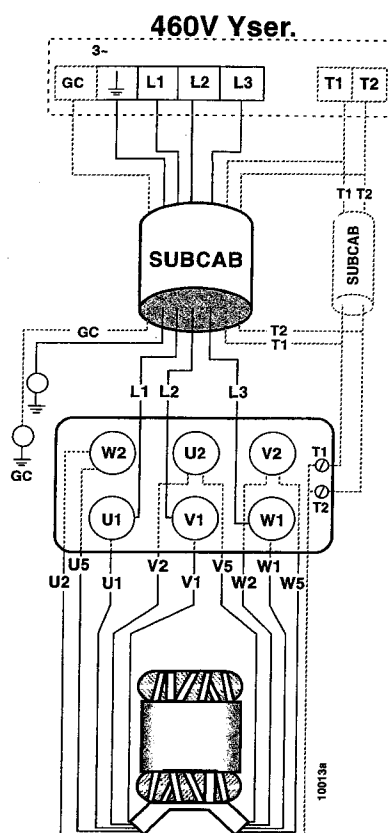
U1 = red	U5 = red
V1 = brown	V5 = brown
W1 = yellow	W5 = yellow
U2 = green	U6 = green
V2 = blue	V6 = blue
W2 = black	W6 = black

\* Terminal for connection of thermal contacts in the motor and monitoring equipment.

\*\* GC = Ground Check

\*\*\* SUBCAB/AWG





Mains	Lead	Pump terminal board	Mains	Lead	Pump terminal board
L1	Brown/(Red*)	U1	L1	Brown/(Red*)	U1
L2	Blue (White*)	W1	L2	Blue (White*)	W1
L3	Black (Black*)	V1	L3	Black (Black*)	V1
Earth (ground)	Yellow/Green	⊥	Earth (ground)	Yellow/Green	⊥
Groundcheck (GC) Yellow*)			Groundcheck (GC) Yellow*)		
Stator leads <b>460V-Y SER</b> connection:			Stator leads <b>230V-Y//</b> connection:		
Stator lead		Pump terminal board	Stator lead		Pump terminal board
U1, red		U1	U1, red		U1
W2, black		W2	U5, red		U5
V1, brown		V1	V1, brown		V1
U2, green		U2	V5, brown		V5
W1, yellow		W1	W1, yellow		W1
V2, blue		V2	W5, yellow		W5
V5, brown			U2, green		
W5, yellow			V2, blue		
U5, red			W2, black		
Control	Cable lead				
T1	T1/orange*				
T2	T2/blue*				

The pump can be transported and stored in a vertical or horizontal position.



- **Always lift the pump by its lifting handle – never by the motor cable or the hose.**
- **Make sure that the pump cannot roll or fall over and injure people or damage property.**

The pump is frostproof as long as it is operating or is immersed in the liquid. If the pump is raised when the temperature is below freezing, the impeller may freeze.

The pump shall be run for a short period after being raised in order to discharge all remaining water.

A frozen impeller can be thawed by allowing the pump to stand immersed in the liquid for a short period before it is started. Never use a naked flame to thaw the pump.

For longer periods of storage, the pump must be protected against moisture and heat. The impeller should be rotated occasionally (for example every other month) to prevent the seals from sticking together.

After a long period of storage, the pump should be inspected before it is taken into operation. Pay special attention to the seals and the cable entry.

Follow the instructions under the heading “Before starting”.

## Before starting



- **Before starting work on the pump, make sure that the pump is isolated from the power supply and cannot be energized.**
- **Make sure that the pump cannot roll or fall over and injure people or damage property.**

Check that the visible parts on the pump and installation are undamaged and in good condition.

Check the oil level in the oil housing.

Remove the fuses or open the circuit breaker and check that the impeller can be rotated freely.

Check that the monitoring equipment (if any) works.

Check the direction of rotation. The impeller shall rotate clockwise, as viewed from above. When started, the pump will jerk in the opposite direction to the direction in which the impeller rotates. See the figure.

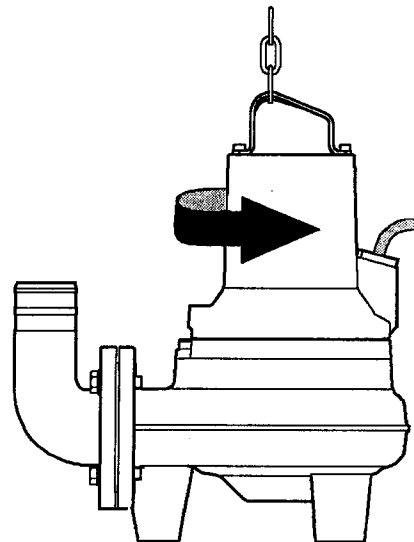
In the case of dry installation, check the direction of rotation through the inlet elbow access cover.

Transpose two phase leads if the impeller rotates in the wrong direction (3 ~).



**In some installations the pump surface and the surrounding liquid may be hot. Bear in mind the risk of burn injuries.**

## Starting jerk



**Watch out for the starting jerk, which can be powerful.**



**Before starting work on the pump, make sure that the pump is isolated from the power supply and cannot be energized.**

**This applies to the control circuit as well.**



**NOTE for Ex version page 3.**



**Make sure that the pump cannot roll or fall over and injure people or damage property.**

The following points are important in connection with work on the pump:

- Make sure that the pump has been thoroughly cleaned.
- Beware of the risk of infection.
- Follow local safety regulations.

The pump is designed for use in liquids which can be hazardous to health. In order to prevent injury to the eyes and skin, observe the following points when working on the pump:

- Always wear goggles and rubber gloves.
- Rinse the pump thoroughly with clean water before starting work.
- Rinse the components in water after dismantling.
- The oil housing may be under pressure. Hold a rag over the oil screw (oil plug) to prevent splatter.

Proceed as follows if hazardous chemicals have splashed into your eyes:

- Rinse your eyes immediately in running water for 15 minutes. Hold your eyelids apart with your fingers.
- Contact an eye specialist.

On your skin:

- Remove contaminated clothes.
- Wash your skin with soap and water.
- Seek medical attention, if required.

## Inspection

Regular inspection and preventive maintenance ensure more reliable operation.

The pump should be inspected at least once a year, but more frequently under severe operating conditions.

Under normal operating conditions, the pump should have a major overhaul in a service shop at least every third year for permanent installation and every year for portable pumps. This requires special tools and should be done by an authorized service shop.

If the seals have been replaced an inspection of the oil is recommended after one week of operation.

**NOTE!** Regular check of the condition of the lifting handle and chain is important.

### Inspection of hot water applications

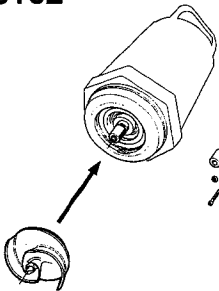
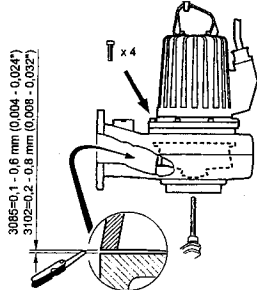
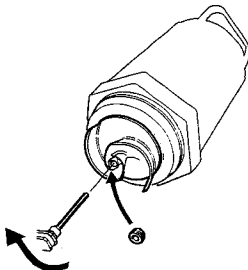
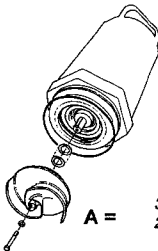
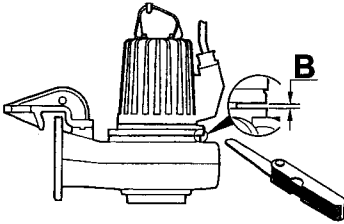
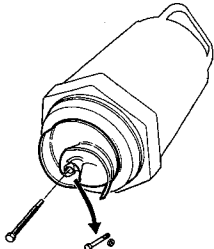
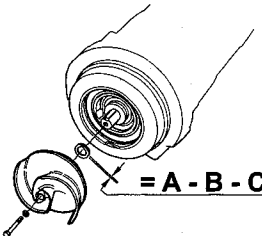
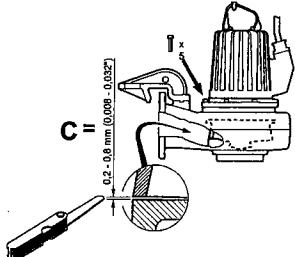
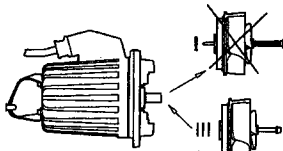
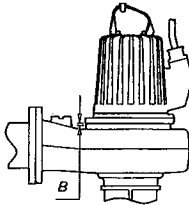
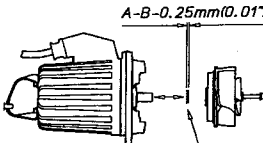
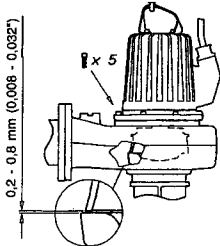
Pumps in hot water applications shall undergo inspection or overhaul at a service shop as follows, depending on the time they have been submerged in the hot water:

Temp.	Mode of operation	Inspection	Shop overhaul
≤70°C (160°F)	Continuous	1000 hours	4000 hours
≤70°C (160°F)	Intermittent	twice a year	once a year
≤90°C (195°F)	Cont./Int.	6 times a year	twice a year

## N-type impeller - replacing and setting clearance



**Warning!** The impellers may have very sharp edges.  
Use protective gloves.

<div><div>N3085/3102</div><div><p>1.</p></div></div>	<div><div><p>2.</p></div></div>	<div><div><p>3.</p></div></div>
<div><div>NP/NS/NL3127</div><div><p>(3x) 0,3 mm (0,012") 298 62 00 (1x) 1,5 mm (0,060") 298 62 01 (2x) 0,5 mm (0,020") 298 62 02</p><p>A = 3x 0,3 + 1x 1,5 + 2x 0,5 = 2,9 mm</p><p>1.</p></div></div>	<div><div><p>2.</p></div></div>	<div><div><p>3.</p></div></div>
<div><div><p>= A - B - C</p><p>4.</p></div></div>		<div><div><p>5.</p></div></div>
<div><div>NT3127</div><div><p>A=3x 298 62 01</p><p>1.</p></div></div>	<div><div><p>2.</p></div></div>	
<div><div><p>A-B-0,25mm(0.01")</p><p>298 62 00 0.3mm (0.012") 298 62 01 1.5mm (0.060") 298 62 02 0.5mm (0.020")</p><p>3.</p></div></div>		<div><div><p>4.</p></div></div>



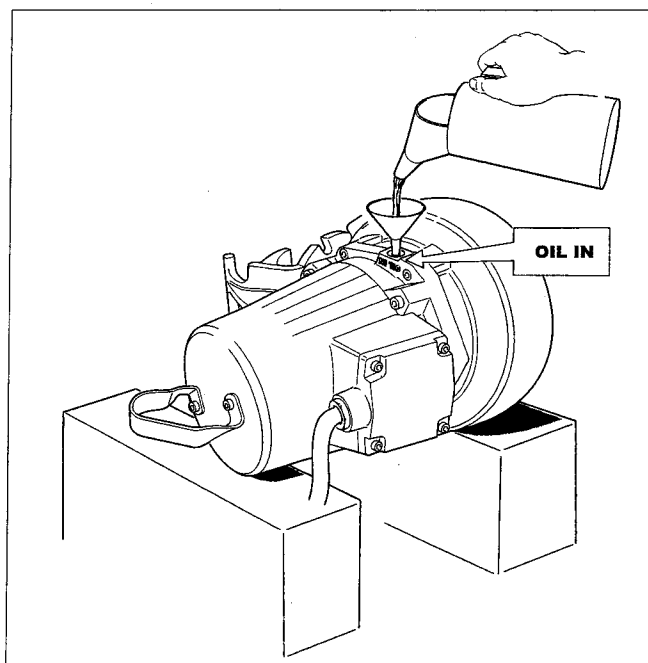
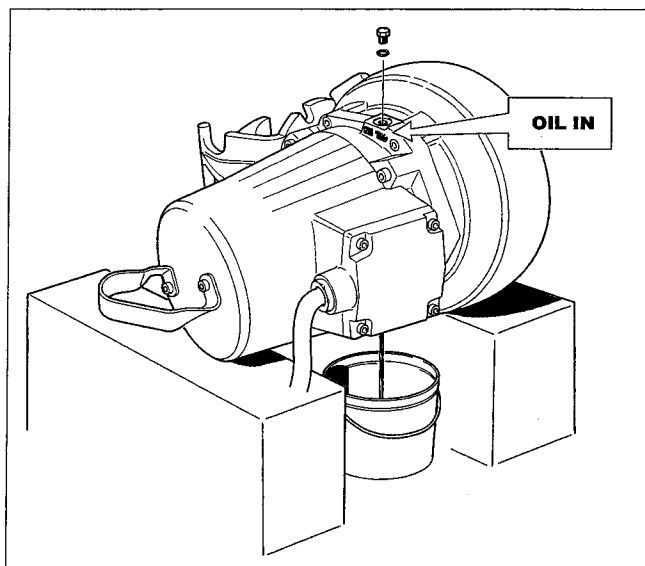
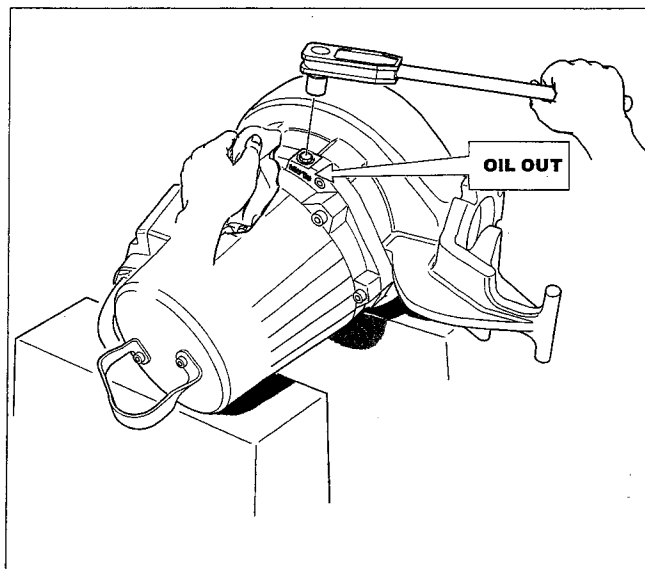
The oil housing may be under pressure. Hold a rag over the oil plug to prevent splatter.

1. Lay the pump on its side on a bench or over two supports. Unscrew the oil housing screw (oil plug) marked "oil out". Emptying the oil must be done through the "oil out" hole.
2. Turn the pump. Unscrew the "oil in" oil hole screw/plug. In order to drain out all oil, the pump must be raised upright for a short while during drainage.
3. Replace the O-rings under the oil housing screws (plugs) with new ones.
4. Install the "oil out" screw/plug and fill with oil through the other hole. It is important that the oil be added through the hole marked "oil in" since the oil housing must contain some air for pressure equalization. The pump should be tilted slightly and put down again horizontally in order to get the full amount of oil in.

A paraffin oil with viscosity close to ISO VG15 is recommended (e.g. Mobil Whiterex 309). The pump is delivered from factory with this type of oil.

In applications where poisonous properties are of less concern, a mineral oil with viscosity up to ISO VG32 can be used.

Approx. oil quantity		
	l	US quarts
3085	1.0	1.1
3085.280/290	0.8	0.8
3102	1.0	1.1
3127	2.0	2.1





Most recent service date	Pump No.	Hours of operation	Remarks	Sign.



[www.flygt.com](http://www.flygt.com)



# **FLYGT SUBMERSIBLE PUMP**

**PARTS LIST CP 3127 HT**

**SERIAL NO 3127.090 0340072**



**ITT FLYGT CORPORATION  
35 NUTMEG DRIVE**

**TRUMBULL, CT 06611  
USA  
TELEPHONE NO: 203-3804870**

**Flygt**



**ITT Industries**

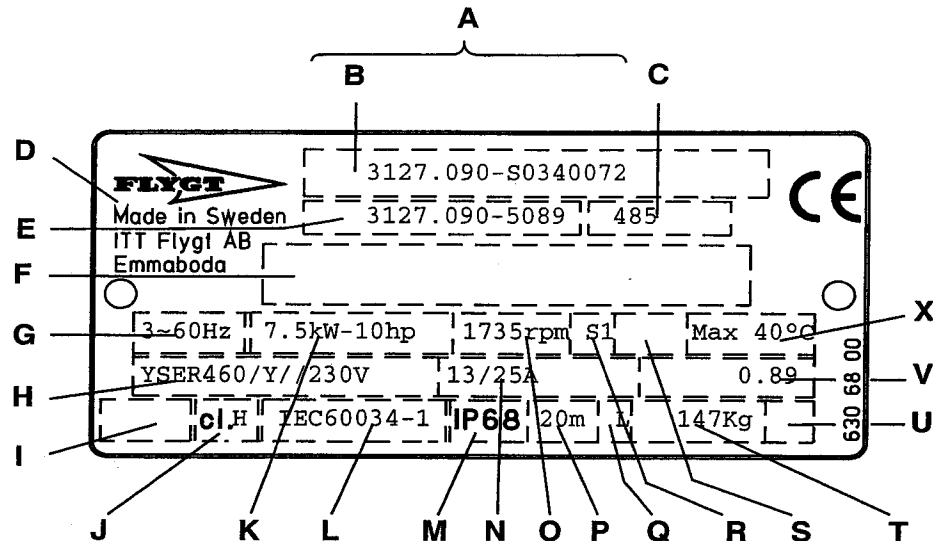


# 

FLYGT CP 3127 HT

DATE: 2003-05-21

SERIAL NO: 3127.090 0340072



### Dataplate interpretation:

- |                                     |   |
|-------------------------------------|---|
| A Serial number                     | M Degree of protection                  |
| B Product code + Number             | N Rated current                         |
| C Curv code / Propeller code        | O Rated speed                           |
| D Country of origin                 | P Max. submergence                      |
| E Product number                    | Q Direction of rotation R=right, L=left |
| F Additional information            | R Duty class                            |
| G Phase; Type of current; Frequency | S Duty factor                           |
| H Rated voltage                     | T Product weight                        |
| I Thermal protection                | U Locked rotor code letter              |
| J Thermal class                     | V Power factor                          |
| K Rated shaft power                 | X Max. ambient temperature              |
| L International standard            |   |
- (1 kg = 2.2 pound, 1 Lit=0.26 US gallon, 1 l = 0,22 UK gallon)

### Recommended spare parts:

See REC. column: A = Parts for inspection and maintenance  
B = Parts for major overhaul

For service;

To ensure long operating life use Flygt Bearing Grease 90 20 61 (Cartridge).  
Lubrication kit 84 15 40 contains two 90 20 61 and one 84 15 30 (Grease gun).

The O-ring kit contains a full set of O-rings. Position no 800.

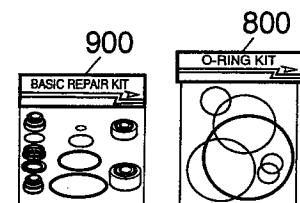
The Basic Repair kits contain both inner and outer Mechanical seals, bearings and a O-ring kit. Position no 900.

A complete set of tools can be ordered for repair and maintenance work, i.e. standard hand tools and special tools for seal change and hydraulic-end use.

Order:

This partlist can be used as an order form by marking out the number of parts in the Qty/Order column.

Please send or fax the form to your Flygt representative.



# PARTS LIST

**FLYGT CP 3127 HT**

**SERIAL NO 3127.090 0340072**

Item no	Partno	Rec	Denomination	Qty/ord.
1	477 11 01	(s)	Lifting handle	1
2	83 03 23	B (s)	Hex.socket hd screw M10X25-A4-70	2
3	630 68 00		Data plate USE 6306801 AS SPARE PART	2
6	83 02 58	B	Hex.socket hd screw M5X12-A4-70	2
8	279 29 00	B	Earthing plate	1
9	82 21 73	(s)	Drive screw 4X5-A4-70	4
9	82 21 73	(s)	Drive screw 4X5-A4-70	4
9	82 21 73	(s)	Drive screw 4X5-A4-70	2
10	443 53 01		Stator housing	1
11	83 03 27	(s)	Hex.socket hd screw	4
14	630 70 00		Certificate plate FM APPROVED	2
15	550 22 00		Connection plate (FLS)	1
15	559 92 00		Connection plate	1
16	82 80 86	B (s)	O-ring 239,3X5,7 FPM	1
17	83 31 80	B	Ball bearing 6207 Z/C3 35X72X17	1
18	443 66 04		Shaft unit	1
19	309 44 12		Stator 21-12-4a	1
22	83 45 59		Cable tie 200X2,4 PA 6/6 -55+105	1
23	94 21 06	B	Motor cable SUB10AWG/3-2-1GC 20-22	16.5 m
24.1	435 56 00		Motor cable entr.uni	1
24.6	82 17 61		Cutting screw TAPTITE-M6X12	4
24.7	83 42 96		Cable lug 2,5 -6 MM2;M6	2
24.8	83 44 23		Closed end splice 5.1-10,5;L=40	3
24.8	83 44 24		Closed end splice 2.5-6(AWG 12-10)L=17.5	1
25	443 50 01		Entrance cover	1
26	83 03 01	(s)	Hex.socket hd screw	4
27	82 80 98	AB (s)	O-ring 129,5X3,0 FPM	1
27	82 80 98	AB (s)	O-ring 129,5X3,0 FPM	1
28.2	83 53 30		Terminal clamp	6
28.4	83 53 33		End plate	1
28.6	83 53 31		End support 35X15	2
28.7	443 68 00		Rail	1
28.8	83 95 18		Marking strip	2
28.9	427 13 00		Marking tape	1
30	443 69 00	B	El-lead through	1

Ordered by:

Company:.....Ref:.....Tel:.....Date:.....

## PARTS LIST

Item no	Partno	Rec	Denomination	Qty/ord.
30.2	81 98 44		Hex.socket hd screw	1
30.3	82 35 13		Plain washer	3
31	439 44 01		Screw	3
32	596 07 00		Square washer	3
33	82 17 64		Cutting screw TAPTITE-M6X20	7
34	82 50 60		Lock washer DUBO NR 301	3
37	504 78 07		Cable unit	1
38	518 89 02		Leakage detect.unit (FLS)	1
40	443 55 11		Bearing holder EX.VERSION	1
41	83 37 60	B	Ball bearing 3307/C3 TOL.P6 35X80X34,9	1
42	82 79 18	B (s)	O-ring 78,0X4,0 FPM	1
43	614 49 00		Bearing cover	1
44	593 70 03	B	Mechanical seal WCCR/WCCR-TYPE O	1
45	83 03 48	(s)	Hex.socket hd screw M12X40-A4-70	5
46	604 47 00		Oil housing bottom	1
47	443 49 00		Sleeve	1
48	82 72 95	AB (s)	O-ring 19.2X3.0 FPM	2
48	82 72 95	AB (s)	O-ring 19.2X3.0 FPM	4
49	428 22 05	B (s)	Inspection screw SS	2
53	593 70 03	B	Mechanical seal WCCR/WCCR-TYPE O	1
59	436 10 01	(s)	Ring	1
61	380 91 00		Guiding claw	1
62	81 49 09	(s)	Hexagon head screw M12X45-A4-70	4
64	439 18 00		Impeller	1
67	465 14 00		Pump housing	1
70	338 13 06	(s)	Plain washer	1
72	84 42 54		Hex.socket hd screw MC6S 12X40-2343	1
73	314 88 54	AB (s)	Ring	1
75	80 70 63	B	Parallel key	1
169	667 40 00		Sticker	2
800	80 32 33		O-rings kit 3127.090,170,180,890	1
800	80 32 74		O-rings kit 3127.090/180F,D,SUP.HT	1
900	601 89 07		Basic repair kit 3127.090,170,180,890	1
900	601 89 08		Basic repair kit 3127.090, 180	1
900	601 89 09		Basic repair kit 3127.090, 180	1
900	601 89 10		Basic repair kit 3127.090,180	1
	90 17 52		Paraffin oil	2 l
	90 20 54		Bearing grease ESSO UNIREX N3	0.03 kg
	82 42 72	(s)	Plain washer (32)- 34 MM	4
	82 81 03	(s)	O-ring 49,5X3,0 FPM	1
	83 03 46	(s)	Hex.socket hd screw M12X30-A4-70	2

Ordered by:

Company:.....Ref:.....Tel:.....Date:.....

## PARTS LIST

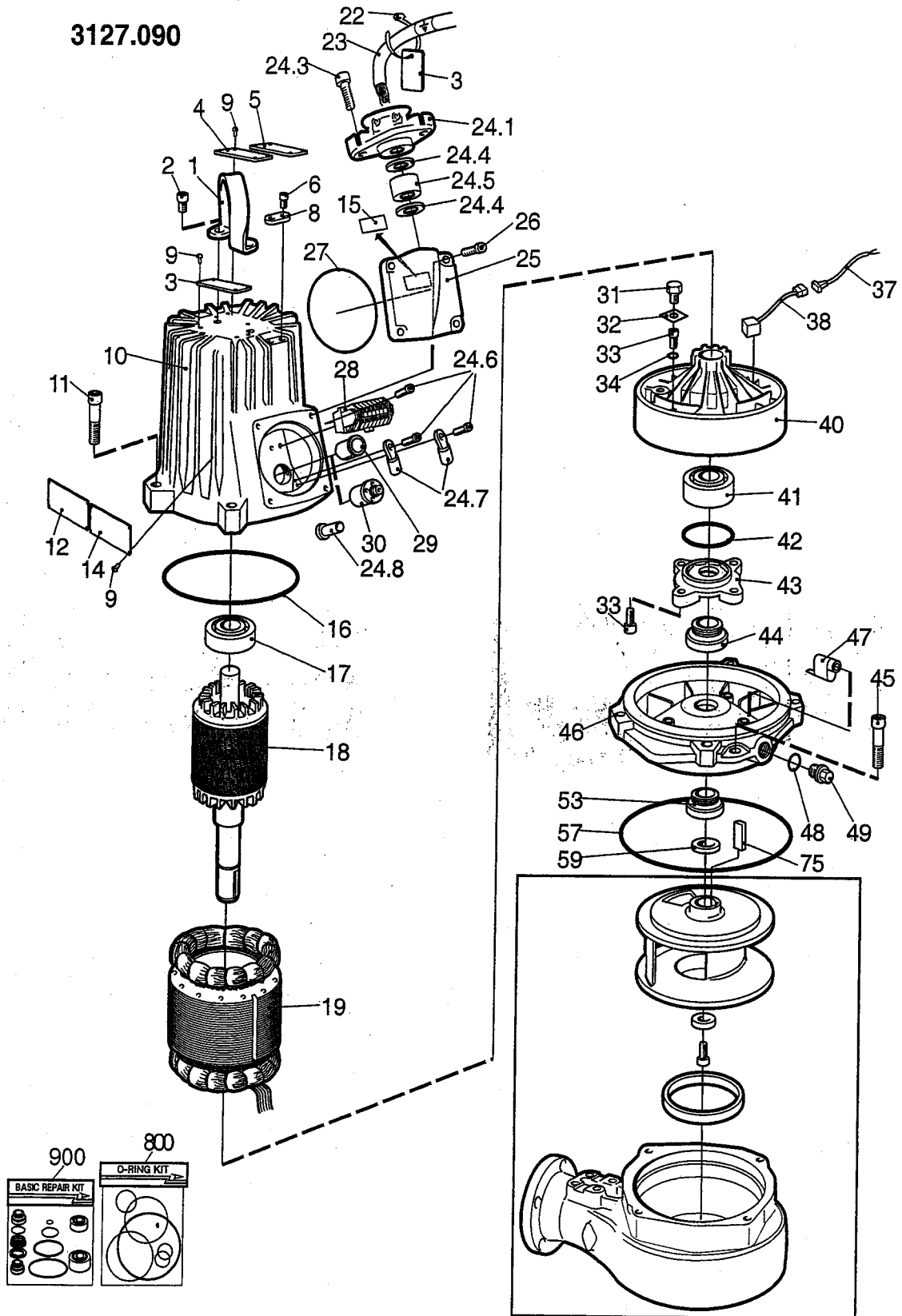
Item no	Partno	Rec	Denomination	Qty/ord.
	84 18 02	(s)	Seal sleeve (20)-23 MM	2
	597 87 11	(s)	Entrance flange	1
	597 98 00	(s)	Ring	1
	633 11 04	(s)	Gland screw 1 1/2' NPT	1
	640 31 03	(s)	Nipple	1
...	.....		.....	....
...	.....		.....	....
...	.....		.....	....
...	.....		.....	....

Ordered by:

Company:.....Ref:.....Tel:.....Date:.....

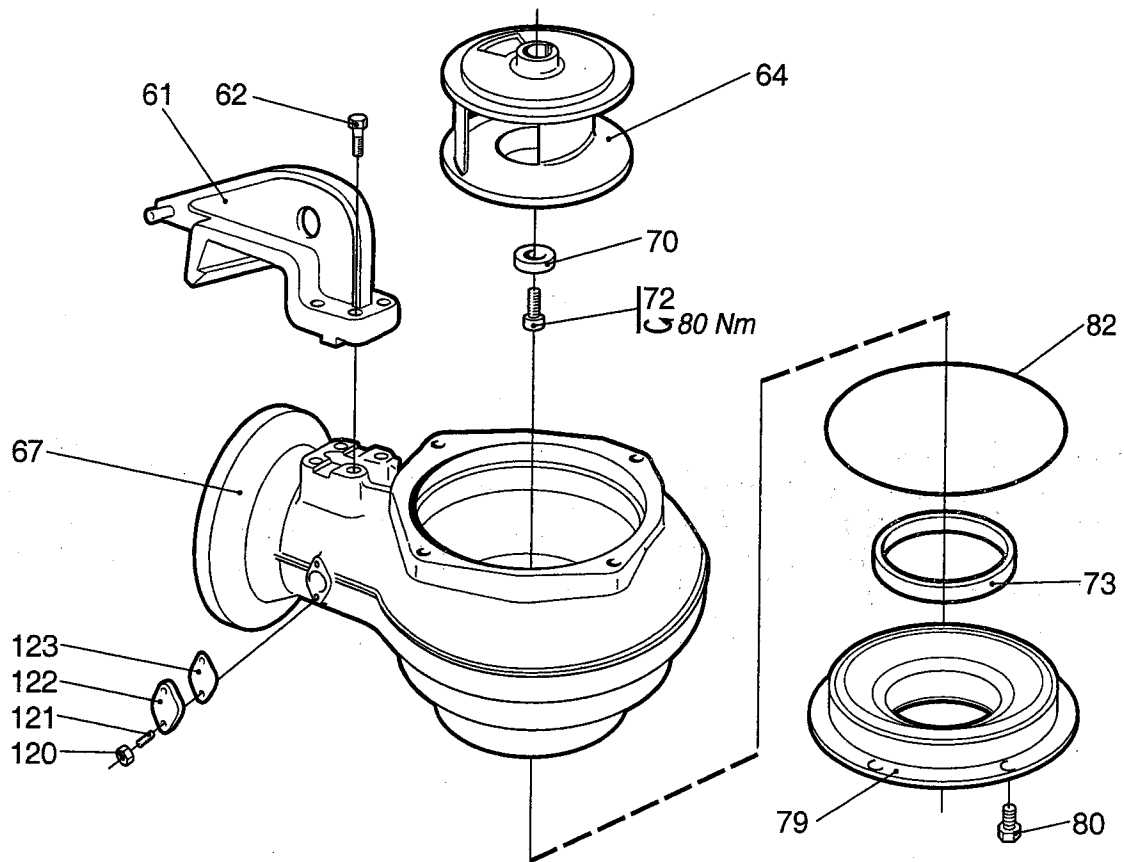
# EXPLODED VIEW

3127.090



## HYDRAULIC PARTS

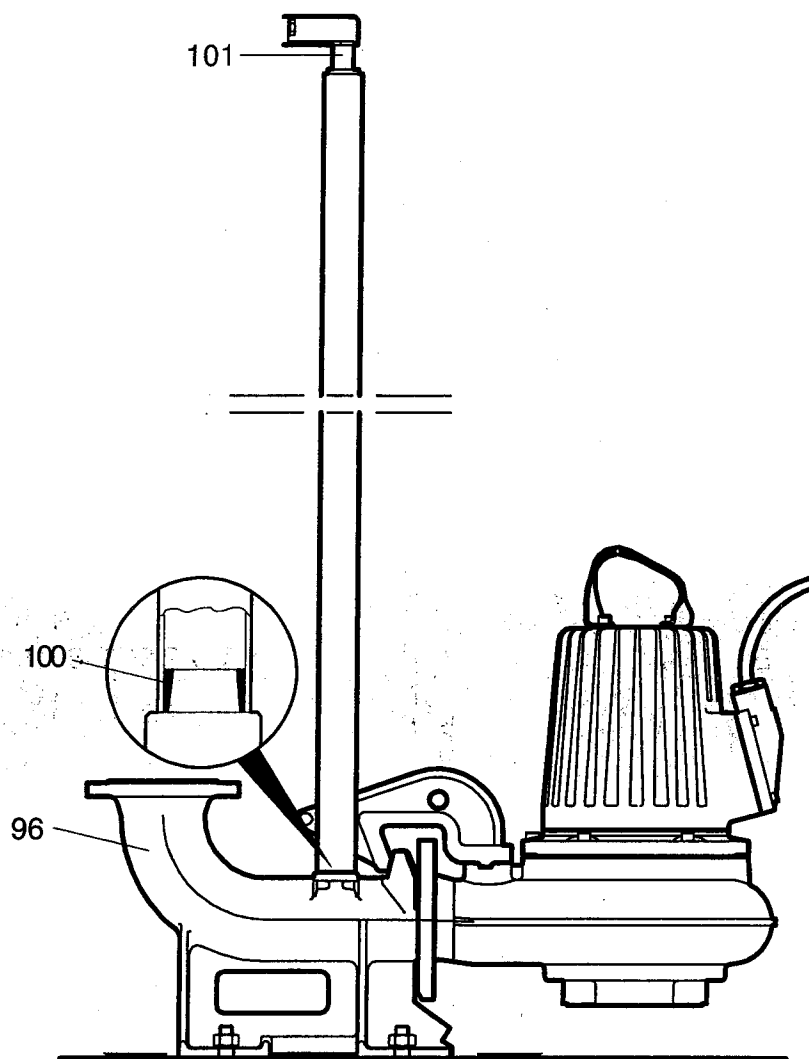
### CP 3127 HT



30220

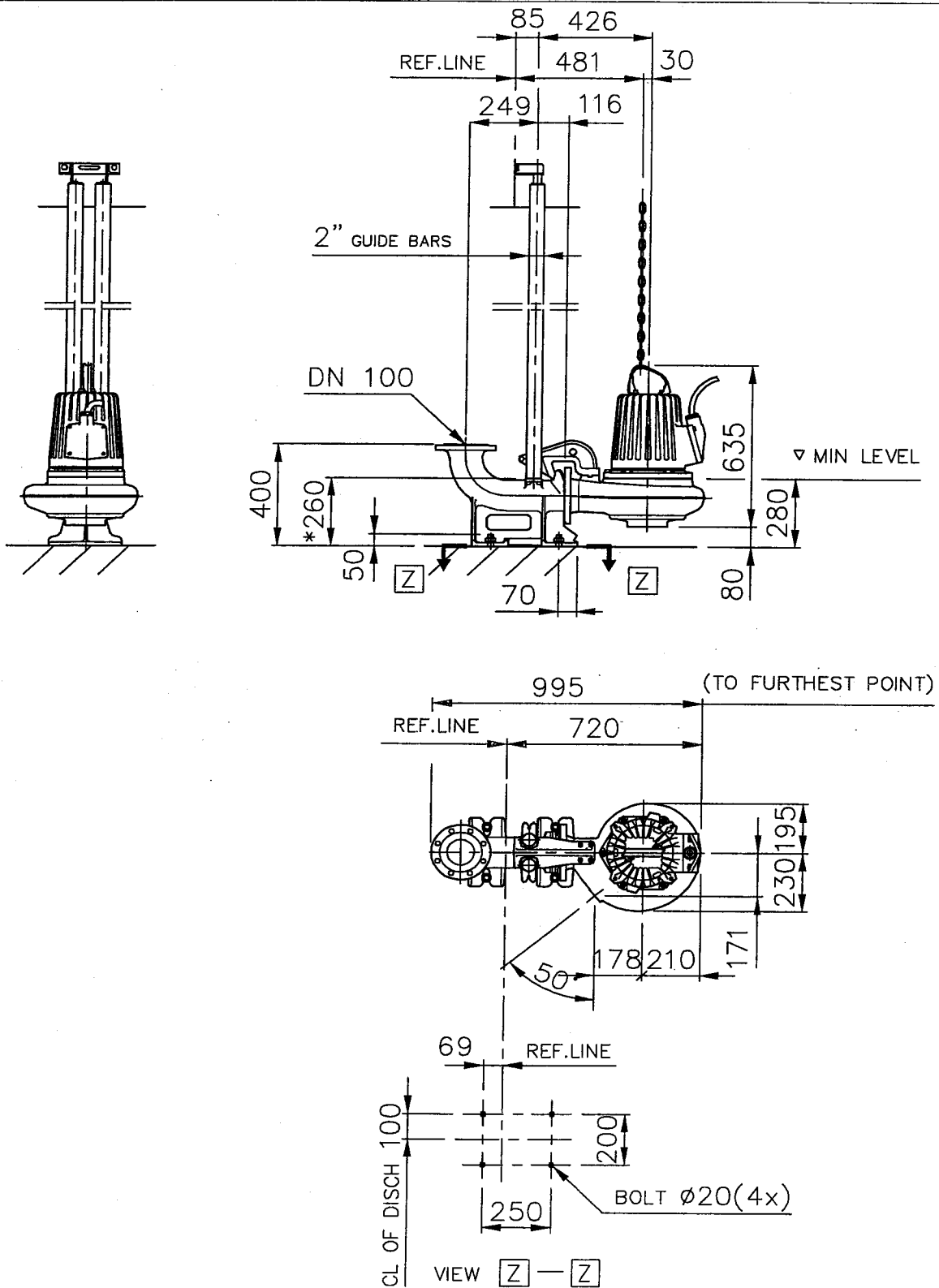
## CONNECTION

CP, NP 3127.090/180/980



30741

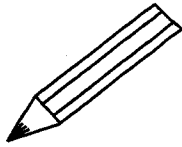
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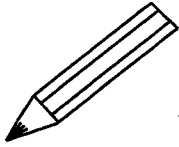
EQUIPPED WITH IMPELLER: 461, 467 OR 480-485.

\* DIMENSION TO ENDS OF GUIDE BARS





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***EPG Companies Inc.***

**Operations & Maintenance  
Manual**

**FOR**

**Marcy Excavation Company,  
Inc.**

**Chaffee Landfill**

**EPG Job #03-6244**

# ***EPG Companies Inc.***

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## **Operations and Maintenance Index**

### **Marcy Excavation Company Inc. - Chaffee Landfill**

#### **EPG Job # 03-6244**

Bulletin	1055	List of Equipment
Drawing	05773	Series 5 SurePump™
Bulletin	0335e	Engineer's Specification EPG WSDPT SurePump™ Wheeled Sump Drainer for side slope riser installations with built-in level sensor
Bulletin	0480d	Materials of Construction
Bulletin	0130c	EPG Sump Drainer Vent Tube / Check Valve Installation Instructions
Bulletin	0680a	EPG SurePump™ with LevelMaster™ Level Sensor Disassembly / Assembly Operation & Maintenance Instructions
Bulletin	0691	EPG SurePump™ with LevelMaster™ Level Sensor Replacement Instructions for Level Sensor in Wheeled Sump Drainer
Bulletin	0790	Test Equipment
Bulletin	0780a	Troubleshooting Guide
Bulletin	6090a	Wire Cable Clamp Installation Instructions
Bulletin	0370a	Storage Information
Form	200	SurePump™ Installation Record
Bulletin	0060a	Engineer's Specification EPG Series L925PT PumpMaster™ Controller
Form	117	Attachment to Bulletin 0060a
Drawings	05900-0250	L925PT Control Panel Schematics
Information	1 Page	Meter Default Settings
Bulletin	3360	Caution
Bulletin	8000	EPG Controllers With Intrinsically Safe Circuit(s) Field Installation Instructions
Bulletin	0121b	Engineer's Specification EPG LevelMaster™ Submersible Level Sensor
Bulletin	0690c	EPG LevelMaster™ Level Sensor Operation & Maintenance Instructions
Bulletin	0526	EPG LevelMaster™ Level Meter Model 2551A-SDHH Operations & Set Up Instructions
Bulletin	6160	S3070-PT Transducer Simulator Operation
Bulletin	6165	S3070-PT Transducer Simulator Test Procedure
Drawing	03626-0500	BJBP 500 Breakout Junction Box for Motor Lead

# ***EPG Companies Inc.***

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Drawing	02523-0605	BJBL 600B Breakout Junction Box for Level Sensor
Bulletin	3300a	Type "F" PVC Suction and Transfer Hose
Bulletin	0285	Model NW Stainless Steel Discharge Adapter
Photo	A	Front Panel Layout
Photo	B	Inner Door Layout
Photo	C	Back of Inner Door Layout
Photo	D	Back Panel Layout
Bulletin	0200c	Limited Warranty

# ***EPG Companies Inc.***

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## **List of Equipment**

**Marcy Excavation Company Inc. – Chaffee Landfill**

**EPG Job # 03-6244**

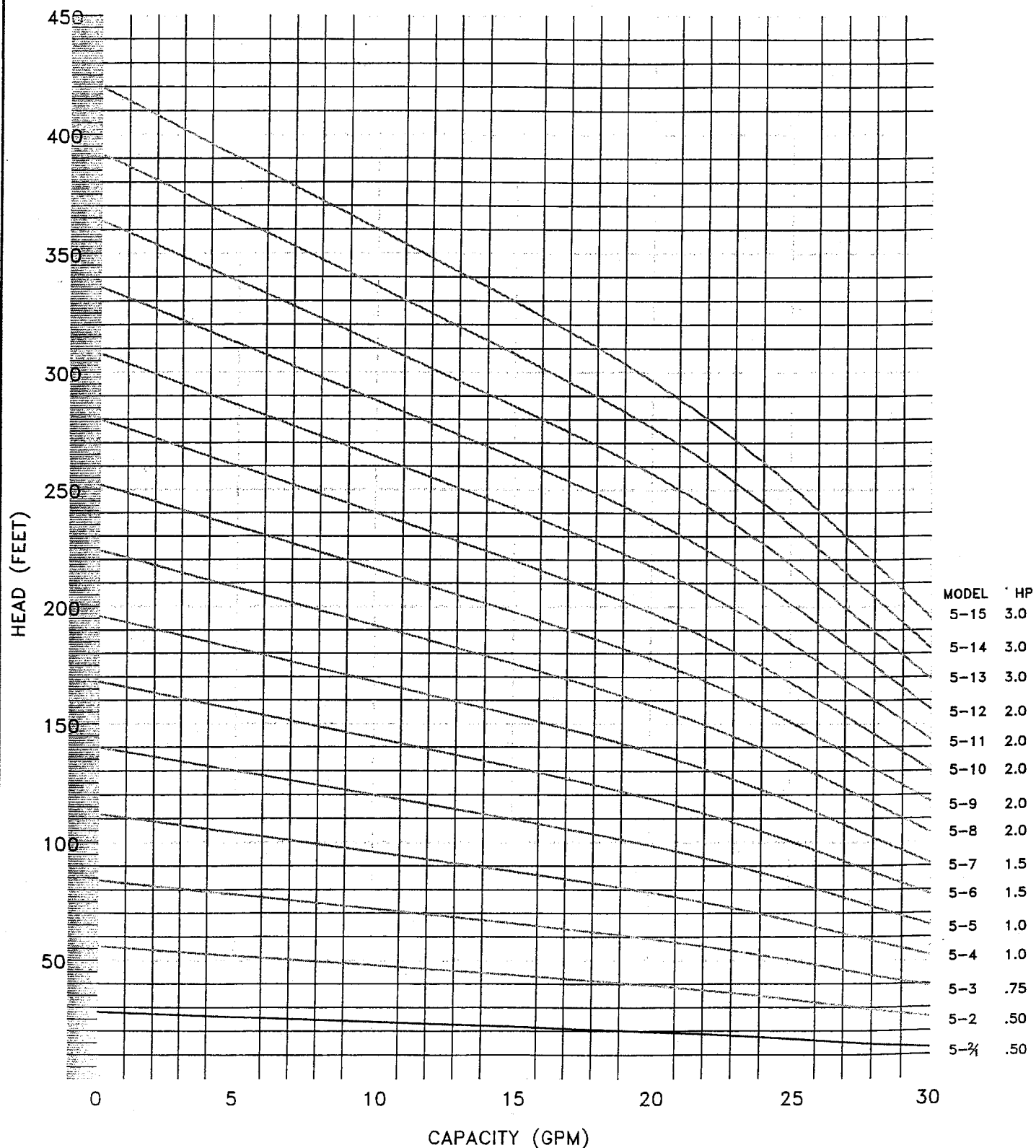
- |        |   |
|--------|---|
| 1 each | WSDPT 5-2<br>SurePump patented, wheeled, stainless steel sump drainer with a 1/2 HP 460 VAC 3 phase motor. Includes a 180' jacketed motor lead 12GA, submersible level sensor with 180' lead, 1.5" X 1" reducing coupling, and a 160' length of 1/8" stainless steel suspension cable with clamps.          |
| 1 each | L925PT<br>PumpMaster™ control panel to operate 1ea. 1/2 HP 460 VAC 3 phase motor. Includes 1ea. LevelMaster™ level control meter, 5ea. push to test light, 1ea. lightning arrestor, 1ea. common alarm dry contact, and 1ea. top mounted high level alarm light. Enclosure is rated NEMA 4X stainless steel. |
| 1 each | BJBP 500<br>Breakout Box, NEMA 4X non-metallic enclosure, for motor lead junction with connection terminals.  |
| 1 each | BJBL 600B<br>Breakout Box, NEMA 4X non-metallic enclosure, junction box for level sensor with desiccant dryer, bellows, and connection terminals  |
| 1 each | Discharge Hose<br>1" Discharge Hose Length 180', Polypropylene Cam & Groove Fittings, and Stainless Steel Hose Clamps.  |
| 1 each | NW1SS<br>Disconnect, 1" Stainless Steel Adapter.  |
| 1 each | 4415<br>Anti siphon valve.  |



## SERIES 5 SurePump™

Flow Range 15–30 GPM

60 Hz



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE



## Materials of Construction

### EPG SurePump™

	STANDARD
Check Valve Housing	304 Stainless Steel
Check Valve	304 Stainless Steel
Check Valve Seat	E-Glide™
Diffuser Chamber	304 Stainless Steel
Impeller Seal Ring	E-Glide™
Impeller	304 Stainless Steel
Motor Adapter	304 Stainless Steel
Inlet Screen	304 Stainless Steel
Pump Shaft	304 Stainless Steel
Coupling	329/420/431 Stainless Steel
Fasteners	304 Stainless Steel
Bearings	E-Glide™

### FRANKLIN ELECTRIC MOTORS

	1/3 to 2 HORSEPOWER POLLUTION RECOVERY	3 to 10 HORSEPOWER NI-RESIST
End Bell Castings	304 Stainless Steel over Iron	Ni-Resist Type 1B
Stator Shell	301 Stainless Steel	316 Stainless Steel
Shaft Extension	303 Stainless Steel	17-4 Stainless Steel
Fasteners	316 Stainless Steel	316 Stainless Steel
Seal Cover	Tefzel	316 Stainless Steel
Shaft Seal	Viton	Viton, Carbon, Ceramic Face Seal
Diaphragm	Viton	Type 200 Hydrin
Diaphragm Plate	304 Stainless Steel	304 Stainless Steel
Diaphragm Spring	302 Stainless Steel	302 Stainless Steel
Diaphragm Cover	316 Stainless Steel	316 Stainless Steel
Slinger	Viton	Nitrile Rubber
Lead Sleeve	316 Stainless Steel	316 Stainless Steel
Lead Jam Nut	316 Stainless Steel	316 Stainless Steel
Lead Potting	Epoxy	Epoxy
Lead Bushing	Viton	Viton

## EPG Sump Drainer Vent Tube / Check Valve

## INSTALLATION INSTRUCTIONS

EPG's patented sump drainer\* enables a submersible pump to pump down and restart in applications that would normally cause the pump to air lock.

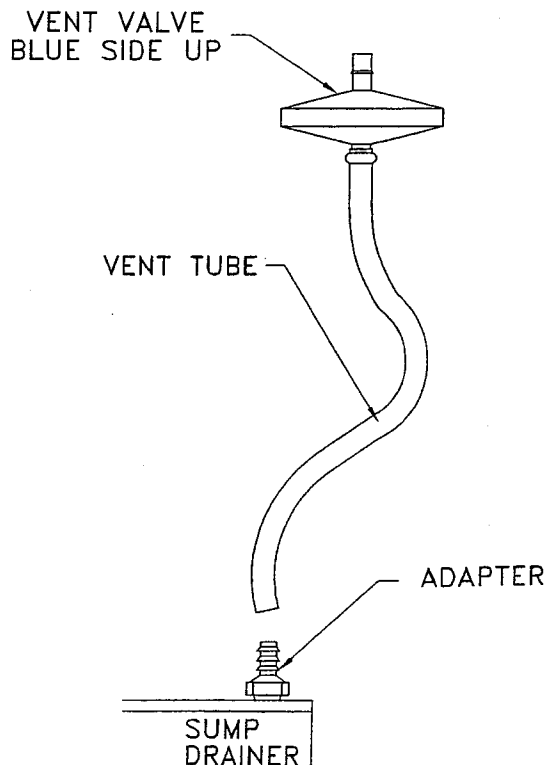
Critical to the operation of the sump drainer is the installation of the vent tube and air check valve. The vent tube / check valve assembly has two functions. First, as the sump drainer fills with fluid the vent tube assembly allows air trapped inside of the sump drainer to escape, allowing the sump drainer to completely fill with fluid. When the sump drainer pump starts the vent assembly then closes, allowing the pump to draw liquid through the screen at the opposite end of the sump drainer. The closed check valve enables the pump to continue pumping even though the fluid level in the sump is below the normal intake of the pump.

The vent tube may be tied off to the pump discharge line. The vent check valve will operate correctly even if submerged.

### INSTALLATION

Refer to Figure 1 for help in completing this procedure.

1. Slip the free end of the plastic vent tube onto the adapter on the top of the sump drainer.
2. Verify the open end of the check valve is labeled "VAC".
3. As you lower the sump drainer into the sump, uncoil the vent tube and fasten it to the discharge pipe. We recommend you keep the check valve above the fluid level. The check valve will work if it is submerged, but can foul with particles in the fluid.



\* U.S. Patent #4,966,534 and 4,992,030

Figure 1. Vent Tube / Check Valve Assembly

## **EPG SurePump™ with LevelMaster™ Level Sensor Disassembly / Assembly**

## **OPERATION & MAINTENANCE INSTRUCTIONS**

**NOTE:** Refer to Table B for list of tools needed for disassembly, assembly, and testing.

1. Place the pump on a suitable work surface with blocks to prevent the pump from rolling. Remove the vent tube by pulling straight out from the top. In cold weather it is better to unscrew the vent hose barb adaptor with tube attached rather than trying to pull the tube off the hose barb.
2. Unscrew the cord restraint nuts and pull inserts out about two (2) feet along the motor lead and level sensor lead. Loosen the insert from the wires so they are free to move through the cord restraint.
3. Mark the alignment of the tube and top (check for factory alignment marks). Center punch new marks in top and tube if factory marks can not be found. The alignment marks will make reassembly easier.
4. Remove the three (3) cap screws that secure the tube to the top and carefully pull the top, with pump and motor attached, out of the tube. Do not hammer, pry, or pound on tube or top. Allow the sensor lead wire to slide through the cord restraint.
5. Remove the three (3) socket head setscrews from the level sensor housing on the bottom of the tube. Carefully pull the level sensor up and out from the bottom of the tube. Carefully remove the sensor lead wire by pulling the controller end back through the top. Cover the end of the sensor lead wire with tape to prevent moisture and dirt from entering. If the sensor is unused or put into storage, remove the dryer from the controller and install on end of vent tube during storage period.
6. Remove the nuts (4) that secure the motor to the pump and pull the motor from the pump. Do not remove the motor lead from the motor unless it will be replaced with a new lead. It is recommended that a new motor lead be used whenever the old lead is removed from the motor because of possible damage to the lead or distortion of the rubber seal that may prevent resealing.
7. Unscrew the motor lead nut from the motor. Work the lead back and forth to loosen seal and unplug the lead from the motor connector. Remove the lead by pulling the controller end back through the top.
8. Unscrew the pump assembly from the top using cloth strap wrenches to prevent damage to the metal surfaces.

### **CAUTION**

Do not attempt to disassemble level sensor or pump motor. Any disassembly will void the warranty.

## ASSEMBLY

1. Apply pipe sealing compound to the top threads and screw the pump to the top. To prevent damage to the top sealing surface or the pump bowls, tighten pump to top using cloth strap wrenches.
2. Slide motor and pump together and align motor shaft splines to pump splines by turning the motor shaft. Align the motor lead connector with the cutaway in the pump flange. Secure motor to pump with four (4) nuts.
3. Slide the long end of the motor lead through the cord restraint cap and nut in the top. Insert plug into the motor connector. Tighten motor lead connector nut to secure lead to motor.
4. Inspect upper and inside surface of tube and remove any sharp edges or burrs. Wipe surface of tube and top to remove any dirt, sand, or metal filings. Remove the O-ring and clean sealing groove in the top. If original O-ring installation used a spacer / shim between the top and O-ring, clean the shim and reinstall into the sealing groove in the top.
5. Carefully slide level sensor lead wire through the top cord restraint and nut.

### **CAUTION**

Use care while handling the level sensor lead wire to prevent damage to the conductors and center vent tube.

6. Slide the level sensor and center it within the sensor housing at the bottom of the tube. Secure it with the three (3) socket head setscrews. To prevent damage to the sensor case, do not over tighten the setscrews.
7. Position the tube vertically and carefully slide the pump and motor assembly into the tube. Guide the assembly past the sensor lead wire to prevent crushing or cutting the lead wire. Remove slack from the sensor lead wire by pulling the lead wire out through the top.
8. Install a new top O-ring and liberally apply white petroleum jelly (Vaseline or equivalent) to the O-ring and cover sealing surfaces. Align the screw holes in the top with the holes in the tube and carefully slide the top into the tube making sure that the O-ring is not damaged.
9. Remove the slack from the motor lead and sensor lead wire. Secure the top to the tube with three (3) cap screws. Tighten cap screws until sealing grease starts to bead out from the top-to-tube joint. Do not over tighten.
10. Secure motor lead and sensor lead wire with the cord restraint nuts. Tighten the nut until the edge of the insert can be seen on the inside edge. Install vent hose.

## SEAL TEST PROCEDURE

**NOTE:** Refer to Figure 2.

1. Install mechanical plug into the discharge pipe connection located in pump top. Tighten to recommended specifications. Refer to Table A.
2. Connect gage tubing to vent fitting.
3. Connect magnehelic gage to gage tubing.
4. Fill five gallon pail with water to the rim.
5. Place pump assembly, as depicted on Figure 2, in the filled five gallon pail.
6. Observe the magnehelic gage. The pressure should read about 5" W.C. and hold steady.
  - a. If the pressure holds steady, the pump is ready to be installed. Remove the gauge tubing and the mechanical plug.
  - b. If the gauge pressure does not hold steady, there is an air leak in the top assembly.
    - b.1. Remove the pump assembly from the five gallon pail and refill the pail with water.
    - b.2. Mix a solution of soap and water in a hand pump spray application bottle and spray the top assembly.
    - b.3. Place the pump assembly in the five gallon pail and observe the top assembly for bubbles to determine point of the seal leak.
    - b.4. Make necessary adjustments to the pump assembly and repeat items b.1. through b.3. until the leak has been corrected and the gauge pressure holds steady.

## INSTALLATION

1. Remove the gage tubing and the mechanical plug and install the vent tube with vent valve.
2. Run the level sensor lead wire to the PumpMaster™ control panel or breakout box and connect the sensor RED wire to the (-) terminal and BLACK wire to the (+) terminal. Connect the level sensor vent tube to the dryer and check for kinks and crushed areas in the tube connection area. The vent tube must be open to allow atmospheric pressure change compensation in the sensor.
3. Repeat bucket test to verify level sensor operation.
4. Install pump into place.
5. Check the level sensor readings before running pump. The LevelMaster meter should indicate the proper depth of the sensor when immersed in liquid. If the meter shows -34.7 the lead wires connections are reversed, not connected or damaged. Be certain to check correct voltages at the controller and measure the resistance of the motor lead and motor to assure proper wiring.

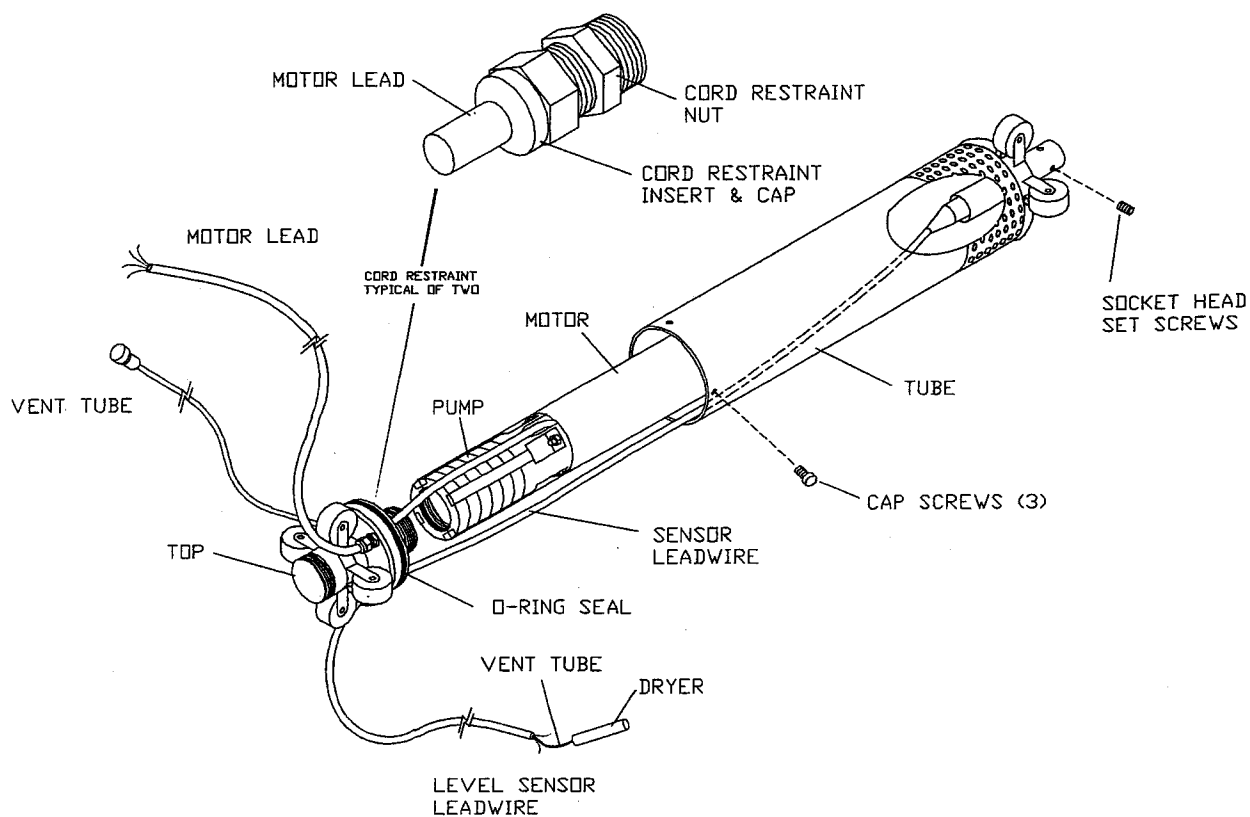
**Table A****MECHANICAL PLUG SPECIFICATION**

Nominal Pipe Size	Maximum Allowable Back Pressure PSIG		Tightening Torque
	Air	Water	
1"	5	110	20 in. lbs.
1.25"	5	100	30 in. lbs.
1.5"	5	70	5 ft. lbs.
2"	5	40	10 ft. lbs.
3"	5	30	12 ft. lbs.

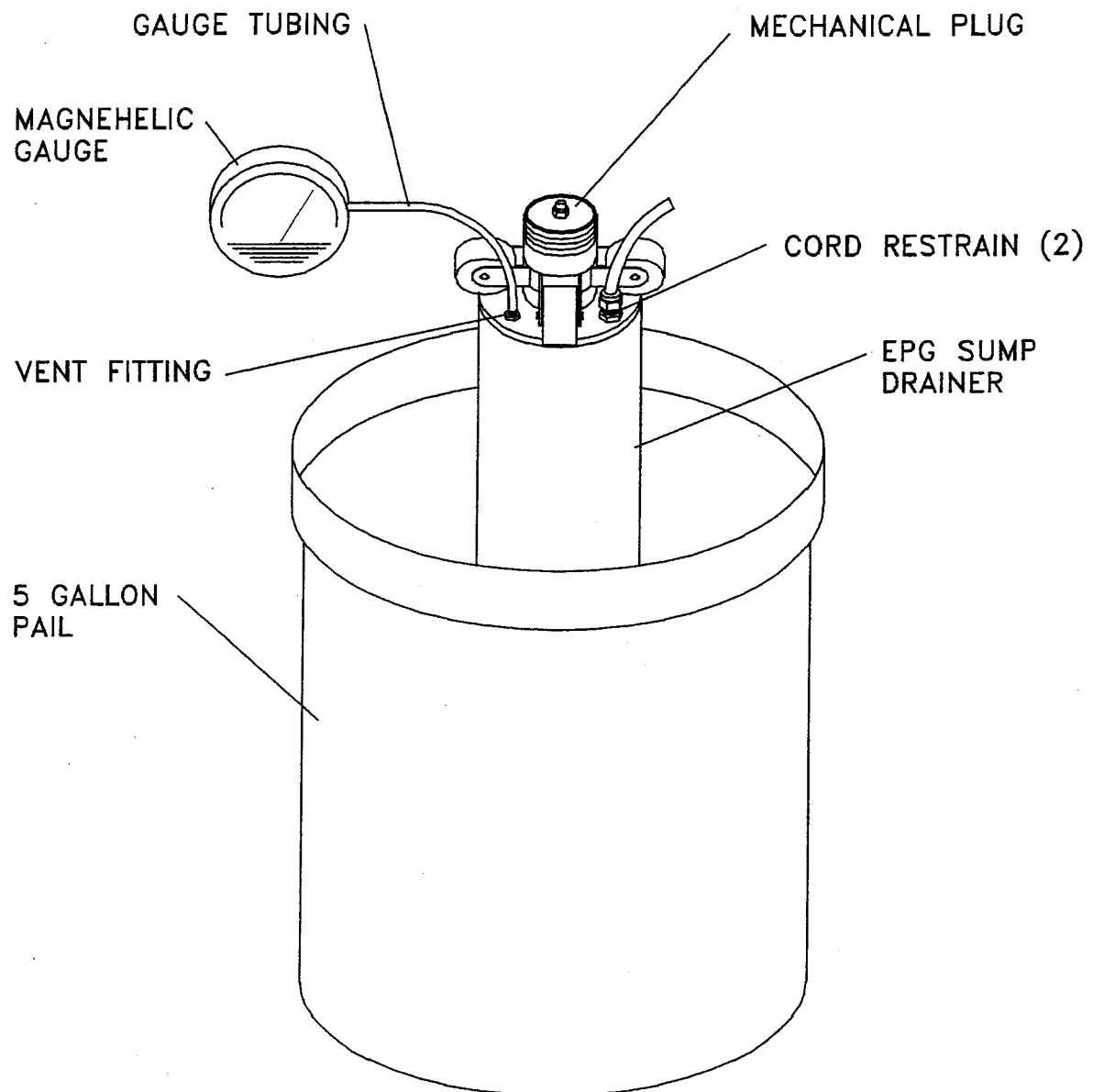
**Table B****TOOLS AND ITEMS REQUIRED FOR  
MAINTENANCE OF EPG SUREPUMP**

- \* 0-32 Screw with 5/16" hex head
- \* 5/16" Nut driver
- \* 10-32 x 5/16" long stainless steel set screw
- \* 3/32" Allen wrench
- \* .0005" Shim stock (blue)
- \* O-ring set 4, 5, and 6
- \* White petroleum jelly (Vaseline)
- \* Anti-seize compound
- \* Small channel lock pliers
- \* Magnehelic gage (Model 2010)
- \* Scissors to cut shim stock
- \* Flat blade screwdriver
- \* 1/2" Open end wrench
- \* 24" of 1/4" OD nylon tubing
- \* Mechanical plug set -- 1", 1.25", 1.5", 2", and 3"
- \* Torque wrench

Figure 1



**Figure 2**





## EPG SurePump™ with LevelMaster™ Level Sensor

## REPLACEMENT INSTRUCTIONS FOR LEVEL SENSOR IN WHEELED SUMP DRAINER

1. Use a 15/16 open end wrench to loosen and then remove the cord restraint nut (2).
2. Slide the cord restraint nut (2) and the grommet (3) off of the level sensor cable (1).
3. Use a 3/32" hex key to loosen the three set screws (4) from the locking collar.
4. Tie a string to the top end of the level sensor cable (1) and use electrician's tape to secure the string. Remove desiccant dryer from vent tube and close vent tube with tape.
5. Push several inches of the level sensor cable (1) into the sump drainer. Pull the level sensor holder (8) and the level sensor (6) out of the locking collar (5).
6. Pull the level sensor cable (1) through the sump drainer to a point where the electrician's tape can be removed.

**CAUTION:** Do not pull the string through the sump drainer, it will be used to assist installation of the new level sensor.

7. Use the 3/32" hex key to loosen the four set screws (7) in the level sensor holder (8) and remove the level sensor.
8. Remove the string from the level sensor cable (1).
9. Remove the foam protective cover from the new level sensor.

10. Remove the desiccant dryer tube (9) and seal the vent tube with electrician's tape.

**CAUTION:** The vent tube must have a dessicant dryer installed at all times or be sealed with electrician's tape. It is very important not to allow any dirt or moisture to enter the vent tube.

11. Place the new level sensor (6) in the level sensor holder (8). Secure the four set screws with the 3/32 hex key and torque to a maximum of seven-inch pounds.

**CAUTION:** Do not over tighten the set screws. Over tightening can damage the level sensor. Seven-inch pounds torque will secure the level sensor (6) in place.

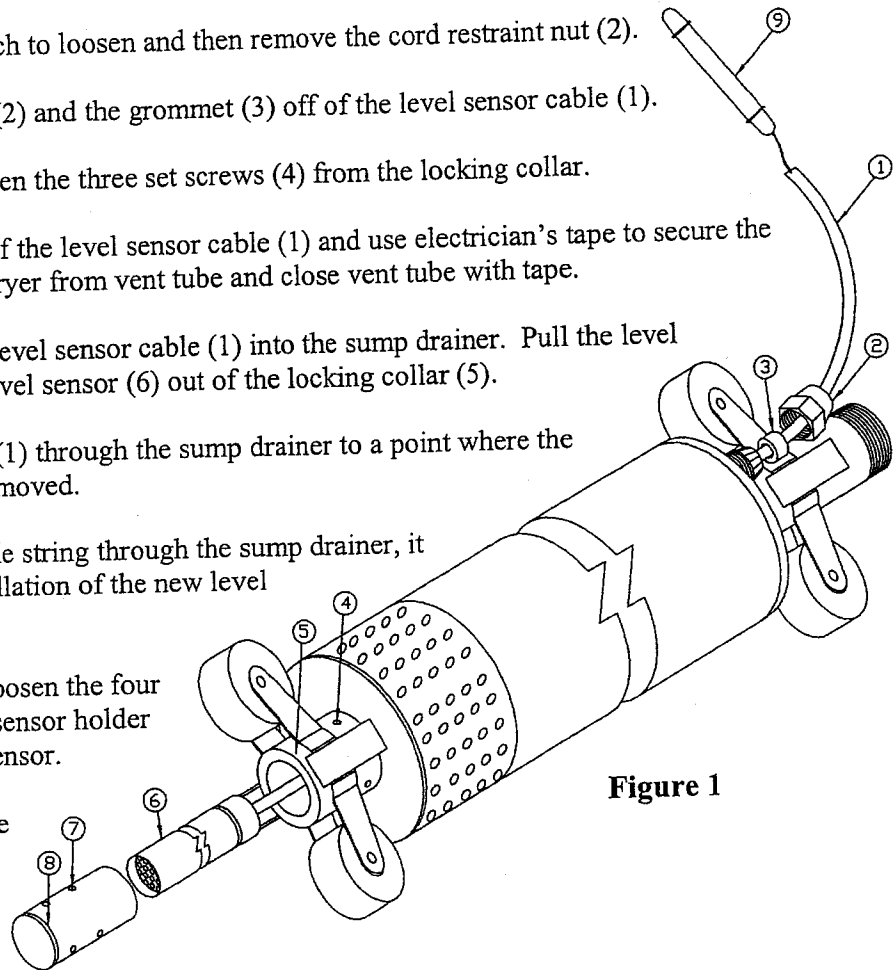


Figure 1

12. Tie the string to the new level sensor cable end (1) and use electrician's tape to secure the string.
13. At the sump drainer's discharge end, pull the string and level sensor cable (1) through the sump drainer until the level sensor holder (8) is seated in the locking collar (5).

**CAUTION:** Do not pull the cable tight. Allow two to three inches of slack in the sump drainer.

14. Insure the level sensor holder (8) is securely seated in the locking collar (5) and tighten the three set screws (4). Torque to 15-inch pounds.
15. Remove the electrician's tape and string from the level sensor cable.
16. Reinstall the grommet (3) and the cord restraint nut (2). Tighten with the 15/16 open end wrench
17. Remove the tape from the vent tube and reinstall the dryer (9).

Tools/Equipment needed:

- 15/16 open end wrench
- 3/32 hex key
- String-2 or 3 feet longer than the sump drainer
- Electrician's tape
- Torque wrench with inch pound scale

## **TEST EQUIPMENT**

To insure proper installation, EPG recommends the following instruments. When working with electrical circuits, use caution to avoid electrical shock.

**Megohmmeter:** To measure insulation value of motor and motor leads to ground. The higher the reading, the better.

**Ohmmeter:** (Must be able to read less than 1 ohm) To measure resistance winding to winding in motor, check quality of any connections made in motor circuit to test coils of relays and continuity of circuits.

**Volt Meter:** To verify correct supply voltage and measure system requirements when running.

**Clamp on Amp Meter:** To measure current draw in system.

## TROUBLESHOOTING GUIDE

FAULT	POSSIBLE CAUSE	HOW TO CHECK	HOW TO CORRECT
Pump or blower does not run.	No electricity at controller.	Check for voltage at controller.	If no voltage at controller, check for cause. Contact power company if voltage is incorrect.
	Fuses are blown or circuit breakers are tripped.	Check fuses for correct size and check for loose, dirty, or corroded connections in fuse receptacle, terminal strip and at splice points.	Replace with proper fuse or reset circuit breaker. If new fuses blow or circuit breaker trips, the electrical installation, motor and leads must be checked.
	Motor starter overloads have tripped out.	Check for voltage on line and load side of starter. Check megohm value of motor and lead.	Reset heaters or replace. Inspect starter for other damage. If heater trips again, check the supply voltage. Replace motor or lead as needed.
	Motor and/or cable are defective.	Turn off voltage, disconnect drop leads from controller to the motor. Measure the lead-to-lead resistances with ohmmeter (RX-1). Measure lead-to-ground values with megohm meter. Record measured values.	If open winding or ground is found, remove pump and recheck values at the surface. Repair or replace motor or cable.

FAULT	POSSIBLE CAUSE	HOW TO CHECK	HOW TO CORRECT
	Starter does not energize.	Energize control circuit and check for voltage at the holding coil.	If no voltage, check control circuit. If voltage, check holding coil for shorts. Replace bad coil.
	Defective controls.	Check all sensors and safety switches for operation. Inspect contact in control devices.	Replace worn or defective parts.
	Defective capacitor. (Single phase only.)	Turn off voltage, discharge capacitor. Check with megohm meter. Record measured values.	Replace if defective.
<b>Pump runs but does not deliver liquid.</b>	Liquid level in sump is too low or sump infiltration rate is reduced or intranded gas.	Check sump draw down.	See pump data sheet for minimum submergence values.
	Vent valve not installed or improperly installed.	Make sure valve is attached to the to of the sump drainer and that it is not installed backward.	Replace valve if missing. Reverse valve if installed upside down.
	Inlet strainer is clogged.	Install pressure gauge, start pump, gradually close the discharge valve and read pressure at shutoff.	Remove pump and inspect for blockage. Clean screen as needed. Inspect check valve for blockage. Rinse out pump and reinstall.

FAULT	POSSIBLE CAUSE	HOW TO CHECK	HOW TO CORRECT
	Pump is defective or worn.	Same as description above.	Convert PSI to feet ( $\text{PSI} \times 2.31 \text{ ft/PSI} = \text{___ ft.}$ ), add elevation from pressure gauge to liquid level to the converted pressure reading. Refer to specific pump curve for shutoff head for that pump model. If calculated value is close to curve, pump is probably OK. If not, remove pump & inspect.
Pump runs continuously.	Leak in system.	Check system for leaks.	Replace damaged pipes or repair leaks.
	Worn pump.	Install pressure gauge, start pump, gradually close the discharge valve and read pressure at shut-off.	Pull pump and inspect. Replace worn impellers, bearings or other close fitting parts.
	Loose or broken motor shaft.	Little or no liquid will be delivered if the pump/motor coupling is loose or if the motor shaft has sheared off.	Check for damaged shafts if coupling is loose and replace worn or defective units.
	Pump intake or impellers blocked.	Restricted flow may indicate a clogged intake screen or partially blocked impellers. Pump may be installed in mud or sand.	Clean screen and reset pump. It may be necessary to clean impellers.

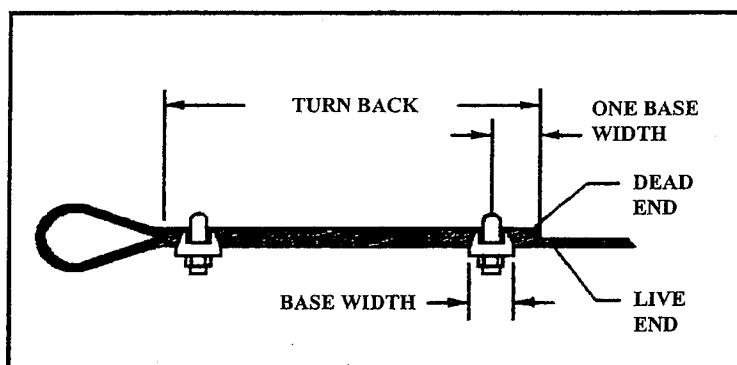
FAULT	POSSIBLE CAUSE	HOW TO CHECK	HOW TO CORRECT
<b>Pump runs but at reduced capacity.</b>	Wrong rotation.	Check for proper electrical connection in control box.	Correct wiring and change leads as required.
	Leak in system.	Check system for leaks.	Replace damaged pipes or repair leaks.
	Pump strainer or check valve is clogged.	Remove pump and inspect.	Clean, repair, rinse out and re-install pump. It may be necessary to take pump apart and clean impellers. Check discharge line for any obstructions.

## Wire Cable Clamp

## INSTALLATION INSTRUCTIONS

### Recommended Method of Applying Clamps to get Maximum Holding Power

1. *Turn back* the specified amount of cable from the loop. Apply the first clamp one base width from the dead end of the wire cable (U-bolt over dead end - live end rests in clamp saddle). Tighten nuts evenly to recommended torque.
2. *Apply the next clamp* as near the loop as possible. Turn on nuts firm, take up rope slack, and tighten nuts evenly to recommended torque.
3. Do not use clamps on plastic coated wire rope.
4. Never use clamps to connect two straight lengths of wire rope.



### Attaching Clamps

A termination made in accordance with instruction and using the number of clamps shown has an approximate 80% efficiency rating. This rating is based upon the catalog breaking strength of wire rope.

### Number of Clamps Recommended

Clamp Size Inches	Minimum No. of Clamps	Amount of Cable to Turn Back in Inches	Breaking Strength FT/LBS	Clamp Torque FT/LBS	Cable Strength with Clamps FT/LBS
1/8	2	3 1/4	1,760	4.5	1400
3/16	2	3 3/4	3,700	7.5	2960
1/4	2	4 3/4	6,400	15	5120



## STORAGE INFORMATION

### SUREPUMP™

1. The ideal storage condition for SurePump is in a warm dry location. Although SurePump will tolerate a light freeze, temperatures should not fall below -3°C (27°F). Repeated freezing and thawing should be avoided to prevent possible loss of motor fluid.
2. Limit storage time to less than two years if storage area temperatures exceed 100°F. Limit storage time to one year or less if storage area temperatures exceed 130°F.
3. To prevent motor seal damage and/or fluid loss, always store SurePumps vertically.

### LEVELMASTER™

1. IMPORTANT: During any short or long term storage, to prevent moisture damage to internal components, the desiccant dryer must be installed on the vent tube of the submersible level sensor signal cable. Store in a warm dry location to prevent internal condensation in the meter enclosure.
2. If the level sensor is installed in a SurePump, pump must be stored in a vertical position. Coil the sensor signal cable and place in a box or protected area to prevent damage to the signal cable. Do not stack heavy items on top of level sensor signal cable.
3. Make certain that the desiccant dryer is attached to the end of the level sensor vent tube. Inspect dryer periodically and replace if crystals are pink or white.

### PUMPMASTER™ CONTROLS

1. To prevent condensation/moisture damage within the control cabinet, store the PumpMaster in a warm dry location.
2. Check that the corrosion inhibitor cartridge is installed in the interior of the cabinet. If the PumpMaster control will be stored for over six months, contact EPG Companies Inc. for additional corrosion inhibitor cartridges

#### NOTE

The non-volatile memory of level and flow meters may deteriorate if left without power for periods greater than one year. If storage times are expected to exceed one year contact EPG Companies Inc. for special precautions.

## SurePump™ Installation Record

EPG Job No. \_\_\_\_\_

Installer's Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Zip \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

Contact name \_\_\_\_\_

Owner's Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Zip \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

Contact name \_\_\_\_\_

Sump Name/ ID \_\_\_\_\_ Date Installed \_\_\_\_\_

Leachate or Condinsate Temp \_\_\_\_\_ °F Or °C

### Pump:

Model No. \_\_\_\_\_

Rating: \_\_\_\_\_ GPM@ \_\_\_\_\_ Ft. TDH

HP \_\_\_\_\_ Voltage \_\_\_\_\_ Phase \_\_\_\_\_

Actual Pump Delivery \_\_\_\_\_ GPM@ \_\_\_\_\_ PSI

Operating Cycle \_\_\_\_\_ ON (Min/Hr) \_\_\_\_\_ OFF (Min/Hr)

(Circle Min. or Hr. as appropriate)

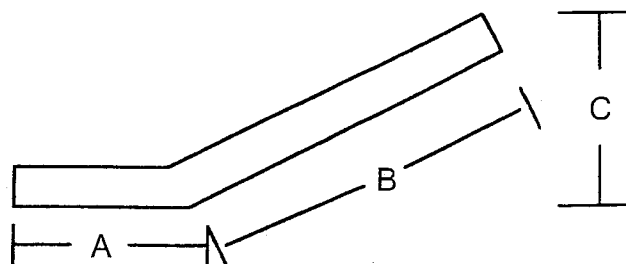
### Side Slope Riser Information:

Slope \_\_\_\_\_ :1

Length of riser Pipe (A+B) \_\_\_\_\_ ft.

Vertical Distance = Sump to  
Top of Riser Pipe (C) \_\_\_\_\_ ft.

Riser ID \_\_\_\_\_ SDR \_\_\_\_\_

Distance From Top of Riser  
Pipe to Controller \_\_\_\_\_ ft.

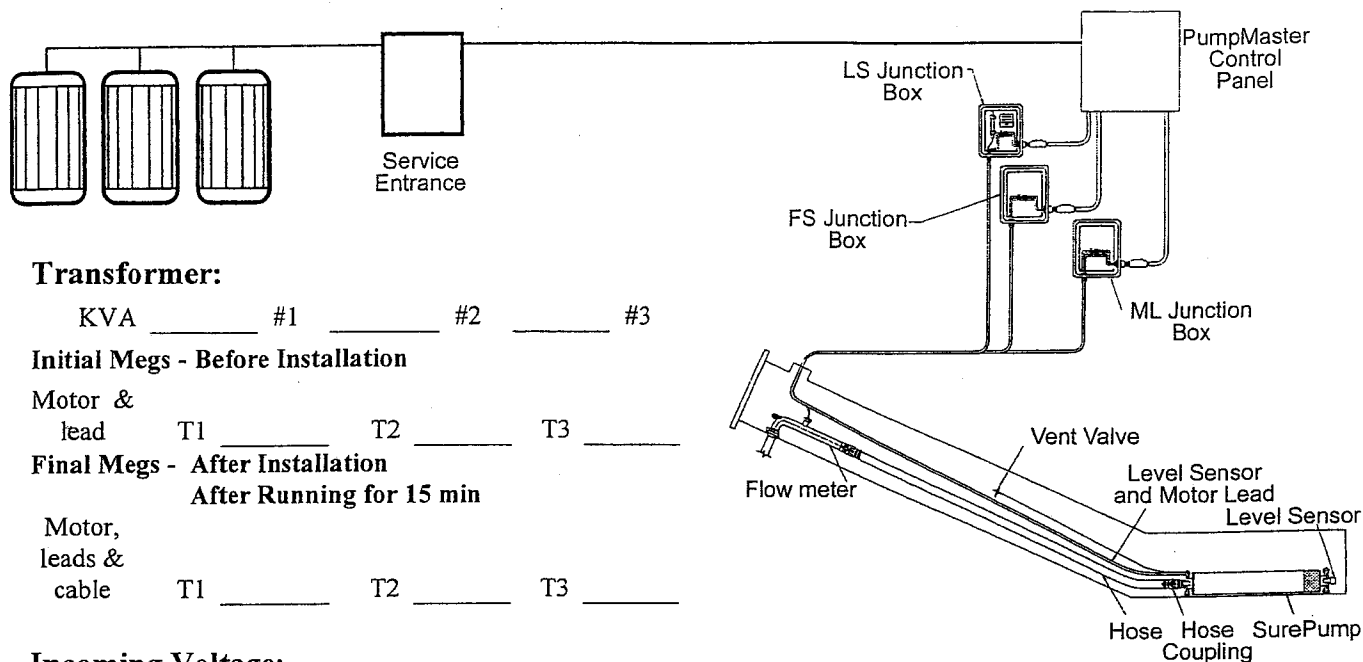
### Power supply:

Cable: Service Entrance to Control Distance \_\_\_\_\_ ft Wire Size \_\_\_\_\_ AWG/MCM

Copper \_\_\_\_\_ Jacketed \_\_\_\_\_ Aluminum \_\_\_\_\_ Individual conductors \_\_\_\_\_

Cable: Control to Motor \_\_\_\_\_ ft \_\_\_\_\_ AWG/MCM

Copper \_\_\_\_\_ Jacketed \_\_\_\_\_



## Transformer:

KVA \_\_\_\_\_ #1 \_\_\_\_\_ #2 \_\_\_\_\_ #3

## Initial Megs - Before Installation

Motor & lead T1 \_\_\_\_\_ T2 \_\_\_\_\_ T3 \_\_\_\_\_

## Final Megs - After Installation After Running for 15 min

Motor, leads & cable T1 \_\_\_\_\_ T2 \_\_\_\_\_ T3 \_\_\_\_\_

## Incoming Voltage:

No Load L1-L2 \_\_\_\_\_ L2-L3 \_\_\_\_\_ L1-L3 \_\_\_\_\_

Full Load L1-L2 \_\_\_\_\_ L2-L3 \_\_\_\_\_ L1-L3 \_\_\_\_\_

## Running Amps:

### Hookup:1

Full Load L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_ % unbalanced \_\_\_\_\_

### Hookup:2

Full Load L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_ % unbalanced \_\_\_\_\_

### Hookup:3

Full Load L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_ % unbalanced \_\_\_\_\_

Ground wire size \_\_\_\_\_ AWG/MCM

DC Ground Current \_\_\_\_\_ mA Ground Test \_\_\_\_\_ Ohms

Motor Surge Protection \_\_\_\_\_ Yes \_\_\_\_\_ No

## Control Panel:

Model # \_\_\_\_\_

### Short Circuit Device

Circuit Breaker \_\_\_\_\_ Rating \_\_\_\_\_ Setting \_\_\_\_\_

Fuses \_\_\_\_\_ Type \_\_\_\_\_ Rating \_\_\_\_\_

\_\_\_\_\_ Standard \_\_\_\_\_ Time Delay \_\_\_\_\_

### Start Overloads:

Set at \_\_\_\_\_ amps

### Controls are Grounded to:

\_\_\_\_\_ Motor

\_\_\_\_\_ Rod

\_\_\_\_\_ Power Supply

Company \_\_\_\_\_

Date \_\_\_\_\_

## **ENGINEER'S SPECIFICATION**

## **EPG WSDPT SurePump™ Wheeled Sump Drainer** for side slope riser installations with built-in level sensor

Furnish and install 1 centrifugal submersible EPG WSDPT SurePump Wheeled Sump Drainer(s) (U.S. patented), Model WSDPT 5 - 2 with 2 impeller stages. Each unit shall be suitable for side slope riser installation. Each unit shall come with a 1/2 HP, submersible electric motor for operation on 460 Volts, 3 phase, 60 Hertz service with 180 feet of power cable. Each SurePump Wheeled Sump Drainer shall have a 1 inch MNPT threaded discharge nozzle and be capable of delivering 25 GPM at 34 feet of TDH. Each SurePump will be fitted with 160 feet of stainless steel lifting cable of sufficient strength to permit removal of the unit.

### **DESIGN**

Each SurePump Wheeled Sump Drainer shall be capable of pumping contaminated ground water for spill recovery, leachate, condensate, and purge applications. A removable transmitter mount (patent pending) shall be installed at the center bottom of the Sump Drainer for liquid level control. The Sump Drainer shall permit the unit to "pump down" to within 8 inches of the sump bottom without any loss of performance or damage to the pump. External "priming" shall not be required nor allowed. The Sump Drainer shall be equipped with a vent valve to assist with the evacuation of air from the Sump Drainer.

### **MATERIALS**

Major components shall be made of 304 stainless steel, seal rings are to be made of E-Glide™, and bearings are to be E-Glide. In addition, all fasteners shall be 304 stainless steel.

### **CHECK VALVE**

Each unit shall include a built-in check valve with non-metallic seat, and housing and disc of 304 stainless steel.

### **SHAFT**

The shaft shall be of 304 stainless steel and rotate on E-Glide bearings that are fluid lubricated.

### **DIFFUSER CHAMBER**

The diffuser chambers for each impeller shall be 304 stainless steel and fitted with E-Glide impeller seal rings.

### **IMPELLERS**

The impeller(s) shall be closed and consist of 304 stainless steel.

### **MOTOR**

The motor shall be a submersible, hermetically sealed Franklin motor in Pollution Recovery construction. The motor shall be designed for continuous duty, capable of sustaining up to 100 starts per day. The motor shall be connected to the pump via a motor adaptor and coupling in 304 stainless steel. Single phase motors in 1/2 HP to 1 HP only shall have thermal protection in the motor windings to protect the windings from overload. The unit will restart automatically after the motor cools down. Larger horsepower single phase motors and three phase motors shall have thermal protection located in the control panel that is manually reset.

### **MOTOR LEAD WIRE**

The lead wire shall be no-splice with EPG's "CP" waterproof and chemically resistant jacket over 600 Volt insulation and be of the length specified.

## ENGINEER'S SPECIFICATION

## EPG Series L925PT PumpMaster™ Controller 3Ø CONTROL PANEL

Furnish one EPG Companies Inc., UL listed 508A/698A, Series L925PT controller to operate pump motor and auxiliary equipment in manual or automatic mode. The control panel enclosure shall be NEMA type 4x – stainless steel.

The enclosure shall be equipped with a window in the outer door, an inner door, a stainless steel drip shield, and a tamper resistant latch. The NEMA 4 (standard) enclosure is finished with polyester urethane paint. The NEMA 4X (optional) enclosure can be either stainless steel or non-metallic.

The control system will operate from a 460 Volt, 60 Hertz, three phase power supply. Pump control components will be sized to operate pump motor of specified horsepower.

The control panel shall include the following as standard features:

- \* Main Disconnect Switch: The main disconnect switch shall be 40 Amp rated and will prevent opening of the control panel while power is on, and includes 460 Volt, 2 Amp dual element fuses.
- \* "Hand-Off-Auto" Selector Switch: Allows manual or automatic operation of the pump motor. The selector switch shall be a heavy duty, oil tight, NEMA 4 rated switch mounted on the inner door. The hand position shall be momentary with a spring return.
- \* Motor Starter: The motor starter shall be sized to the pump motor horsepower, and shall be equipped with built in single phasing protection and ambient compensated, quick trip adjustable thermal overloads.
- \* Control Transformer: A transformer with fused primary and secondary shall isolate the control circuit from the power circuit and provide easier and safer field wiring of accessories. It shall lower incoming voltage to 120 Volts.
- \* Run Light: Indicates energization of motor circuit. It shall be heavy duty, oil tight, NEMA 4 rated and shall have a voltage surge suppressor built in to prolong lamp life. The light shall be mounted on the inner door and will be green in color.
- \* Motor Overload Light: Indicates motor not running due to overload condition. It shall be heavy duty, oil tight, NEMA 4 rated and shall have a voltage surge suppressor built in to prolong lamp life. The light shall be mounted on the inner door and will be red in color.
- \* LevelMaster™ Level Control: The LevelMaster level control meter shall be mounted on the inner door. The meter shall have a digital readout and the capability to monitor and maintain liquid levels as well as output a high level alarm. It shall also provide a high-high level alarm fail safe feature that shuts off the pump motor. The high-high alarm may indicate level sensor failure or a problem with the pump. Level control shall be accurate to within 0.1 inch.
- \* Level Simulator: The level simulator shall be mounted on the inner door. The level simulator is a built-in test circuit designed to simulate a 4-20 mA load to assist in level meter setup and troubleshooting.
- \* Intrinsically Safe Barrier: The level sensor circuit shall be by protected by an intrinsically safe barrier.
- \* Heater with Adjustable Thermostat: A heater with adjustable thermostat shall promote even distribution of heat and elimination of hot spots and condensation. It shall also maintain the minimum temperature required for the operation of the LevelMaster level control meter. The heater element shall be mounted in space between the sub-panel and the back of the enclosure and provide a minimum of 100 inches square of heating area.
- \* Lightning Arrestor: Shall be grounded, metal-to-metal, to water strata. When properly grounded, the lightning

arrestor will protect electrical equipment against lightning induced surges.

- \* Terminal Strip: Labeled and numbered terminal strip provides easy connection of external components.
- \* Corrosion Inhibitor Emitter: Inclusion of an industrial corrosion inhibitor emitter shall protect internal components of control panel from corrosion for up to one year and shall be replaceable.
- \* Options are available to meet specific needs.

## SYSTEM LOGIC AND FUNCTION

The controller is designed to start and stop a pump using the LevelMaster level control meter with a submersible pressure transmitter. The pump starts at the pump start level set point and continues to run until the liquid level decreases to the pump stop level set point as programmed in the LevelMaster level control meter. If the liquid level rises to the high level alarm set point, a high level alarm will be annunciated. If the liquid level rises to the high-high level fail-safe set point, the pump motor will shut off. The pressure transmitter level sensor shall have a range of 0 to 11.5 feet with a 4-20 mA output signal.

# ***EPG Companies Inc.***

---

## **ATTACHMENT TO BULLETIN 0060a**

### **ENGINEER'S SPECIFICATION**

**EPG L925PT Controller**

**3Ø Control Panel**

**EPG Job #03-6244**

These controllers include the following optional features:

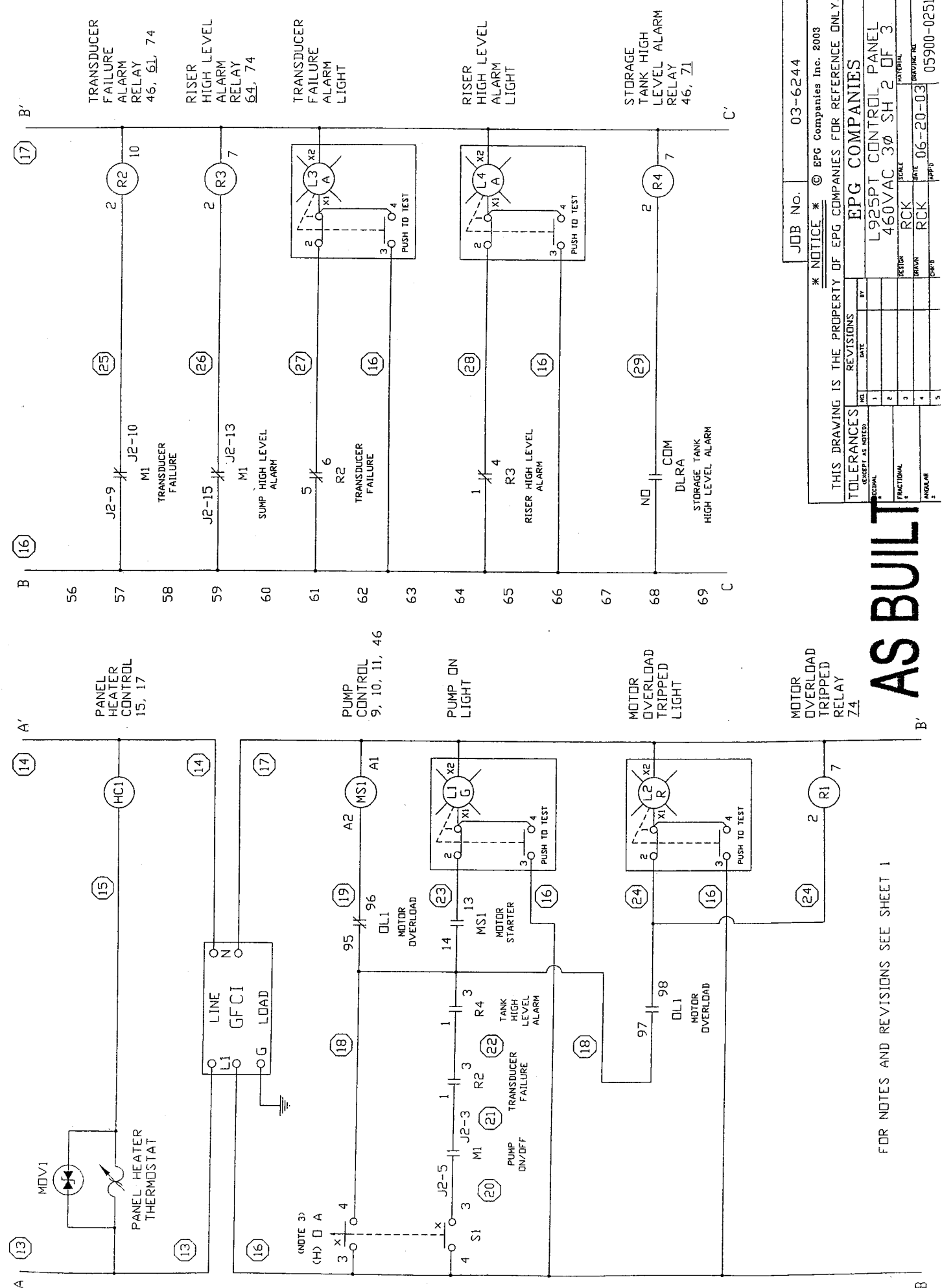
- 5ea. push to test light.
- 1ea. lightning arrestor.
- 1ea. common alarm dry contact.
- 1ea. top mounted high level alarm light.



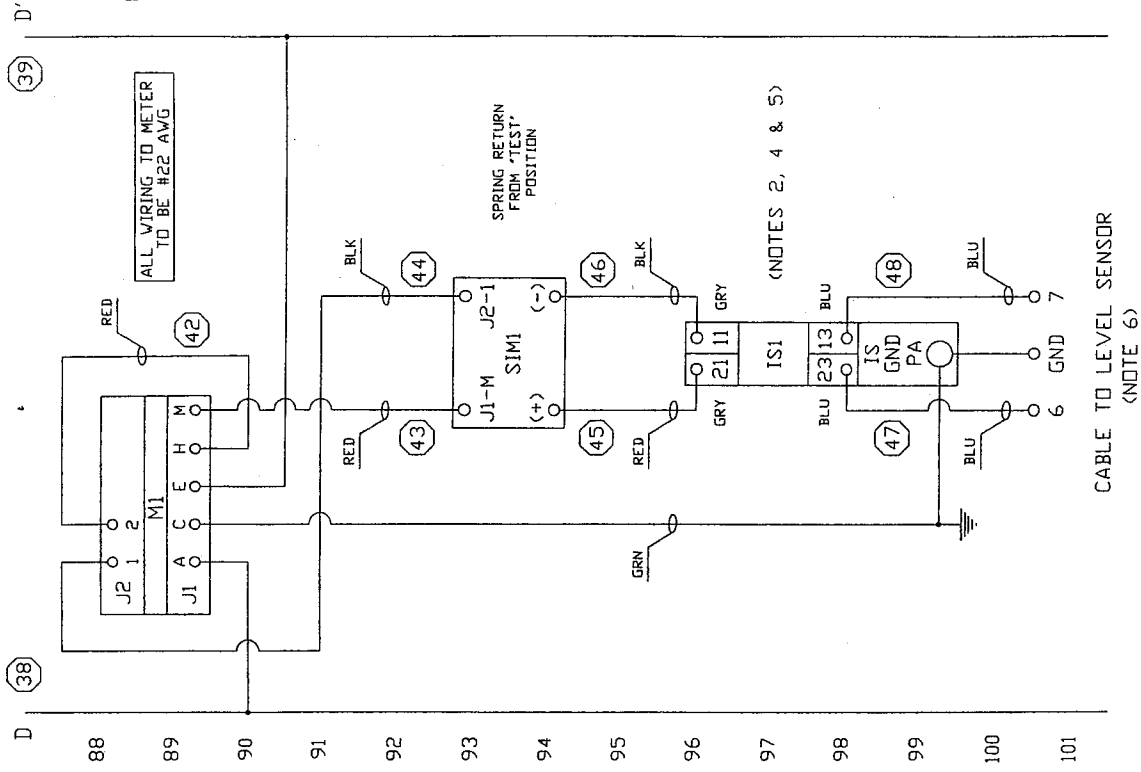
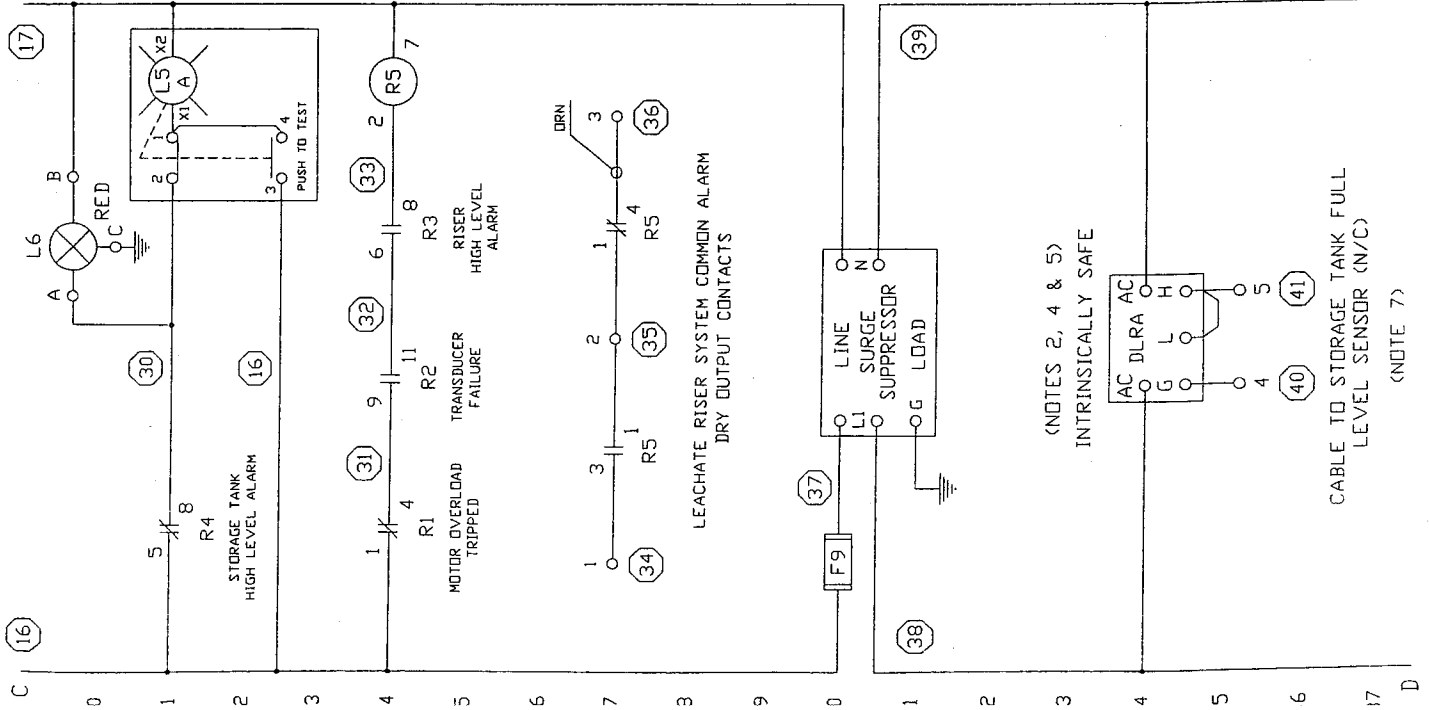


AS BUILT

FOR NOTES AND REVISIONS SEE SHEET 1



JOB No.		03-6244	
* NOTICE * © EPG Companies Inc. 2003			
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TOLERANCES		REVISIONS	
DECIMAL	EXCEPT AS NOTED	NO.	DATE
1		1	
2		2	
3		3	
4		4	
5		5	
L925PT CONTROL PANEL		EPG COMPANIES	
460VAC 3Ø SH 2 OF 3			
RCK		RCK	
DATE		DATE	
06-20-03		06-20-03	
APPROVED		APPROVED	
05900-0251			



LAST WIRE NUMBER USED: 48  
FOR NOTES AND REVISIONS  
SEE SHEET 1

**AS BUILT**

JOB No. 03-6244

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TOLERANCES		REVISIONS		DATE		BY	
FRACTIONAL	1	2	3	4	5	6	7
FRACTIONAL	1	2	3	4	5	6	7
ANGULAR	1	2	3	4	5	6	7
EPT COMPANIES		L925PT CONTROL PANEL		460VAC 3Ø SH 3 OF 3		RCK	
DATE		DATE		DATE		DATE	
06-20-03		06-20-03		06-20-03		06-20-03	
05900-0252		05900-0252		05900-0252		05900-0252	

EPG LevelMaster Pump controller

Panel S/N: 03-6244

Meter S/N: \_\_\_\_\_

**Primary Leachate Meter**

Default setting - Operating Parameters - Setup Code 35

Meter Designation(s): M1

Parameter	Value	Operation
Pr Hi	28	Turns Pump on when level on meter reads <u>28</u> ".
Pr Lo	16	Turns Pump off when level on meter reads <u>16</u> ".
AL H1	34	Turns High Level Light on when meter reads <u>34</u> ".
Hy Hi	1	Keeps High Level Light on until level drops <u>1</u> " below AL Hi.
AL H2	150	Turns Pumps off if meter reads 150" or greater. Indicates a possible sensor failure.
Hy H2	0	Not used.

Default Settings - Sensor Parameters - Setup Code 25

Parameter	Value	Operation
dp	8888.8	Sets Meter to read in 0.1"
OFFSET	-34.6	Provides a "0" reading when sensor inputs 4.0ma
SCALE	0.8656	Converts current input into inches - 1.0ma = 8.656 inches.

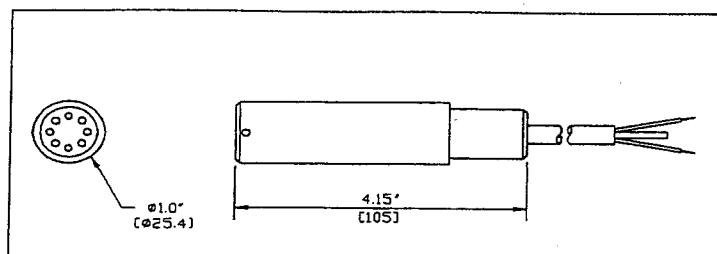
**AS BUILT**

## **CAUTION**

EPG submersible level sensors are designed for rugged use. However, care should be taken to protect these devices from over pressure and sudden impact. When lowering the level sensor into a liquid, penetrate the surface slowly and only to the depth that the unit is designed for. Do not drop or wash with high pressure since this may damage the unit.

## ENGINEER'S SPECIFICATION

## EPG LevelMaster™ Submersible Level Sensor



### GENERAL FEATURES

- \* **Application:** The LevelMaster sensor is designed specifically to work with the EPG SurePump™, but its durability, accuracy and weight make it the logical choice for stand alone level applications. The chemical resistant jacketed cable with water block contains a vent tube for atmospheric pressure compensation.
- \* **Ranges Available:** 0-13" through 0-460' models are standard. Call EPG for other ranges available.
- \* **Accuracy:** The LevelMaster sensor has built-in temperature compensation as well as precise calibration giving an accuracy of  $\pm 1.0\%$  at ambient temperature and a combined repeatability and hysteresis error of  $\pm 1.25\%$ .
- \* **Fully Submersible:** The LevelMaster sensor is fully submersible in any liquid compatible with 316 stainless steel and the chemical resistant polyurethane cable jacket. It is designed for submergence at depths greater than operating level without sustaining damage. Call EPG for more severe service.
- \* **Self-Sealing Cable:** If a cut occurs in the outer jacket of the cable, a water block feature just inside the outer jacket will self-seal in most cases guarding against the incursion of water.
- \* **Superior Noise Immunity:** Designed for heavy duty use in hostile environments, the LevelMaster sensor gives outstanding noise immunity. Unlike transducers, whose signals may be distorted by outside interference, the LevelMaster sensor utilizes a conditioned compensated 4-20 mA output to maximize signal strength and accuracy. The sensor also features a shielded lead to help prevent signal disruption from outside sources.

### PERFORMANCE

- \* **Depth Range:** 0-26" thru 0-690' (0-2 PSI thru 0-300 PSI)
- \* **Static Accuracy<sup>1</sup>:**  $\pm 1.0\%$  BFSL FSL maximum
- \* **Thermal Error<sup>2</sup>:** 0.05% FSO/°C worst case
- \* **Proof Depth:** 1.5 X rated depth
- \* **Burst Depth:** 2.0 X rated depth
- \* **Resolution:** Infinitesimal

1. Static accuracy includes the combined errors due to nonlinearity, hysteresis and non-repeatability on a Best Fit Straight Line basis, at 25°C per ISA S51.1.
2. Thermal error is the maximum allowable deviation from the Best Fit Straight Line due to a change in temperature, per ISA S51.1.

## ELECTRICAL

- \* Excitation: 10 to 40 VDC, Red = (+) excitation, Black = (-) excitation
- \* Input Current: 20 mA maximum
- \* Output: 4-20 mA (2 wire)
- \* Zero offset (max): 4-20 mA,  $\pm 12$ mA
- \* Output impedance: <10 ohms
- \* Insulation resistance: 100 megohms at 50VDC
- \* Circuit protection: Polarity, surge & shorted output
- \* Power supply rejection:  $<\pm 0.05\%$  FSO/VDC (mA output)
- \* Electrical termination: 2-24 AWG conductors in a shielded cable with sensor breather and polyurethane jacket

## ENVIRONMENTAL

- \* Compensated temp range: 0° to 50°C
- \* Operating temp range: -20° to 70°C

## PHYSICAL

- \* Dimensions: Nominal diameter of 1.0" X 4.15" length
- \* Weight: 7 oz. (not including cable)
- \* Cable: Polyurethane jacketed shielded cable with polyethylene vent tube and Kevlar tension members
- \* Wetted materials: 316 SS, Viton
- \* Mounting provision: Suspended by cable

**MODEL** {Call EPG for other ranges available – specify length (---)}

PART #	DESCRIPTION	RANGE
PT05X---	Submersible Pressure Transmitter	0-11'
PT07X---	" " "	0-16'
PT10X---	" " "	0-23'
PT20X---	" " "	0-46'
PT25X---	" " "	0-57'

## OPTIONS

- \* Tefzel® Cable: Used for highly corrosive environments
- \* Titanium Housing: Used for highly corrosive environments
- \* Lightning Protection: Protects against transient voltages and lightning associated surges up to 20,000 amperes with proper grounding
- \* Temperature Sensor: A sensor with 4-20 mA output for temperature (0-50°C) is available –  
Excitation: 9-30 VDC, White = (+) excitation, Green = (-) excitation

## **EPG Controllers With Intrinsically Safe Circuit(s)**

## **Field Installation Instructions**

**PURPOSE:** Provide instructions to install EPG control panels with Intrinsically Safe (IS) Circuits wired to EPG Level Sensors, EPG Flow Sensors, and Single and Dual Level Float Sensors.

### **PROCEDURE:**

Familiarize yourself with the electrical components and the panel electrical schematics. Read these instructions thoroughly before attempting installation of intrinsically safe circuits. Reference: Installation of intrinsically safe instrument systems in CLASS I HAZARDOUS LOCATIONS, ANSI/ISA-RP 12.6-1987, SECTION 4.5.4.

Install in accordance with Article 504 of the National Electrical Code.

This control panel and its intrinsically safe circuit(s) must be connected to a ground system with very low impedance (1 OHM or less) per NEC 504-50 and 250-50.

See control panel drawings for device wiring. Only simple apparatus (NEC 504-2) and those specifically called out in the controller drawing are to be connected to the intrinsically safe circuit(s). The attached drawings show specific device wiring for level, flow, single level float and dual level float sensors

Where intrinsically safe circuits enter or exit a hazardous (classified) area, a means must be provided to prevent the passage of gases or vapors per NEC 501-5. A seal device must be installed to conduit entering the enclosure and then filled with appropriate sealant.

Wiring of intrinsically safe circuits shall be physically separated from non-intrinsically safe circuits per NEC 504. Do not run intrinsically safe and non-intrinsically safe circuits in the same conduit.

Do not exceed maximum cable lengths stated in the control panel drawings.

Field wiring supplied by others is to have 600 Volt insulation rating.

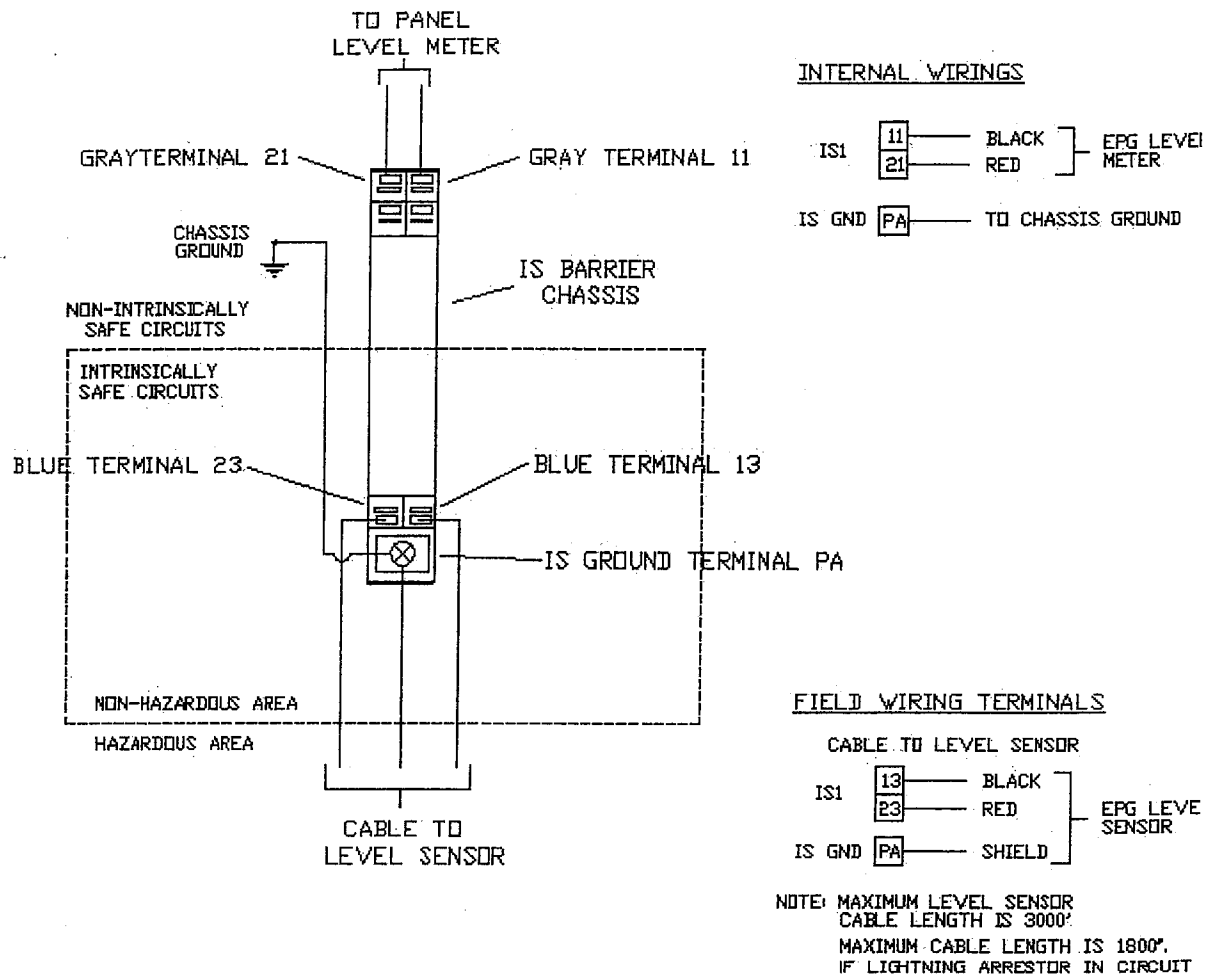
Conductors of intrinsically safe circuits must be separated by at least 5" from conductors of any non-intrinsically safe circuits

If field wiring is terminated in field supplied junction boxes there must be a minimum of 8" between intrinsically safe and non-intrinsically safe field wiring terminals.

Do not substitute parts. Use only the same make, model and part number as originally supplied.

Replace fuses only with fuses of same type and rating.

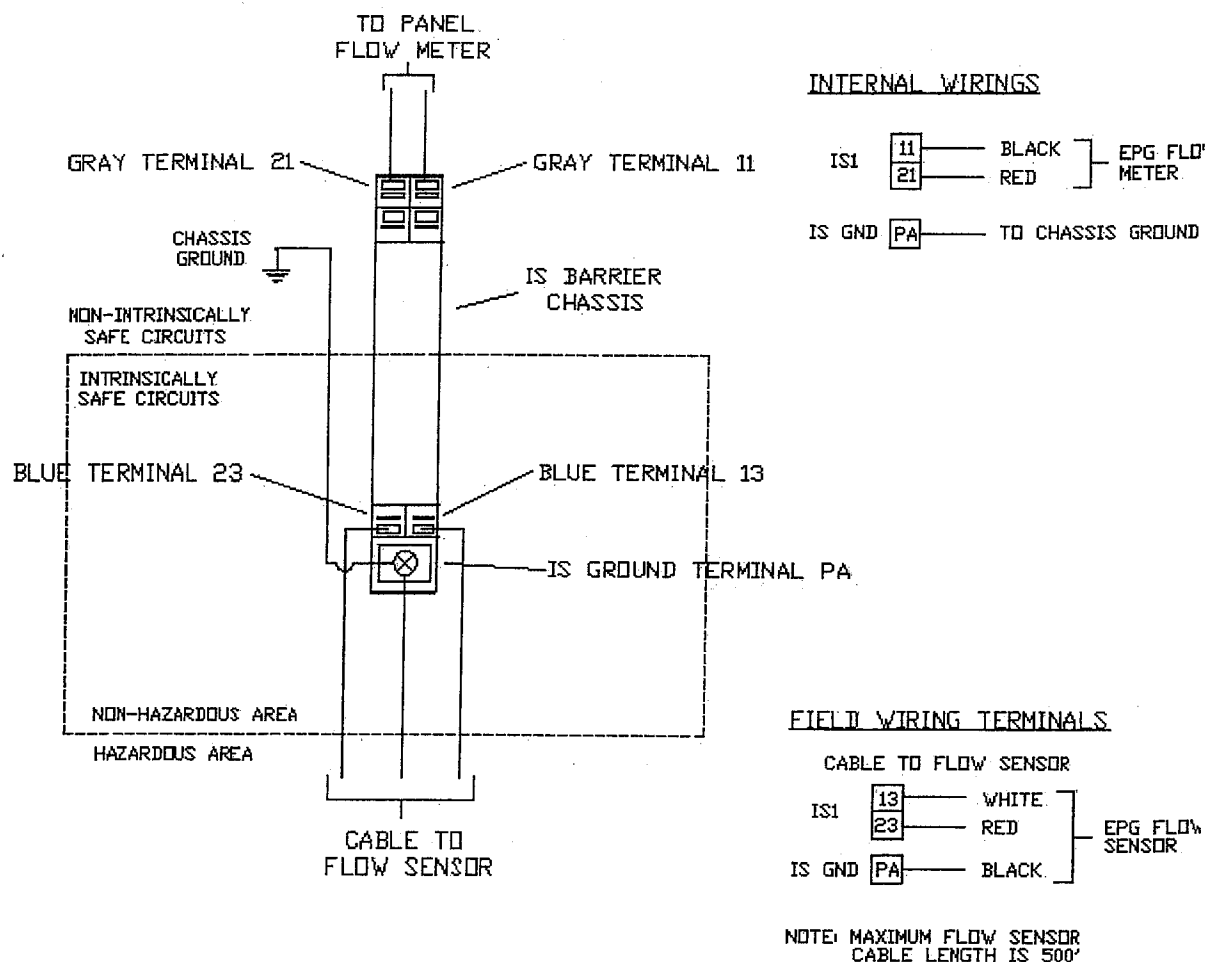
## I.S. BARRIER - LEVEL SENSOR



- NOTE: 1. PROVIDES INTRINSICALLY SAFE CIRCUIT EXTENSIONS FOR USE IN CLASS 1 GROUPS C & D HAZARDOUS LOCATIONS WHEN CONNECTED PER EPG BULLETIN 8000.
2. REFERENCE INSTALLATION OF INTRINSICALLY SAFE SYSTEMS IN CLASS 1 HAZARDOUS LOCATIONS, ANSI/ISA-RP 12.6-1987, SECTION 4.5.4.
3. WARNING SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
4. INSTALL IN ACCORDANCE WITH ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE.
5. MAXIMUM CABLE LENGTH TO EPG LEVEL SENSOR IS 3000 FEET.  
MAXIMUM LENGTH IS 1800 FEET IF LIGHTNING ARRESTOR IN CIRCUIT.

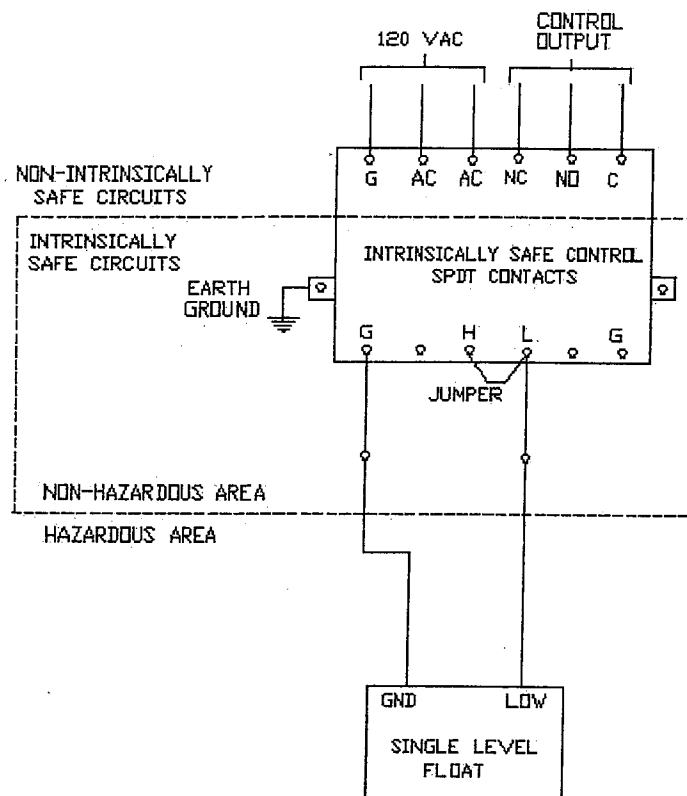


## I.S. BARRIER - FLOW SENSOR

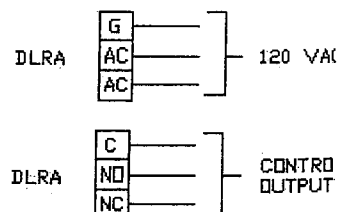


- NOTE: 1. PROVIDES INTRINSICALLY SAFE CIRCUIT EXTENSIONS FOR USE IN CLASS 1 GROUPS C & D HAZARDOUS LOCATIONS WHEN CONNECTED PER EPG BULLETIN 8000.
2. REFERENCE INSTALLATION OF INTRINSICALLY SAFE SYSTEMS IN CLASS 1 HAZARDOUS LOCATIONS, ANSI/ISA-RP 12.6-1987, SECTION 4.5.4.
3. WARNING SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
4. INSTALL IN ACCORDANCE WITH ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE.
5. MAXIMUM CABLE LENGTH TO EPG FLOW SENSOR IS 500 FEET.

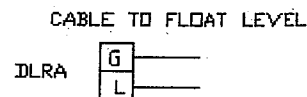
## I.S. RELAY BARRIER - SINGLE LEVEL



### INTERNAL WIRINGS



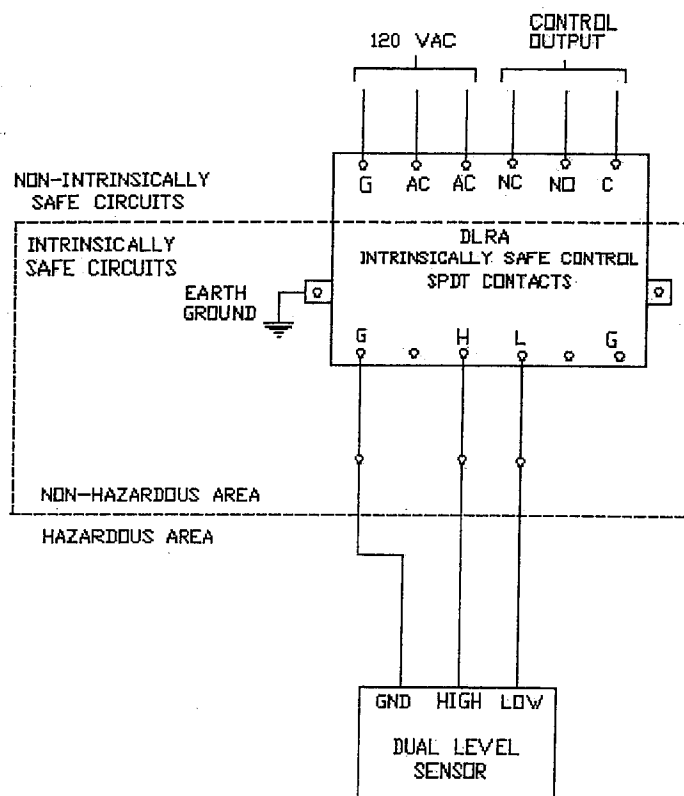
### FIELD WIRING TERMINALS



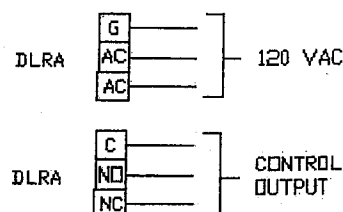
NOTE: MAXIMUM CABLE LENGTH TO LEVEL FLOAT IS 901

- NOTE: 1. PROVIDES INTRINSICALLY SAFE CIRCUIT EXTENSIONS FOR USE IN CLASS 1 GROUPS A, B, C, & D HAZARDOUS LOCATIONS WHEN CONNECTED PER EPG BULLETIN 8000.
2. REFERENCE INSTALLATION OF INTRINSICALLY SAFE SYSTEMS IN CLASS 1 HAZARDOUS LOCATIONS, ANSI/ISA-RP 12.6-1987, SECTION 4.5.4.
3. WARNING SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
4. INSTALL IN ACCORDANCE WITH ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE.
5. MAXIMUM CABLE LENGTH TO LEVEL FLOAT SENSOR IS 900 FEET.

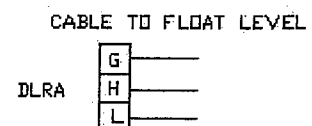
## I.S. RELAY BARRIER - DUAL LEVEL



### INTERNAL WIRINGS



### FIELD WIRING TERMINALS



NOTE: MAXIMUM CABLE LENGTH TO LEVEL FLOAT IS 900'

- NOTE: 1. PROVIDES INTRINSICALLY SAFE CIRCUIT EXTENSIONS FOR USE IN CLASS 1 GROUPS A, B, C, & D HAZARDOUS LOCATIONS WHEN CONNECTED PER EPG BULLETIN 8000.
2. REFERENCE INSTALLATION OF INTRINSICALLY SAFE SYSTEMS IN CLASS 1 HAZARDOUS LOCATIONS, ANSI/ISA-RP 12.6-1987, SECTION 4.5.4.
3. WARNING SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
4. INSTALL IN ACCORDANCE WITH ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE.
5. MAXIMUM CABLE LENGTH TO LEVEL FLOAT SENSOR IS 900 FEET.

## **EPG LevelMaster™ Level Sensor**

## **OPERATION & MAINTENANCE INSTRUCTIONS**

### **Characteristics of the LevelMaster Level Sensor**

EPG Companies Inc. LevelMaster level sensor is a submersible pressure transmitter. The pressure transmitter is a precision measurement device that incorporates isolated diaphragm sensors that are specifically designed for use with hostile fluids and gases. The sensor utilizes a silicon pressure cell that has been fitted into a stainless steel package with a stainless steel barrier diaphragm. The sensor assembly is housed in a rugged 316 stainless steel case.

The device features a high performance internal signal conditioning. Standard output is 4 to 20 mA. All units have surge and reverse polarity protection.

All EPG transmitters are permanently etched with wiring information, part number (P/N), serial number (S/N), date of manufacture (DOM), range, excitation, and output.

All EPG transmitters are designed for rugged use. However, care should be taken to protect these devices from overpressure and sharp impact. When lowering submersible pressure transmitters into a liquid, penetrate the surface slowly and only to the depth necessary. Do not drop the unit from above the surface. All transmitters can be cleaned by rinsing them in mild detergent. Do not pressure wash.

### **Vent Filter / Water Vapor Trap**

The vent filter and water vapor trap is a replaceable vent tube dehumidifier intended for use with the submersible pressure transmitters. This device is specifically designed to protect sensitive electronic components from mildew, corrosion, rust, and other forms of deterioration while at the same time preventing the formation of a liquid column.

Vent filters should be changed when they are 85% spent. Do not remove the old filter until a new one is available. The number one failure mode is moisture and corrosion damage due to lack of maintenance of the vent filter. The vent filter connects to the existing vent tube as it exits the cable at the junction box via a tube.

Replacement vent filters can be ordered by calling EPG at 800-443-7426. The vent filter and water vapor trap can be exposed to air, industrial gases, refrigerants, organic liquids, and solvents. However, they should not be used when ammonia is present.

### **Specifications**

Most installations of submersible pressure transmitters connect the cable directly to the control panel or to a breakout box (junction box). From this breakout box, end users must run cable to the required instrumentation. Specifications for the polyurethane or Tefzel jacketed cable is as follows:

- \* Excitation: 10 to 40 VDC, Red = (+) excitation, Black = (-) excitation
- \* Input Current: 20 mA maximum
- \* Output: 4-20 mA (2 wire)
- \* Zero offset (max): 4-20 mA,  $\pm 12$ mA
- \* Output impedance: <10 ohms
- \* Insulation resistance: 100 megohms at 50VDC
- \* Circuit protection: Polarity, surge & shorted output
- \* Power supply rejection:  $<\pm 0.05\%$  FSO/VDC (mA output)
- \* Electrical termination: 2-24 AWG conductors in a shielded cable with sensor breather, water block, and polyurethane jacket
- \* Compensated temp range: 0° to 50°C
- \* Operating temp range: -20° to 70°C
- \* Dimensions: Nominal diameter of 1.0" X 4.15" length
- \* Weight: 7 oz. (not including cable)
- \* Cable: Polyurethane jacketed shielded cable with polyethylene vent tube and Kevlar tension members
- \* Wetted materials: 316 SS, Viton
- \* Mounting provision: Suspended by cable

## **Polyurethane Cable**

The standard cable is polyurethane and will handle most environments and has a self-sealing feature. If a cut occurs in the outer jacket of the cable, a water block feature below the outer jacket will self-seal in most cases to guard against the incursion of water.

## **Chemical Resistance of Polyurethane**

Potable Water, Waste Water, Borax, Butane, Animal Fat, Carbonic Acid, Citric Acid, Cod Liver Oil, Corn Oil, Glycerin, Glycol, Mineral Oils, Potassium Nitrate, Potassium Sulfate, Silicone Oils, Stoddard Solvent, Tannic Acid (10), Tartaric Acid, Turbine Oil, and most Leachate.

## **Tefzel® Cable**

Optional Tefzel cable is recommended for use in highly corrosive environments. It offers additional resistance in corrosive environments over the standard polyurethane cable.

## **Chemical Resistance of Tefzel**

Acetic Acid (Glacial), Acetic Anhydride, Acetone, Aluminum Chloride, Anti-Freeze, Bromine, Calcium Chloride, Calcium Hydroxide, Chlorine, Copper Chloride, Ferrous Chloride, Hydrochloric Acid, Ketones, Lacquer Thinners, Leachate, and Sulfuric Acid.

## **Cable Lengths**

The maximum length of cable to be used with the submersible pressure transmitter is up to 10,000 feet.

## **OPTIONS**

- \* Titanium Housing:                      Used for highly corrosive environments
- \* Lightning Protection:                Protects against transient voltages and lightning associated surges up to 20,000 amperes
- \* Temperature Sensor:                A sensor with 4-20 mA output for temperature (0-50°C) is available –  
Excitation: 9-30 VDC, White = (+) excitation, Green = (-) excitation.

## EPG LevelMaster™ Level Meter

Model 2551A-SDHH

## OPERATION & SET UP INSTRUCTIONS

The EPG LevelMaster system uses a submersible pressure transmitter to detect changes in fluid levels and a programmable meter featuring a digital LED display and front panel keypad to monitor and control fluid levels. The user can program the desired control parameters for a single pump and one other high level control function. The LevelMaster display is in inches unless otherwise programmed. During a pumping and/or an alarm condition, the display alternates between the message and the current liquid level reading. The message indicates which function is active (see below).

### GENERAL SETUP OPERATIONS

**IMPORTANT:** During setup, if two (2) minutes elapse without a keypad entry the meter automatically returns to the run mode without the entered changes being stored. **DO NOT USE FINGERNAIL OR OTHER SHARP OBJECT TO PROGRAM METER. DAMAGE TO KEYPAD MAY RESULT.**

DISPLAY	INSTRUCTION
SETUP	At this prompt, enter the lockout code (35) in order to enter the set point setup mode.
Pr H1	At this prompt, followed by the current setting, select the Pump Relay High set point. This is the pump ON set point.
Pr Lo	At this prompt, followed by the current setting, select the Pump Relay Low set point. This is the pump OFF set point.
AL H1	At this prompt, followed by the current setting, select the Alarm High Relay set point. This is the high level alarm set point.
Hy H1	At this prompt, followed by the current setting, select the hysteresis for the Alarm High Relay set point. This value, when subtracted from the high level alarm set point, sets the disengage point for the high alarm condition.
AL H2	At this prompt, followed by the current setting, select the Alarm High-High Relay set point. This is the high-high alarm level set point and is factory set.
Hy H2	At this prompt, followed by the current setting, select the hysteresis for the Alarm High-High Relay set point. This value, when subtracted from the high-high level alarm set point, sets the disengage point for the high-high alarm condition and is factory set.

DISPLAY	MESSAGE
P	Pump relay activated. Display alternates with current level.
H1P	High alarm & pump relay activated. Display alternates with current level.
H1PH2	High-High alarm & pump relay deactivated. Display alternates with current level.

## SET UP PROCEDURES FOR SIMPLEX OPERATION – SDHH METER

STEP NO.	ACTION
1	Push SETUP/ENTER button. Wait for the meter to display 0.
2	Push arrow buttons to set a value of 35 on meter display. Push SETUP/ENTER.
3	Meter shows <b>Pr H1</b> (pump ON set point) followed by current value.
4	Push arrow buttons to set the desired level for pump ON. Push SETUP/ENTER button.
5	Meter shows <b>Pr Lo</b> (pump OFF set point) followed by current value.
6	Push arrow buttons to set the desired pump OFF level. Push SETUP/ENTER button.
7	Meter shows <b>AL H1</b> (High Level Alarm) followed by current value.
8	Press arrow buttons to set desired high level alarm point. Push SETUP/ENTER button.
9	Meter shows <b>Hy H1</b> . Press arrow buttons to select value. Push SETUP/ENTER button.
10	Meter shows <b>AL H2</b> (High-High level alarm set point) followed by current value. Factory setting is 150.0". <b>NOTE: This fail safe feature shuts off the pump if the level sensor fails and should not be changed in the field.</b>
11	Meter shows <b>Hy H2</b> . Press arrow buttons to select value of 0.0". Not used.
12	Push SETUP/ENTER button. Meter shows <b>RUN</b> .

### EXAMPLE:

If the desired levels for the pump were:

Pump ON	18.0"
Pump OFF	12.0"
High Level Alarm	30.0"
High Level Alarm Hys.	1.0"

Complete steps 1 – 3 above.

Select **18.0** with arrow buttons for the **Pr H1** value. Push SETUP/ENTER.

**Pr Lo** is displayed, select **12.0** with the arrow buttons for the Pump OFF value. Push SETUP/ENTER.

**AL H1** is displayed, select **30.0** with the arrow buttons for the High Alarm value. Push SETUP/ENTER.

**Hy H1** is displayed, select **1.0** with the arrow buttons for the High Level Alarm OFF value (value determined by subtracting from high-level-alarm set-point). Push SETUP/ENTER.



## INSTALLATION NOTES AND TROUBLESHOOTING

BACKGROUND: Numerous installations of the EPG LevelMaster system have proven its long-term reliability. The majority of malfunctions of the LevelMaster system are the result of improper installation and handling of the pressure transmitter sensor. During new installations, be certain to check for any shipping damage, loose controller connections or parts that may have come loose during shipment.

### CAUTION

Do not use any other programming codes other than setup code (35).

SYMPTOM / DISPLAY	PROBABLE CAUSES	HOW TO CORRECT
Continuous above full scale reading (above 139"), or Continuous reading.	If pump has been off for a long period of time, liquid level may actually be quite high. Loose connections in circuit.  Short circuit in sensor lead wire or connector or circuit.  Faulty sensor.	Reprogram meter if above 150" or pull pump up slightly to initiate pump start.  Repair connections in controller.  Inspect for shorted connections at breakout box (junction box) and at controller. If connections are good, replace sensor.  Replace sensor.
-34.6 reading.	Lead wire damaged or reversed connections.  Open circuit in sensor lead wire or controller connections.  Faulty power supply in meter.	Check schematic, repair connections.  Replace sensor and lead wire. Test IS barrier and meter with simulator.  Replace meter.
Erratic readings.	Damaged sensor lead wire.  Improper connections.  Faulty meter.	Check schematic, repair connections.  Replace sensor and lead wire.  Test meter with simulator. If faulty meter, replace meter.
Pump starts at normal reading, runs for a few seconds and stops.	Low liquid recovery rate. Screen on pump may be clogged.  Sump clogged or plugged.	Remove pump and clean screen. May also need to disassemble pump and clean pump impellers.  Remove pump and clean out sump.

## **FACTORY SETTINGS**

LevelMaster Model SDHH Meter

Panel S/N: \_\_\_\_\_

Meter S/N: \_\_\_\_\_

Meter Designation: \_\_\_\_\_

### **Operating Parameters – Setup Code 35**

<b>PARAMETER</b>	<b>VALUE</b>	<b>OPERATION</b>
Pr H1	inches	Turns Pump ON when level on meter reads _____
Pr Lo	"	Turns Pump OFF when level on meter reads _____
AL H1	"	Turns High Level Light ON when level on meter reads _____
Hy H1	"	Keeps High Level Light ON until level until level drops _____ below AL H1
AL H2	150.0	Turns Pump OFF when level meter reads <u>150.0"</u> or greater Indicates a probable level sensor failure
Hy H2	0.0	Not used

NOTE: If the up arrow is pressed any time that the meter is operating, the highest level that the meter has observed since power was applied will be displayed.

## **S3070-PT TRANSDUCER SIMULATOR**

### **Operation**

The model 3070-PT Transducer Simulator is a device designed for the express purpose of testing an EPG LevelMaster™ level controller circuit while temporarily bypassing the existing level sensor. In the "Run" (normal operation) mode liquid level in the sump applies pressure on the level sensor. The sensor converts that force into an electrical signal. The electrical signal is transmitted by the sensor cable to the level meter where it is converted into a liquid level display.

The "Test" mode simulates a level sensor signal. Rotating the potentiometer changes the electrical signal forcing the system to function as if a level sensor were in the circuit. Varying the electrical signal changes the level meter display in the same manner in which the level sensor signal would effect the system. By turning the simulator knob slowly clockwise from top to bottom the meter will display each set point such as start, stop and alarms. With the toggle switch turned back to the "Run" position the potentiometer is removed from the circuit and the level sensor controls according to the set points. Meter values register actual liquid level.

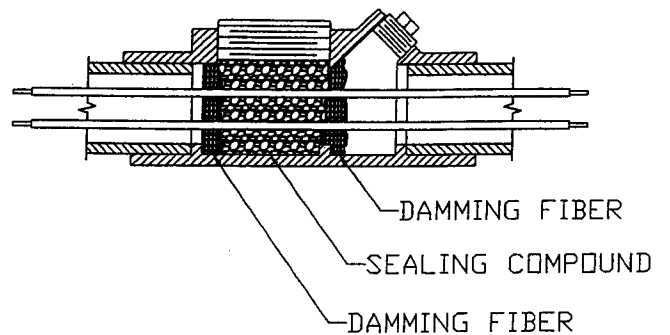
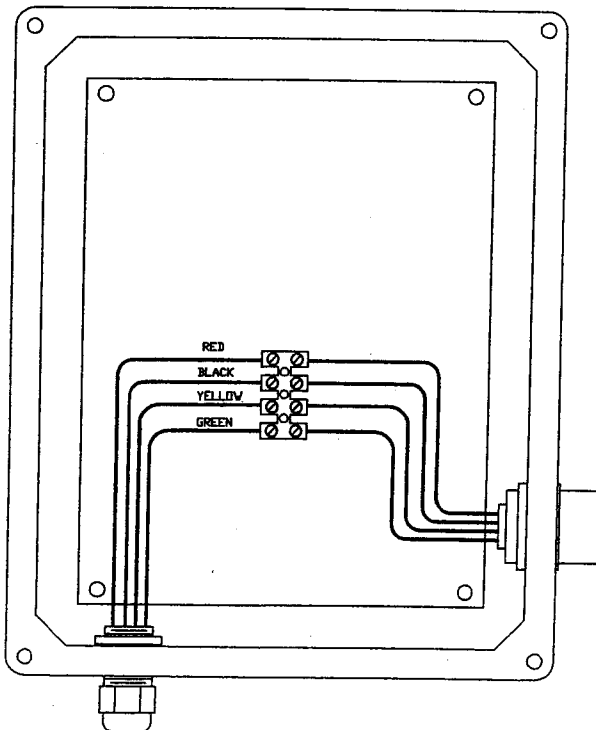
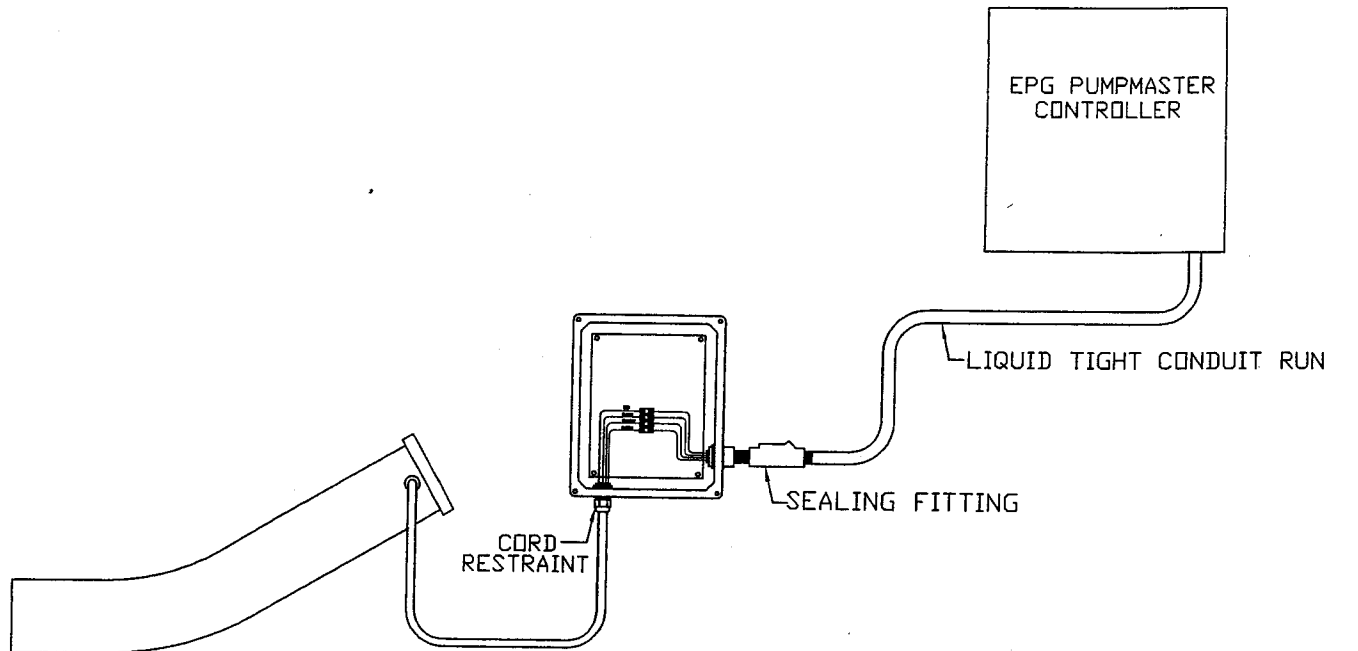
**"CAUTION"**, care must be taken when using this device in "Test" mode to avoid damaging the motor by running it dry. In normal test mode the pump switches should be off.

**S3070-PT TRANSDUCER SIMULATOR  
TEST PROCEDURE**

1. When the toggle switch is in the "Run" position the controls should function normally.
2. When the toggle switch is in the "Test" position (pressure transducer temporarily removed from the control circuit) the level meter should display the liquid level. By turning the simulator knob slowly clockwise from top to bottom the meter will display each set point such as start, stop, and alarms. Care must be taken when using this device in the "Test" mode to avoid damaging the motor by running it dry. In normal test mode the pump switches should be off.
3. Make sure that the potentiometer has full travel (270 degrees maximum) in both clockwise and counter-clockwise directions.
4. Make sure that all of the wires on the rear of the simulator (wires 200, 201, 202, 203) are connected in the proper position.
5. Replace the transducer simulator if it does not function as described above.

# BJBP 500

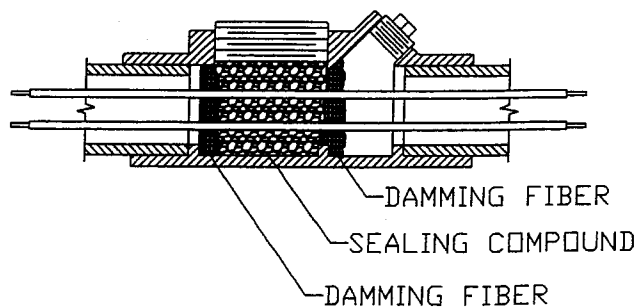
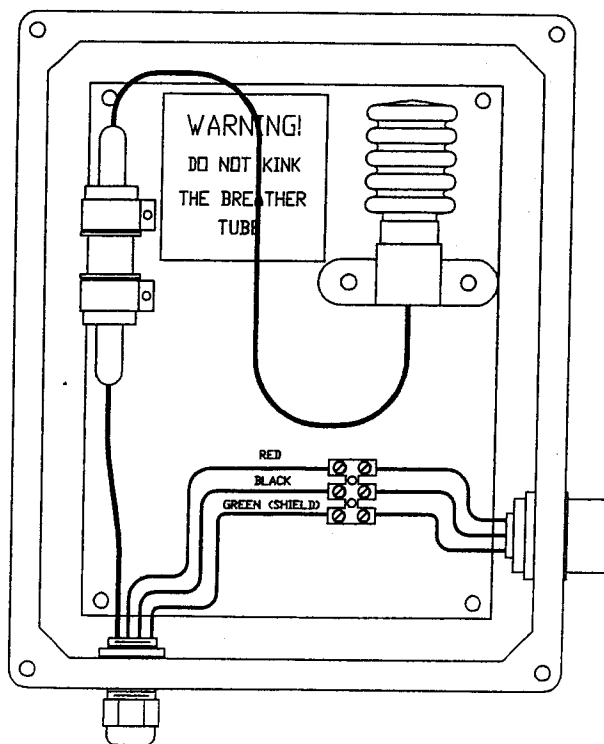
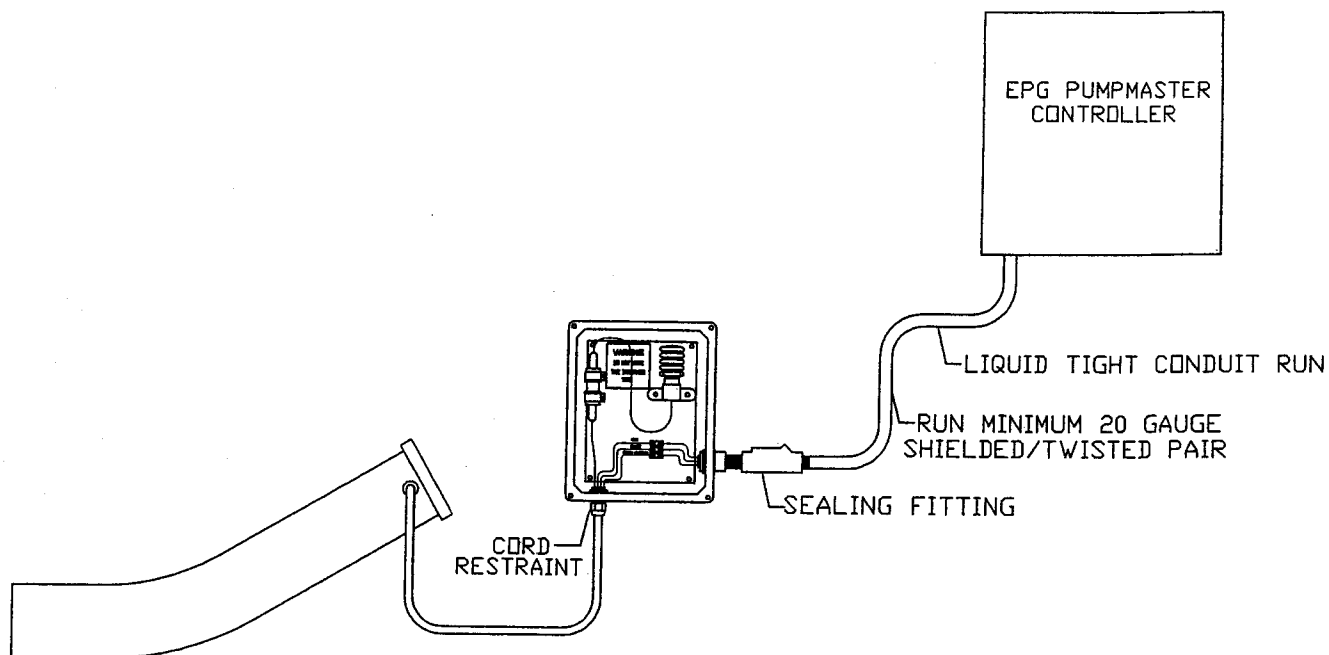
## BREAKOUT JUNCTION BOX FOR MOTOR LEAD



* NOTICE *				© EPG Companies Inc. 2002			
TOLERANCES				REFERENCE			
EXCEPT AS NOTED				EPG COMPANIES			
DECIMAL				TYPICAL INSTALLATION			
FRACTIONAL				DESIGN	C.A.S.	SCALE	NONE
				DRAWN	DATE	DATE	DRAWING NO.

# BJBL 600B

## BREAKOUT JUNCTION BOX FOR LEVEL SENSOR



* NOTICE * © EPG Companies Inc. 2002			
REFERENCE			
TOLERANCES			
EXCEPT AS NOTED			
REVISIONS			
NO.	DATE	BY	
1			
2			
3			
DESIGN			
C.A.S.			
SCALE			
NONE			
MATERIAL			
DATE 05/28/2002			
DRAWING NO.			

## TYPE "F" PVC SUCTION AND TRANSFER HOSE

**APPLICATIONS:** General purpose suction, construction, mining, irrigation lines, wellpoint systems, liquid fertilizer transfer, leachate transfer in landfills.

**FEATURES:** General purpose PVC suction and transfer hose. Smooth bore allows full flow. Rigid polyvinyl chloride, in general, shows excellent resistance to acids, alkalis, aqueous solutions of salts, and many organic solvents and oils. Plasticized PVC is attacked by certain chlorinated hydrocarbons, aromatics, esters, ketones, aldehydes, phenols, and strong oxidizing agents.

This chemical resistance is based on tests of specimens conducted by completely submerging the hose sample in the listed chemical or reagent. In critical applications, it is suggested that greater reliance be placed on actual field experience or that testing be performed under conditions of stress, exposure, temperature and duration which can be related to the anticipated application.

**DESCRIPTION:** Clear flexible with gray helix.

**SERVICE TEMPERATURE:** -4° F to 150° F static condition,  
14° F to 104° F dynamic condition

### TYPE F SPECIFICATIONS

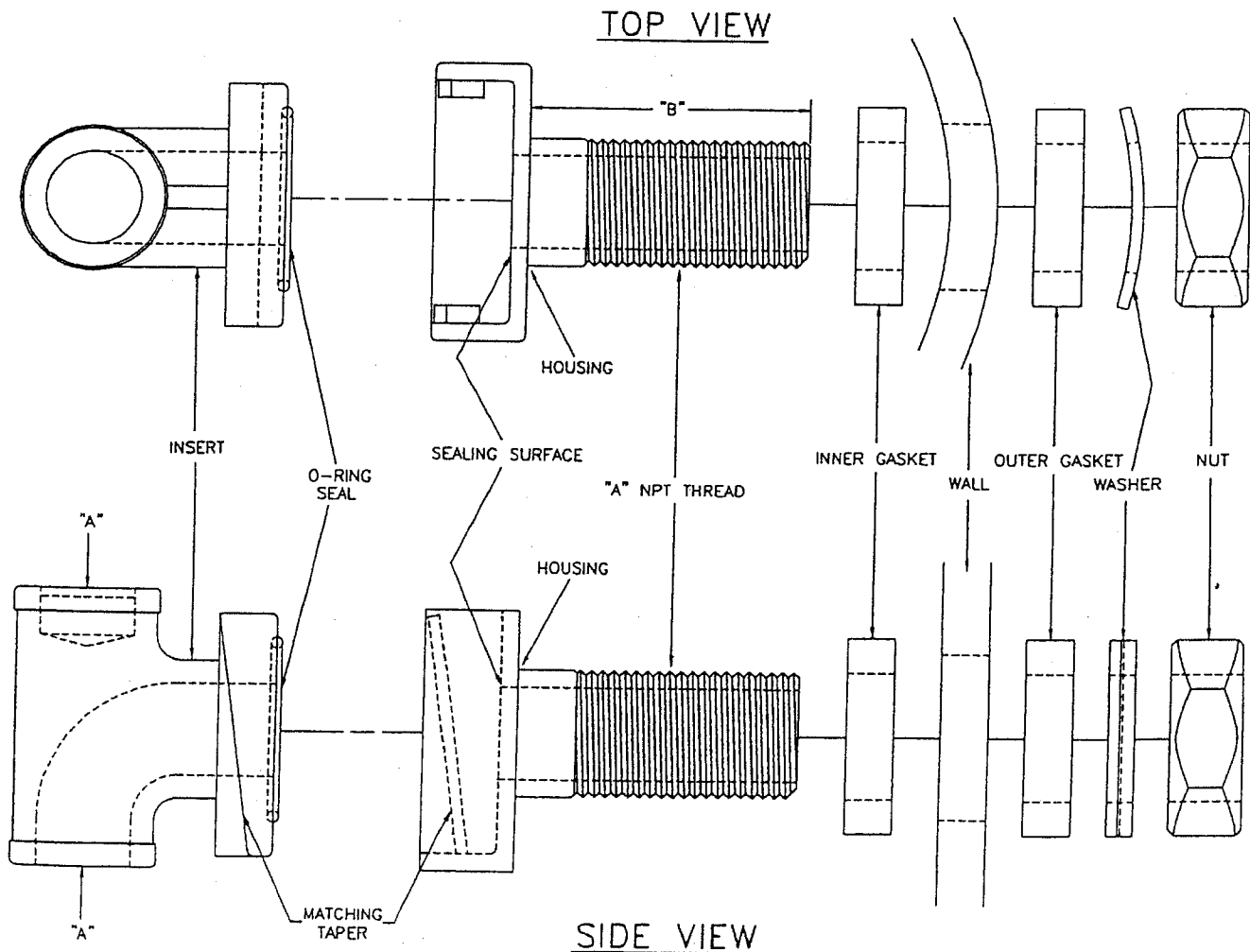
Series	ID	OD	Working Pressure (PSI)		Vacuum Rating Inch HG		Min. Bend Rad. Inch	Max. Lgth.	Approx. Wt.
	Inch	Inch	68°F	104°F	68°F	104°F	@ 68°F	Feet	Lbs./100 Ft.
F 075	¾"	0.94	115	75	Full	28	3	100	17
F 100	1"	1.26	90	65	Full	28	3	100	22
F 125	1¼"	1.51	90	65	Full	26	4	100	32
F 150	1½"	1.79	90	65	Full	26	5	100	41
F 200	2"	2.38	90	65	Full	26	7	100	71
F 250	2½"	2.89	70	48	Full	26	8	100	89

## Model NW Stainless Steel Discharge Adapter

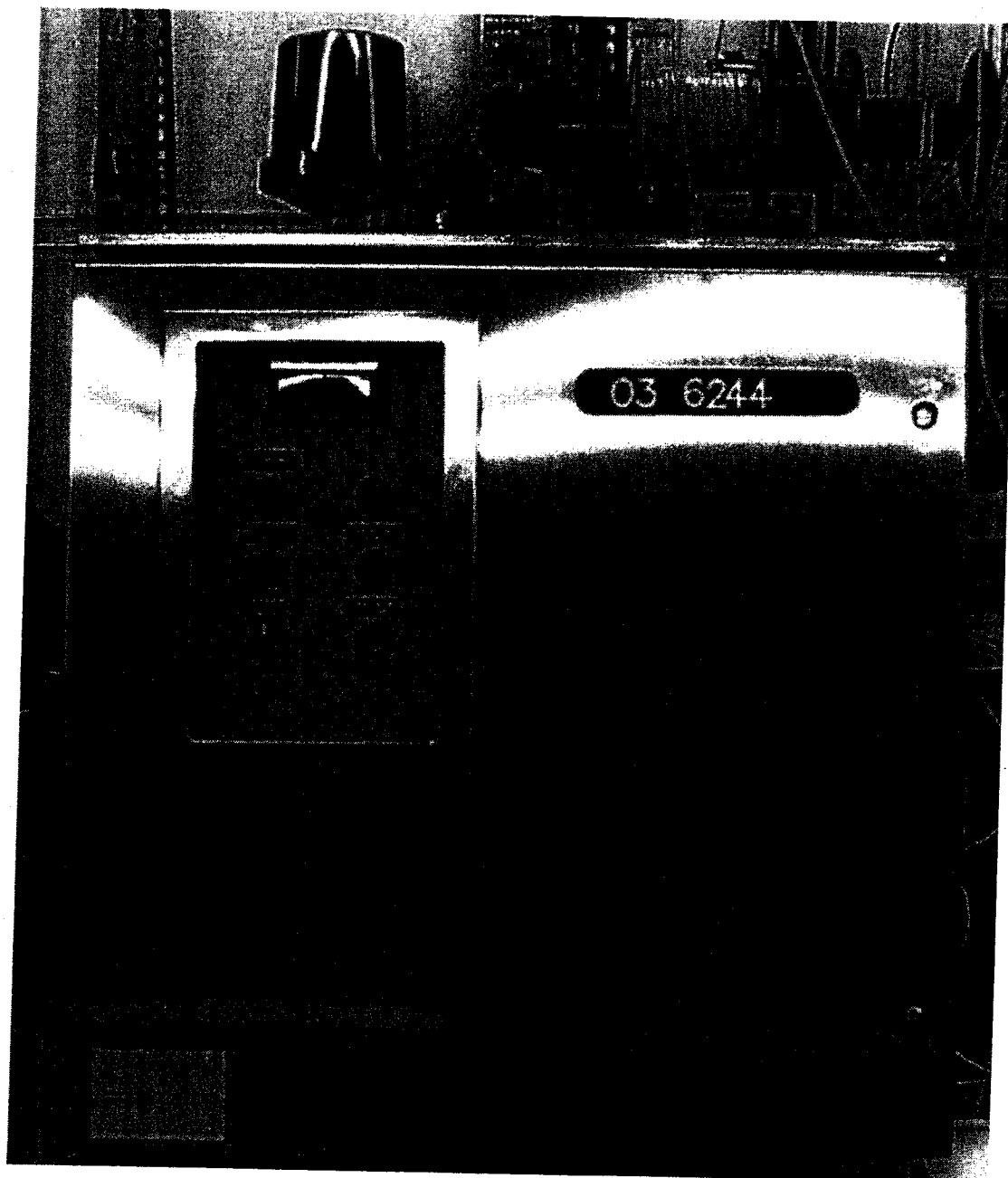
**For Leachate, Monitoring, and Remediation Piping Applications**

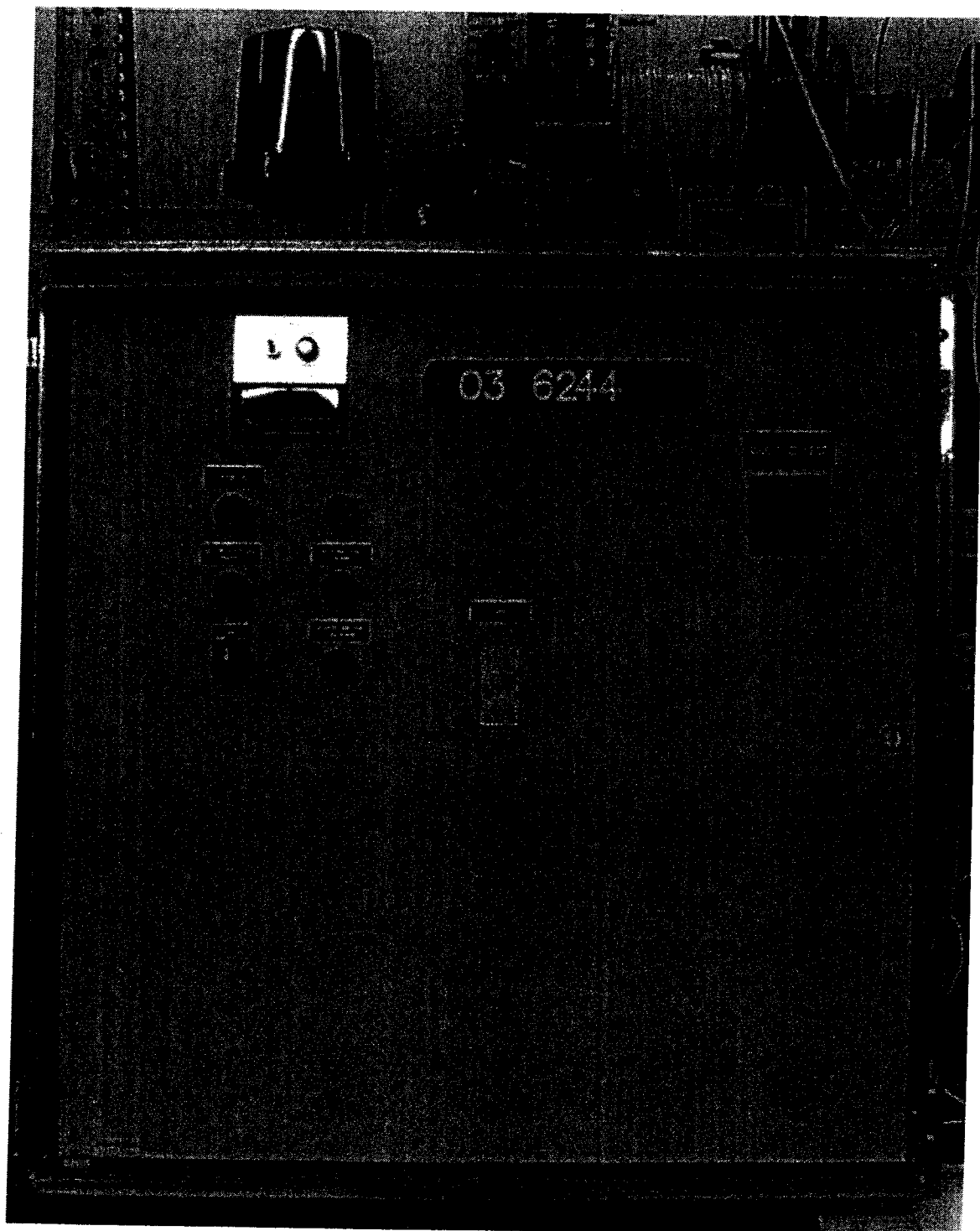
MODEL	"A"	"B"	Minimum I.D.
NW1SS	1" NPT	4"	8"
NW1.25SS	1.25" NPT	4"	8"
NW1.5SS	1.5" NPT	4"	8"
NW2SS	2" NPT	5"	8"
NW3SS	3" NPT	6.25"	12"

- 304 stainless steel construction
- Insert and housing are tapered for easy installation and removal
- O-Ring seal
- EPDM gasket for inner and outer wall seal
- Extended length nipple on housing allows adapter to fit from 1/4" to 3" thick wall pipe
- 1", 1.25", 1.5", 2", 3" NPT sized fittings for pump pipe, lift out pipe and discharge pipe

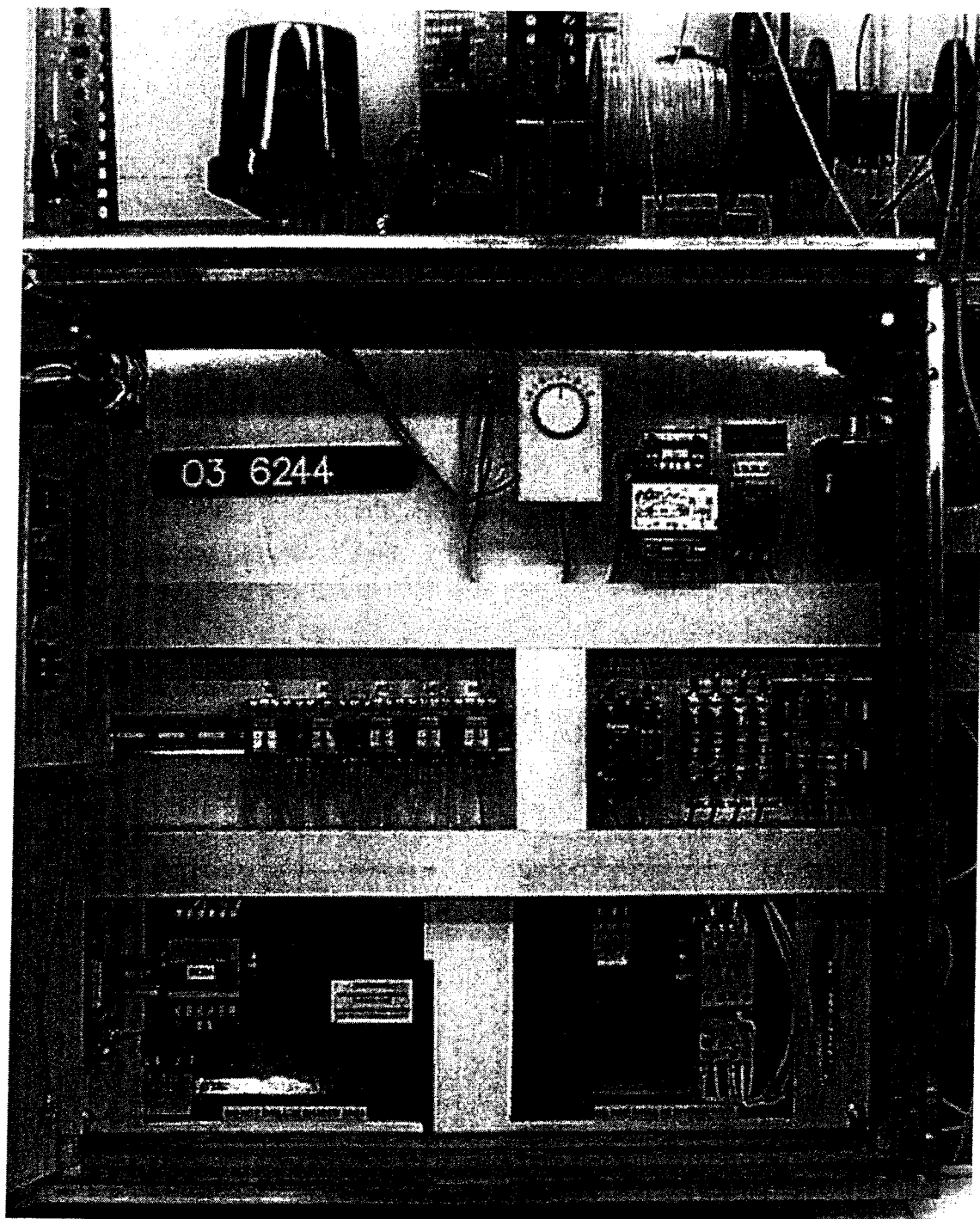












## **LIMITED WARRANTY**

This agreement shall be deemed to have been entered into in the State of Minnesota, and shall be construed in accordance with the laws of the State of Minnesota, including Minnesota's enactment of the Uniform Commercial Code. Buyer hereby stipulates and agrees that Hennepin County, Minnesota shall be the proper jurisdiction for adjudicating all claims and controversies arising from this agreement.

Products manufactured by EPG Companies Inc. are warranted for a period of 12 months from date of installation or eighteen (18) months from date of manufacture\* to be free from defects of materials and workmanship. It is expressly agreed that the exclusive remedy under this warranty is limited solely to the repair or replacement, at the sole discretion of EPG, of the part that failed. The cost of labor for any field repairs is not covered by this warranty. EPG Companies will not be liable for any damage or wear due to abnormal conditions or improper installation.

Products not manufactured by EPG Companies Inc. are covered by the original manufacturer's warranty, which EPG Companies passes through to the purchaser. The actual manufacturer will make warranty determination.

To have a defective part repaired or replaced, you must return the defective product to EPG Companies. Please call (800) 443-7426 or (763) 424-2613 to obtain a Return Goods Authorization (RGA) number. Send defective product (freight prepaid) with RGA #, description of installation, installation data and failure date to EPG Companies Inc., 19900 County Rd. 81, Maple Grove, MN 55311.

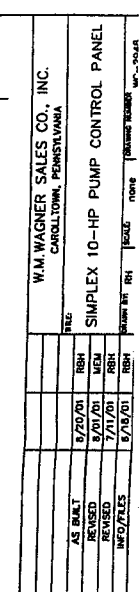
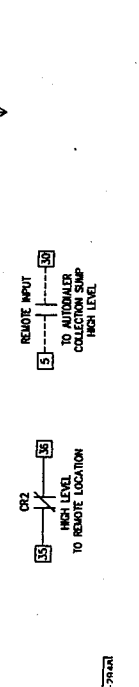
EPG Companies will not be held liable for any incidental or consequential damages, losses or expenses incurred from installation, use or any other reason. THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING IMPLIED WARRANTIES OF EITHER FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY, WHICH EXTEND BEYOND THOSE SPECIFICALLY LISTED HERE.

If equipment is to be stored for a period greater than six months, proper storage precautions must be taken if the warranty is to be maintained. Please call EPG Companies for specific requirements regarding product storage.

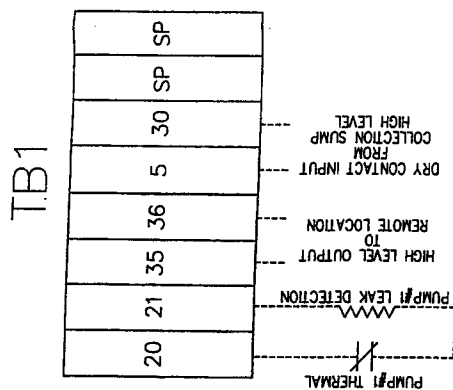
The following is a partial list of items, which will void the warranty:

- Opening the motor for any reason.
- Using undersized electrical wire.
- Making unauthorized circuit changes. Please call EPG Companies before making any changes.
- Operating a three phase submersible motor from single phase power through a phase converter unless 3-leg ambient-compensated quick trip overload protectors are used and complete details are sent in writing to EPG Companies.

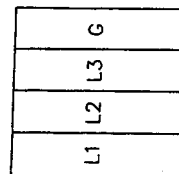
\* To qualify for the delayed installation warranty you must contact EPG Companies Inc., at (800) 443-7426 or (763) 424-2613 within 60 days of purchase.



QUANTITY	PART NUMBER	DESCRIPTION	MATERIAL LIST	WC-2948
1	FA34030	Circuit Breaker, 3 pole, 30 amp, 480 VAC		
1	9421 LC43	Handle Operating Mechanism		
1	9421 LF3	Handle Operating Shaft		
1	8556 SC2DVIES	Push Button, Thermal Indicator		
3	B25	Starter Thermal Unit		
1	GR2CB80	Circuit Breaker, 1 pole, 5 amp, 300 VAC		
1	ZB2-B-P	Selector Switch Operator, 2 position, maintained		
1	ZB2-ZB201	Operator Base, 1-111 contact		
1	ZB2-ZB202	Push Button Operator		
1	ZB2-ZB203	Push Button Operator		
1	ZB2-BV03	Photo Light Detector, w/ LED		
4	ZB2-BV04	Photo Light Detector, w/ LED		
4	ZB2-BV05	Photo Light Detector, w/ LED		
1	ZB2-BV06	Photo Light Detector, w/ LED		
1	3007500M15	Transformer, 500VA, 480-120VAC		
1	3007500M15	Transformer, 500VA, 480-120VAC		
1	HEFFMAN	Enclosures, NEMA 4X, Stainless Steel, (30x24x12)		
1	A-3024	Back Panel		
1	A-3024AL	Inner Door		
1	A-100F K	Mounting Kit		
AC/DC	BLSP	Alarm Light		
1	BLSP	Alarm Light		
GRASSLIN	AV-49-201-0G	Eclipse Time Meter		
1	FV2 72G	Relay, DPDT, w/ LED		
1	RHEILLAC120	Relay, DPDT, w/ LED		
4	SC2BMS	Relay, DPDT, w/ LED		
1	RHEILLAC120	Relay, DPDT, w/ LED		
1	SC2BMS	Relay, DPDT, w/ LED		
SENSAPHONE	1104	Auto Dialer		
VARLOCK	27AED	Intrinsically Safe Relay		
BUDHANAN	8 0725	Terminal Blocks		
USB	1	Terminal Blocks		
LITTLEJOE	1	Fuse, 4-amp		
1	KLIR-4	Fuse, 4-amp		
1	KLIR-2	Fuse, 4-amp		
FLYGT	1	Thermal/Moisture Module		
1	MINICAS	Thermal/Moisture Module		



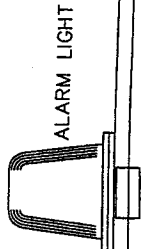
TB2



460 VAC, 3 PHASE, 60 Hz

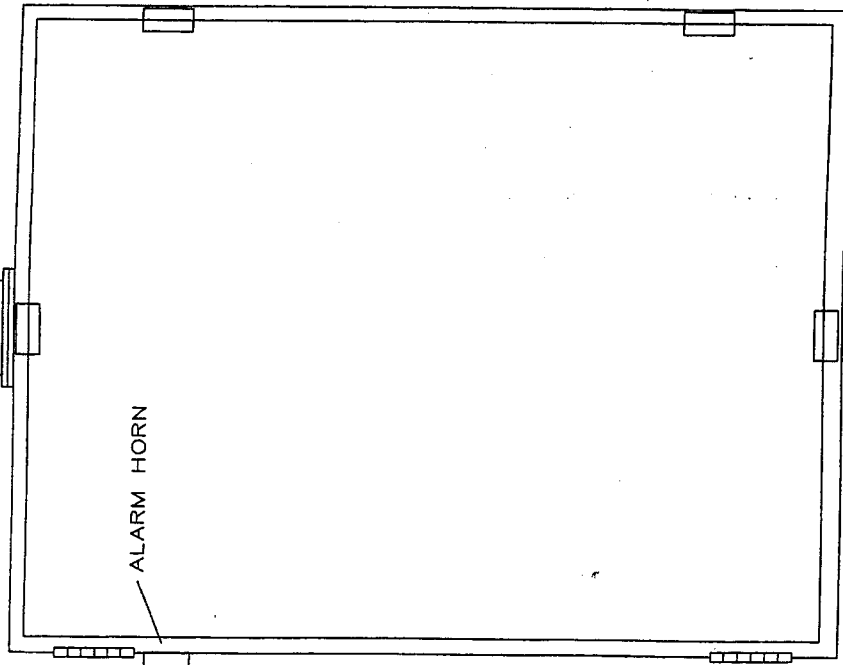
NOTE:  
1. EQUIPMENT SHOWN W/POWER CRY.

[illegible]

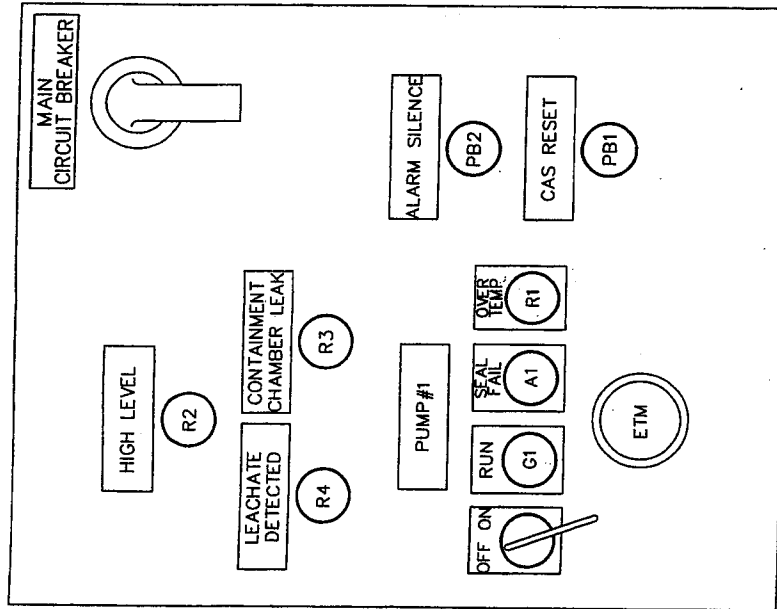


ALARM LIGHT

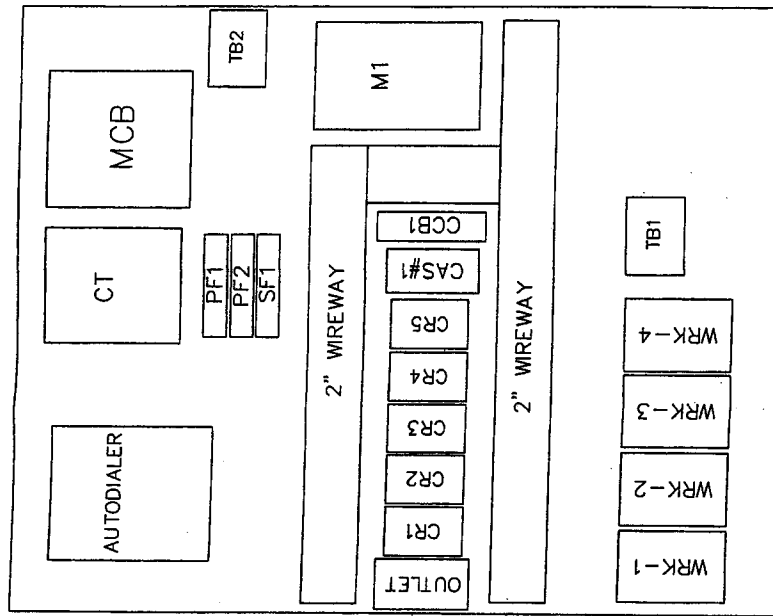
ALARM HORN



**ENCLOSURE**  
(30" x 24" x 12")  
NEMA 4X STAINLESS STEEL



**INNER DOOR**  
ALUMINUM



**BACK PANEL**

W.M. WAGNER SALES CO., INC.			
CARROLLTOWN, PENNSYLVANIA			
SIMPLEX 10-HP PUMP CONTROL PANEL			
AS BUILT	8/20/01	OSH	REV
REVISION	9/10/01	MEM	REV
REVISION	11/14/01	OSH	REV
INFO FILES	12/14/01	REV	REV
DATE	8/1/01	DATE	8/1/01
BY	REV	BY	REV
W.C. 2848			





# **Sensaphone® 1104**

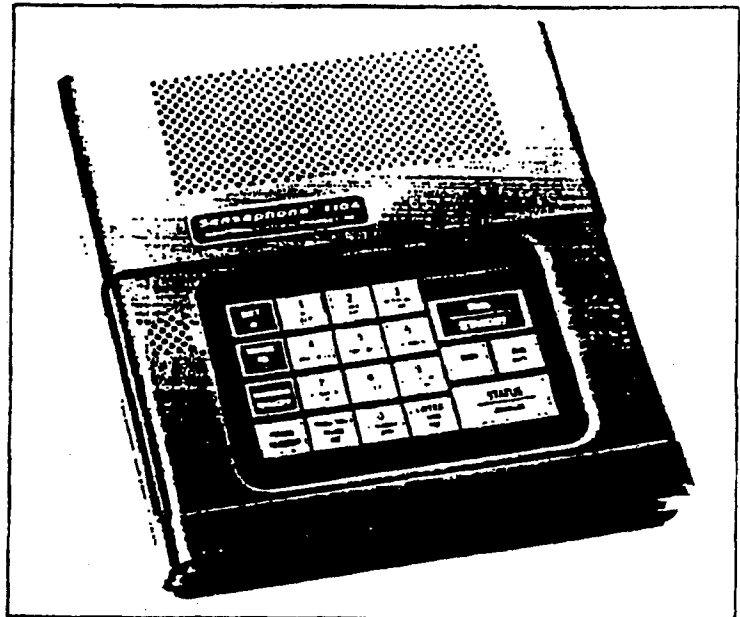
## **Desktop Monitoring System**

**Environmental/Process monitoring  
over telephone lines with full  
programming capabilities**

- ☐ The versatile Model 1104 is designed for programming flexibility
- ☐ Variable alarm recognition and "listen-in" time, with alarm disable, security code access, remote sensing, and other programming features
- ☐ Monitors power, temperature, and other important environmental conditions to protect computers, equipment, and processes
- ☐ Automatically contacts you at up to 4 locations if unsafe conditions occur
- ☐ Allows you to contact your system using any telephone, to receive status reports and listen-in to on-site sounds
- ☐ Helps you detect problems before they turn into disasters

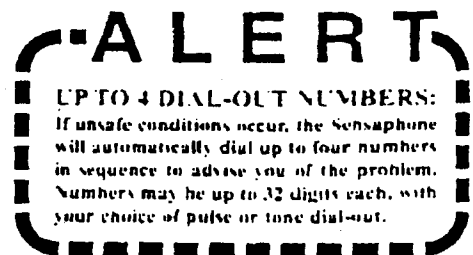
Now you can protect your equipment and processes even when you can't be there - The Sensaphone 1104 monitors your computer rooms, equipment centers, offices, or any unattended facility to detect power failures, temperature extremes, intrusions, water incursion, sounds such as smoke and burglar alarms, and other conditions of your choice.

Alerts you immediately if problems arise - The Sensaphone 1104 automatically contacts you by phone at up to four different phone numbers, to alert you of unsafe conditions. The system communicates in voice-synthesized English, and even lets you "listen-in" to actual on-site sounds.



### **CONDITIONS MONITORED:**

**Temperature  
Humidity  
Electricity  
Water Incursion  
Smoke  
Sound  
Windows &  
Doors  
...and more!**



**COMMUNICATES OVER  
STANDARD PHONE  
LINES**

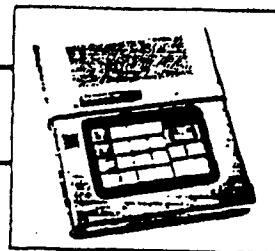
Call-in for periodic status reports on all monitored conditions, using any telephone. The Sensaphone communicates in simple voice-synthesized English.

## **Phonetics, Inc.**

901 Tryens Road, Aston, Pa 19014 610-558-2700 FAX: 610-558-0222  
<http://www.phonetics-monitoring.com/>

See reverse side for a list of the Sensaphone's outstanding features and capabilities.

# Sensaphone<sup>®</sup> 1104



Ideal for a variety of applications - The Sensaphone is useful wherever there is a need for monitoring of temperature, humidity, or other conditions. Sensors and input devices are available to suit a wide range of applications.

- ☐ HVAC Equipment
- ☐ Computer rooms
- ☐ Refrigeration and freezers
- ☐ Health care centers
- ☐ Offices
- ☐ Warehouses
- ☐ Livestock and egg/poultry
- ☐ Home & property
- ☐ Greenhouses
- ...and many others!

## BUILT-IN FEATURES

- ☐ 4 User-selectable inputs, temperature or dry-contact
- ☐ Microphone monitors high sound alarms and enables remote listen-in
- ☐ AC Power failure sensing with variable recognition time
- ☐ Battery condition monitor
- ☐ Clock

## ADVANCED CAPABILITIES

- ☐ User Programmable: Alarm recognition time, Call delay, Inter-call delay, Message repetitions
- ☐ Temperature sensing in Fahrenheit (-20°F to 150°F), or Celsius (-29°C to 65°C)
- ☐ Individual temperature input calibration
- ☐ Nonvolatile memory for all programmed parameters

## VERSATILE DIAL-OUT CAPABILITIES

- ☐ Alert sensors trigger pulse or tone dialout automatically
- ☐ Dials up to 4 numbers, up to 32 digits each
- ☐ Continues dialing numbers in sequence, until acknowledged
- ☐ Call Progress: Intelligently detects ringing or busy signal
- ☐ Intelligent dial out to beepers and pagers

## EASY CONTROL ACCESS:

- ☐ Keypad for local programming and status report
- ☐ Unit can be called from any phone to verify status of all monitored conditions
- ☐ Local or remote enabling/disabling of all dial-out conditions
- ☐ Can share a single phone line with an answering machine, allowing full operation of both units
- ☐ Programmable security code access

## SPECIFICATIONS

**Size:** 7½" W, 2" H, 8½" D  
**Power Requirements:** 120 VAC 60Hz 15W  
**Batteries:** (6) 1.5 Volt "D" cell alkaline (not included)  
**Telephone Interface:** FCC approved RJ-11 plug-in modular connector with 6' cord  
**Operating Range:** Unit should be kept between 32° F and 120° F.  
**Temperature Sensing Range:** -20° F to 150° F with remote temperature sensor.  
**Shipping Weight:** 4 lbs.  
**NRTL listed for compliance with U.L. Standard 1459.**  
*Technical data subject to change without notice*

We'd like to show you how the Sensaphone 1104 can help you monitor your equipment and facilities. Give us a call to find out more! Or, listen to an actual Sensaphone report by calling 610-558-4591.

# Phonetics, Inc.

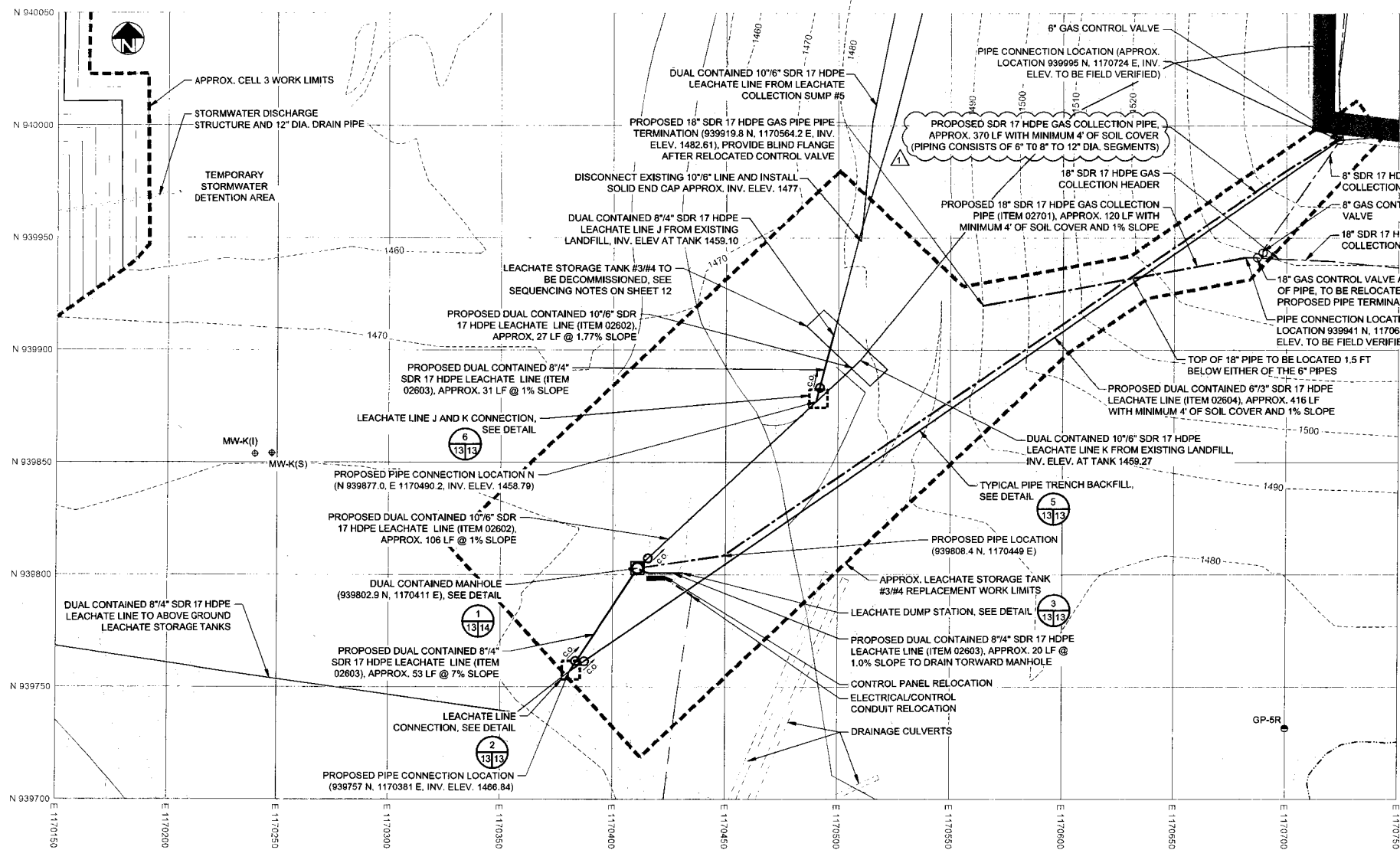
901 Tryens Road, Aston, Pa 19014 610-558-2700 FAX: 610-558-0222



© 1995 Phonetics, Inc.  
 Sensaphone<sup>®</sup> is a registered trademark of Phonetics, Inc.

## **APPENDIX A -3**

### **Sump 3/4 Manhole**

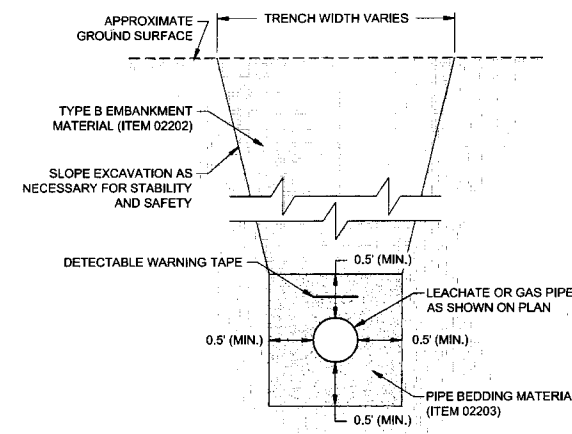


### LEGEND

- 1440 --- EXISTING CONTOURS (SEE NOTE 1)
- 1480 --- PROPOSED SUBGRADE CONTOURS
- EXISTING DRAINAGE PIPES
- EXISTING UTILITY POLES
- LEACHATE TRANSMISSION LINES AND CLEANOUTS (SEE NOTE 2)
- PROPOSED LEACHATE TRANSMISSION LINES AND CLEANOUTS
- GAS TRANSMISSION PIPE (SEE NOTE 2)
- PROPOSED GAS TRANSMISSION PIPE
- ELECTRICAL/CONTROL CONDUITS AND PULL BOXES (SEE NOTE 2)
- PROPOSED ELECTRICAL/CONTROL CONDUITS
- MW-K(I) --- MONITORING WELL LOCATION AND DESIGNATION (SEE NOTE 3)
- GP-SR --- GAS PROBE LOCATION AND DESIGNATION (SEE NOTE 4)

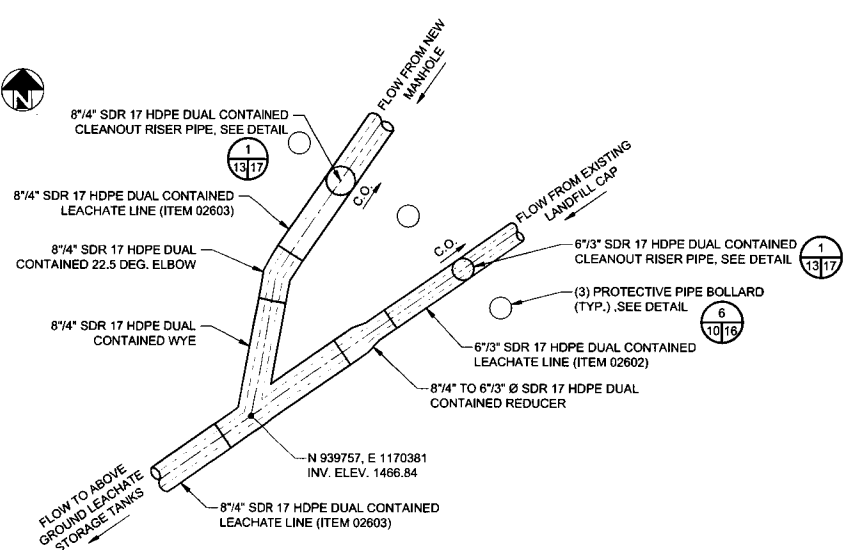
NOTES:

- Existing site contours are based on aerial photography dated June 18, 2010 compiled by Aero Metric of Dulles, Virginia, ground surveys from the Cell 586 and Cell 4 Construction by Wendel Duchschere Survey and additional ground surveys from the fall of 2010.
- Existing leachate, gas and electrical information is based on 2007 construction record drawings prepared by Wendel Duchschere Survey.
- MW(K) and K(S) locations are based on survey completed by Wendel Duchschere Survey dated December 27, 2007.
- GP-SR location is based on survey completed by Wendel Duchschere Survey dated September 2003.

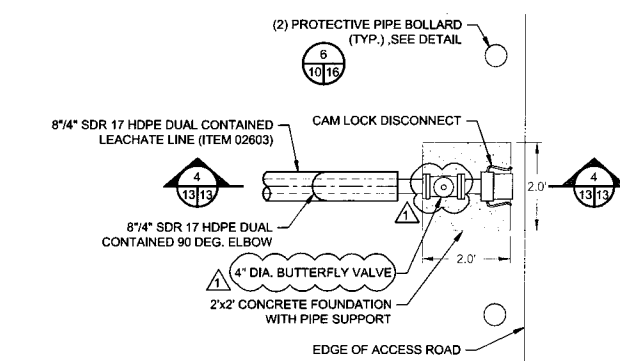


**5 TYPICAL PIPE TRENCH DETAIL**  
13/13 SCALE: N.T.S.

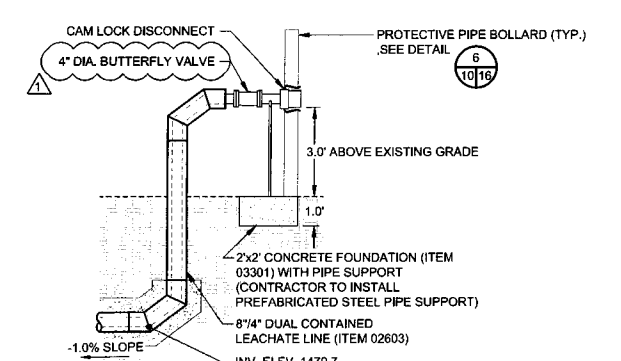
**1 MANHOLE REPLACEMENT PLAN**  
13/13 SCALE: 1" = 30'



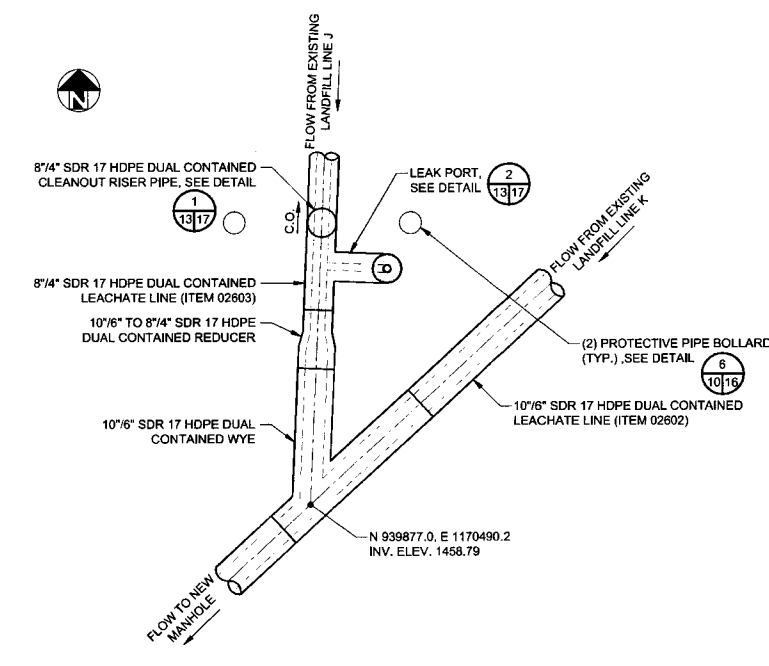
**2 LEACHATE LINE CONNECTION DETAIL**  
13/13 SCALE: 1" = 2'



**3 LEACHATE DUMP STATION PIPE DETAIL**  
13/13 SCALE: 1" = 2'



**4 LEACHATE DUMP STATION PIPE SECTION**  
13/13 SCALE: N.T.S.



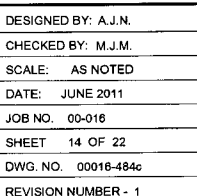
**6 LEACHATE LINE J AND K CONNECTION DETAIL**  
13/13 SCALE: 1" = 2'

REV 1	1/13/12- Revised to show gas system modifications
REV 2	
REV 3	
REV 4	
REV 5	

**McMahon & Mann**  
Consulting Engineers, P.C.  
2495 MAIN STREET, SUITE 432  
BUFFALO, NY 14214  
(716) 834-8932  
FAX: (716) 834-8934

**CHAFFEE FACILITY  
CELL 3 CONSTRUCTION  
LEACHATE STORAGE TANK  
#3/#4 MODIFICATION PLAN  
AND DETAILS**  
ERIE COUNTY NEW YORK

DESIGNED BY: A.J.N.
CHECKED BY: M.J.M.
SCALE: AS SHOWN
DATE: JUNE 2011
JOB NO. 00-016
SHEET 13 OF 22
DWG. NO. 00016-484b
REVISION NUMBER - 1



## **APPENDIX A -4**

### **Sump 5**

**Leachate Collection Well No. 5**  
**Tank Volume and Pump Control Functions**

Level Indicator Reading (inches)	Volume of Leachate in Tank (gallons)	Comments
0	900	Low Level Alarm. Note level sensor is located 8 inches above the bottom of the tank.
1	1012.5	Low Level Alarm turns off when level gets above 1 inch.
2	1125	Pump turns off (when operating in "Auto").
3	1237.5	
4	1350	
5	1462.5	
6	1575	
7	1687.5	
8	1800	
9	1912.5	
10	2025	
11	2137.5	
12	2250	
13	2362.5	
14	2475	
15	2587.5	
16	2700	
17	2812.5	
18	2925	
19	3037.5	
20	3150	
21	3262.5	
22	3375	
23	3487.5	
24	3600	
25	3712.5	
26	3825	
27	3937.5	
28	4050	
29	4162.5	
30	4275	
31	4387.5	
32	4500	Pump On turns on when operating in "Auto". 32 inches is the minimum level required to begin pumping.
33	4612.5	
34	4725	
35	4837.5	
36	4950	
37	5062.5	
38	5175	
39	5287.5	
40	5400	
41	5512.5	
42	5625	
43	5737.5	
44	5850	High Level Alarm turns off when level goes below 44 inches.
45	5962.5	High Level Alarm
46	6075	



**Leachate Collection Well No. 5**  
**Tank Volume and Pump Control Functions (Continued)**

Level Indicator Reading (inches)	Volume of Leachate in Tank (gallons)
47	6076.6
48	6078.2
49	6079.8
50	6081.4
51	6083
52	6084.6
53	6086.2
54	6087.8
55	6089.4
56	6091
57	6093
58	6095
59	6097
60	6099
61	6101
62	6103
63	6105
64	6107
65	6109
66	6111
67	6113
68	6115
69	6116
70	6118
71	6120
72	6122
73	6124
74	6126
75	6128
76	6130
77	6132
78	6134
79	6136
80	6138
81	6146
82	6154
83	6161
84	6169
85	6177
86	6185
87	6193
88	6201
89	6208
90	6216
91	6224
92	6232
93	6240

Level Indicator Reading (inches)	Volume of Leachate in Tank (gallons)
94	6248
95	6255
96	6263
97	6271
98	6279
99	6287
100	6295
101	6302
102	6310
103	6318
104	6326
105	6334
106	6342
107	6349
108	6357
109	6365
110	6373
111	6381
112	6389
113	6396
114	6404
115	6412
116	6420
117	6428
118	6436
119	6443
120	6451

## **APPENDIX A -5**

### **Gas Condensate Knockout Tank**

## Condensate Tank Chart

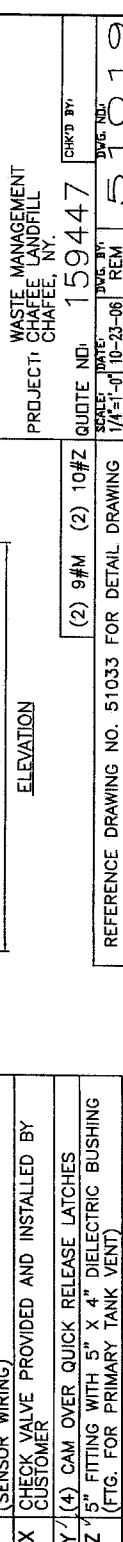
Feet	Gallons
19.0	9
18.9	25
18.8	47
18.7	70
18.6	100
18.5	130
18.4	164
18.3	200
18.2	277
18.1	319
18.0	362
17.9	406
17.8	500
17.7	549
17.6	599
17.5	651
17.4	703
17.3	757
17.2	811
17.1	923
17.0	980
16.9	1,038
16.8	1,097
16.7	1,216
16.6	1,277
16.5	1,338
16.4	1,400
16.3	1,463
16.2	1,562
16.1	1,653
16.0	1,717
15.9	1,782
15.8	1,912
15.7	1,977
15.6	2,043
15.5	2,109
15.4	2,175
15.3	2,241
15.2	2,307
15.1	2,374
15.0	2,507

Feet	Gallons
14.9	2,573
14.8	2,706
14.7	2,772
14.6	2,839
14.5	2,905
14.4	2,971
14.3	3,036
14.2	3,102
14.1	3,167
14.0	3,296
13.9	3,361
13.8	3,488
13.7	3,551
13.6	3,613
13.5	3,675
13.4	3,797
13.3	3,857
13.2	3,917
13.1	3,975
13.0	4,033
12.9	4,091
12.8	4,147
12.7	4,202
12.6	4,310
12.5	4,363
12.4	4,414
12.3	4,464
12.2	4,513
12.1	4,607
12.0	4,652
11.9	4,695
11.8	4,736
11.7	4,814
11.6	4,850
11.5	4,883
11.4	4,914
11.3	4,942
11.2	4,967
11.1	4,988
11.0	5,013







<u>DESIGN DATA</u>
CAPACITY - 5000 GALLONS
TYPE - DOUBLE WALL, S.T.I.P. 3, UNDERGROUND
NO. REQ. - (1)
OPERATING PRESSURE - ATMOSPHERIC
TANK MATERIAL - A-36 CARBON STEEL
THICKNESS - INNER HEADS 1/4" SHELL 7 GA.
THICKNESS - OUTER HEADS 7 GA. SHELL 10 GA.
*GA THK. BASED ON 160" MAX. BURIAL DEPTH
CONSTRUCTION - LAP WELD ALL INTERIOR AND EXTERIOR SEAMS
TANK TEST - 5 PSIG
INT. FINISH - SP-10 BLAST, COAT WITH (2) COATS OF CHEMLINER 4000 NOVALAC EPOXY 6-10 MILS. PER COAT
EXT. FINISH - SP6 BLAST, 15 MILS POLYURETHANE
LABEL - UL-58, S.T.I.P. 3

LEGEND	
A	3" LEAK DETECTION WITH 3" X 2" DIELECTRIC BUSHING (FITTING DETECTION WITH INTERNAL PIPE)
B	2" 150 # R.F.S.O. FLANGE W/ ISOLATED THD'D COMPANION FLANGE, 6" PROJECTION.
C	36" MANHOLE W/ BOLT ON EXTENSION & LID. COAT INT. WITH 12-15 MILS OF POLYURETHANE. COAT EXTERIOR W/15 MILS OF POLYURETHANE
D	16" WIDE STAINLESS STEEL INTERNAL LADDER
E	78" WIDE x 132" LONG CONTAINMENT CHAMBER WITH BOLT ON EXTENSION. COAT INTERIOR WITH 12-15 MILS OF POLYURETHANE AND EXTERIOR W/15 MILS OF POLYURETHANE
F	72" WIDE x 96" LONG FLYGT ACCESS HATCH IN TOP OF CONTAINMENT CHAMBER EXTENSION (MODEL CHD-72X96AL)
G	4" 150 # R.F.S.O. FLANGE INSIDE AND OUTSIDED OF CONTAINMENT CHAMBER, 6" PROJECTION TYPE ISOLATED THD'D COMPANION FLANGE ON OUTER
H	9# MAGNESIUM ANODE WELDED TO INNER SHELL
J	4"x1/2" REINFORCING RING
K	2" FITTING WITH MOUNTING BRACKET (CHAMBER LEAK DETECTION SEE DETAIL-B)
L	DEADMAN HOLD DOWN STRAPS W/ GALVANIZED TURNBUCKLES, WIRE ROPES AND CLAMPS, D RING CLEVIS AND PIN
M	HTLP 1.5 LIQUID ONLY LEAK DETECTION SENSOR WITH 40' OF CABLE
N	HTSC-28 NEMA 4 CAP FOR LEAK SENSOR
P	3" FITTING WITH 3" X 2" DIELECTRIC BUSHING (CHAMBER LEAK DETECTION WIRING)
Q	8" 150 # R.F.S.O. FLANGE OUTSIDE W/ ISOLATED THD'D COMPANION FLANGE, 6" 150# R.F.S.O. FLANGE INSIDE (SECONDARY CONTAINMENT PIPING FOR PUMP). SEE DETAIL-A
R	2" SCH. 40-304 STAINLESS STEEL SLIDE RAILS PROVIDED BY OTHERS, INSTALLED BY HIGHLAND
S	5" FITTING WITH 5" X 4" DIELECTRIC BUSHING (VENT)
T	FLYGT NP3127 EFFLUENT PUMP WITH INTERNAL PIPING AS NEEDED BY HIGHLAND

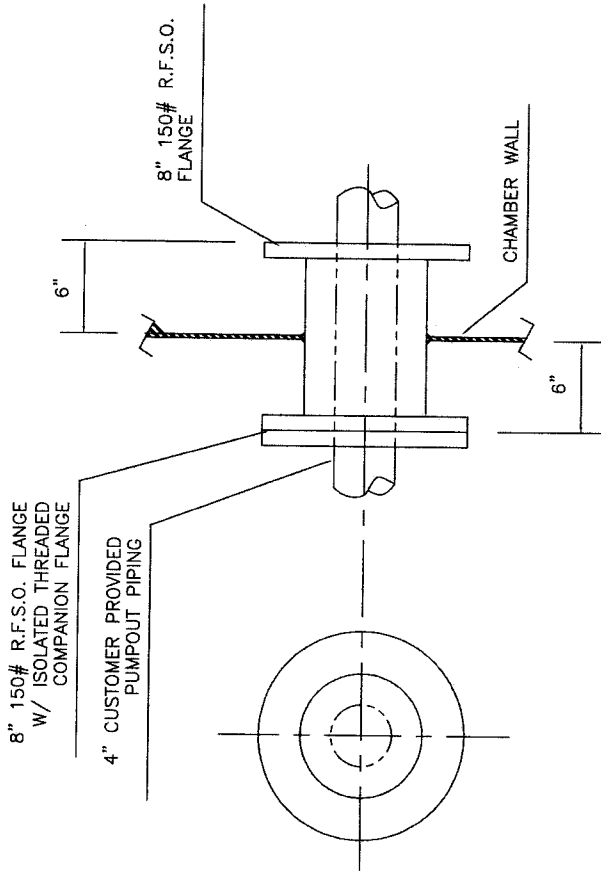


CUSTOMER	Y' (4) CAM OVER QUICK RELEASE LATCHES	(2) 9#M (2) 10#Z QUOTE NO. 159447 CHECKED BY:
Z' 5" FITTING WITH 5" X 4" DIELECTRIC BUSHING (FIG. FOR PRIMARY TANK VENT)		

	-ADDED VENT FTGS, STRAPS, & MANHOLE LATCHES	12-13-06 REM
	-REVISED FITTING ORIENTATION -ADDED PUMP/ACCESSORIES	12-11-06 REM
	-REVISED DIMENSIONS	11-16-06 BWM

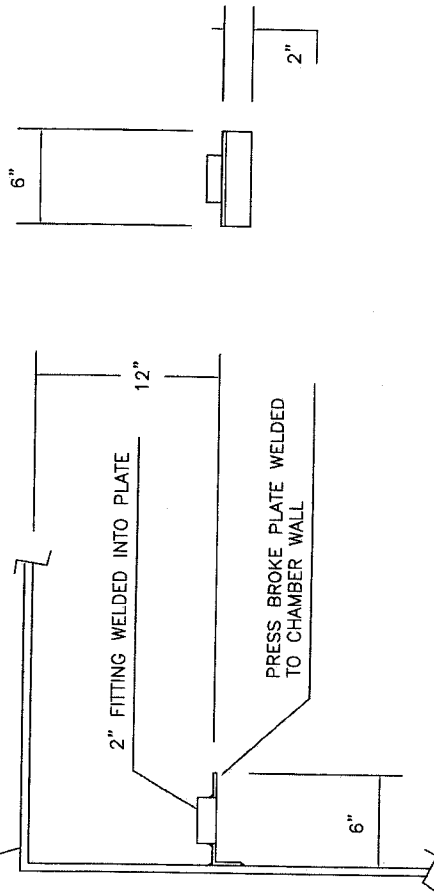
	<h1>Highland Tank®</h1>	
	<h2>5000 GALLON 96" DOUBLE WALL S.T.I.P.3</h2>	
CUSTOMER: TOM GREENAUER DEVELOPMENT		
WASTE MANAGEMENT PROJECT: CHAFFEE LANDFILL CHAFFEE, NY.		
QUOTE NO.	159447	CHECKED BY:
ISSUE DATE:	10-23-06	DATE NO:
SCALE: 1/4"=1'-0"	REM	51010

NOTE: ALL RIGHTS RESERVED. THIS DRAWING IS THE PROPERTY OF HIGHLAND TANK & FABRICATING CO. AND SHALL NOT BE REPRODUCED IN ANY FORM WITHOUT THE WRITTEN PERMISSION OF HIGHLAND TANK & FABRICATING CO. HIGHLAND TANK & FABRICATING CO. SHALL BE RESPONSIBLE FOR THE DESIGN AND FABRICATION OF THIS DRAWING UNLESS OTHERWISE NOTED. CUSTOMER IS RESPONSIBLE FOR VERIFYING CORRECTNESS OF SIZE AND LOCATION OF FITTINGS, ACCESSORIES, AND COATINGS SHOWN ON THIS DRAWING.



DETAIL-A

CHAMBER TOP



DETAIL-B

Good Iron Will Not Rust  
Good Drawing Will Not Bend  
Good Welding Will Not Leak

APPROVED

*Tom Greenauer*  
Date 11/13/06



**Highland Tank®**

DETAILS

CUSTOMER: TOM GREENAUER DEVELOPMENT

PROJECT: CHAFFEE LANDFILL  
CHAFFEE, NY

QUOTE NO. 159447

CHK'D BY:

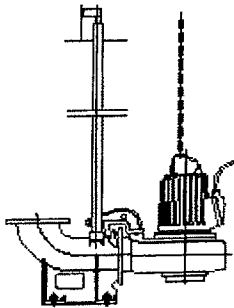
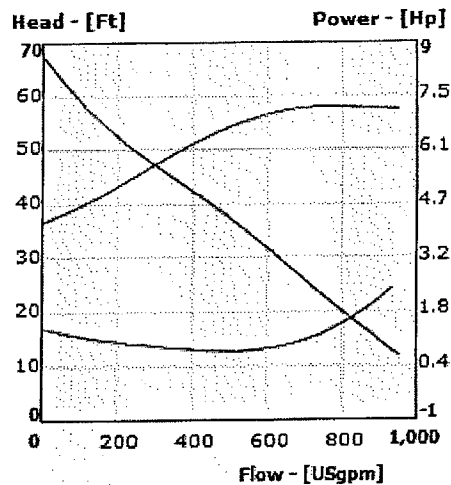
SCALE: 1 1/2"=1'-0"

DATE: 10-23-06

REV

51033

REFERENCE DRAWING NO. 51019 FOR TANK DRAWING

**PRODUCT: NP 3127 HT****Product picture****Curves** **Enlarge****Pump Data**

Curve id: 63-489-00-2202 Impeller: 489 Poles: 4 - pole Motor: 21-10-4AL Frequency: 60 Hz

**Motor Data**

Rated output power Hp (kW)	Ø	Nominal voltage (V)	Full load current (A)	Locked rotor current (A)	Locked rotor kVA	Locked rotor code letter kVA/HP	Poles/rpm
7.5 (5.6)	3	230	19	105	42	F	4/1740
7.5 (5.6)	3	460	9.6	52	41	F	4/1740

Pump motor Hp	Efficiency			Power factor		
	100% load	75% load	50% load	100% load	75% load	50% load
7.5	83.5	84.5	83.5	0.88	0.85	0.77

**Cable Data**

HP	Cables	Volts	Max. length (Ft)	Cable size/Nominal OD.	Conductors (In one cable)	Type	Part number
7.5	1	230 460	180 715	#10/3-2-1-GC 0.84"-(21.3mm)	(3) 10 AWG (PWR) (2) 12 AWG (CTRL) (1) 10 AWG (GND) (1) 12 AWG (GC)	STD	942106

**Available Discharge Connection Outlet Size**

Outlet Drilled Flange	4"
-----------------------	----

# N-3127



## Impeller/Motor/Nominal Sizes

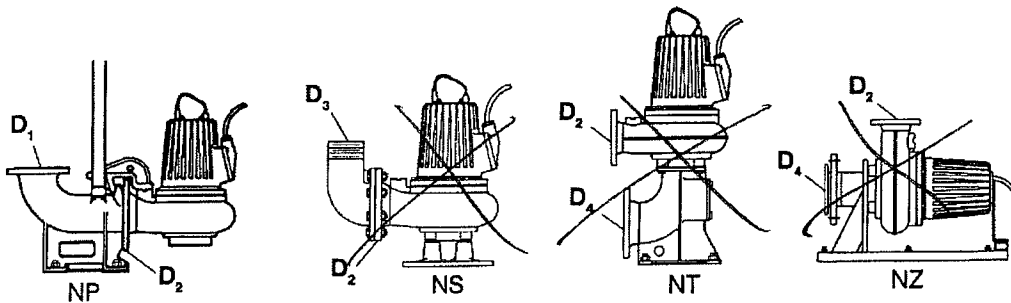
Issued: 9/04

Supersedes: 5/02

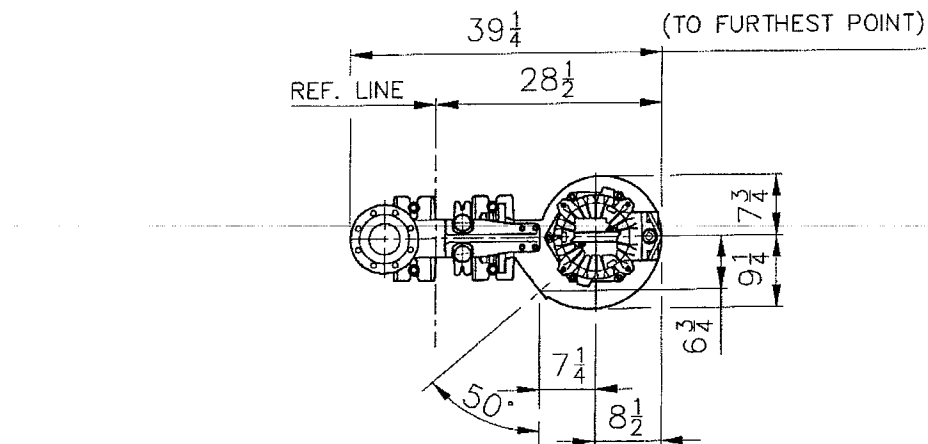
PUMP MODEL	IMPELLER CODE	HP RATING				VAC	D1	D2	D3	D4
		NP	NS	NT	NZ					
3127 3Ø	421 LT	10.0	10.0	--	--	200 230/460 575	8"	6"	8"	--
	422 LT	7.5,10	7.5,10	7.4	7.4		8"	6"	6,8"	8"
	438 MT	10.0	10.0	--	--		4,6,8	4,6"	4,6"	6"
	439 MT	7.5,10	7.5,10	7.4	7.4		4,6,8	4,6"	4,6"	6"
	487 HT	10	10	--	--		4"	4"	4"	--
	488 HT	10	10	--	--		4"	4"	4"	--
	489 HT	7.5,10	7.5,10	7.4	7.4		4"	4"	4"	4"

PUMP MODEL	IMPELLER CODE	HP RATING				VAC	D1	D2	D3	D4
		NP	NS	NT	NZ					
3127 1Ø	422 LT	7.5	7.5	--	--	230	8"	6"	6,8"	--
	439 MT	7.5	7.5	--	--		4,6,8	4,6"	4,6"	--
	489 HT	7.5	7.5	--	--		4"	4"	4"	--

LT= High Volume MT= Standard HT= High Head

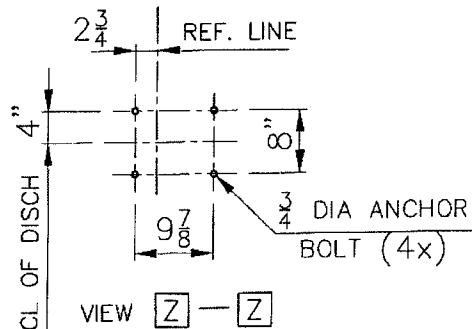
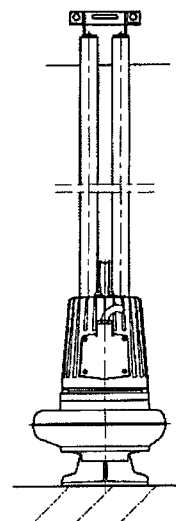
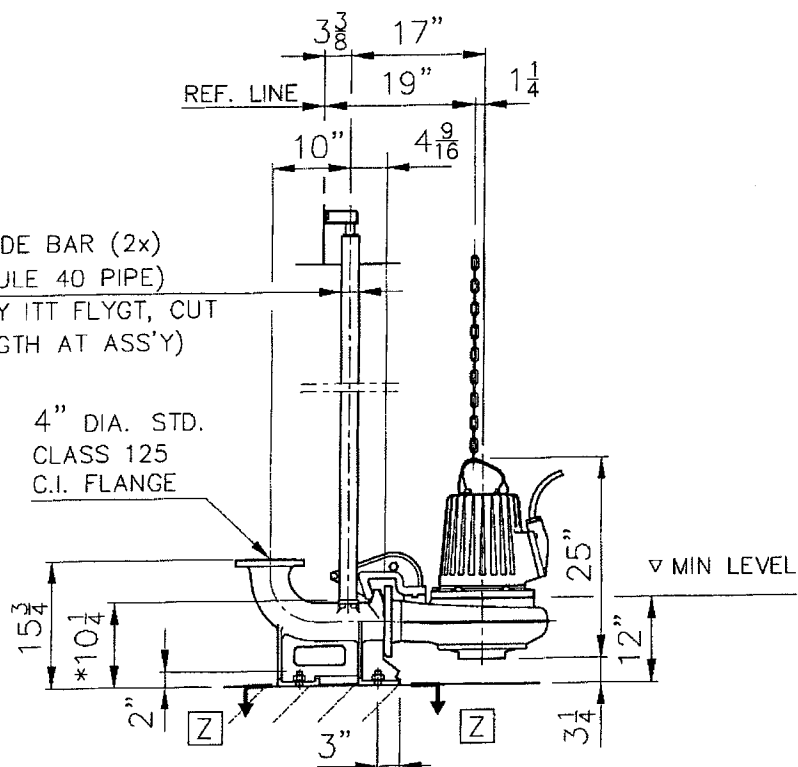






2" GUIDE BAR (2x)  
(SCHEDULE 40 PIPE)  
(NOT BY ITT FLYGT, CUT  
TO LENGTH AT ASS'Y)

4" DIA. STD.  
CLASS 125  
C.I. FLANGE



EQUIPPED WITH IMPELLER 486-489.

ALL DIMENSIONS IN INCHES  
\* DIMENSION TO ENDS OF GUIDE BARS

Weight (LBS)

Pump	Disch
325	80



Denomination  
Dimensional drwg  
NP 3127 HT 1  
4" / 4"

Drawn by Sors	Checked by RB	Date 010115
Scale	Reg no 5399	
663 41 00		B

# CP/NP-3127

e-Catalog

FLYGT

Lift Station Dimensions

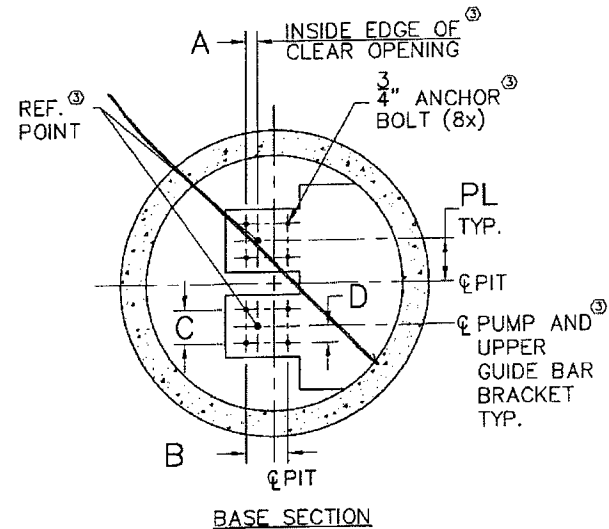
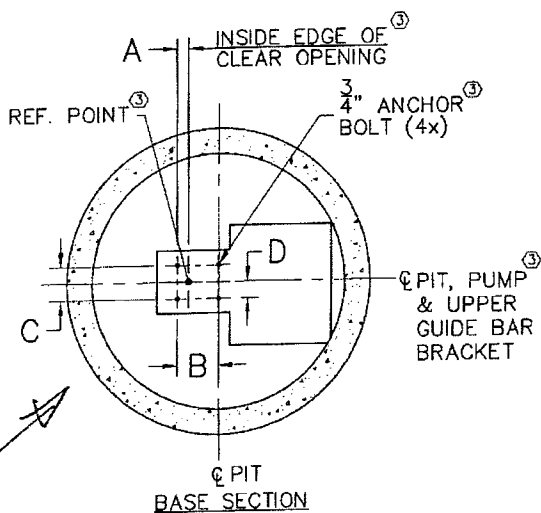
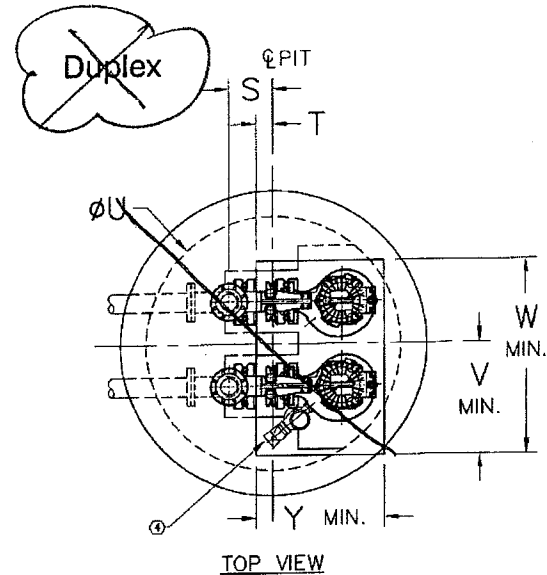
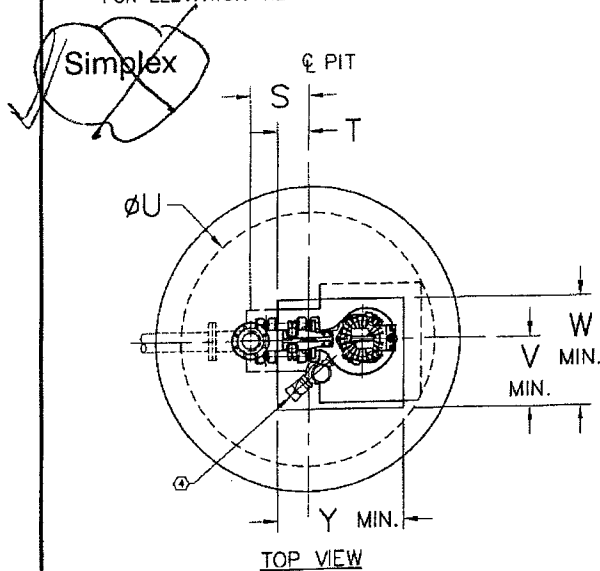
Issued: 7/05

Supersedes: 5/05

## NOTES:

1. CONFIGURATION AND DIMS. SHOWN ARE SUGGESTED REQUIREMENTS ONLY. ALL DETAILS, INCLUDING SIZING OF PIT, TYPE, LOCATION AND ARRANGEMENT OF VALVES AND PIPING, ETC. ARE TO BE SPECIFIED BY THE CONSULTING ENGINEER AND ARE SUBJECT TO THEIR APPROVAL.
2. REFERENCE GENERIC DUPLEX LIFT STATION LAYOUT FOR ELEVATION VIEW.

3. LOCATE ANCHOR BOLTS USING INSIDE EDGE OF CLEAR OPENING AND PUMP CENTERLINE AS REFERENCE POINT. BOLT LOCATIONS MUST BE HELD TO MAINTAIN EXACT POSITION OF PUMP TO CLEAR OPENING.
4. ITT FLYGT MIX-FLUSH VALVE.



ALL DIMENSIONS ARE IN INCHES

ALL DIMENSIONS ARE IN INCHES																			
MODEL	NOM. SIZE	VERSION	SIMPLEX										DUPLEX						
			A	B	C	D	S	T	U	V	W	Y	S	T	U	PL	V	W	Y
CP	3"	SH	2 $\frac{3}{8}$	9 $\frac{1}{8}$	8	4	15 $\frac{1}{2}$	9 $\frac{1}{2}$	60	17 $\frac{1}{2}$	26	30	19 $\frac{3}{8}$	13 $\frac{3}{8}$	72	8 $\frac{1}{2}$	26	43	30
CP	4"	HT	2 $\frac{3}{8}$	9 $\frac{1}{8}$	8	4	13 $\frac{3}{4}$	7 $\frac{1}{4}$	60	18 $\frac{1}{2}$	28	30	17	10 $\frac{1}{2}$	72	10	28 $\frac{1}{2}$	48	30
CP/NP	4"	HT	2 $\frac{3}{8}$	9 $\frac{1}{8}$	8	4	13 $\frac{3}{4}$	7 $\frac{1}{4}$	60	18 $\frac{1}{2}$	28	30	17	10 $\frac{1}{2}$	72	10	28 $\frac{1}{2}$	48	30
CP/NP	4"	MT	2 $\frac{3}{8}$	9 $\frac{1}{8}$	8	4	13 $\frac{3}{4}$	7 $\frac{1}{4}$	60	16 $\frac{1}{2}$	26	30	17	10 $\frac{1}{2}$	72	10	28 $\frac{1}{2}$	46	30
CP/NP	6"	MT	4 $\frac{1}{8}$	11	10	5	11	3 $\frac{3}{8}$	60	16 $\frac{1}{2}$	26	30	13 $\frac{1}{2}$	5 $\frac{3}{8}$	72	11	28 $\frac{1}{2}$	48	30
CP/NP	6"	MT	4 $\frac{1}{8}$	11	10	5	11	3 $\frac{3}{8}$	60	17 $\frac{1}{2}$	26 $\frac{1}{2}$	30	13 $\frac{1}{2}$	5 $\frac{3}{8}$	72	11	28 $\frac{1}{2}$	48 $\frac{1}{2}$	30
CP/NP	8"	MT	5 $\frac{1}{2}$	11	10	5	14 $\frac{3}{8}$	5 $\frac{1}{2}$	72	17 $\frac{1}{2}$	26 $\frac{1}{2}$	30	10 $\frac{1}{2}$	1 $\frac{3}{8}$	72	11	28 $\frac{1}{2}$	48 $\frac{1}{2}$	30
CP/NP	8"	LT	5 $\frac{1}{2}$	11	10	5	14 $\frac{3}{8}$	5 $\frac{1}{2}$	72	11 $\frac{1}{2}$	27 $\frac{1}{2}$	32	10 $\frac{1}{2}$	1 $\frac{3}{8}$	72	11	22 $\frac{1}{2}$	49 $\frac{1}{2}$	32

\* WITH 4" VOLUTE OUTLET

\*\* WITH 6" VOLUTE OUTLET

\*\*\* WITH 462 OR 463 IMPELLER

\*\*\*\* WITH 481, 483-485, 487-489 IMPELLER

# Generic Duplex Lift Station Layout

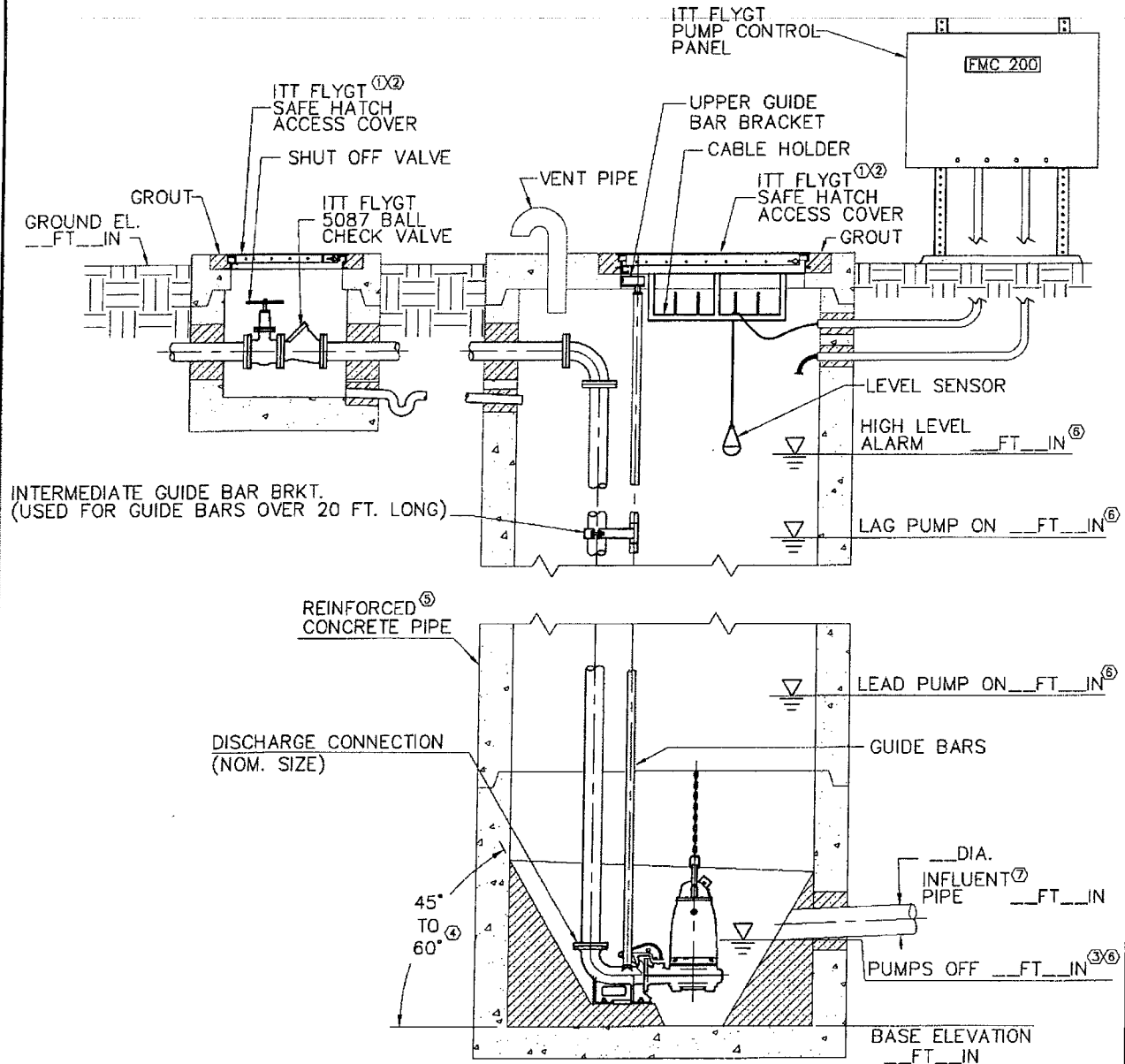
e-Catalog



Lift Station Guide Lines

Issued: 9/05

Supersedes: 5/05



## ○ NOTES:

- COVER SHOWN IS A STANDARD DUTY SAFE HATCH WITH ANGLE FRAME. FOR DIMENSIONS ON ACCESS COVERS WITH SAFE HATCH OR WITHOUT SAFE HATCH AS WELL AS HEAVY DUTY OR OTHER TYPES, CONSULT ITT FLYGT.
- INSTALL ACCESS COVERS PER MANUFACTURER'S INSTRUCTIONS.
- MIN. LIQUID LEVEL MUST NOT FALL BELOW TOP OF VOLUTE.
- 60° RECOMMENDED.
- OTHER MATERIALS AVAILABLE. CONSULT ITT FLYGT.
- ITT FLYGT LIQUID LEVEL CONTROL MONITORING SYSTEM.
- GOOD DESIGN PRACTICE DICTATES THAT INFLUENT PIPE ELEVATIONS HIGHER THAN LWL SHOULD BE AVOIDED DUE TO RISK OF AIR ENTRAINMENT, UNLESS SPECIAL ARRANGEMENTS ARE MADE.

# Standard CP/NP Discharge Connections (Cast Iron)

## Dimensions



### Accessories

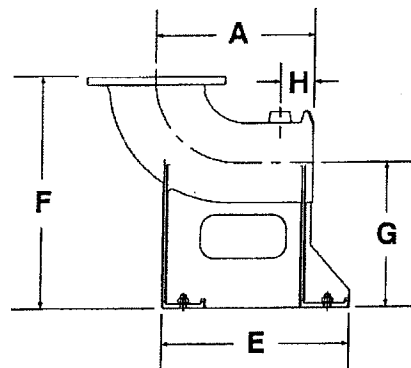
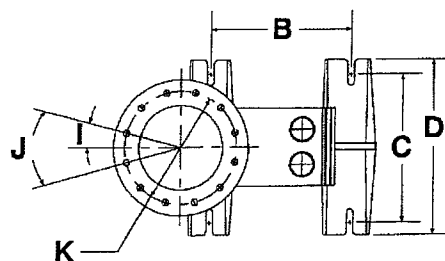
Issued: 10/06

Supersedes: 4/06

All dimensions (inches)

Pump Model	Part Number	Disch. Inlet	Disch. Outlet	A	B	C	D	E	F	G	H	I	J	K
2" - 3045, 3057, 3068.	486 55 01	2"	2"-11 1/2 NPT	3 13/16	4	4 1/2	5 1/2	7 1/4	6 3/4	3 15/16	7/8	---	---	---
2 1/2" - 3068.	493 17 06	2 1/2"	2 1/2"	11 5/8	7 7/8	6 1/2	7 7/8	11 7/16	9 7/8	6 1/2	4 9/16	45°	90° x 4	5 5/8
3" - 3057, 3068.	555 48 01	2"	3-8 NPT	6 3/4	5 1/2	4 1/8	5 1/2	10 3/4	6 3/4	3 15/16	7/8	---	---	---
3" - 3076, 3068, 3080, 3085, 3102, 3153.	444 68 05	3"	3"	14	9 7/8	8	10 5/8	15 3/8	15 3/4	7 7/8	4 9/16	45°	90° x 4	6
4" - 3080, 3085, 3102, 3127, 3152, 3153, 3170, 3171, 3202.	540 13 05	4"	4"	14 3/8	9 7/8	8	10 5/8	15 3/8	15 3/4	7 7/8	4 9/16	22.5°	45° x 8	7 1/2
6" - 3102, 3127, 3152, 3153, 3170, 3171, 3201.	444 70 06	5 1/2"	6"	15 9/16	11	10	12 3/16	15 3/8	17 3/4	9 7/8	4 9/16	22.5°	45° x 8	9 1/2
6" - 3153, 3171, 3202.	602 33 06	5 1/2"	6"	15 9/16	11	10	12 3/16	15 15/16	17 3/4	9 7/8	4 9/16	22.5°	45° x 8	9 7/16
6" - R3231	388 25 06	6"	6"	20 11/16	19 3/4	15 3/4	19 3/4	23 5/8	15 3/4	7 7/8	6 7/8	22.5°	45° x 8	9 7/16
6" - 3301	604 56 06	6"	6"	15 9/16	11 1/8	10	12 3/16	15 15/16	18	10 1/8	4 9/16	22.5°	45° x 8	9 7/16

Note: Alternative discharge connections may be available, contact Flygt Application Engineering.



Note:  
The discharge connection shown here is typical in appearance for most pumps.

# Upper Guide Bar Brackets



## Accessories

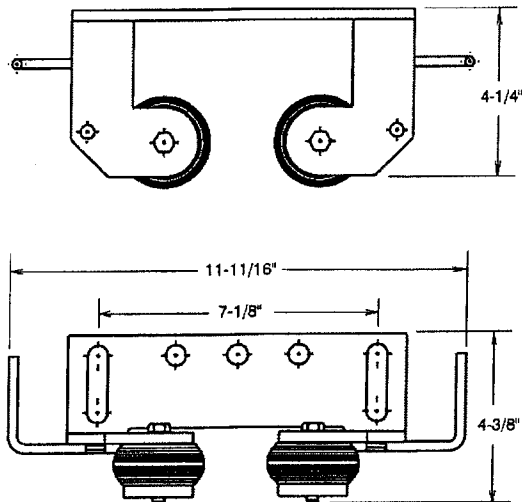
Issued: 8/06

Supersedes: 6/06

### 2" UPPER GUIDE BAR BRACKET

613 68 00 - Galvanized Steel

613 68 04 - 316 Stainless Steel



Note: use with 2" nominal guide bars

### MOUNTING HARDWARE

14-59 00 00 (stainless steel)



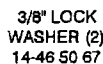
3/8"-16 LATERAL NUT  
14-46 37 05



HEX. HEAD BOLT (2),  
3/8"-16 x 7/8"  
14-46 20 25



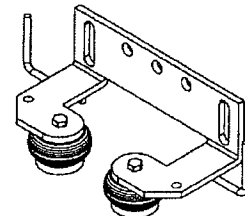
3/8" PLAIN WASHER  
(2)  
14-46 50 07



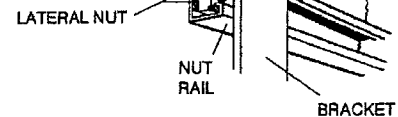
3/8" LOCK  
WASHER (2)  
14-46 50 67

Standard for the  
following pumps:

DP-3068  
CP-3076  
DP-3080  
BP/CP/DP/FP/NP-3085  
CP/FP/NP-3102  
CP-3126  
CP/FP/NP-3127  
CP/FP-3152  
NP-3153  
NP-3171  
HP-5520, 5530, 5540



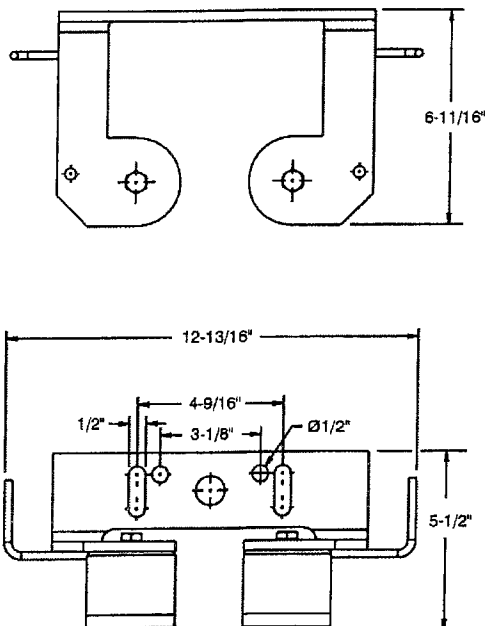
### OPTIONAL: NUT RAIL FEATURE



### 3" UPPER GUIDE BAR BRACKET

661 54 00 - Galvanized Steel

661 54 01 - 316 Stainless Steel



Note: use with 3" nominal guide bars

### MOUNTING HARDWARE

14-59 00 00 (stainless steel)



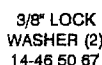
3/8"-16 LATERAL NUT  
14-46 37 05



HEX. HEAD BOLT (2),  
3/8"-16 x 7/8"  
14-46 20 25



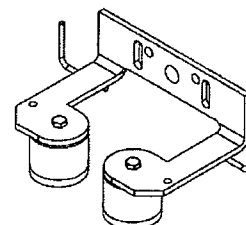
3/8" PLAIN WASHER  
(2)  
14-46 50 07



3/8" LOCK  
WASHER (2)  
14-46 50 67

Standard for the  
following pumps:

CP-3170 CP-3351  
NP-3171 CP/NP-3356  
CP/HP-3201 CP/NP-3400  
NP-3202 CP-3501  
CP/NP/RP-3231 CP-3531  
CP-3240 CP-3602  
CP/NP/RP-3300 CP-3800  
NP-3301 HP-5550  
CP/NP-3306 HP-5560  
CP/NP-3312 HP-5570

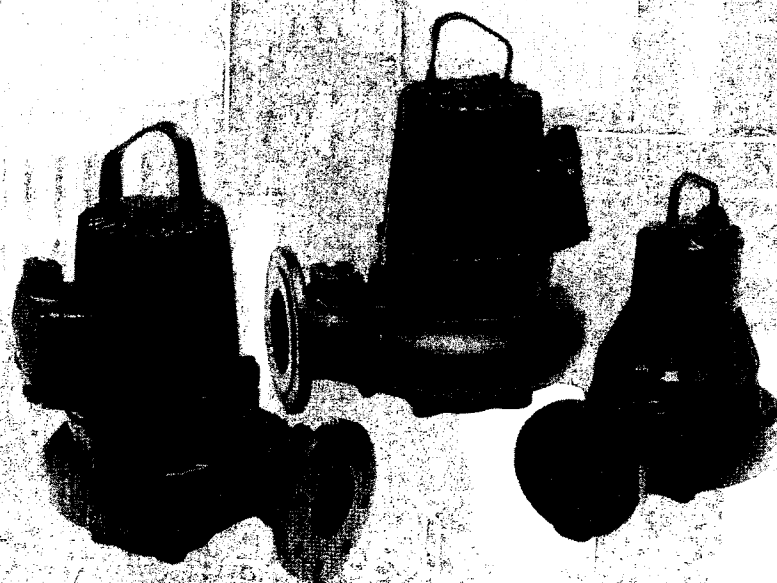


**FLYGT**

# Installation, care and maintenance

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3085/3102/3127



# CONTENTS

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<b>Electrical connections</b> _____	<b>7</b>	<b>Service log</b> _____	<b>15</b>

## SAFETY

This manual contains basic information on the installation, operating and maintenance and should be followed carefully. It is essential that these instructions are carefully read before installation or commissioning by both the installation crew as well as those responsible for operation or maintenance. The operating instructions should always be readily available at the location of the unit.

### Identification of safety and warning symbols



#### General Danger:

Non-observance given to safety instructions in this manual, which could cause danger to life have been specifically highlighted with this general danger symbol.



#### High Voltage:

The presence of a dangerous voltage is identified with this safety symbol.

### WARNING!

Non-observance to this warning could damage the unit or affect its function

### Qualifications of personnel

An authorized (certified) electrician and mechanic shall carry out all work.

### Safety regulations for the owner/operator

All government regulations, local health and safety codes shall be complied with.

All dangers due to electricity must be avoided (for details consult the regulations of your local electricity supply company).

### Unilateral modification and spare parts manufacturing

Modifications or changes to the unit/installation should only be carried out after consulting with ITT Flygt.

Original spare parts and accessories authorized by the manufacturer are essential for compliance. The use of other parts can invalidate any claims for warranty or compensation.

### Dismantling and re-assembly

If the pump has been used to pump hazardous media, care must be taken that, when draining the leakage, personnel and environment are not endangered.

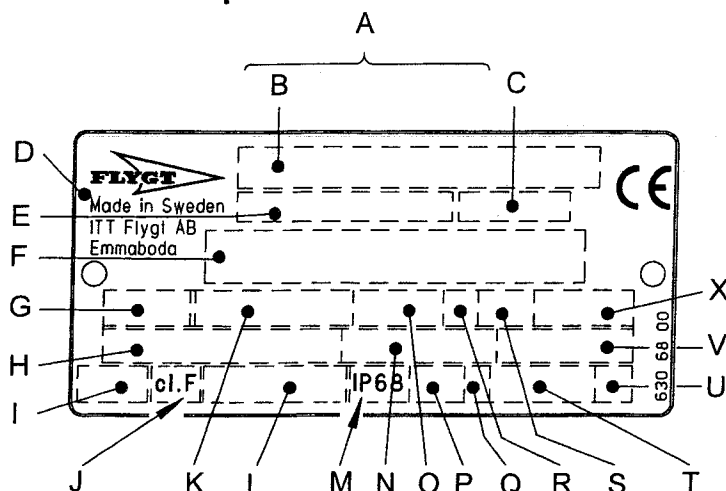
All waste and emissions such as used coolant must be appropriately disposed of. Coolant spills must be cleaned up and emissions to the environment must be reported.

The pumping station must be kept tidy and in good order at all times.

All government regulations shall be observed.

# DATA PLATE INTERPRETATION

## General data plate

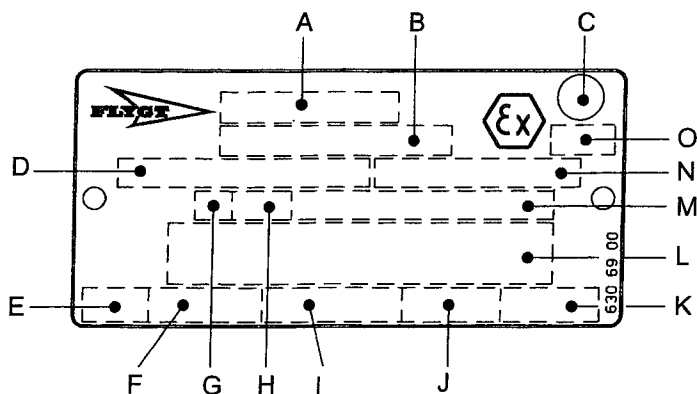


- A Serial number
- B Product code + Number
- C Curve code / Propeller code
- D Country of origin
- E Product number
- F Additional information
- G Phase; Type of current; Frequency
- H Rated voltage
- I Thermal protection
- J Thermal class
- K Rated shaft power
- L International standard
- M Degree of protection
- N Rated current
- O Rated speed
- P Max. submergence
- Q Direction of rotation: L=left, R=right
- R Duty class
- S Duty factor
- T Product weight
- U Locked rotor code letter
- V Power factor
- X Max. ambient temperature

## Approval plates

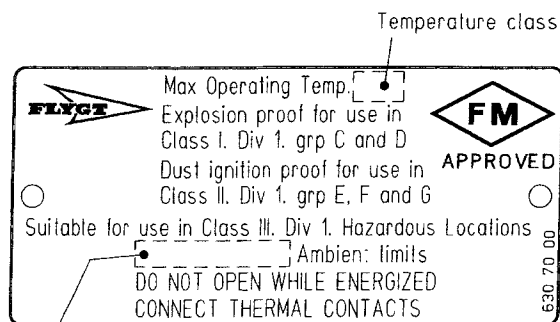
These approval plates apply to an explosion-proof submersible Flygt pump.  
The plates are used together with the general data plate on the pump.

**EN:** European Norm  
ATEX Directive  
EN 50014, EN 50018, EN 1127-1  
Ⓔ II 2 G EEx dII T4



- A Approval
- B Approval authority + Approval Number
- C Approval for Class I
- D Approved drive unit
- E Stall time
- F Starting current / Rated current
- G Duty class
- H Duty factor
- I Input power
- J Rated speed
- K Controller
- L Additional information
- M Max. ambient temperature
- N Serial number
- O ATEX marking

**FM:** Factory Mutual  
Class I Div. I Grp C and D  
Class II and III Div. I Grp E, F and G



Max. ambient temperature



# PRODUCT DESCRIPTION

## Introduction

Thank you for buying a submersible Flygt pump. In this Installation, Care and Maintenance manual you will find general information on how to install and service the 3085, 3102 or 3127 pump to give it a long and reliable life. In the Parts List you will find all the specific technical data for your pump.

## Application

This Installation, Care and Maintenance manual applies to a submersible Flygt pump. If you have bought an Ex-approved pump (please see approval plate on your pump or Parts List) special handling instructions apply as described in this document.

Depending on the hydraulic end, the pump is intended to be used for:

- pumping of waste water
- pumping of light liquid manure and urine
- pumping of sludge
- pumping of ground water
- pumping of sewage if the solids need to be cut into small pieces.

The pumps must not be used in highly corrosive liquids. See pH limits below.

The pump is available for permanent installation in a sump or portable installation with hose connection and stand.

In some applications, the pump is also available for a dry stationary installation on a base stand directly connected to the inlet and outlet lines.

For further information on applications, contact your nearest Flygt representative.

## Specific technical data

For specific technical data regarding your pump, please see Parts List.

## General technical data

**Liquid temperature:** max. 40°C (104°F). The pump can be operated at full load only if at least half the stator housing is submerged.

The pump can be equipped for operation at temperatures up to 90°C (195°F). At increased temperatures, the pump must be completely submerged when operated at full load.

Higher temperatures than 40°C (104°F) are not permitted for Ex-approved pumps.

**Liquid density:** max. 1100 kg/m<sup>3</sup> (9.2 lb per US gal.)

**The pH of the pumped liquid:** 6—13 (cast iron pumps).

**The pH of the pumped liquid:** 3—14 (stainless steel pumps).

**Depth of immersion:** max. 20 m (65 ft).



- In some installations and at certain operating points on the performance curve, the noise level of 70 dB or the noise level specified for the actual pump may be exceeded.
- Only Ex-approved pumps may be used in an explosive or flammable environment.

## Warranty claim

Flygt pumps are high quality products with expected reliable operation and long life. However, should the need arise for a warranty claim, please contact your Flygt representative.

# GENERAL DESIGN OF A FLYGT PUMP

## Design

The pump is a submersible, electric motor-driven product.

### 1. Impeller

The pump is available with a wide range of impellers for different applications and capacities.

### 2. Shaft seals

The pump has two mechanical face seals – one inner and one outer, with an intermediate oil housing.

### 3. Shaft

The shaft is delivered with the rotor as an integral part.  
Shaft material: stainless steel.

### 4. Bearings

The support bearing of the rotor consists of a single-row ball bearing.

The main bearing of the rotor consists of a two-row angular contact ball bearing.

### 5. Oil housing

The oil lubricates and cools the seals and acts as a buffer between the pump housing and the electric motor.

### 6. Motor

Squirrel-cage 1-phase or 3-phase induction motor for 50 Hz or 60 Hz.

The motor can be started by direct on-line or star-delta starting.

The motor can be run continuously or intermittently with a maximum of 15 evenly spaced starts per hour.

Flygt motors are tested in accordance with IEC 34-1.

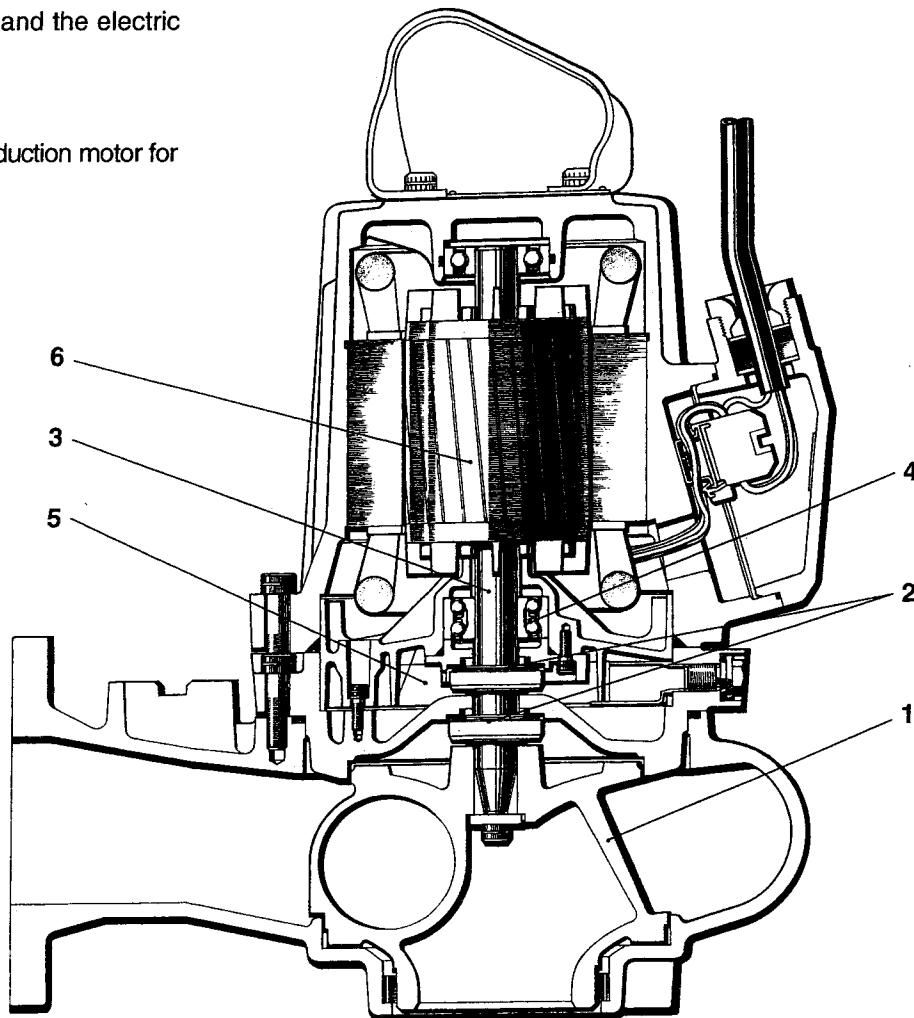
The stator is insulated in accordance with class F (155°C, 310°F). The motor is designed to deliver its rated output at  $\pm 5\%$  variation from the rated voltage. Without overheating the motor,  $\pm 10\%$  variation from the rated voltage can be accepted provided that the motor does not run continuously at full load. The motor is designed to operate at a voltage imbalance of up to 2% between the phases.

### Monitoring equipment

The stator incorporates thermal contacts connected in series.

The pump can be equipped with sensors for sensing water in the oil\* and/or stator housing.

\*Not applicable to Ex-approved pumps.



# INSTALLATION

## Handling equipment

Lifting equipment is required for handling the pump.



- Stay clear of suspended loads.
- Always lift the pump by its lifting handle - never by the motor cable or the hose.

The minimum height between the lifting hook and the floor shall be sufficient to lift the pump out of the sump.

The lifting equipment shall be able to hoist the pump straight up and down in the sump, preferably without the need for resetting the lifting hook.

Oversize lifting equipment could cause damage if the pump should stick when being lifted.

Make sure that the lifting equipment is securely anchored.

## General recommendations

To ensure proper installation, please see the dimensions on the dimensional drawing in the Parts List.

**NOTE!** The end of the cable must not be submerged. It must be above flood level, as water may penetrate through the cable into the junction box or the motor.

Check that the lifting handle and chain are in good condition.

For automatic operation of the pump (level control), it is recommended that the level regulators be used at low voltage. The data sheet delivered with the regulators gives the permissible voltage. Local rules may specify otherwise.

Clean out all debris from the sump before the pump is lowered down and the station is started.



**Special rules apply to installation in explosive atmosphere.**

- Intrinsically safe circuits are normally required (Ex i) for the automatic level control system by level regulators.
- Minimum stop level should be according to the dimensional drawing.
- The pump must never run dry.

## Safety precautions

In order to minimize the risk of accidents in connection with the service and installation work, the following rules should be followed:

1. Never work alone. Use a lifting harness, safety line and a respirator as required. Do not ignore the risk of drowning!
2. Make sure there are no poisonous gases within the work area.
3. Check the explosion risk before welding or using electric hand tools.
4. Do not ignore health hazards. Observe strict cleanliness.
5. Bear in mind the risk of electrical accidents.
6. Make sure that the lifting equipment is in good condition.
7. Provide a suitable barrier around the work area, e.g. a guard rail.
8. Make sure you have a clear path of retreat!
9. Use safety helmet, safety goggles and protective shoes.
10. All personnel who work with sewage systems must be vaccinated against diseases to which they may be exposed.
11. A first-aid kit must be close at hand.
12. Note that special rules apply to installation in explosive atmosphere.

Follow all other health and safety rules and local codes and ordinances.

# ELECTRICAL CONNECTIONS



- Before starting work on the pump, make sure that the pump and the control panel are isolated from the power supply and cannot be energized.
- If the pump is equipped with automatic level control, there is a risk of sudden restart.
- All electrical equipment must be earthed. This applies to both pump equipment and any monitoring equipment. Failure to heed this warning may cause a lethal accident. Make sure that the earth lead is correctly connected by testing it.
- If persons are likely to come into physical contact with the pump or pumped media (liquid), e.g. on construction sites and farms, the earthed (grounded) socket must have an additional earth-(ground)-fault protection device (GFI) connected.  
When pumping near a lake (jetties, beaches, ponds, fountains etc) a safety-distance of at least 20 m (65 ft) between the person and the pump is applicable.  
The pump must never be placed directly into a swimming pool. If used in connection with swimming pools, special safety regulations apply.



## NOTE for Ex version

- Electrical connections on the explosion-proof motor must be made by authorized personnel.  
Flygt disclaims all responsibility for work done by untrained, unauthorized personnel.
- The pump may be used only in accordance with the approved motor data stated on the pump's plates.
- Thermal contacts must be connected to protection circuit intended for that purpose according to the approval of the product.

All electrical work shall be carried out under the supervision of an authorized electrician.

Local codes and regulations shall be complied with.

Check on the data plate which voltage supply is valid for your pump.

Check that the main voltage and frequency agree with the specifications on the pump data plate.

If the pump can be connected to different voltages, the connected voltage is specified by a yellow sticker.

Connect the motor cable to the starter equipment as illustrated in the wiring diagrams.

## Conductors that are not in use must be isolated.

The cable should be replaced if the outer sheath is damaged. Contact a Flygt service shop.

Make sure that the cable does not have any sharp bends and is not pinched.

Under no circumstances may the starter equipment be installed in the sump.

**NOTE!** For safety reasons, the earth conductor should be approx. 50 mm (2.0") longer than the phase conductors. If the motor cable is jerked loose by mistake, the earth conductor should be the last conductor to come loose from its terminal. This applies to both ends of the cable.

Thermal contacts are incorporated in the stator. The thermal contacts can be connected to max 250 V, breaking current max 4 A. Flygt recommends that they be connected to 24 V over separate fuses to protect the other automatic equipment.

Make sure that the pump is correctly earthed (grounded).

When using a variable-frequency-drive (VFD) the shielded cable (type NSSHÖU.../3E+St) should be used. Contact your Flygt representative and ask your VFD-supplier for electrical limitations.

# ELECTRICAL CONNECTIONS

Remember that the starting current in direct on-line starting can be up to six times higher than the rated current. Make sure that the fuses or circuit breakers are of the proper rating.

The Parts List gives rated current. Fuse rating and cable shall be selected in accordance with local rules and regulations. Note that with long cables, the voltage drop in the cable must be taken into consideration, since the motor's rated voltage is the voltage that is measured at the terminal board in the pump.

The overload protection (motor protection breaker) for direct on-line starting shall be set to the motor rated current as given on the data plate.

Check the phase sequence in the mains with the phase sequence indicator.

If intermittent operation is prescribed (see Data Plate), the pump shall be provided with control equipment that provides such operation.

## Single phase operation

The Flygt single phase pumps must be equipped with a starter which has start and run capacitors.

A special Flygt designed starter is required for the operation of single phase pumps. The connection of the motor cable to the starter is shown in the wiring diagram.

**NOTE!** It is not possible to change the direction of rotation of a single phase pump by changing the cable conductors on the starter. Please contact your nearest Flygt representative.

## Monitoring equipment

A plate in the junction box shows if the pump is equipped with sensors.

**CLS-30** is a leakage sensor for sensing water in the oil housing and initiates an alarm when the oil contains 30% water. Oil change is recommended after the alarm. If the sensor initiates an alarm shortly after the oil is changed, contact your nearest Flygt representative. The CLS sensor is installed in the bearing housing and goes down into the oil housing. The sensor is not applicable to Ex-approved pumps.



**CLS sensor body made of glass.  
Handle with care.**

The **FLS** sensor consists of a small float switch for sensing water in the stator housing. Its design makes it suitable for pumps in vertical installations. The FLS sensor is installed in the bottom of the stator housing.

The two sensors, CLS and FLS, can be used in the same pump. They are connected in parallel. Follow the instructions for monitoring equipment.

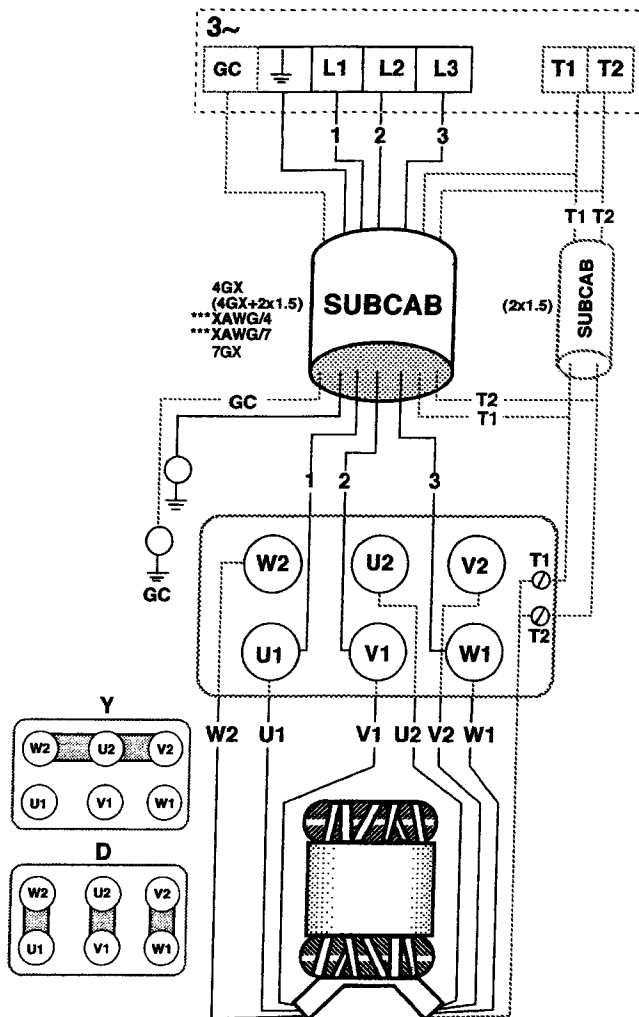
The **MiniCas II** is a monitoring relay to which CLS and/or FLS are connected.

Check:

- signals and tripping function.
- that relays, lamps, fuses and connections are intact.

Replace defective equipment.

# CABLE CHART

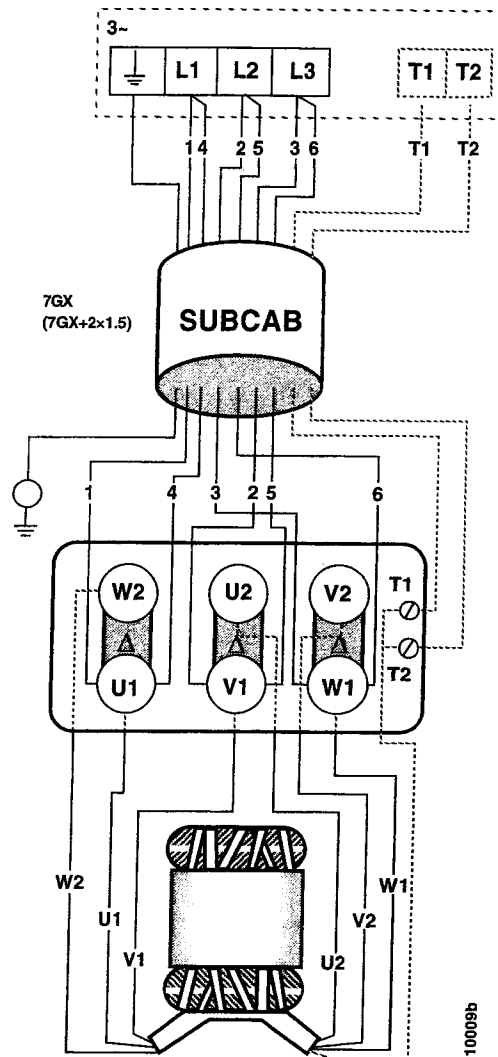


## 3-phase, direct-on-line starting

	Conductors	Connection starter
<b>SUBCAB 4Gx</b>	1 brown ***red	L1
<b>***SUBCAB xAWG/4</b>	2 blue ***white	L2
<b>H07RN-F 4Gx</b>	3 black ***black	L3
<b>BIHF 4Gx silicon</b>	yellow/green	earth
<b>SUBCAB 4Gx+2x1,5</b>	1 brown	L1
	2 blue	L2
	3 black	L3
	yellow/green	earth
	T1 black	T1*
	T2 black	T2*
<b>SUBCAB 7Gx</b>	1 black	L1
<b>H07RN-F 7Gx</b>	2 black	L2
<b>SO7E6E5-F 7x2.5</b>	3 black	L3
	4 black	cut off
	5 black	T1*
	6 black	T2*
	yellow/green	earth
<b>For Canada/USA</b>	red	L1
<b>***SUBCAB xAWG/7</b>	white	L2
	black	L3
	yellow	GC**
	yellow/green	earth
	orange	T1*
	blue	T2*

## Stator leads

U1 = red	V2 = blue
V1 = brown	W2 = black
W1 = yellow	U2 = green



## 3-phase, direct-on-line, Δ

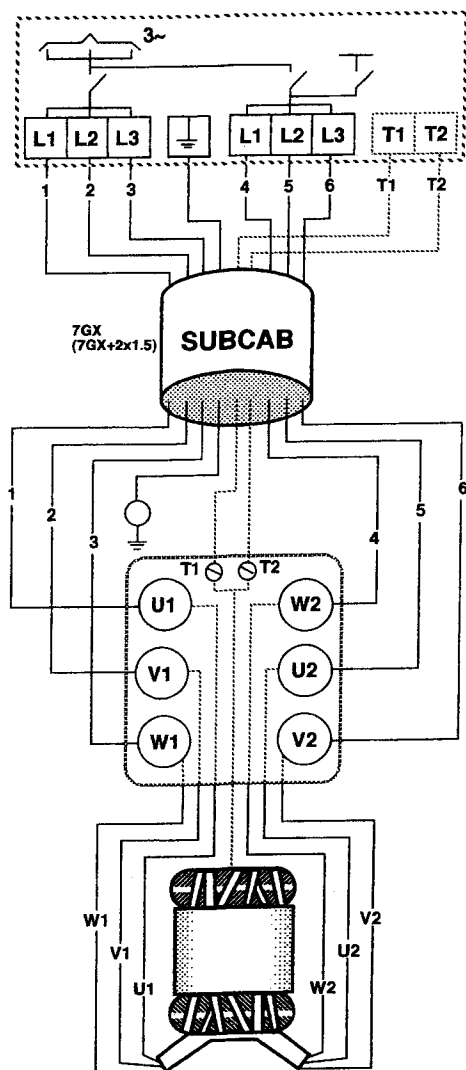
	Conductors	Connection starter
<b>SUBCAB 7Gx</b>	1 black	L1
<b>SO7E6E5-F 7x2.5</b>	2 black	L2
	3 black	L3
	4 black	L1
	5 black	L2
	6 black	L3
	yellow/green	earth
<b>SUBCAB 7Gx+2x1,5</b>	1 black	L1
	2 black	L2
	3 black	L3
	4 black	L1
	5 black	L2
	6 black	L3
	T1 black	T1*
	T2 black	T2*
	yellow/green	earth

## Stator leads

U1 = red	V2 = blue
V1 = brown	W2 = black
W1 = yellow	U2 = green

\* Terminal for connection of thermal contacts in the motor and monitoring equipment.  
 \*\* GC = Ground Check  
 \*\*\* SUBCAB/AWG

# CABLE CHART



## 3-phase, star-delta starting

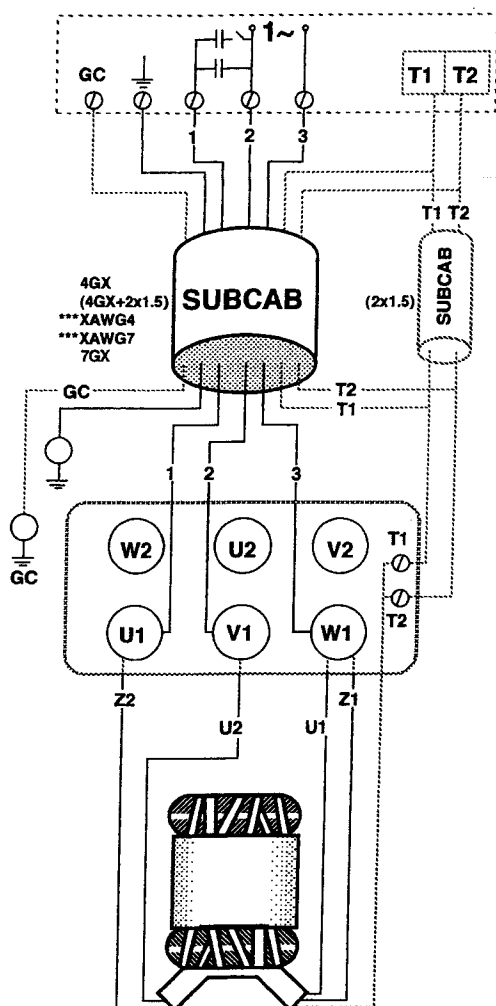
	Conductors	Connection starter
<b>SUBCAB 7Gx</b> <b>SO7E6E5-F 7x2.5</b>	1 black	L1
	2 black	L2
	3 black	L3
	4 black	L1
	5 black	L2
	6 black	L3
	yellow/green	earth
<b>SUBCAB 7Gx+2x1,5</b>	1 black	L1
	2 black	L2
	3 black	L3
	4 black	L1
	5 black	L2
	6 black	L3
	T1 black	T1*
	T2 black	T2*
	yellow/green	earth

## Stator leads

U1 = red	V2 = blue
V1 = brown	W2 = black
W1 = yellow	U2 = green

\* Terminal for connection of thermal contacts in the motor and monitoring equipment.

# CABLE CHART



## Single phase

**SUBCAB 4Gx**  
**\*\*\*SUBCAB xAWG/4**  
**H07RN-F4Gx**  
**BIHF 4Gx silicon**

Conductors	Connection starter
1 brown ***red	1
2 black ***black	2
3 blue ***white	3
yellow/green	earth

**SUBCAB 4Gx+2x1,5**

1 brown	1
2 black	2
3 blue	3
yellow/green	earth
T1 black	T1*
T2 black	T2*

**SUBCAB 7Gx**

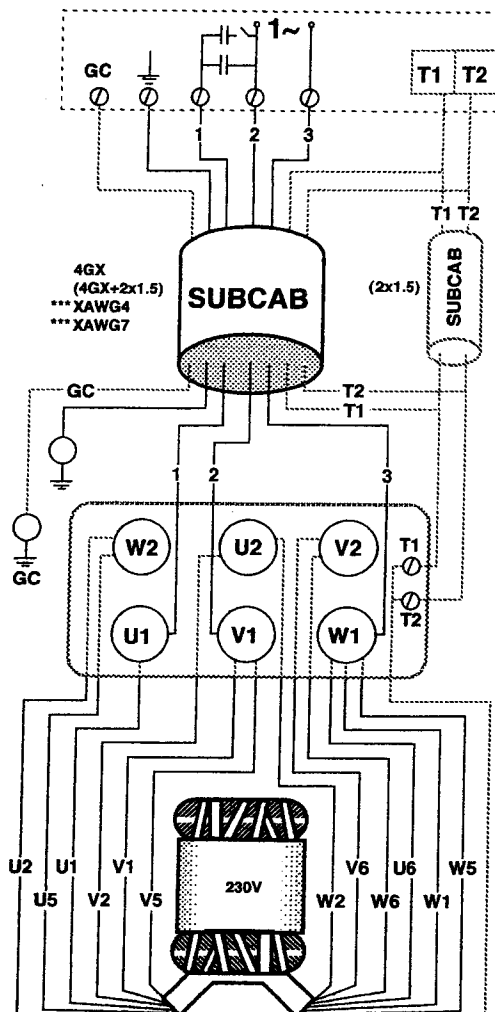
1 black	1
2 black	2
3 black	3
4 black	cut off
5 black	T1*
6 black	T2*
yellow/green	earth

**For Canada/USA**  
**\*\*\*SUBCAB xAWG/7**

red	1
black	2
white	3
yellow	GC**
yellow/green	earth
orange	T1*
blue	T2*

## Stator leads

U1 = red	U2 = brown
Z1 = yellow	Z2 = black



## Stator leads

U1 = red	U5 = red
V1 = brown	V5 = brown
W1 = yellow	W5 = yellow
U2 = green	U6 = green
V2 = blue	V6 = blue
W2 = black	W6 = black

\* Terminal for connection of thermal contacts in the motor and monitoring equipment.

\*\* GC = Ground Check

\*\*\* SUBCAB/AWG



# TRANSPORTATION AND STORAGE

The pump can be transported and stored in a vertical or horizontal position.



- Always lift the pump by its lifting handle – never by the motor cable or the hose.
- Make sure that the pump cannot roll or fall over and injure people or damage property.

The pump is frostproof as long as it is operating or is immersed in the liquid. If the pump is raised when the temperature is below freezing, the impeller may freeze.

The pump shall be run for a short period after being raised in order to discharge all remaining water.

A frozen impeller can be thawed by allowing the pump to stand immersed in the liquid for a short period before it is started. Never use a naked flame to thaw the pump.

For longer periods of storage, the pump must be protected against moisture and heat. The impeller should be rotated occasionally (for example every other month) to prevent the seals from sticking together.

After a long period of storage, the pump should be inspected before it is taken into operation. Pay special attention to the seals and the cable entry.

Follow the instructions under the heading “Before starting”.

# OPERATION

## Before starting



- Before starting work on the pump, make sure that the pump is isolated from the power supply and cannot be energized.
- Make sure that the pump cannot roll or fall over and injure people or damage property.

Check that the visible parts on the pump and installation are undamaged and in good condition.

Check the oil level in the oil housing.

Remove the fuses or open the circuit breaker and check that the impeller can be rotated freely.

Check that the monitoring equipment (if any) works.

Check the direction of rotation. The impeller shall rotate clockwise, as viewed from above. When started, the pump will jerk in the opposite direction to the direction in which the impeller rotates. See the figure.

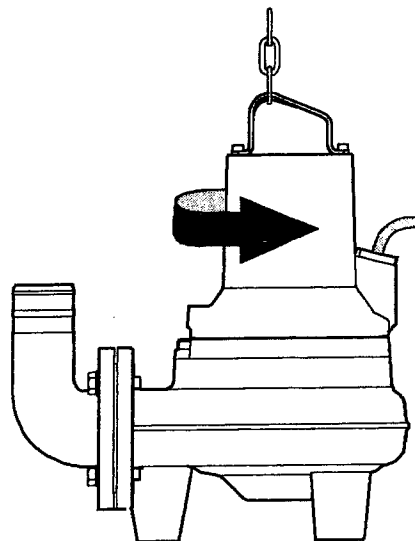
In the case of dry installation, check the direction of rotation through the inlet elbow access cover.

Transpose two phase leads if the impeller rotates in the wrong direction (3 ~).



In some installations the pump surface and the surrounding liquid may be hot. Bear in mind the risk of burn injuries.

## Starting jerk



Watch out for the starting jerk, which can be powerful.

# CARE AND MAINTENANCE



Before starting work on the pump, make sure that the pump is isolated from the power supply and cannot be energized.

This applies to the control circuit as well.



## NOTE for Ex version

All work on the explosion-proof motor section must be performed by personnel authorized by Flygt.

Flygt disclaims all responsibility for work done by untrained, unauthorized personnel.



Make sure that the pump cannot roll or fall over and injure people or damage property.

The following points are important in connection with work on the pump:

- Make sure that the pump has been thoroughly cleaned.
- Beware of the risk of infection.
- Follow local safety regulations.

The pump is designed for use in liquids which can be hazardous to health. In order to prevent injury to the eyes and skin, observe the following points when working on the pump:

- Always wear goggles and rubber gloves.
- Rinse the pump thoroughly with clean water before starting work.
- Rinse the components in water after dismantling.
- The oil housing may be under pressure. Hold a rag over the oil screw (oil plug) to prevent splatter.

Proceed as follows if hazardous chemicals have splashed into your eyes:

- Rinse your eyes immediately in running water for 15 minutes. Hold your eyelids apart with your fingers.
- Contact an eye specialist.

On your skin:

- Remove contaminated clothes.
- Wash your skin with soap and water.
- Seek medical attention, if required.

## Inspection

Regular inspection and preventive maintenance ensure more reliable operation.

The pump should be inspected at least once a year, but more frequently under severe operating conditions.

Under normal operating conditions, the pump should have a major overhaul in a service shop at least every third year for permanent installation and every year for portable pumps. This requires special tools and should be done by an authorized service shop.

If the seals have been replaced an inspection of the oil is recommended after one week of operation.

NOTE! Regular check of the condition of the lifting handle and chain is important.

## Inspection of hot water applications

Pumps in hot water applications shall undergo inspection or overhaul at a service shop as follows, depending on the time they have been submerged in the hot water:

Temp.	Mode of operation	Inspection	Shop overhaul
≤70°C (160°F)	Continuous	1000 hours	4000 hours
≤70°C (160°F)	Intermittent	twice a year	once a year
≤90°C (195°F)	Cont./Int.	6 times a year	twice a year

# OIL CHANGE



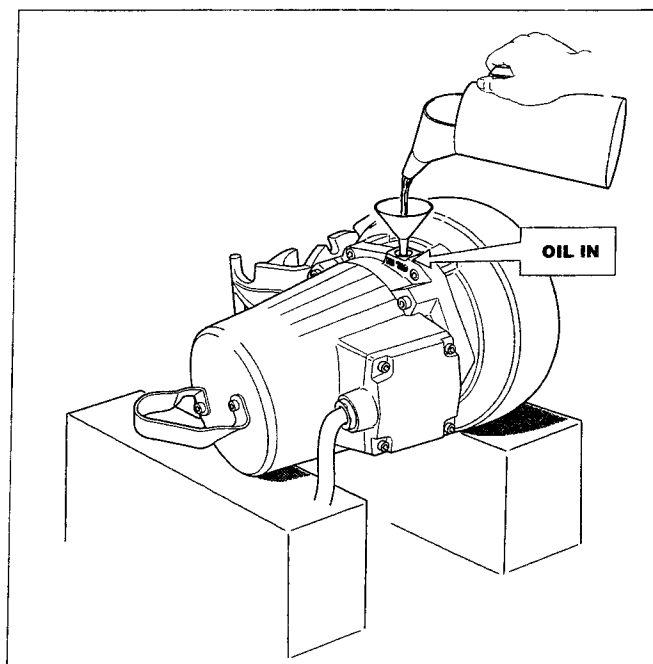
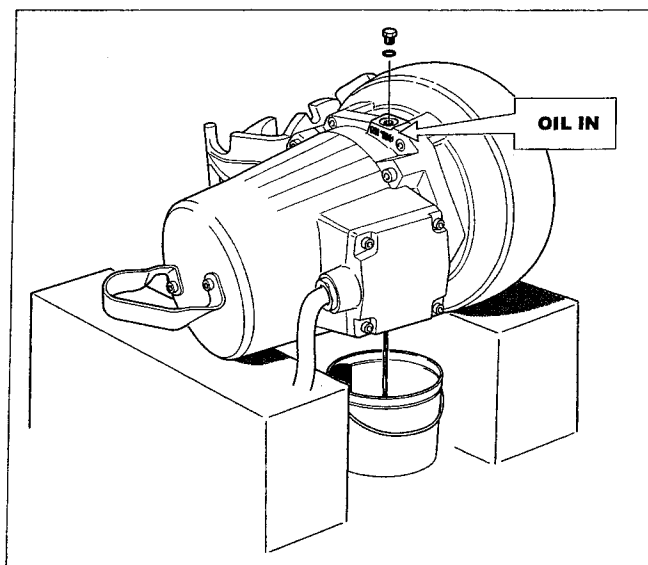
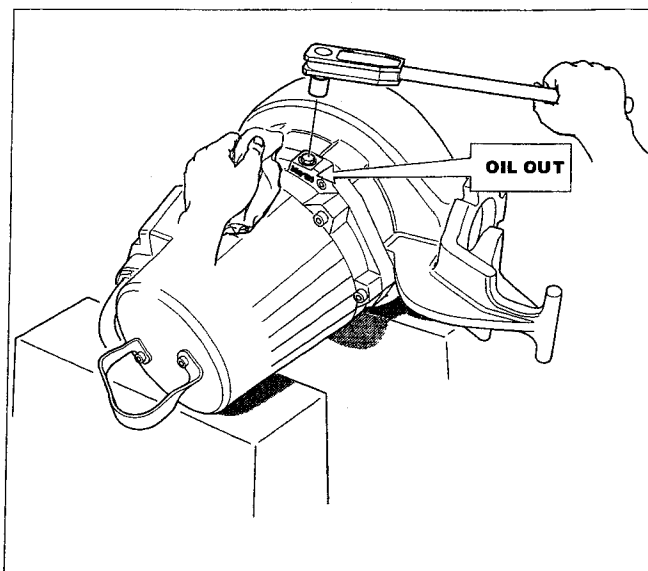
The oil housing may be under pressure. Hold a rag over the oil plug to prevent splatter.

1. Lay the pump on its side on a bench or over two supports. Unscrew the oil housing screw (oil plug) marked "oil out". Emptying the oil must be done through the "oil out" hole.
2. Turn the pump. Unscrew the "oil in" oil hole screw/plug. In order to drain out all oil, the pump must be raised upright for a short while during drainage.
3. Replace the O-rings under the oil housing screws (plugs) with new ones.
4. Install the "oil out" screw/plug and fill with oil through the other hole. It is important that the oil be added through the hole marked "oil in" since the oil housing must contain some air for pressure equalization. The pump should be tilted slightly and put down again horizontally in order to get the full amount of oil in.

A paraffin oil with viscosity close to ISO VG15 is recommended (e.g. Mobil Whiterex 309). The pump is delivered from factory with this type of oil.

In applications where poisonous properties are of less concern, a mineral oil with viscosity up to ISO VG32 can be used.

Approx. oil quantity		
	l	US quarts
3085	1.0	1.1
3085.280/290	0.8	0.8
3102	1.0	1.1
3127	2.0	2.1



# SERVICE LOG

Most recent service date	Pump No.	Hours of operation	Remarks	Sign.

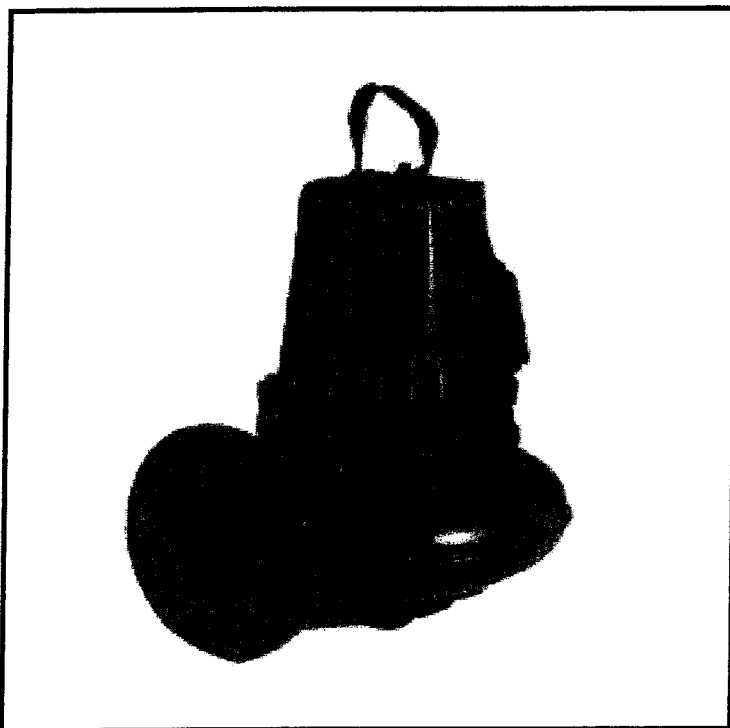
1



## FLYGT SUBMERSIBLE PUMP

PARTS LIST CP 3127 HT

SERIAL NO 3127.090 0210089



ITT FLYGT CORPORATION  
35 NUTMEG DRIVE

TRUMBULL, CT 06611  
USA  
TELEPHONE NO: 716-4260280

Flygt



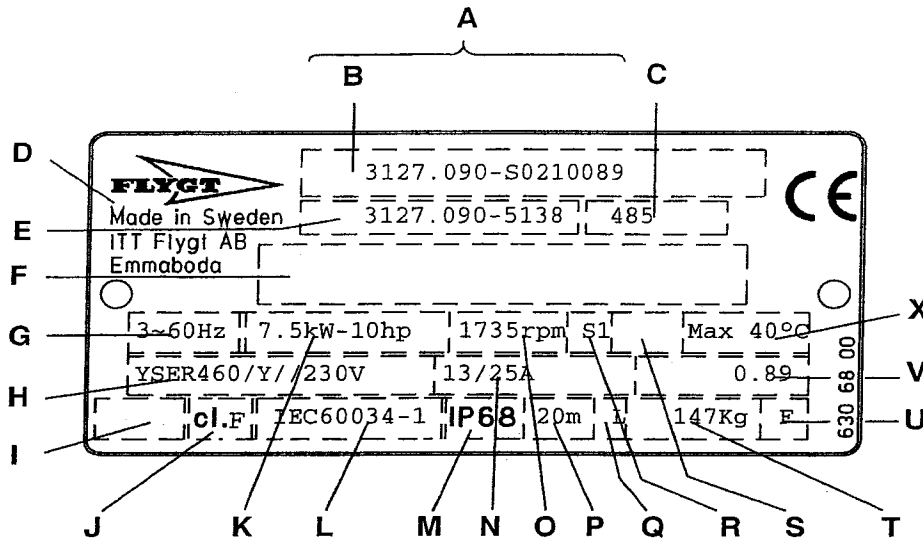
ITT Industries

# 

FLYGT CP 3127 HT

DATE: 2002-01-15

SERIAL NO: 3127.090 0210089



### Dataplate interpretation:

- |  |  |
|--|--|
| <b>A</b> Serial number                     | <b>M</b> Degree of protection                  |
| <b>B</b> Product code + Number             | <b>N</b> Rated current                         |
| <b>C</b> Curv code / Propeller code        | <b>O</b> Rated speed                           |
| <b>D</b> Country of origin                 | <b>P</b> Max. submergence                      |
| <b>E</b> Product number                    | <b>Q</b> Direction of rotation R=right, L=left |
| <b>F</b> Additional information            | <b>R</b> Duty class                            |
| <b>G</b> Phase; Type of current; Frequency | <b>S</b> Duty factor                           |
| <b>H</b> Rated voltage                     | <b>T</b> Product weight                        |
| <b>I</b> Thermal protection                | <b>U</b> Locked rotor code letter              |
| <b>J</b> Thermal class                     | <b>V</b> Power factor                          |
| <b>K</b> Rated shaft power                 | <b>X</b> Max. ambient temperature              |
| <b>L</b> International standard            |  |
- (1 kg = 2.2 pound, 1 Lit=0.26 US gallon, 1 l = 0,22 UK gallon)

### Recommended spare parts:

See REC. column: **A** = Parts for inspection and maintenance  
**B** = Parts for major overhaul

For service;

To ensure long operating life use Flygt Bearing Grease 90 20 61 (Cartridge).

Lubrication kit 84 15 40 contains two 90 20 61 and one 84 15 30 (Grease gun).

The O-ring kit contains a full set of O-rings. Position no 800.

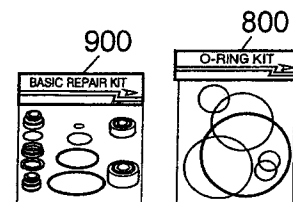
The Basic Repair kits contain both inner and outer Mechanical seals, bearings and a O-ring kit. Position no 900.

A complete set of tools can be ordered for repair and maintenance work, i.e. standard hand tools and special tools for seal change and hydraulic-end use.

Order:

This partlist can be used as an order form by marking out the number of parts in the Qty/Order column.

Please send or fax the form to your Flygt representative.



## PARTS LIST

**FLYGT CP 3127 HT**

**SERIAL NO 3127.090 0210089**

Item no	Partno	Rec	Denomination	Qty/ord.
1	477 11 01	(s)	Lifting handle	1
2	83 03 23	B (s)	Socket head screw	2
3	630 68 00		Data plate USE 6306801 AS SPARE PART	2
6	83 02 58	B	Socket head screw M5X12-A4-70	2
8	279 29 00	B	Earthing plate	1
9	82 21 73	(s)	Drive screw 4X5-A4-70	2
9	82 21 73	(s)	Drive screw 4X5-A4-70	4
9	82 21 73	(s)	Drive screw 4X5-A4-70	4
10	443 53 01		Stator housing	1
11	83 03 27	(s)	Socket head screw	4
14	630 70 00		Certificate plate FM APPROVED	2
15	550 22 00		Connection plate (FLS)	1
15	559 92 00		Connection plate	1
16	82 80 86	B (s)	O-ring 239,3X5,7 FPM	1
17	83 31 80	B	Ball bearing 6207 Z/C3 35X72X17	1
18	443 66 04		Shaft unit	1
19	309 44 12		Stator 21-12-4a	1
22	83 45 59		Cable tie 200X2,4 PA 6/6 -55+105	1
23	94 21 06	B	Motor cable SUB10AWG/3-2-1GC 20-22	13.5 m
24.1	435 56 00		Cable entry unit	1
24.6	82 17 61		Screw TAPTITE-M6X12	4
24.7	83 42 96		Cable lug 4-6 MM2;M6	2
24.8	83 44 23		Closed end splice 5.1-10,5;L=40	3
24.8	83 44 24		Closed end splice 2.5-6(AWG 12-10)L=17.5	1
25	443 50 01		Entrance cover	1
26	83 03 01	(s)	Socket head screw	4
27	82 80 98	AB (s)	O-ring 129,5X3,0 FPM	1
27	82 80 98	AB (s)	O-ring 129,5X3,0 FPM	1
28.2	83 53 30		Terminal clamp	6
28.4	83 53 33		End plate	1
28.6	83 53 31		End support 35X15	2
28.7	443 68 00		Rail	1
28.8	83 95 18		Marking strip	2
28.9	427 13 00		Marking tape	1
30	443 69 00	B	Lead through	1

Ordered by:

Company:.....Ref:.....Tel:.....Date:.....



## PARTS LIST

Item no	Partno	Rec	Denomination	Qty/ord.
30.2	81 98 45		Socket head screw	1
30.3	82 35 13		Washer	3
31	439 44 01		Screw	3
32	596 07 00		Washer	3
33	82 17 64		Screw TAPTITE-M6X20	7
34	82 50 60		Lock washer DUBO NR 301	3
37	504 78 07		Cable unit	1
38	518 89 02		Leakage detect.unit (FLS)	1
40	443 55 11		Bearing holder	1
41	83 37 60	B	Ball bearing 3307/C3 TOL.P6 35X80X34,9	1
42	82 79 18	B (s)	O-ring 78,0X4,0 FPM	1
43	614 49 00		Bearing cover	1
44	593 70 03	B	Mechanical seal	1
45	83 03 48	(s)	Socket head screw M12X40-A4-70	5
46	604 47 00		Oil housing bottom	1
47	443 49 00		Sleeve	1
48	82 72 95	AB (s)	O-ring 19,2X3,0 FPM	2
48	82 72 95	AB (s)	O-ring 19,2X3,0 FPM	4
49	428 22 05	B (s)	Inspection screw SS	2
53	593 70 03	B	Mechanical seal	1
59	436 10 00		Ring	1
61	380 91 00		Guiding claw	1
62	81 41 58		Hexagon head bolt M12X45-A2-70	4
64	439 18 00		Impeller	1
67	465 14 22		Pump housing	1
70	338 13 06	(s)	Washer	1
72	84 42 54		Socket head screw MC6S 12X40-2343	1
73	314 88 54	AB (s)	Ring	1
75	80 70 63	B	Parallel key	1
120	82 27 28		Lock nut M10-A4-70	2
121	80 95 07		Stud 10X45-A2-70	2
122	433 56 00		Cover	1
123	502 53 00		Gasket	1
800	80 32 33		O-rings kit 3127.090,170,180,890	1
800	80 32 74		O-rings kit 3127.090/180F,D,SUP.HT	1
900	601 89 07		Basic repair kit	1
900	601 89 08		Basic repair kit	1
900	601 89 09		Basic repair kit	1
900	601 89 10		Basic repair kit	1
	90 17 52		Paraffin oil	2 l
	90 20 54		Bearing grease ESSO UNIREX N3	0.03 kg

Ordered by:

Company:.....Ref:.....Tel:.....Date:.....

## PARTS LIST

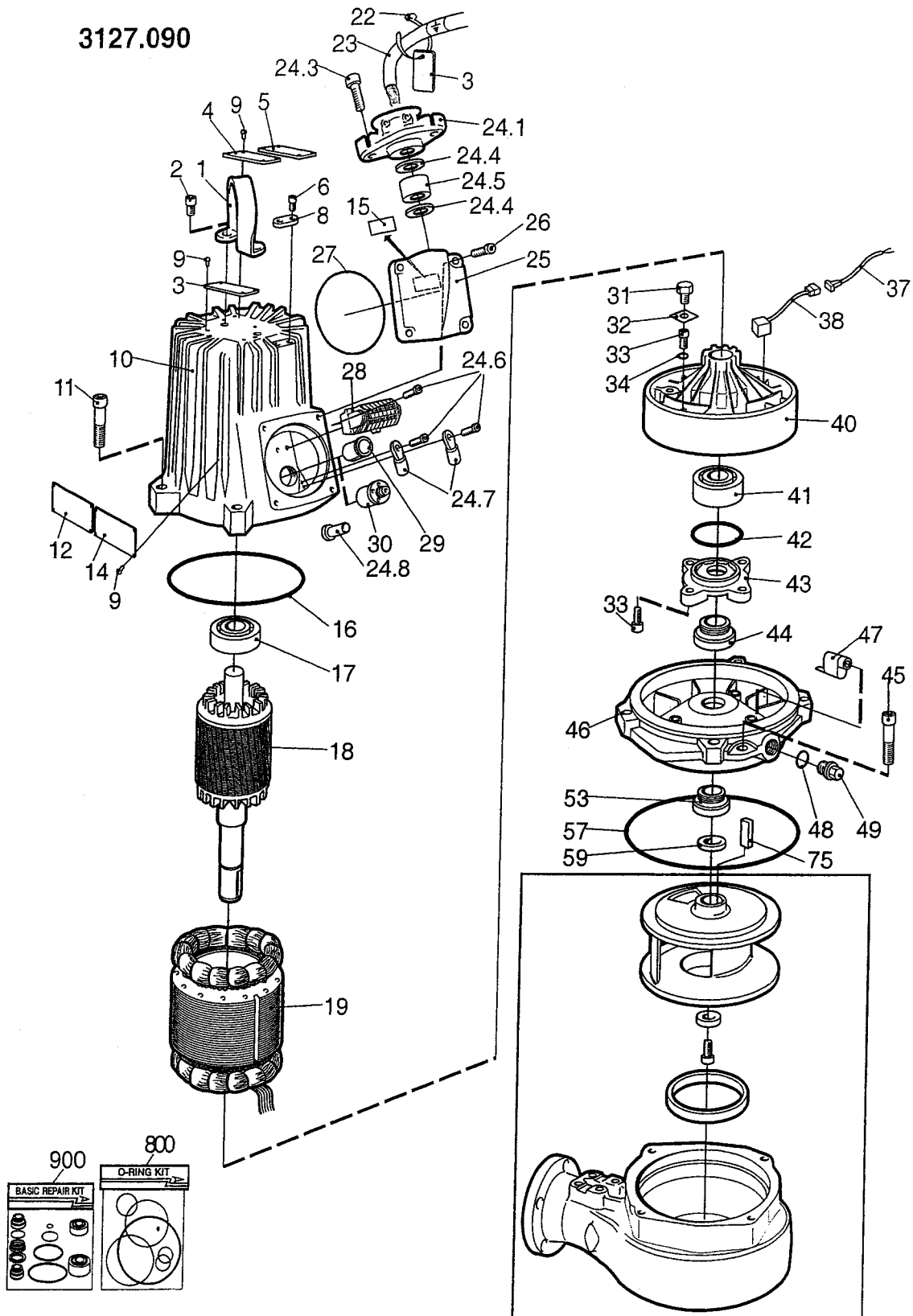
Item no	Partno	Rec	Denomination	Qty/ord.
	82 42 72	(s)	Washer 34,5X52X2-A4-70	4
	82 81 03	(s)	O-ring 49,5X3,0 FPM	1
	83 03 46	(s)	Socket head screw M12X30-A4-70	2
	84 18 02	(s)	Seal sleeve (20)-23	2
	597 87 01	(s)	Entrance flange SS	1
	597 98 00	(s)	Ring	1
	633 11 01	(s)	Gland screw	1
	640 31 03S	(s)	Nipple	1
...	.....		.....	....
...	.....		.....	....
...	.....		.....	....
...	.....		.....	....

Ordered by:

Company:.....Ref:.....Tel:.....Date:.....

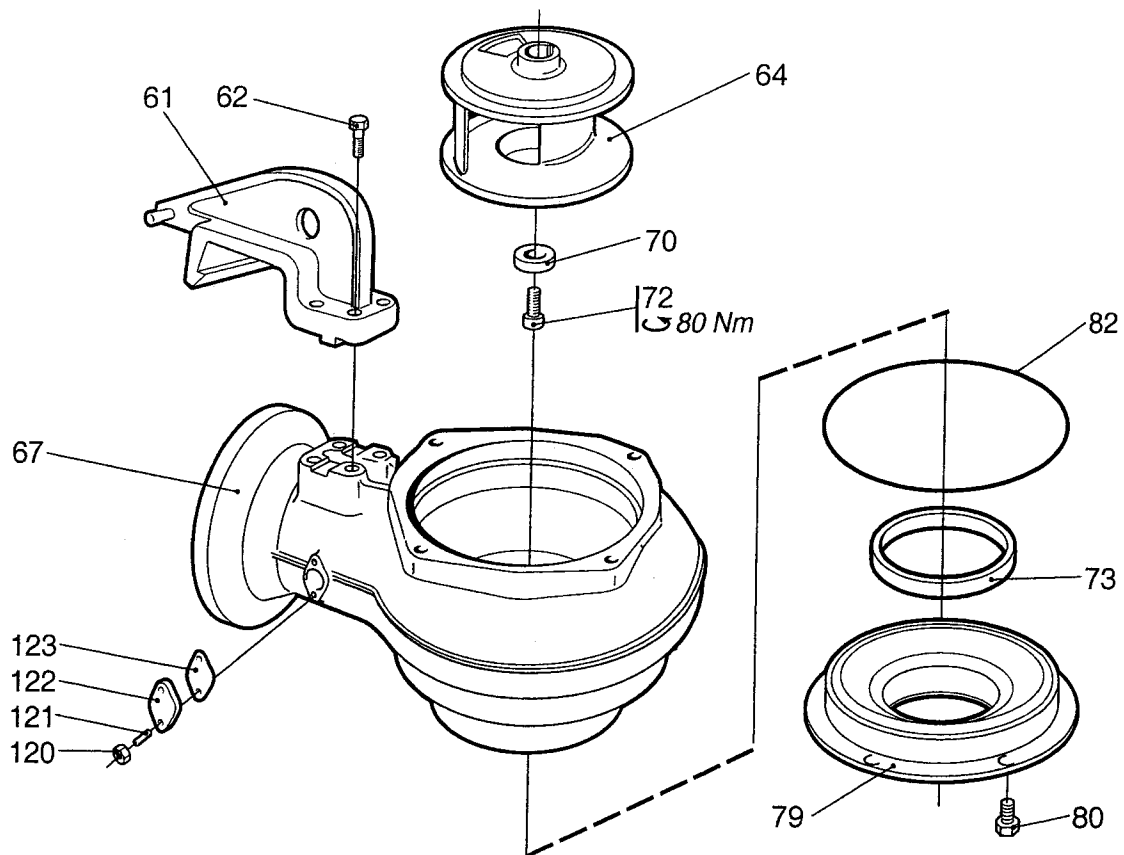
# EXPLODED VIEW

3127.090



## HYDRAULIC PARTS

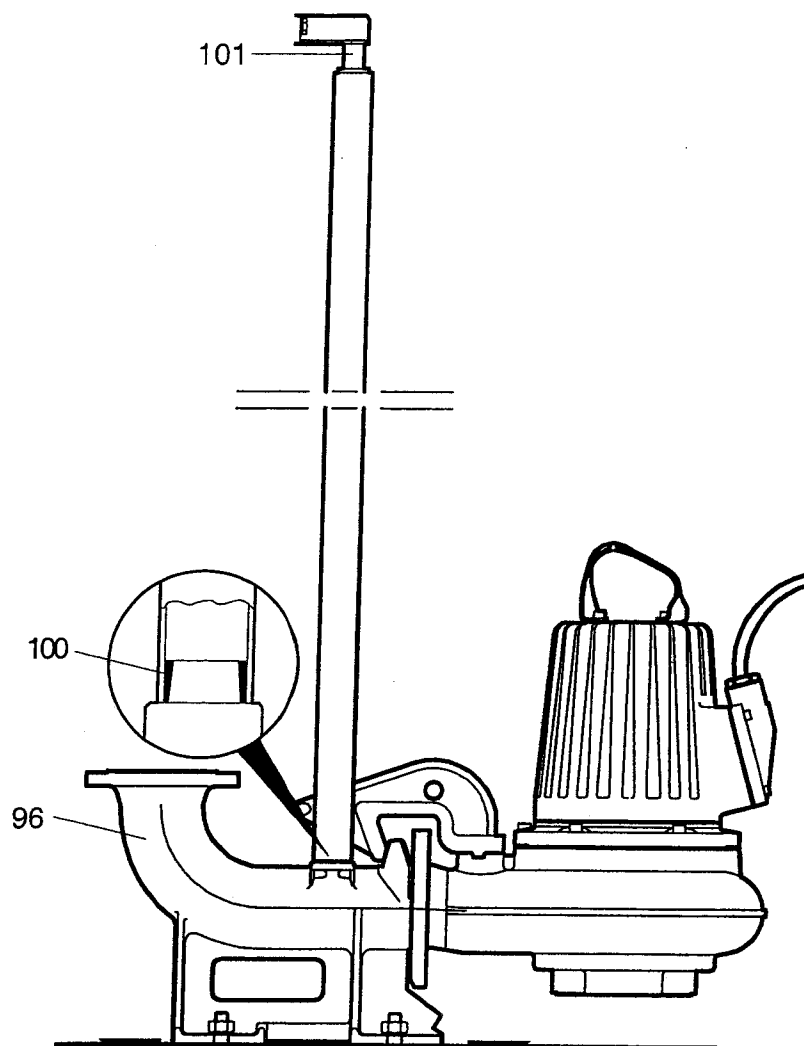
CP 3127 HT



30220

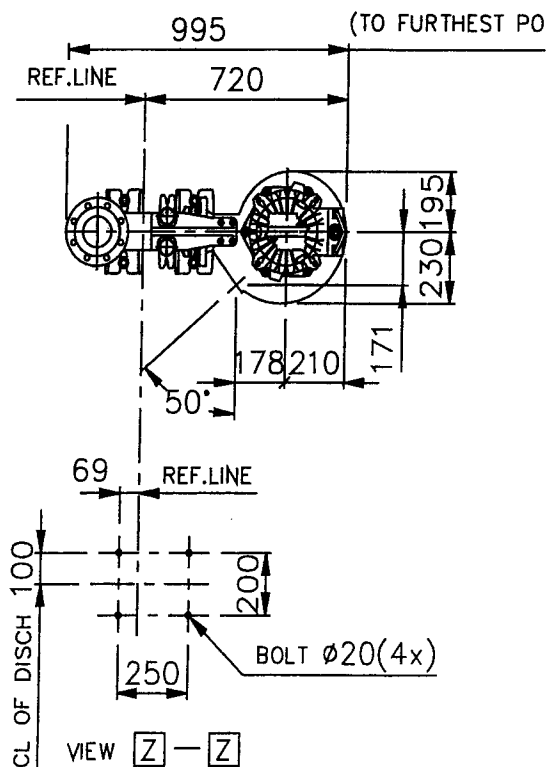
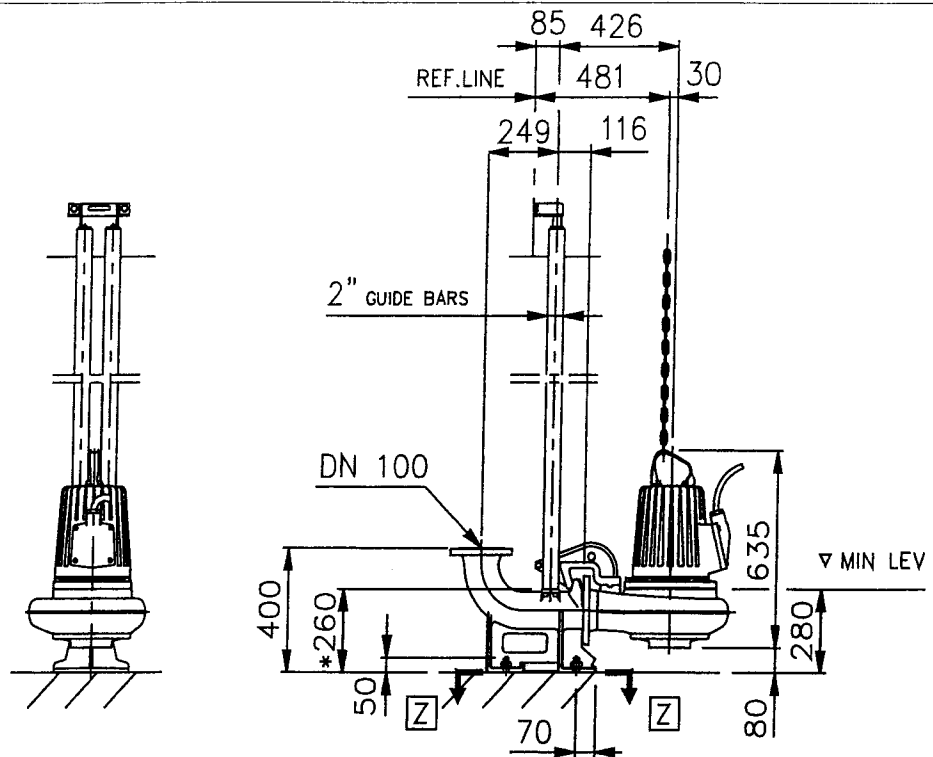
## CONNECTION

CP, NP 3127.090/180/980



30741

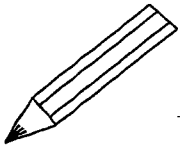
# DIMENSIONAL DRAWING



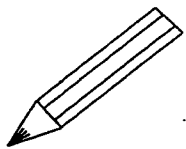
EQUIPPED WITH IMPELLER: 461, 467 OR 480-485.

\* DIMENSION TO ENDS OF GUIDE BARS

5388800d



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## **APPENDIX A -6**

### **R-972-01 Recommended Practice, Addition of Supplemental Anodes to STI-P3 UST's**



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**RECOMMENDED PRACTICE  
FOR THE ADDITION OF  
SUPPLEMENTAL ANODES  
TO STI-P3® USTs**

**R972**

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**REVISED  
JANUARY 2006**

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## 1.0 INTRODUCTION

- 1.1 On occasion, tank owners of sti-P3® tanks find that the cathodic protection readings are more positive than the NACE recommended -850 millivolt criteria. In this case, the cathodic protection system must be supplemented so that the tank continues to be protected from corrosion.
- 1.2 The addition of supplemental anodes can bring the tank potential more negative than the recommended -850 millivolt criteria. It does not, however, change the period of the manufacturer warranty on the tank.
- 1.3 This recommended practice (RP) was prepared under the direction of James B. Bushman, P.E., registered Professional Corrosion Engineer and Principal Corrosion Consultant for Bushman & Associates, Inc., P.O. Box 425, Medina, OH 44256, USA.

## 2.0 SCOPE

- 2.1 The tanks which are considered in this RP are shop fabricated steel storage tanks built according to the sti-P3® standard.
- 2.2 Tanks must be verified, through STI, that they are sti-P3® tanks.
- 2.3 This RP contains information regarding the number, size and type of anodes which may be used to supplement the cathodic protection of an sti-P3® tank, the installation of the anodes, the installation of test stations, and methods for verifying the proper operation of the anodes after installation.
- 2.4 The installation and testing of the cathodic protection system shall be performed by a qualified installer and tester. The qualified installer and tester shall be as defined by the applicable Federal, State, and Local regulations.
- 2.5 This RP only applies to tanks that require no more than 30 milliamps of current to bring the tank to protected levels. (See Section 8). If the current requirement is more than 30 milliamps, contact the Steel Tank Institute or a qualified corrosion consultant, as defined by the applicable Federal, State, and Local regulations.
- 2.6 Procedures for cathodic protection testing, verification of electrical isolation and measurement of supplemental protective current required are also included in this RP.

## 3.0 DEFINITIONS

**Cathodic Protection (CP)** - A technique to reduce (or eliminate) the corrosion of a metal surface (the exterior metal surfaces of underground storage tank (UST) in contact with the earth or tank backfill as used in this RP) by making that surface the cathode of an electrochemical cell.

**Electrical Isolation** - The condition of being electrically separated from other metallic structures or the environment. For the purposes of this RP, it shall mean that the sti-P3® underground storage tank(s) is electrically separated (no metal-to-metal contact) from all other buried metallic structures.

**Electrolyte** - A chemical substance containing ions that migrate in an electric field. For the purposes of this RP, electrolyte refers to the soil or liquid adjacent to and in contact with a buried or submerged metallic UST system, including the moisture and other chemicals contained therein.

**Galvanic Anode** - A metal that provides sacrificial protection to another metal that is more noble when electrically coupled in an electrolyte. This type of anode is the electron source in one type of cathodic protection. For the purposes of this RP, the supplementary galvanic anode shall mean a high potential magnesium alloy anode ingot, prepackaged in selected backfill consisting of 75% gypsum, 20% bentonite, and 5% sodium sulfate.

**IR Drop** - The voltage drop through a resistance resulting from current flow through the resistance in accordance with Ohm's Law ( $V = I \times R$ ).

**Reference Electrode** - An electrode whose open-circuit potential is constant under similar conditions of measurement, which is used for measuring the relative potentials of other electrodes. For the purposes of this RP, this shall mean a calibrated saturated copper-copper sulfate reference electrode (CSE).

**Soil Resistivity** - The property of the soil that is directly proportional to the soil's resistance to electric current flow. For the purposes of this RP, it is the average soil resistivity measured using the Wenner Four-Pin method. The value so measured is expressed as the *"average resistivity of the soil as measured to a depth equal to the pin spacing and is normally recorded in ohm-centimeters"*.

**Structure Instant-Off Potential** - It is the structure-to-electrolyte potential reading obtained immediately after interruption of all CP system current flow. For the purposes of this RP, it is the second reading displayed on the digital voltmeter immediately after interruption of the test CP system current when measuring the potential on an sti-P3<sup>®</sup> tank during current requirement testing.

**Structure-to-Electrolyte Potential (also tank-to-soil potential or tank-to-electrolyte potential)** - The potential difference between a buried metallic structure and the electrolyte that is measured with a reference electrode (CSE as used in this RP) in contact with the electrolyte. For this RP, it is generally the voltage difference between the tank and the soil.

## **4.0 EQUIPMENT REQUIREMENTS**

- 4.1 The following equipment is required for the tank testing procedures discussed in this recommended procedure.
- 2 - Portable copper-copper sulfate reference electrodes (1 is a calibrated reference electrode and is never to be used in the field.)
  - 2 - Digital Multimeters capable of measuring DC Volts and DC Amps (minimum 10 megaohm internal resistance). (The second multimeter is required if current requirement testing is performed.)

- 1 - Portable 12 volt battery or battery from your vehicle
- 1 - Temporary anode (uncoated steel rebar or pipe, uncoated long screwdriver, etc.)
- 1 - Nilsson Model 400 Four-Pin Soil Resistivity Meter and pins
  - Enough test wires and connectors to perform all testing

## **5.0 REFERENCE ELECTRODE USE, CARE & MAINTENANCE**

- 5.1 Proper maintenance of the reference electrode is crucial to accurate tank-to-soil potential readings. Be sure that only distilled water is used in the reference electrode, and that it is typically two-thirds full of solution. The reference electrode should always have a quantity of undissolved copper sulfate crystals present in the solution to assure that the solution is saturated. The solution should always be azure blue and clear since contaminants can make the solution cloudy. If the solution is cloudy, compare the reference cell to a calibrated reference cell. If the difference between the reference cells is more than 10 millivolts, then the cloudy reference cell should be reconditioned.
- 5.2 Proper use of the reference electrode is as important as proper maintenance. Reference electrode placement can have varying effects on the accuracy of the tank-to-soil potential reading. Never place the reference cell in frozen or frosted soil, soil contaminated by hydrocarbon product, or any area above the tank which is shielded from the anode current, such as a containment sump, etc. Never place the reference cell on top of concrete since this can introduce substantial errors in the measurement.
- 5.3 If it is suspected that one of the conditions identified in Section 5.2 is present, place the reference electrode remote from the tank, in accordance with Section 6.3.
- 5.4 When inserting the reference electrode porous tip in the soil, assure good contact between the soil and the tip by twisting the electrode while inserting. Adding water to dampen the soil at the contact point will help provide good contact.
- 5.5 The meter connections for a standard commercial volt meter are; the positive (+) lead is connected to the tank, and the negative (-) lead is connected to the reference electrode. Set the meter to the autoscaling DC volts or manually set the meter to 2 volts DC or the next lowest available DC setting above 2 volts. If stable, record the reading.
- 5.6 If the readings are not stable, check all of the connections to ensure they are secure. If all connections are good, there may be stray currents in the area affecting the readings. If the reading continues to fluctuate, contact a cathodic protection specialist to determine if stray current is affecting the tank.

- 5.7 When conditions at the reference electrode location are suspected of affecting the reading accuracy, see Section 5.2. If necessary, the reference electrode should be relocated or the soil dampened. In some instances it may be necessary to place the reference electrode in native soil outside of the tank excavation. Accurately record both the reading and the location of the reference electrode.

## 6.0 TANK TESTING PROCEDURE

With a cathodically protected sti-P3® tank, the test methods require tank-to-soil potential measurements with respect to a permanently buried or portable copper/copper sulfate reference electrode placed in contact with the soil over the tank or remote from the tank. In addition, tank continuity and tank current requirement tests may be performed to obtain additional information about the cathodic protection system.

### 6.1 OVER THE TANK POTENTIAL READINGS

- 6.1.1 Place a portable copper/copper sulfate reference electrode in the soil over the top midpoint (or as near as possible) of the tank. For paved locations, soil can sometimes be found around vapor recovery units, automatic tank gauge riser, or other areas above the tank top. Check the soil for hydrocarbon or other contamination. If there is no contamination in the soil, place the reference cell in the soil, ensuring good contact is made between the soil and the porous tip by twisting the electrode while inserting. Pour water around the reference cell to help provide good electrical contact. If hydrocarbons are present, take remote reading as per section 6.3
- 6.1.2 Make the appropriate tank connection by either connection to the wire connected to the tank (PP2) or making a metallic connection to an exposed portion of the tank or by inserting a test lead down through the fill pipe and contacting the tank bottom.
- 6.1.3 Turn on the voltmeter to the 2 volt DC scale. Connect the negative test lead of the voltmeter to the reference cell. Connect the positive test lead of the voltmeter to the tank structure connection. Record the reading on the voltmeter.
- 6.1.4 Where the tank reading is more positive than -850 millivolts, perform the testing in Section 7 and 8.
- 6.1.5 A reading of -850 millivolts, or more negative, with respect to a copper/copper sulfate reference electrode is considered verification of adequate cathodic protection.
- ### 6.2 PERMANENT REFERENCE CELL READINGS
- 6.2.1 If a PP4 monitoring system is being used, then turn on the voltmeter to the 2 volt DC scale. Touch the negative test lead of the voltmeter to the contact for the reference cell, which is in the center of the PP4 test station marked with a "C". Touch the positive test lead of the voltmeter to the tank structure connection contact, which is the numbered contact marked with either "1, 2, 3, or 4." Accurately record the reading on the voltmeter.
- 6.2.2 The tank reading should be more negative than -850 millivolts. If the reading is more positive than -850 millivolts, perform the testing in Sections 7 and 8.



### **6.3 Remote Potential Readings**

- 6.3.1 Place the reference cell in soil, approximately 30 feet (9.14 m) or more away from the tank. Try to place the reference cell in a place where there will be no metallic structures in between the tank and the reference cell. Connect the negative lead of the voltmeter to the reference cell. Connect the positive test lead of the voltmeter to the tank structure connection. Turn on the voltmeter to the 2-volt DC scale. Record the reading on the voltmeter.
- 6.3.2 The tank reading should be more negative than -850 millivolts. If the reading is more positive than -850 millivolts, perform the testing in Sections 7 and 8.

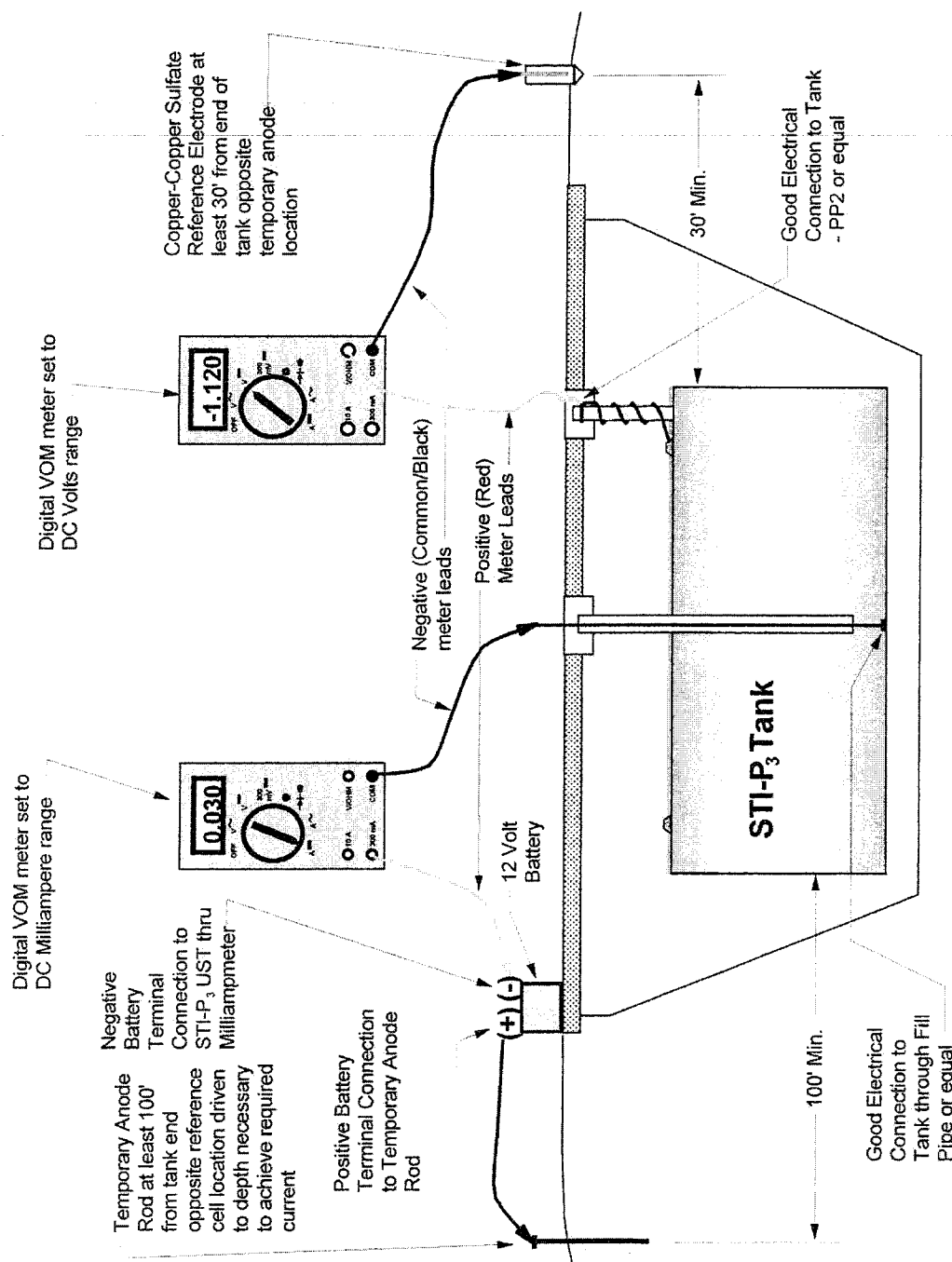
## **7.0 ELECTRICAL ISOLATION TESTING**

- 7.1 In order to adequately cathodically protect the sti-P3® tanks, it is important that the tank be electrically isolated from metallic objects such as riser pipes, conduit, submersible pumps, leak detection equipment and any metallic piping. If a tank is not electrically isolated, this may be the cause for low cathodic protection measurements.
- 7.2 To check that there is no electrical circuit from the tank to the piping and other underground metallic structures, one test method is the Fixed Cell/Moving Ground test. This test method is detailed in sections 7.2.1-7.2.5.
- 7.2.1 The Fixed Cell/Moving Ground test method is a reliable means of verifying that the tank is isolated from all other buried metallic structures. The equipment requirements to properly perform the procedure include; a copper/copper sulfate reference electrode, a high impedance digital volt meter, and test leads of adequate length to reach structures adjacent to the tank.
- 7.2.2 Test any visible metallic object that is attached to the tank. Place the reference electrode in a location remote to the tank excavation. This location shall be at least 30 feet (9.14 m) away. Obtain a tank-to-soil potential reading for the tank using the procedure in Section 6.
- 7.2.3 Do not move the reference electrode from the selected position until the conclusion of this test procedure. Disconnect the meter lead from the tank structure connection.
- 7.2.4 Touch the positive (+) meter lead to all metallic objects that could possibly have continuity to the tank. These would include riser pipes, conduit, submersible pumps, leak detection equipment, electrical ground, and any metallic piping.
- 7.2.5 If a reading obtained from 7.2.4 above, or any other metallic object tested, is within 10 millivolts of the remote tank potential reading obtained in 7.2.2, that item may have continuity to the tank.
- 7.3 If an electrical short, i.e. continuity, is found between the tank and another object, move on to the current requirement test described in Section 8.0.

## **8.0 CURRENT REQUIREMENT TEST**

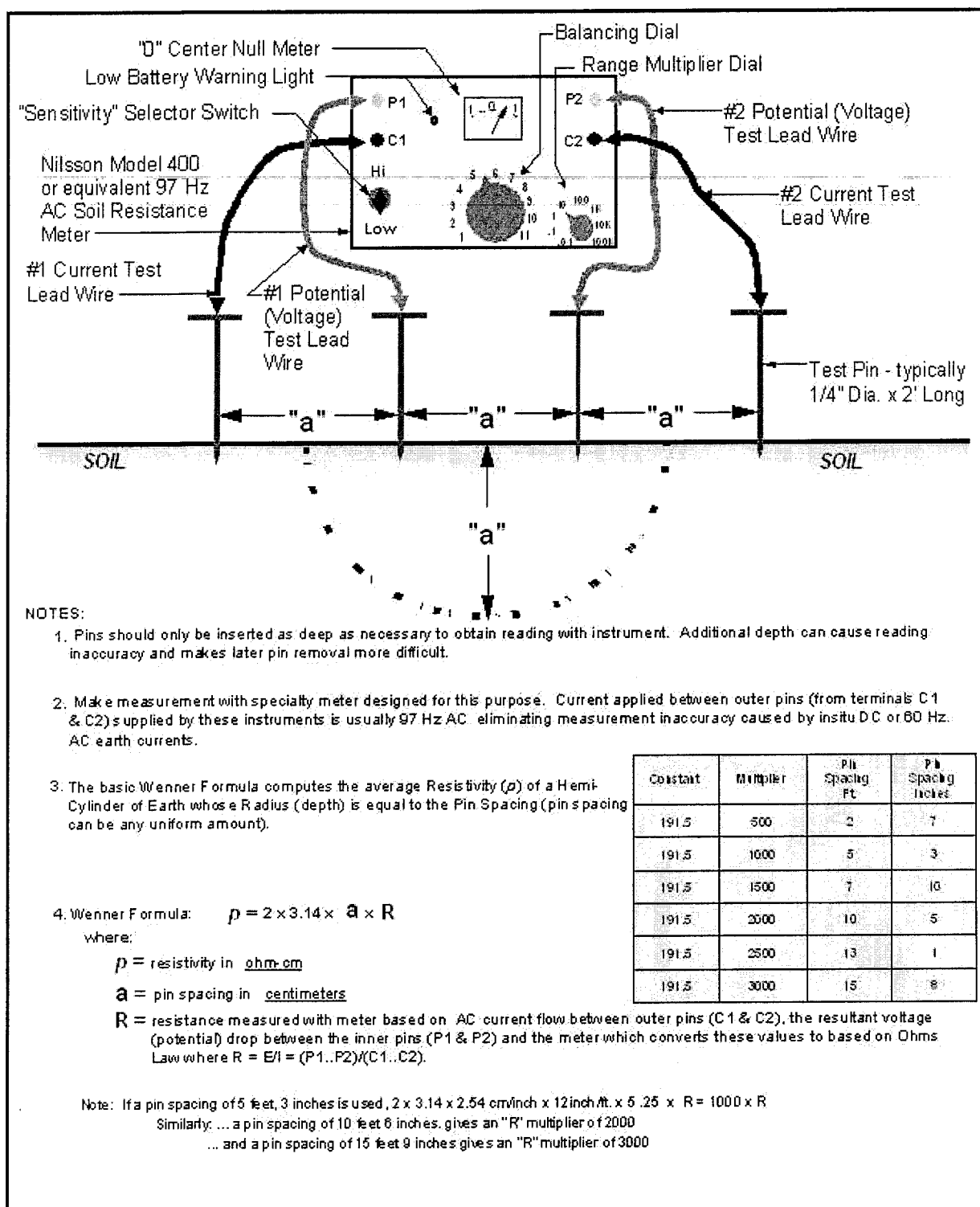
- 8.1 The current requirement test procedure, for the purpose of this RP, will be used to determine if this RP is suitable for the tank being tested. Given that each tank is electrically isolated, the current requirement test is specific to one tank and must be performed on each tank that does not meet the -850 millivolt criteria.

- 8.1.1 If the current required is less than 30 milliamps, no further isolation testing is required. However, if the current required is greater than 30 milliamps, further isolation testing may be required.
- 8.2 The following connections shall be made, as directed in Paragraph 8.3, prior to beginning the test procedure. (See Figure 8.2.)
  - 8.2.1 Negative (-) battery terminal to positive (+) lead of ammeter (multimeter)
  - 8.2.2 Positive (+) battery terminal to the temporary anode
  - 8.2.3 Negative (-) lead of voltmeter for tank potential to reference electrode
  - 8.2.4 Positive (+) lead of voltmeter for tank potential to first tank connection
  - 8.2.5 Negative (-) lead of ammeter (multimeter) to second tank connection - Setting ammeter to 200 mA, or lowest amp scale
- 8.3 Obtain a remote tank-to-soil potential measurement for the tank(s) before applying current.
  - 8.3.1 Place reference electrode in remote soil at a location at least 30 feet (9.14 m) away from the tank end. Do not place reference electrode on pavement. (See Section 5.)
  - 8.3.2 Take initial tank-to-soil potential measurements using the method described in Section 6.1 and 6.2 and record data.
  - 8.3.3 Make battery connections to impress current through temporary anode. (See Figure 8.2.)
  - 8.3.4 The temporary anode shall be located 100 feet (30.48 m) away from the tank on the end opposite the reference electrode location. Slowly insert the temporary anode into ground until a 1 milliampere reading is registered on ammeter.
  - 8.3.5 Because an external power source is used during this test and the voltage applied by these systems is greater than normally supplied by an sti-P3 tank, "Instant Off" potentials readings must be obtained.
  - 8.3.6 To obtain an "Instant Off" potential reading, apply the selected current for 1 minute. The current is turned off by disconnecting one of the current leads to the battery, while continuing to observe the voltmeter. Read and record the second reading displayed on the voltmeter after disconnecting current leads. If any difficulty occurs in obtaining this reading, reconnect the current lead and allow the test current to flow for at least an additional 30 seconds before interrupting the current again. Then repeat the "Instant Off" reading.
  - 8.3.7 Insert temporary anode slightly deeper into soil and record the increase of current as measured on the ammeter.
  - 8.3.8 Note new tank-to-soil potential measurement and record current and tank potential data.
  - 8.3.9 Repeat this process until an "Instant Off" potential is between -850 and -1050 millivolts.
  - 8.3.10 Record the final current measurement as shown on the ammeter as required to achieve the requirements of 8.3.9. This is the current requirement.



**FIGURE 8.2**  
**CURRENT REQUIREMENT TEST SETUP**

- 8.4 For current requirements less than 30 milliamperes (0.030 amperes) the use of sacrificial anodes to extend the life of the cathodic protection system is feasible. Current requirements greater than 30 milliamperes might indicate a continuity problem which may not be easily identified, such as hold down straps, and can shorten the life of a sacrificial anode. In such situations, verification of the tank system as an sti-P3<sup>®</sup> is suggested. If the current requirement exceeds 30 milliamperes contact Steel Tank Institute or a qualified corrosion consultant, as defined by the applicable Federal, State, and Local regulations.
- 8.5 **SOIL RESISTIVITY TEST**
- 8.5.1 Soil resistivity may either be obtained by direct measurement at the UST site or by contacting the local gas utility, who may have soil resistivity data for the UST site area.
- 8.5.2 Direct measurement of soil resistivity is accomplished using the Wenner Four Pin method.
- 8.5.3 Figure 8.5.3 depicts the measurement being taken using the Nilsson model 400 soil resistivity meter, but any equivalent instrument specifically designed for performing this test may be used.
- 8.5.4 Follow the instructions given in the instrument's manual or the tester may refer to ASTM Test Method G57-95 "Standard Test Method for Field Measurement of Soil Resistivity Using the Wenner Four-Electrode Method". *Compare this against above to determine differences.*
- 8.5.5 The measurement shall be made using a pin spacing at least equal to or up to 5 feet (1.52 m) greater than the tank bottom depth.
- 8.5.5.1 The depth that the measurement is taken at is determined by the distance between the pin spacing.
- 8.5.5.2 Example: If the tank is 8 feet (2.44 m) in diameter and is buried to a depth of 3 feet (0.91 m) below grade, the pins should be spaced between 11 feet (3.35 m) and 16 feet (4.88 m) apart. Typically the pins would be spaced at 15 feet (4.57 m) apart.
- 8.5.6 The soil resistivity measuring pins shall be placed either parallel or perpendicular to the UST but shall be no closer than 20 feet (6.10 m) of the nearest UST as measured from the tank center line or tank head, which ever is greater.
- 8.5.7 The pins should not be placed over any metallic piping or other buried metal structure. If the only soil area available does not meet the criteria of 1.6, then readings shall be taken at three different locations. All three readings shall be taken at the same pin spacing, as determined by the tank bottom depth (Paragraph 8.4.5.2). Use the average of the three readings to determine the number and size of anodes (Table 9.1.1).



**FIGURE 8.5.3**  
**SOIL RESISTIVITY TEST SETUP**

8.5.8 The Wenner four pin method uses the following formula:

$$\rho = 191.5 \times a \times R$$

where:

$\rho$  = average soil resistivity in ohm-centimeters measured to a depth equal to the spacing between pins

191.5 = constant to convert formula where pin spacing is measured in feet and resultant resistivity is expressed in ohm-centimeters.

$a$  = pin spacing in feet

$R$  = meter reading when using Nilsson Model 400 =

balance dial reading x multiplier dial reading or equal AC Soil Resistivity Meter as measured in ohms (alternatively if using DC method =  $E/I$ )

## 9.0 DETERMINING THE AMOUNT OF SUPPLEMENTAL ANODES NEEDED

### 9.1 ANODE REQUIREMENT

- 9.1.1 Except for special circumstances, the preferred anode for use as a field supplement to cathodic protection is magnesium due to its higher driving potential. Install the quantity of anodes as defined in Table 9.1.1.
- 9.1.2 If the soil or excavation soil is suspected of having a resistance lower than 1500 ohm-cm the use of zinc anodes will promote longer anode life. For zinc anode requirements per the sti-P3® specification contact the Steel Tank Institute.
- 9.1.3 Table 9.1.1 is based on using a wired-on, high potential magnesium alloy type anode, pre-packaged in a special anode grade backfill. It is also based on a current requirement of 30 milliamps or less.

TABLE 9.1.1  
ANODE REQUIREMENTS

SOIL RESISTIVITY (OHM-CM)	TOTAL ANODE WEIGHT REQ'D (LBS)	NO. OF ANODES & SIZE OF EACH
1,500-4,000	64 (29.03 kg)	2 ea. 32 lbs (14.51 kg)
4,001-10,000	34 (15.42 kg)	2 ea. 17 lbs (7.71 kg)
10,001-20,000	40 (18.14 kg)	2 ea. 20 lbs (9.07 kg)
20,001-30,000	60 (27.22 kg)	3 ea. 20 lbs (9.07 kg)
30,001-40,000	80 (36.29 kg)	4 ea. 20 lbs (9.07 kg)

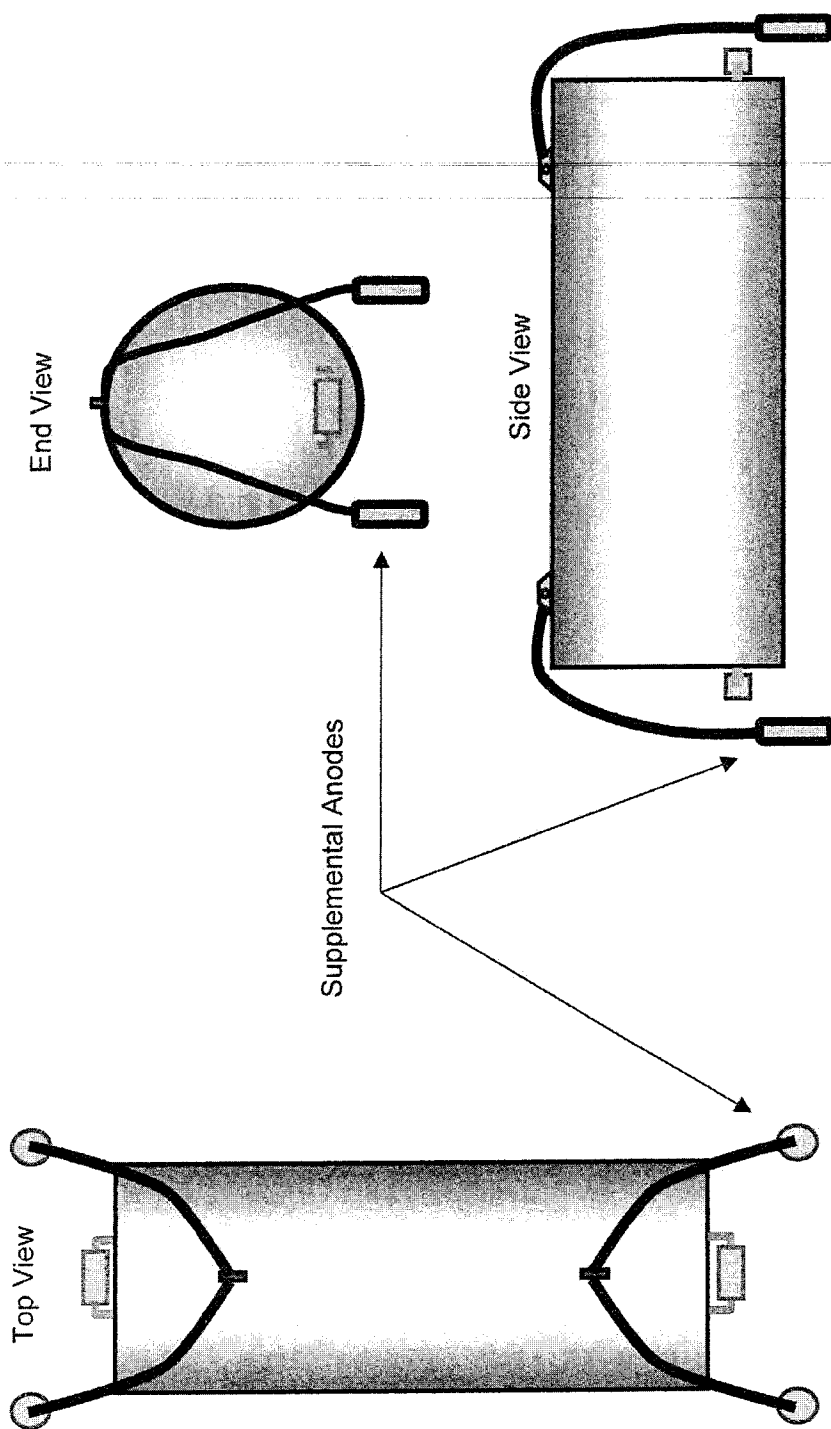
- 9.1.4 A minimum of two (2) anodes are required for each tank. The types of magnesium anodes for this table are 17 pound (7.71 kg) (17D3 Type), 20 pound (9.07 kg) (20D2 Type), or 32 pound (14.51 kg) (32D5 Type) sizes.

## **10.0 ANODE HANDLING AND INSTALLATION**

- 10.1 The key to the efficient operation of any system is the proper installation of the system components. Proper field procedures used during the installation will help ensure long term performance of the additional anodes.
- 10.2 The key components in a galvanic protection system are galvanic anodes, lead wires, wire connections, and test stations.
- 10.3 Handle the anode carefully. Do not lift by, or pull on the anode wire. Do not handle using end of bag. Carry the anode by cradling in both hands. Avoid deformation and damage to the cotton bag and subsequent loss of fill material.
- 10.4 Galvanic anodes should be prepackaged in select backfill. The anodes will have a #12 solid lead wire connected at the factory.
- 10.5 The anodes shall be placed as shown in Figure 10.5. There shall be a minimum 18 inches (0.46 m) between the tank head and the anode(s) and a minimum of 5 feet (1.52 m) between anodes.
- 10.6 It is recommended that the top of the anodes be installed within 1 foot (0.30 m) of the tank bottom depth.
- 10.6.1 For example, if the tank had a 10 foot (3.05 m) diameter and has a 3 foot (0.91 m) burial depth, the bottom of the tank would be at 13 feet (3.96 m) from grade. The anode would be buried to a depth of 12 to 14 feet (3.66-4.27 m). If the anode is placed horizontally, it would be 12 to 14 feet (3.66-4.27 m) deep. If the anode is placed vertically, the anode has to be placed deep enough so that the top of the anode was 12 feet (3.66 m) deep or greater. The length of the anode must be considered. If the anode is 3 feet (0.91 m) long, then auger a hole to a minimum of 15 feet (4.57 m), maximum of 17 feet (5.18 m). (See Figure 10.5.)
- 10.7 Anodes are sometimes shipped in water-proof paper or plastic bags. These bags must be removed prior to installation. The cloth bag containing the special fill material must be left intact both during and after installation.
- 10.8 When lowering an anode into an excavation, use a rope tied around the anode. Do not drop the anode or attempt to lower it by the lead wire.
- 10.9 Prior to backfilling, thorough watering of the anode(s) in place will activate it more quickly so that evaluation of the installation can be done immediately after backfilling and connection is complete.

## **11.0 ELECTRICAL CONNECTIONS**

- 11.1 The importance of excellent electrical connections cannot be overemphasized. The galvanic system relies upon the flow of very small currents which must have proper connections in order to operate. These small potentials cannot overcome the resistance in a poor electrical wire connection or one that becomes poor because proper precautions were not taken to preserve it from contamination and a consequential build-up of resistance to the current.



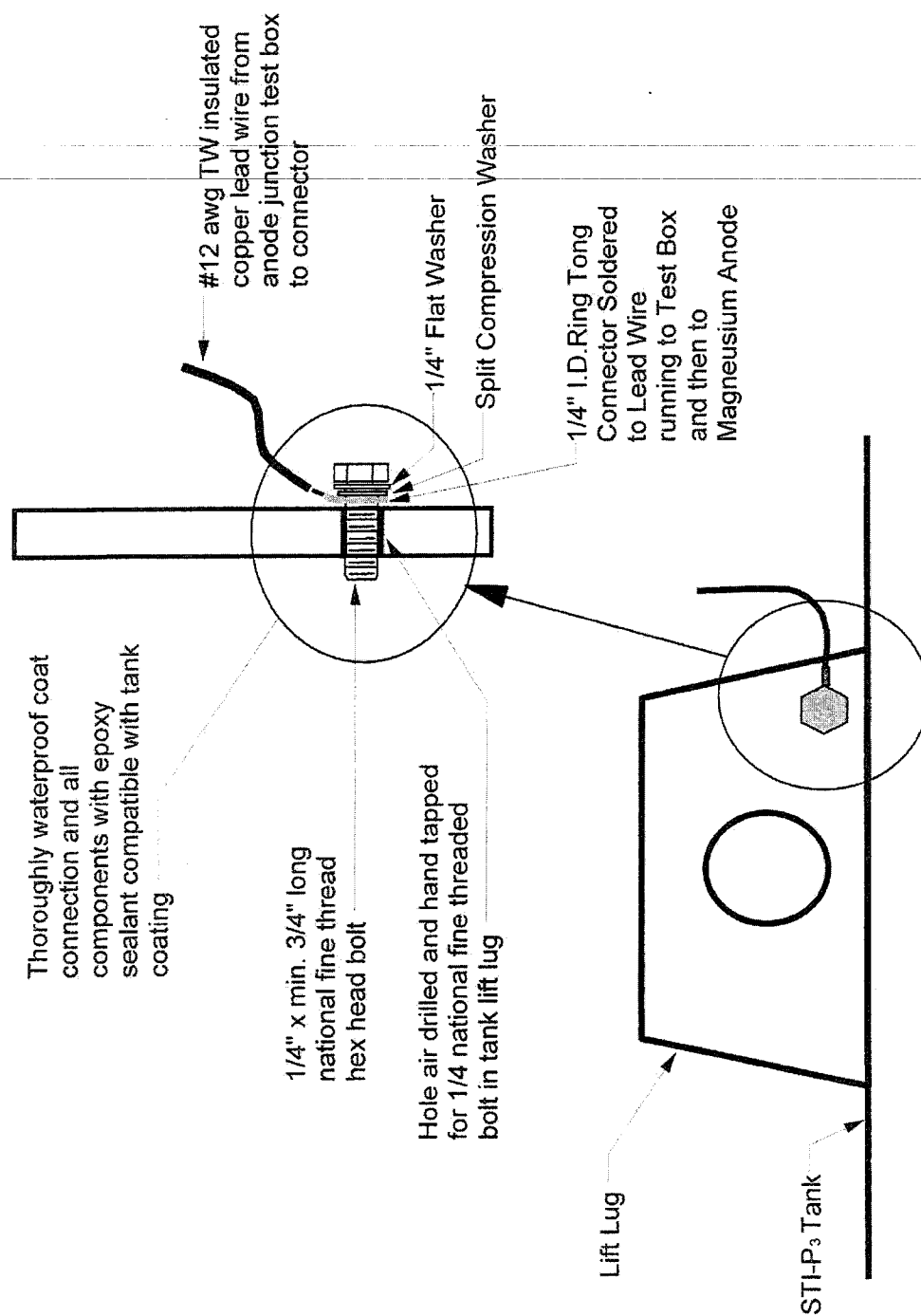
**FIGURE 10.5**  
**PLACEMENT OF SUPPLEMENTAL ANODES AROUND TANK**



- 11.2     **Should combustible vapors exist, do not use a thermite welding procedure. Instead, mechanical methods of tank connection must be employed.** Make a mechanical connection to the tank at the lift lug(s). An air drill may be utilized to provide a hole in a lifting lug where hardware can be attached to hold the lead wire. See Figure 11.2. A lug type connector is very effective for clamping the wire.
- 11.3     Always install the connection so that there is slack in the lead wire. The tank and soil may settle or move over time which could cause a strain to be placed on the wire, possibly causing it to break.
- 11.4     Prior to making any connection, clean the tank surface and the wire connector to ensure a good long term electrical bond. Some roughing of the surface may be required.
- 11.5     Each wire connection to the tank shall be coated to insure the connection is waterproof. The coating material must also be compatible with the tank.
- 11.6     Wire splices are to be avoided and all precautions shall be taken to furnish plenty of wire so that splices will not be required in the field. However, in the event splicing is unavoidable, provide a soldered "Western Union" splice sealed with a mastic filled, heat shrinkable tube designed for use "in-line" underground splices. The spliced wires must be insulated from the ground and sealed from moisture.

## **12.0     TEST STATION INSTALLATION**

- 12.1     To monitor a galvanic cathodic protection system, test stations which permit IR drop compensated reading are required. There should be at least one test lead available for each tank. Often, a single test station is used as a common point for monitoring all of the tanks at a particular site.
- 12.2     Cathodic protection test stations should be clearly marked, readily accessible, and located away from the heavy traffic patterns at the site. They typically include a structure lead wire connected directly to the tank and allow for placement of a reference electrode in the soil adjacent to the tank.
- 12.3     The test station may incorporate a buried reference electrode to aid in consistent monitoring of the galvanic system.
- 12.4     Some test stations will allow for the measurement of the anode current output. This type of test station includes a calibrated resistor called a shunt. The shunt is located in line between the anode and the tank. A separate structure lead should be provided with this test station for use when obtaining a tank-to-soil potential.



**FIGURE 11.2**  
**ANODE/TEST STATION LEAD WIRE ATTACHMENT TO LIFT LUG**

### **13.0 VERIFICATION OF SYSTEM OPERATION**

- 13.1 Once the final anode connections have been completed and the anode has been backfilled, verification of the system operation is possible. Verification can be accomplished by performing the tank-to-soil potential reading per Section 6.0.
- 13.2 After correct operation of the system has been verified, fill out the record-keeping form completely. See Figure 13.2. Once completed, place this form with the other tank cathodic protection records at the tank site.

### **14.0 DISCLAIMER**

- 14.1 This RP is available for general use by those interested. Every effort has been made to ensure that the information contained within this RP is accurate and reliable. However, neither STI nor its corrosion consultant shall be held liable in any way for loss or damage resulting from such use or for violation of any federal, state, or municipal regulation with which it may conflict.
- 14.2 This may be revised or withdrawn at any time without prior written notice. This does not necessarily address all of the applicable health and safety risks and precautions with respect to particular materials, conditions, or procedures. Information concerning safety and health risks and precautions should be obtained from the applicable standards, regulations, suppliers of materials, or material safety data sheets.

**RECORD KEEPING FORM WHEN ADDING ANODES TO STI-P3® TANKS FOLLOWING  
STEEL TANK INSTITUTE'S RECOMMENDED PRACTICE R972**

Date Anodes Added:

**INSTALLER INFORMATION**

Name:  
Address:

Company:  
Phone:

**Before Anode Installation:**

Indicate Location and Value of All Potential Readings

**Tank (top view)**

Tank is Isolated from Other Metallic Structures: ☐

Current Requirement Measurement (mA):

Soil Resistivity:

\_ Number of Anodes Installed:

\_ Weight of Each Anode:

**After Anode Installation:**

Indicate Location and Value of All Potential Readings

**Tank (top view)**

Indicate Placement of  
Anodes on the Tank:

**Tank (top view)**

Signature:

Date:

**FIGURE 13.2  
RECORD KEEPING FORM WHEN ADDING ANODES TO STI-P3® TANKS**

## APPENDIX A

### DESCRIPTION OF PP2, PP4, AND IR DROP COMPENSATED TEST STATIONS

PP2, which stands for Protection Prover 2, is an insulated wire electrically connected to the tank via a mounting plate. This system is provided on most sti-P3® tanks. The installation of the PP2 to the tank is the responsibility of the tank manufacturer. When the tank is installed, the installer has the responsibility of bringing this PP2 wire up to surface grade into one of the openings in the concrete. In the past, these wires used to be brought up coiled around the outside of the fill pipe. However, since the requirement of spill containment, the wire is typically brought into an unused opening of the tank concrete cover. In this location, the cathodic protection tester can place the reference cell in the backfill in this hole and connect the multimeter in the same place. The PP2 wire, once confirmed that it is still continuous with the structure, is an excellent source to connect the supplemental anodes to the structure. Once the PP2 wire and the supplemental anode wires are brought to the surface, they should be connected inside of an IR Drop Compensated Test Station.

PP4, which stands for Protection Prover 4, is a system incorporating a buried reference cell and 2-4 wire leads that terminate in a test station head. The 2-4 wires are connected to the PP2 wires from 2-4 sti-P3® tanks. This system utilizes a buried reference cell which is buried beneath the tanks and measures the electrochemical potential differences at the most susceptible area of the tank, the bottom. It also ensures that the reference cell placement variable is constant for each measurement. Measurements using this system can be performed by the tank owner at anytime by taking the voltmeter and connecting the test leads to the PP4 test station metallic contacts.

IR Drop Compensated Test Stations have several components. They have test terminals, structure wires, anode wires, and sometimes buried reference cell wires. The structure leads can be connected to the anode leads directly at the terminal or they can be connected via a low resistance shunt. The test station allows the cathodic protection tester to take "Instant On" readings, "Instant Off" readings, voltage drop across the known resistance value of the shunt to calculate current output of the anodes, as well as anode potential readings. The test station should be shielded or sealed off as best as possible from moisture ingress. This will reduce the amount of corrosion resistance introduced into the cathodic protection system. These test stations can be used with the PP2 system and the buried reference cells from the PP4 system.

## REFERENCES

STI R892

“Steel Tank Institute Recommended Practice for Corrosion Protection of Underground Piping Networks Associated with Liquid Storage Dispensing Systems”

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STI R821

“Steel Tank Institute Installation Instructions for sti-P3®”

NACE, International RP 0285

“Corrosion Control of Underground Storage Tank Systems by Cathodic Protection”

Petroleum Equipment Institute RP100

“Recommended Practices for Installation of Underground Liquid Storage Systems”

ASTM G57-95a,

“Method for Field Measurement of Soil Resistivity Using the Wenner Four-PIN Method”



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## **APPENDIX B**

### **Forms**

- 1. Special Waste Profile**
- 2. Waste Hauler Inspection Form**
- 3. Facility Inspection Forms**
  - a. Facility Inspection**
  - b. Gas Monitoring**
  - c. Daily Leachate Readings**
  - d. Weekly Leachate Inspection Schedule**
  - e. Monthly Leachate Inspection Schedule**
  - f. Semi Annual Leachate Inspection Schedule**
  - g. Annual Leachate Inspection Schedule**
  - h. Leachate System Alarm Log**
  - i. Closed Landfill Routine Leachate System Maintenance**
  - j. Landfill Expansion Routine Leachate System Maintenance**
  - k. Daily Stormwater Pumping / Inspection Log**



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## **APPENDIX B -1**

### **Special Waste Profile**



WASTE MANAGEMENT

GENERATOR'S WASTE PROFILE SHEET  
CHAFFEE LANDFILL

PLEASE PRINT IN INK OR TYPE

Service Agreement on File? ☐ YES ☐ NO  
☐ Hazardous ☐ Non-Hazardous ☐ TSCA

Profile Number: WMI \_\_\_\_\_  
Renewal Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

**A. Waste Generator Information**

1. Generator Name: \_\_\_\_\_ 2. SIC Code: \_\_\_\_\_  
3. Facility Street Address: \_\_\_\_\_ 4. Phone: (\_\_\_\_) \_\_\_\_\_  
5. Facility City: \_\_\_\_\_ 6. State/Province: \_\_\_\_\_  
7. Zip/Postal Code: \_\_\_\_\_ 8. Generator USEPA/Federal ID #: \_\_\_\_\_  
9. County: \_\_\_\_\_ 10. State/Province ID #: \_\_\_\_\_  
11. Customer Name: \_\_\_\_\_ 12. Customer Phone: (\_\_\_\_) \_\_\_\_\_  
13. Customer Contact: \_\_\_\_\_ 14. Customer Fax: \_\_\_\_\_  
15. Billing Address \_\_\_\_\_ ☐ Same as above

**B. Waste Stream Information**

1. Description

a. Name of Waste: \_\_\_\_\_  
b. Process Generating Waste: \_\_\_\_\_

c. Color	d. Strong odor (describe):	e. Physical state @ 70°F <input type="checkbox"/> Solid <input type="checkbox"/> Liquid <input type="checkbox"/> Gas <input type="checkbox"/> Sludge <input type="checkbox"/> Other	f. Layers <input type="checkbox"/> Single Layer <input type="checkbox"/> Multi-layer	g. Free liquid range _____ to _____ % h. pH: Range _____ to _____ %

i. Solid Flash Point: ☐ <73°F ☐ 73-99°F ☐ 100-139°F ☐ 140-199°F ☐ ≥ 200°F ☐ Not applicable

j. Chemical Composition (List all constituents [including halogenated organics, debris, and UHC's] present in any concentration and submit representative analysis):

Constituents	Concentration Range	Constituents	Concentration Range

**TOTAL COMPOSITION MUST EQUAL OR EXCEED 100%**

k. ☐ Oxidizer ☐ Pyrophoric ☐ Explosive ☐ Radioactive  
☐ Carcinogen ☐ Infectious ☐ Shock Sensitive ☐ Water Reactive

l. Does the waste represented by this profile contain any of the carcinogens which require OSHA notification? (list in Section B.1.j)..... ☐ YES ☐ NO

m. Does the waste represented by this profile contain dioxins? (list in Section B.1.j)..... ☐ YES ☐ NO

n. Does the waste represented by this profile contain asbestos?..... ☐ YES ☐ NO  
If yes..... ☐ friable ☐ non-friable

o. Does the waste represented by this profile contain benzene?..... ☐ YES ☐ NO  
If yes, concentration \_\_\_\_\_ ppm

Is the waste subject to the benzene waste operations NESHAP?..... ☐ YES ☐ NO

p. Is the waste subject to RCRA Subpart CC controls?..... ☐ YES ☐ NO  
If yes, volatile organic concentration \_\_\_\_\_ ppmw

q. Does the waste contain any Class I or Class II ozone-depleting substances?..... ☐ YES ☐ NO

r. Does the waste contain debris? (list in Section B.1.j)..... ☐ YES ☐ NO

2. Quantity of Waste

Estimated Annual Volume \_\_\_\_\_ ☐ Tons ☐ Yards ☐ Drums ☐ Other specify) \_\_\_\_\_

3. Shipping Information

a. Packaging:  
☐ Bulk Solid; Type/Size: \_\_\_\_\_ ☐ Bulk Liquid; Type/Size: \_\_\_\_\_  
☐ Drum; Type; Size: \_\_\_\_\_ ☐ Other: \_\_\_\_\_

b. Shipping Frequency: Units \_\_\_\_\_ Per: ☐ Month ☐ Quarter ☐ Year ☐ One time ☐ Other \_\_\_\_\_

c. Is this a U.S. Department of Transportation (USDOT) Hazardous Material? (If no, skip d, e, and f)..... ☐ YES ☐ NO

d. Reportable Quantity (lbs.; kgs.): \_\_\_\_\_ e. Hazard Class/ID #: \_\_\_\_\_

f. USDOT Shipping Name: \_\_\_\_\_



WASTE MANAGEMENT

GENERATOR'S WASTE PROFILE SHEET  
CHAFFEE LANDFILL

PLEASE PRINT IN INK OR TYPE

g. Personal Protective Equipment Requirements: \_\_\_\_\_

h. Transporter & Transporter Number \_\_\_\_\_

**C. Generator's Certification** (Please check appropriate responses, sign, and date below.)

1. Is this a USEPA hazardous waste (40 CFR Part 261)? If the answer is no, skip to 2. \_\_\_\_\_ ☐ YES ☐ NO
  - a. If yes, identify ALL USEPA listed and characteristic waste code numbers (D, F, K, P, U) \_\_\_\_\_
  - b. If a characteristic hazardous waste, do underlying hazardous constituents (UHCs) apply? (if yes, list in Section B.1.j) \_\_\_\_\_ ☐ YES ☐ NO
  - c. Does this waste contain debris? (if yes, list size and type in Chemical Composition - B.1.) \_\_\_\_\_ ☐ YES ☐ NO
2. Is this a state hazardous waste? \_\_\_\_\_ ☐ YES ☐ NO  
Identify ALL state hazardous/non hazardous waste codes \_\_\_\_\_
3. Is the waste from a CERCLA (40 CFR 300, Appendix B) or state mandated clean-up? \_\_\_\_\_ ☐ YES ☐ NO  
If yes, attach Record of Decision (ROD), 104/106 or 122 order or court order that governs site clean-up activity. For state mandated clean-up, provide relevant documentation.
4. Does the waste represented by this waste profile sheet contain radioactive material, or is disposal regulated by the Nuclear Regulatory Commission? \_\_\_\_\_ ☐ YES ☐ NO
5. Does the waste represented by this waste profile sheet contain concentrations of Polychlorinated Biphenyls (PCBs) regulated by 40 CFR 761? (if yes, list in Chemical Composition - B.1.j) \_\_\_\_\_ ☐ YES ☐ NO
  - a. If yes, were the PCBs imported into the U.S.? \_\_\_\_\_ ☐ YES ☐ NO
6. Do the waste profile sheet and all attachments contain true and accurate descriptions of the waste material, and has all relevant information within the possession of the Generator regarding known or suspected hazards pertaining to the waste been disclosed to the Contractor? \_\_\_\_\_ ☐ YES ☐ NO
7. Will all changes which occur in the character of the waste be identified by the Generator and disclosed to the Contractor prior to providing the waste to the Contractor? \_\_\_\_\_ ☐ YES ☐ NO

☐ Check here if a Certificate of Destruction or Disposal is required.

Any sample submitted is representative as defined in 40 CFR 261 - Appendix I or by using an equivalent method. I authorize WMI to obtain a sample from any waste shipment for purposes of recertification. If this certification is made by a broker, the undersigned signs as authorized agent of the generator and has confirmed the information contained in this Profile Sheet from information provided by the generator and additional information as it has determined to be reasonably necessary. If approved for management, Contractor has all the necessary permits and licenses for the waste that has been characterized and identified by this approved profile.

Certification Signature: \_\_\_\_\_ Title: \_\_\_\_\_  
Name (Type or Print): \_\_\_\_\_ Company Name: \_\_\_\_\_ Date: \_\_\_\_\_

☐ Check if additional information is attached. Indicate the number of attached pages \_\_\_\_\_

**D. WMI Management's Decision**

**FOR WMI USE ONLY**

1. Management Method ☐ Landfill ☐ Non-hazardous Solidification ☐ Bioremediation ☐ Incineration  
☐ Hazardous Stabilization ☐ Other (Specify) \_\_\_\_\_
2. Proposed Ultimate Management Facility: Chaffee Landfill
3. Precautions, Special Handling Procedures, or Limitation on Approval: \_\_\_\_\_
4. Waste Form \_\_\_\_\_ 5. Source \_\_\_\_\_ 6. System Type \_\_\_\_\_  
Special Waste Decision: \_\_\_\_\_ ☐ Approved ☐ Disapproved  
Salesperson's Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
NYSDEC Region 9 Approval: \_\_\_\_\_ Date: \_\_\_\_\_  
Special Waste Approvals Person Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**WASTE MANAGEMENT****GENERATOR'S WASTE PROFILE SHEET**

PLEASE PRINT IN INK OR TYPE

**Instructions**

Information on this form is used to determine if the waste may be transported, treated, stored or disposed in a legal, safe, and environmentally sound manner. This information will be maintained in strict confidence. Answers must be provided for sections A, B, and C and must be printed in ink or typed. A response of "NONE" or "NA" (not applicable) can be made if appropriate. If additional space is needed, indicate on the form that additional information is attached, and attach the information to Generator's Waste Profile Sheet. If you have questions concerning this form, please contact the Contractor's sales representative.

**A. Waste Generator Information**

1. **Generator Name** - Enter the name of the facility where the waste is generated.
2. **SIC Code** - Enter the four digit Standard Industrial Classification Code for the facility where the waste is generated.
3. **Facility Street Address** - Enter the street address (not P.O. Box) of the facility where the waste is generated.
4. **Phone** - Enter Generator's area code and phone number.
5. **Facility City** - Enter the city where the waste is generated.
6. **State/Province** - Enter the state or province where the waste is generated.
7. **Zip/Postal Code** - Enter the generating facility's zip or postal code.
8. **Generator USEPA/Federal ID #** - Enter the identification number issued by the USEPA, Canadian, or Mexican Federal Agency to the facility generating the waste (if applicable).
9. **County** - Enter the county where the waste is generated.
10. **State/Province ID #** - Enter the identification number issued by the state or province to the facility generating the waste (if applicable).
11. **Customer Name** - Entity that the Contractor is directly working with regarding the represented waste stream. If the same as the Generator, mark "Same as Above".
12. **Customer Phone** - Enter technical contact's area code and telephone number.
13. **Customer Contact** - Enter the name of the person who can answer technical questions about the waste.
14. **Customer Fax** - Area code and facsimile number for the customer.
15. **Billing Address** - Address where bill for services should be sent.

**B. Waste Stream Information**

- 1.a. **Name of Waste** - Enter a name generally descriptive of this waste (e.g., paint sludge, fluorescent bulbs).
- 1.b. **Process Generating Waste** - Describe the process generating the waste in detail. List the specific process/operation or source that generates the waste (e.g., incineration of municipal refuse, asbestos removal, wastewater treatment, building maintenance).

At a minimum, the Generator should answer the following questions in determining the process generating the waste.

  - What chemicals are stored and/or used at the facility?
  - Is the waste generated from the production/manufacturing of any of the following industries: wood preservation; inorganic pigments; organic pigments; pesticides; explosives; petroleum refining; iron and steel, copper, lead or zinc production?
  - Is the waste a result from degreasing, solvent parts cleaning, recovery/reclaiming of solvents (bottoms), wastewater treatment (sludges), or electroplating?
- 1.c. **Color** - Describe the color of the waste (e.g., blue, transparent, varies).
- 1.d. **Strong odor** - DO NOT SMELL THE WASTE! If the waste has a known odor, then describe (e.g., acrid, pungent, solvent, sweet).
- 1.e. **Physical state @ 70°F** - If the four boxes provided do not apply, a descriptive phrase may be entered after "Other" (e.g., multi-phase).
- 1.f. **Layers** - Single Layer means the waste is homogenous. Multi-layer means the waste is comprised of two or more layers (e.g., oil/water/sludge).
- 1.g. **Free liquid range** - Range (in percent by volume) of free liquids in the waste.
- 1.h. **pH Range** - Indicate the pH range.
- 1.i. **Liquid Flash Point** - Indicate the flash point obtained using the appropriate test method.
- 1.j. **Chemical Composition** - List all organic and/or inorganic components of the waste using chemical names. If trade names are used, attach Material Safety Data Sheets or other documents that adequately describe the composition of the waste. For each component, estimate the range (in percent) in which the component is present.
- 1.k. Check all that apply.
  - 1.l. Identify any element, chemical compound, or mixture in concentration of 0.1 percent or greater that is considered a carcinogen or potential carcinogen pursuant to OSHA.
  - 1.m. Indicate if the waste contains any dioxins (list in Section B.1.j).
  - 1.n. Indicate if the waste contains asbestos. Indicate if the asbestos is friable.
  - 1.o. Indicate if the waste contains benzene, the level in ppm, and whether it is subject to the benzene NESHAP.
  - 1.p. Indicate if the waste is subject to RCRA Subpart CC control. In addition, indicate the volatile organic concentration, if known, in parts per million weight.
  - 1.q. Indicate if the waste contains any Class I or Class II ozone-depleting controlled substances.
  - 1.r. Indicate if the waste contains debris (list size and type in B.1.j).
2. **Quantity of Waste** - Approximate volume in tons, yards, or other (e.g., drums, gallons) that will be received by the ultimate management facility. This volume amount is not intended for use in complying with state and/or permit restrictions.
- 3.a. **Packaging** - Choose the appropriate option or "other" along with a description.
- 3.b. **Shipping Frequency** - Choose the appropriate option or "other" along with a description.
- 3.c. **Is this a U.S. Department of Transportation (USDOT) hazardous material?** - Choose the appropriate response: yes or no.
- 3.d. **Reportable Quantity (lbs.; kgs.)** - If the answer to 3.c. is yes, enter the Reportable Quantity (RQ) established by 40 CFR



## WASTE MANAGEMENT

### GENERATOR'S WASTE PROFILE SHEET

PLEASE PRINT IN INK OR TYPE

302.4 or equivalent Canadian or Mexican regulation for this waste. Indicate the appropriate units for the RQ.

3.e. **Hazard Class/ID #** - If the answer to 3.c. is yes, indicate the proper USDOT hazard class and identification number.

3.f. **USDOT Shipping Name** - IF the answer to 3.c. is yes, enter the proper USDOT shipping name for the waste.

3.g. **Personal Protective Equipment Requirements** - All personal protective equipment necessary to safely manage the waste stream.

3.h. **Transporter/Transfer Station** - Transporter and/or transfer station name.

#### C. Generator's Certification (Please check appropriate responses, sign, and date below.)

Indicate the appropriate response to questions/statements 1, 2, 3, 4, 5, 6, and 7. By signing this Generator's Waste Profile Sheet, the Generator certifies the responses are true and accurate with respect to the waste stream(s) listed.

**Certification Signature** - Signature of an authorized employee of the Generator or representative of the generator if authorized in writing by the generator.

**Title** - Enter Employee's title.

**Name** - Type or Print Employee's name.

**Company Name** - Company employing the person certifying the Generator's Waste Profile Sheet.

**Date** - Enter the date this Generator's Waste Profile Sheet is signed.

#### D. WMI Management's Decision

FOR WMI USE ONLY

To be completed by WMI.

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## **APPENDIX B -2**

### **Waste Hauler Inspection Form**

Waste Management Chaffee Landfill, Inc.  
Weekly Waste Hauler Inspection Form

DATE: \_\_\_\_\_ MANAGER: \_\_\_\_\_

INSPECT THE: \_\_\_\_\_ TRUCK ON: \_\_\_\_\_

TICKET NUMBER: \_\_\_\_\_ GENERATOR: \_\_\_\_\_

WASTE TRANSPORTER: \_\_\_\_\_

NYSDEC WASTE HAULER PERMIT NUMBER: NA

TRUCK LICENSE NUMBER: \_\_\_\_\_

WASTE TYPE: \_\_\_\_\_

ARE ANY OF THE FOLLOWING ITEMS PRESENT IN THE LOAD?

IDENTIFIABLE  
HAZARDOUS

BULK/FREE  
LIQUIDS

UNAPPROVED INDUSTRIAL  
COMMERICAL WASTE

SMOLDERING OF  
BURNING WASTE

SUSPICIOUS  
WASTE

YES

YES

YES

YES

YES

NO

NO

NO

NO

NO

☐☐☐☐☐☐☐☐☐☐

RESULTS OF INSPECTION: \_\_\_\_\_

IF THE ANSWER TO ANY OF THESE ITEMS IS "YES", IMPLEMENT THE CONTINGENCY PLAN  
PLAN ON RECEIPT OF UNAUTHORIZED WASTES.

INSPECTOR SIGNATURE: \_\_\_\_\_

TITLE: \_\_\_\_\_

DATE & TIME: \_\_\_\_\_

DRIVER SIGNATURE: \_\_\_\_\_

PRINT NAME: \_\_\_\_\_

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## **APPENDIX B -3**

### **Facility Inspection Forms**



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## **APPENDIX B –3a**

### **Facility Inspection**

## ACTIVE LANDFILL ENVIRONMENTAL INSPECTION FORM

FACILITY NAME:

INSPECTION DATE:

LOCATION:

CITY:

STATE:

ZIP CODE:

PERMITTED ACREAGE:

CURRENT DISPOSAL RATE:

HOURS OF OPERATION: a.m., until p.m.

WEATHER (during inspection): Temperature: Conditions:

SIGNATURES:

*The findings of this inspection were discussed with appropriate personnel, corrective actions were identified and entered into CARS, and an implementation schedule was mutually agreed upon:*

Evaluator: \_\_\_\_\_ DATE:

District Manager: \_\_\_\_\_ DATE:

Next Scheduled Inspection Date:

### ENTRANCE & ROADWAYS

	Y	N	NA
1. Signs posted with adequate information? (Entrance, traffic control, safety, etc.) .....	—	—	—
2. Access controlled with gate, perimeter fences, and "No Trespassing" signs in appropriate languages? .....	—	—	—
3. Accurate determination of waste quantity? .....	—	—	—
4. CCTV in place and operable? .....	—	—	—
5. Site entrance, access routes free of litter? .....	—	—	—
6. Entrance road graded and properly drained? .....	—	—	—
7. Access roads graded and drainage provided to ensure wet weather access? .....	—	—	—
8. Tracking of mud and trash onto off-site access roads is minimized? .....	—	—	—
9. Site attended during all hours of operation? .....	—	—	—

### DISPOSAL AREA

10. Adequate site preparation (e.g., cover material stockpiled, liners installed before winter)? .....	—	—	—
11. Markers indicating extent of certified areas are in place? .....	—	—	—
12. Unloading controlled? .....	—	—	—
13. Containers provided to public and readily accessible ( <i>Citizens Use</i> )? ..	—	—	—
14. Public operation separate from commercial operation ( <i>Citizens Use</i> )? .....	—	—	—
15. Working face(s) confined to smallest practical area(s)? .....	—	—	—
16. Waste spread in uniform layers of 2 feet thick or less? .....	—	—	—
17. Waste compacted with appropriate number of passes (recommend 3)? .....	—	—	—
18. Lift height adequate (recommend 8-14 feet)? .....	—	—	—
19. Blowing debris controlled? .....	—	—	—
20. Effective litter control program(s) implemented? .....	—	—	—
21. Daily cover applied and compacted as required <u>or</u> alternate daily cover is approved and implemented? .....	—	—	—

## ACTIVE LANDFILL ENVIRONMENTAL INSPECTION FORM

### **DISPOSAL AREA** (cont'd)

	<b>Y</b>	<b>N</b>	<b>NA</b>
22. Intermediate cover applied and compacted as required?.....	—	—	—
23. Vegetation established over intermediate areas inactive for greater one growing season? .....	—	—	—
24. Final cover applied and compacted as required? .....	—	—	—
25. Vegetation established over fill areas with final cover?.....	—	—	—
26. Scavenging prohibited? .....	—	—	—

### **DRAINAGE**

27. Surface water diverted from active face?.....	—	—	—
28. Adequate contaminated water containment at active face?.....	—	—	—
29. Slopes properly graded.....	—	—	—
30. Erosion control of cover controlled? .....	—	—	—
31. Ditches, canals, impoundments, and associated drainage structures maintained? .....	—	—	—
32. Flood protection provided and markers installed as required?.....	—	—	—
33. NPDES permits (or state equivalent) obtained where applicable?.....	—	—	—
34. Facility is void of standing water where unwanted wetlands may develop? .....	—	—	—

### **OPERATING PLAN**

35. Active fill area in proper location?.....	—	—	—
36. Fill progression in accordance with plan? .....	—	—	—
37. Excavation slopes and depth in accordance with plan?.....	—	—	—
38. Fill height and slope control measures in place? .....	—	—	—
39. Fill height and slopes built and in accordance with plans? .....	—	—	—
40. All required facilities provided and constructed in accordance with plan? .....	—	—	—

### **ENVIRONMENTAL CONTROLS**

41. Emergency Management Plan in place and up to date? .....	—	—	—
42. Fire protection readily available? .....	—	—	—
43. Leachate Management Plan approved and implemented? .....	—	—	—
44. Leachate collection system constructed according to plans? .....	—	—	—
45. Leachate risers and manholes properly secured? .....	—	—	—
46. Leachate treatment system performing properly? .....	—	—	—
47. Surface outbreaks of leachate are being properly controlled?.....	—	—	—
48. Discharge of contaminated water is prevented? .....	—	—	—
49. Current ground water monitoring well inspections in file?.....	—	—	—
50. No evidence of ground water contamination?.....	—	—	—
51. Effective dust control measures in place? .....	—	—	—
52. Effective odor control measures in place?.....	—	—	—
53. Effective vector control measures implemented?.....	—	—	—
54. Open burning non-existent? .....	—	—	—
55. Sediment and erosion controls provided and working adequately? .....	—	—	—
56. Special or hazardous waste handled in accordance with all regulations and policies?.....	—	—	—
57. No evidence of gas migration? .....	—	—	—
58. State regulatory agency required documents (permits, cover log, SDP, etc.) maintained? .....	—	—	—

## ACTIVE LANDFILL ENVIRONMENTAL INSPECTION FORM

### EQUIPMENT

Y      N      NA

59. Site equipment adequate to perform work and back-up equipment available?

—      —      —

### REGULATORY INFORMATION

60. Is this facility on the National Priorities List?

\_\_\_ YES    \_\_\_ NO

a. If yes, date of listing on the NPL:

61. If no, is this facility on CERCLIS?

\_\_\_ YES    \_\_\_ NO    \_\_\_ NA

a. If yes, date of listing on CERCLIS: 1986

### COMMENTS:

ITEM # \_\_\_\_\_

### NOTES:

1. Response box legend

Y = YES

N = NO [A negative response must be identified as an "A" unless a comment is made that demonstrates compliance]

NA = Not Applicable

A = Requires Attention

SN = See Note – issue not currently on CARS, but future recurrence may cause issue to be listed on CARS

2. Shaded boxes indicate that an issue and appropriate corrective action must be entered into CARS.

3. The numerical value following each inspection item indicates the weighted value for that item. The weighted value is then multiplied by the corresponding Y(5 points) or N(-2 points) to obtain the score for that item.



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## **APPENDIX B –3b**

### **Gas Monitoring**

## Chaffee Facility

### Gas Monitoring Field Measurements

Field Representative: \_\_\_\_\_

Date: \_\_\_\_\_

Gas Meter Type: \_\_\_\_\_

Date Calibrated: \_\_\_\_\_

Pressure Gage Type: \_\_\_\_\_

Water Level Meter Type: \_\_\_\_\_

Gas Probe	Time	Pressure (in. H <sub>2</sub> O)	Methane % (Vol. or LEL)	Water Level (ft.)	Comments

Water level measurements are made from the top of PVC riser pipe.

WEATHER CONDITIONS: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

\_\_\_\_\_

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## **APPENDIX B –3c**

### **Daily Leachate Readings**



Chaffee Landfill  
Daily Leachate/Groundwater Readings

			LST 1	LST 2	Condensate Knockout Tank	Above Ground Storage Tanks	Collection Sump (liquid level)																	
Date:	Time:	Name:	(stick read) <sup>1&amp;2</sup>	(stick read) <sup>1&amp;2</sup>	(stick read) <sup>1&amp;2</sup>	(liquid level)	Cell 6 Primary	Cell 6 Secondary	Cell 6 Groundwater	Cell 5 Primary	Cell 5 Secondary	Cell 4 Primary	Cell 4 Secondary	Cell 3 Primary	Cell 3 Secondary	Cell 2 Primary	Cell 2 Secondary	Cell 1 Primary	Cell 1 Secondary	Cell 2 Overliner Secondary	Cell 1 Overliner Secondary	Condensate Pump Station	Sump 3/4 Manhole	Sump 5
			LST 1	LST 2	Condensate Knockout Tank		Collection Sump																	
Date:	Time:	Name:					Cell 6 Primary	Cell 6 Secondary	Cell 6 Groundwater	Cell 5 Primary	Cell 5 Secondary	Cell 4 Primary	Cell 4 Secondary	Cell 3 Primary	Cell 3 Secondary	Cell 2 Primary	Cell 2 Secondary	Cell 1 Primary	Cell 1 Secondary	Cell 2 Overliner Secondary	Cell 1 Overliner Secondary	Condensate Pump Station	Sump 3/4 Manhole	Sump 5
			LST 1	LST 2	Condensate Knockout Tank		Collection Sump																	
Date:	Time:	Name:					Cell 6 Primary	Cell 6 Secondary	Cell 6 Groundwater	Cell 5 Primary	Cell 5 Secondary	Cell 4 Primary	Cell 4 Secondary	Cell 3 Primary	Cell 3 Secondary	Cell 2 Primary	Cell 2 Secondary	Cell 1 Primary	Cell 1 Secondary	Cell 2 Overliner Secondary	Cell 1 Overliner Secondary	Condensate Pump Station	Sump 3/4 Manhole	Sump 5
			LST 1	LST 2	Condensate Knockout Tank		Collection Sump																	
Date:	Time:	Name:					Cell 6 Primary	Cell 6 Secondary	Cell 6 Groundwater	Cell 5 Primary	Cell 5 Secondary	Cell 4 Primary	Cell 4 Secondary	Cell 3 Primary	Cell 3 Secondary	Cell 2 Primary	Cell 2 Secondary	Cell 1 Primary	Cell 1 Secondary	Cell 2 Overliner Secondary	Cell 1 Overliner Secondary	Condensate Pump Station	Sump 3/4 Manhole	Sump 5
			LST 1	LST 2	Condensate Knockout Tank		Collection Sump																	
Date:	Time:	Name:					Cell 6 Primary	Cell 6 Secondary	Cell 6 Groundwater	Cell 5 Primary	Cell 5 Secondary	Cell 4 Primary	Cell 4 Secondary	Cell 3 Primary	Cell 3 Secondary	Cell 2 Primary	Cell 2 Secondary	Cell 1 Primary	Cell 1 Secondary	Cell 2 Overliner Secondary	Cell 1 Overliner Secondary	Condensate Pump Station	Sump 3/4 Manhole	Sump 5

Notes 1: All measurements for LST 1, 2 and Condensate Knockout Tank are from top of tank riser pipe to leachate level.  
2: Leachate measurements for LST 1, 2 and Condensate Knockout Tank can be corrected to gallons based on the tables provided in Appendices A1, A2 and A5.

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## **APPENDIX B –3d**

### **Weekly Leachate Inspection Schedule**

**Chaffee Landfill**  
**Weekly Leachate Inspection Schedule**

Inspector: \_\_\_\_\_

Date: \_\_\_\_\_

Leachate Collection System	Inspection Required	Monitoring Location	Inspection Type	Quantity of Liquid Removed	Notes
LCS 1 / LST 1	Side Slope Riser	Inspection Port	Water Meter		
	Inlet / Outlet Piping	Inspection Riser	Visual		
	Interstitial Tank Space	Inspection Sensor	Visual		
	Cathodic Protection	Inspection Terminal	Visual	NA	
LCS 2 / LST 2	Side Slope Riser	Inspection Port	Water Meter		
	Inlet / Outlet Piping	Inspection Riser	Visual		
	Interstitial Tank Space	Inspection Sensor	Visual		
	Cathodic Protection	Inspection Terminal	Visual	NA	
LCS 3/4 Manhole	Inlet Piping	Line J	Water Meter		
		Line K	Water Meter		
	Interstitial Manhole Space	Inspection Sensor	Visual		
LCS 5	Outlet Piping	Inspection Riser	Visual	NA	
Condensate Knockout Tank	Inlet / Outlet Piping	Inspection Riser	Visual		
	Interstitial Tank Space	Inspection Sensor	Visual		
	Cathodic Protection	Inspection Terminal	Visual	NA	
Condensate Pump Station	Interstitial Manhole Space	Inspection Port	Water Meter		
Transmission Piping (From Sumps To Control Vaults)	Secondary Containment Ports	Inspection Port T 1	Water Meter		
		Inspection Port T 2	Water Meter		
		Inspection Port T 3	Water Meter		
		Inspection Port T 4	Water Meter		
		Inspection Port T 5	Water Meter		
		Inspection Port T 6	Water Meter		
		Inspection Port T 7	Water Meter		
		Inspection Port T 8	Water Meter		
		Inspection Port T 9	Water Meter		
		Inspection Port T 10	Water Meter		
		Inspection Port T 11	Water Meter		
		Inspection Port T 12	Water Meter		
		Inspection Port T 13	Water Meter		
Vault & Tank Piping (Vault, Tanks, Loadout Pad)	Secondary Containment Ports	Inspection Port V 1	Water Meter		
		Inspection Port V 2	Water Meter		
		Inspection Port V 3	Water Meter		
		Inspection Port V 4	Water Meter		
		Inspection Port V 5	Water Meter		
		Sump Sensor	Visual		
Above Ground Storage Tanks	Primary Tank	Electronic Level Indicator	Manual Level	NA	
	Secondary Containment Tank	Primary Tank Exterior Walls And Weeps	Visual		

Notes 1: Both of the above ground leachate storage tanks are equipped with electronic level indicators which shall be checked weekly by comparing a manually taken level with that of the indicator.

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## **APPENDIX B –3e**

### **Monthly Leachate Inspection Schedule**

**Chaffee Landfill**  
**Monthly Leachate/Groundwater Inspection Schedule**

Inspector: \_\_\_\_\_

Date: \_\_\_\_\_

Leachate Collection System	Inspection Required	Operational		Notes
		Yes	No	
LCS 1 / LST 1	Check Auto Dialer Function			
	High Level Sensor At Side Slope Riser			
	Sensor At Tank Containment Chamber			
	High Level Sensor In Tank			
LCS 2 / LST 2	Check Auto Dialer Function			
	High Level Sensor At Side Slope Riser			
	Sensor At Tank Containment Chamber			
	High Level Sensor In Tank			
LCS 3/4 Manhole	High Level Sensor In Manhole			
	Flow meter			
LCS 5	High Level Sensor In Sump			
	Flow meter			
Condensate Knockout Tank	Check Auto Dialer Function			
	Sensor At Tank Containment Chamber			
	High Level Sensor In Tank			
Condensate Pump Station	High Level Sensor In Manhole			
	Flow meter			
Cell 6 Primary Collection	High Level Sensor In Sump			
	Flow meter			
Cell 6 Secondary Collection	High Level Sensor In Sump			
	Flow meter			
Cell 6 Groundwater Collection	High Level Sensor In Sump			
	Flow meter			
Cell 5 Primary Collection	High Level Sensor In Sump			
	Flow meter			
Cell 5 Secondary Collection	High Level Sensor In Sump			
	Flow meter			
Cell 4 Primary Collection	High Level Sensor In Sump			
	Flow meter			
Cell 4 Secondary Collection	High Level Sensor In Sump			
	Flow meter			
Cell 3 Primary Collection	High Level Sensor In Sump			
	Flow meter			
Cell 3 Secondary Collection	High Level Sensor In Sump			
	Flow meter			
Cell 2 Primary Collection	High Level Sensor In Sump			
	Flow meter			
Cell 2 Secondary Collection	High Level Sensor In Sump			
	Flow meter			
Cell 1 Primary Collection	High Level Sensor In Sump			
	Flow meter			
Cell 1 Secondary Collection	High Level Sensor In Sump			
	Flow meter			
Overliner Cell 2 Secondary Collection	High Level Sensor In Sump			
	Flow meter			
Overliner Cell 1 Secondary Collection	High Level Sensor In Sump			
	Flow meter			
Above Ground Storage Tanks	Check Auto Dialer Function			
	High Level Sensor In Tank 1			
	High Level Sensor In Tank 2			
	Sensor In Control Vault			

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## **APPENDIX B –3f**

### **Semi Annual Leachate Inspection Schedule**

**Chaffee Landfill  
Semi Annual Leachate Inspection Schedule**

<b>Leachate Collection System</b>	<b>Inspection Required</b>	<b>Test Results</b>	<b>Notes</b>
LST 1	Cathodic Protection Test		
	Interstitial Space Test		
LST 2	Cathodic Protection Test		
	Interstitial Space Test		
LCS 3/4 Manhole	Interstitial Space Test		
Condensate Knockout Tank	Cathodic Protection Test		
	Interstitial Space Test		
Existing Generator	Manual Startup and Check of Electrical Connection		
Auxiliary Power Plant Power	Manual Startup and Check of Electrical Connection		

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## **APPENDIX B –3g**

### **Annual Leachate Inspection Schedule**



**Chaffee Landfill  
Annual Leachate Inspection Schedule**

<b>System</b>	<b>Inspection Required</b>	<b>Inspection Type</b>	<b>Notes</b>
LST 1	Loadout Pad Concrete	Visual	
	Loadout Pad Sump (i.e. Grate , Pipe, Screen)	Visual	
LST 2	Loadout Pad Concrete	Visual	
	Loadout Pad Sump (i.e. Grate , Pipe, Screen)	Visual	
LCS 3/4 Manhole	Dump Port Valve Function	Visual	
Above Ground Storage Tanks and Control Vault	All Valve Functions	Visual	
	All Sensor Functions	Visual	
	All Alarm Functions	Visual	
	All Interior Piping	Visual	
	Concrete Surface	Visual	
	Sump Area	Visual	
Loadout Building Loadout Pad	Loadout Pad Concrete	Visual	
	Loadout Pad Sump (i.e. Grates and Concrete)	Visual	
Above Ground Storage Tank Secondary Containment	Containment Tank Concrete	Visual	
	Containment Sump (i.e. Grate and Concrete)	Visual	

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## **APPENDIX B –3h**

### **Leachate System Alarm Log**

## Chaffee Landfill

[illegible]

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## **APPENDIX B –3i**

### **Closed Landfill Routine Leachate System Maintenance**

### Routine Leachate System Maintenance (See Figure 13)

**Inspector:**

Date:

## 1. Leachate Collection and Transfer Pipes

[illegible]



Inspector: \_\_\_\_\_  
Date: \_\_\_\_\_[illegible]

Page 3





## Landfill Expansion Routine Leachate System Maintenance

## Routine Leachate System Maintenance (See Figure 13)

Date: \_\_\_\_\_

## **1. Leachate Collection and Transfer Pipes**

[illegible]

Inspector: \_\_\_\_\_

Date: \_\_\_\_\_

Year	1990	2000	2010	2020
Population (millions)	1.2	1.5	1.8	2.1
GDP (billions of USD)	0.5	1.2	2.5	4.0
Life expectancy (years)	55	65	75	80
Urbanization (%)	30	45	60	75
Renewable energy (%)	10	15	20	25
Forest cover (%)	20	25	30	35
Water usage (liters per person per day)	10	15	20	25
Waste generation (kg per person per day)	0.5	1.0	1.5	2.0
Carbon footprint (kg CO <sub>2</sub> per person per day)	0.1	0.2	0.3	0.4
Healthcare expenditure (% of GDP)	5	8	12	15
Education expenditure (% of GDP)	3	4	5	6
Research and development (% of GDP)	1	2	3	4
Government expenditure (% of GDP)	15	18	22	25
Private sector contribution (% of GDP)	10	12	15	18
Foreign aid (% of GDP)	2	3	4	5
Infrastructure investment (% of GDP)	4	6	8	10
Disaster preparedness (% of GDP)	1	2	3	4
Climate change adaptation (% of GDP)	0.5	1.0	1.5	2.0
Renewable energy investment (% of GDP)	0.5	1.0	1.5	2.0
Forest conservation (% of GDP)	0.5	1.0	1.5	2.0
Water management (% of GDP)	0.5	1.0	1.5	2.0
Waste management (% of GDP)	0.5	1.0	1.5	2.0
Carbon footprint reduction (% of GDP)	0.5	1.0	1.5	2.0
Healthcare expenditure (% of GDP)	5	8	12	15
Education expenditure (% of GDP)	3	4	5	6
Research and development (% of GDP)	1	2	3	4
Government expenditure (% of GDP)	15	18	22	25
Private sector contribution (% of GDP)	10	12	15	18
Foreign aid (% of GDP)	2	3	4	5
Infrastructure investment (% of GDP)	4	6	8	10
Disaster preparedness (% of GDP)	1	2	3	4
Climate change adaptation (% of GDP)	0.5	1.0	1.5	2.0
Renewable energy investment (% of GDP)	0.5	1.0	1.5	2.0
Forest conservation (% of GDP)	0.5	1.0	1.5	2.0
Water management (% of GDP)	0.5	1.0	1.5	2.0
Waste management (% of GDP)	0.5	1.0	1.5	2.0
Carbon footprint reduction (% of GDP)	0.5	1.0	1.5	2.0

[illegible]

Inspector: \_\_\_\_\_  
Date: \_\_\_\_\_

[illegible]

1. Connection and manifold pipe cleaning is required for each pipe every 6-months
2. A video log of each collection pipe is required to be made every fourth cleaning (every 2-years)



## Daily Stormwater Pumping / Inspection Log

**Chaffee Landfill**

**Daily Stormwater Pumping / Inspection Log**

Stormwater Inspection Location	Gallons Pumped	Visual Observation	Notes
Unopened Cell Area			
Secondary Containment Tank			
Sediment Basin #5	NA		

## APPENDIX C

### Equipment List



## **Chaffee Landfill Equipment List**

<b>Chassis OEM</b>	<b>Comments</b>	<b>Chassis Model</b>	<b>Chassis Year</b>
Caterpillar	Compactor	836 G	2001
Caterpillar	Compactor	836 G	2000
Sullair	Compressor	185 DPQ	2003
Caterpillar	Dirt Roller	CS 553	1991
John Deere	Dozer	850J	2007
Caterpillar	Dozer	D6R-DS-LGP	2002
Caterpillar	Dozer	D6R	2002
Caterpillar	Dozer	D6R	1999
Caterpillar	Excavator	E70B	1991
Caterpillar	Excavator	345C	2005
Caterpillar	Excavator	325L	1992
Chevrolet	Fuel Truck	C7H042	1990
Caterpillar	Grader	14G	1977
Volvo	Haul Truck	A35 6X6	1993
Volvo	Haul Truck	A40D 6X6	2002
Caterpillar	Loader	938G	2002
Ford	Plow Truck	L8000	1997
Caterpillar	Skid Steer	262A	2001
Tanker	Tanker	5900 Gal Tanker	-
John Deere	Tractor	850	1986
Mack	Water Truck	DM 686S	1989
Mack	Water Truck	DM 686S	1988

APPENDIX D

Leachate Disposal Permits



PAGE 1 OF 9  
PERMIT NO. ICU - 14

## NIAGARA FALLS WATER BOARD WASTEWATER DISCHARGE PERMIT FOR INDUSTRIAL COMMERCIAL USER

PERMIT NO. ICU - 14 Waste Management of New York LLC


In accordance with all terms and conditions of Chapter 250 of the City of Niagara Falls Municipal Code; Sewer Use Ordinance, as adopted by the City Council on July 25, 1983; et seq. and also with all applicable provisions of Federal and State Law or regulation:

Permission is Hereby Granted To: **Waste Management of New York LLC**  
located at: 10860 Olean Road, Chaffee, NY 14030

classified by SIC No(s): 4953

for the contribution of wastewater into the City of Niagara Falls Publicly-Owned Treatment Works (POTW).

EFFECTIVE THIS 28th DAY OF May, 2008  
TO EXPIRE THIS 28th DAY OF May, 2013

  
Richard R. Roll, P.E., DEE  
Director of Technical & Regulatory Services  
Niagara Falls Water Board - Wastewater Facilities

Signed this 17<sup>th</sup> DAY OF March, 2008



[illegible]

A. GENERAL WASTEWATER DISCHARGE PERMIT CONDITIONS

1. Flow monitoring should be performed concurrently with any Wastewater Discharge Permit sampling and should be reported at the same time as analytical results. If it is not feasible to perform flow monitoring, an estimate of flow (method of estimated flow pre-approved by the City) should be submitted with the analytical results.
2. All sampling for pretreatment compliance purposes shall be coordinated through the Industrial Monitoring Coordinator.
3. All analyses must be performed by a laboratory using analytical test methods specified in 40 CFR Part 403.12.
4. All samples shall be handled in accordance with EPA approved methods. Chain of Custody records shall be submitted with all sampling results.
5. All conditions, standards and numeric limitations of Section 250 of the Sewer Use Ordinance are hereby incorporated into this permit by reference. These conditions, standards and numeric limitations must be complied with. Failure to comply with any part of said ordinance constitutes a violation and is subject to enforcement action(s) described in Section 250.9 of said ordinance.
6. Any violation noted by the Industrial User (IU) must be reported immediately to the Department of Wastewater Facilities. In accordance with Federal Regulation 40 CFR, Part 403.12(g), any violation noted by the ICU must be re-sampled, analyzed and resubmitted to the WWTP within thirty (30) days.
7. Sampling frequency for any permitted compounds may be increased beyond the requirements set forth in Section C and D of this permit. If the permittee monitors (sample and analysis) more frequent than required under this permit, all results of this monitoring must be reported.

8. As noted in Section 250.6.2 of the Sewer Use Ordinance, "Personnel as designated by the Director shall be permitted any anytime for reasonable cause to enter upon all properties served by the City POTW for the purpose of, and to carry out, inspection of the premises, observation, measurement, sampling and testing, in accordance with provisions of the Ordinance."
9. As noted in Section 250.5.3 of the Sewer Use Ordinance, significant changes in discharge characteristics or volume must be reported immediately to the WWTP.
10. As noted in Section 250.6.8 of the Sewer Use Ordinance, "Permits are issued to a specific user for a specific monitoring site. A permit shall not be reassigned or transferred without the approval of the Director which approval shall not be unreasonably withheld. Any succeeding owner or user to which a permit has been transferred and approved shall also comply with all terms and conditions of the existing permit."
11. Periodic Self Monitoring Reports (PSMR) shall be submitted as directed in Section D of this permit. Such PSMR's shall obtain the following information:
  - a) Name of permitted facility,
  - b) The exact place, date and time of sampling,
  - c) The dates the analysis were performed,
  - d) The person(s) who performed the analysis,
  - e) The analytical techniques or methods used,
  - f) The results of all required analysis in concentration and mass,
  - g) The flow quantity measured during the 24 hour period of sample collection and the means by which the flow quantity was derived, and
  - h) The report shall be signed by a "Responsible Company Official" acknowledging the following statement:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violation."

**A. GENERAL WASTEWATER DISCHARGE PERMIT CONDITIONS CON'T**

**12. All reports shall be submitted to the following address:**

Industrial Monitoring Coordinator  
Niagara Falls Water Board  
5815 Buffalo Avenue  
Niagara Falls, NY 14304-3832



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**B. SPECIFIC WASTEWATER DISCHARGE PERMIT CONDITIONS**

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**1. Self Monitoring**

a) The permittee will collect and analyze four (4) samples per year at MS#1 for the pollutants listed in Attachment A. The analysis results will be submitted to the Niagara Falls Water Board on/or before February 28<sup>th</sup>, May 31<sup>st</sup>, August 31<sup>st</sup>, November 30<sup>th</sup>.

b) The permittee will collect and analyze one [1] sample from MS#2 for t. phenols. The analysis will be submitted to the Niagara Falls Water Board by February 28<sup>th</sup> of each year.

**2. Septage**

a) The permittee is allowed to co-mingle small quantities of septage with the landfill leachate.

b) The amount of septage will be limited to 4,000 gallons per month.

**C. DISCHARGE LIMITATIONS & MONITORING REQUIREMENTS**

During the period beginning the effective date of this permit and lasting until the expiration date, discharge from the permitted facility outfall(s) shall be limited and monitored by the permittee as specified below.

OUTFALL NUMBER SAMPLE EFFLUENT PARAMETER	DISCHARGE LIMITATIONS		UNITS	MINIMUM MONITORING REQUIREMENTS MEASUREMENT	
	ANNUAL AVERAGE	DAILY MAXIMUM		FREQUENCY	TYPE
<b>MS #1</b> (See Attachment A)	Monitor	Monitor		1/per year	Grab
Flow		100,000	gal/day	daily	N/A
Soluble Organic Carbon	1000	1200	lbs/day	1/per year	Grab
Total Suspended Solids	2500	2700	lbs/day	1/per year	Grab
<b>MS #2</b>					
Flow		17,000	gal/day	daily	N/A
T. phenol	1.5	3.0	lbs/day	1/per year	Grab
Oil & Grease	1.0	5.0	lbs/day	1/per year	Grab

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**C. DISCHARGE LIMITATIONS & MONITORING REQUIREMENTS CONT**

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**SAMPLE TYPE FOOTNOTES**

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- (1) Sample shall consist of a laboratory composite of four (4) grabs collected equally throughout the batch discharge period. A total of four (4) samples (batches) will be analyzed and reported each quarter for each outfall.
- (2) A sample shall consist of a 24 hour laboratory composite of four (4) grab samples collected evenly spaced over the period of release. pH of each grab sample shall be tested immediately upon collection.
- (3) Sample shall consist of a 24 hour flow proportion composite sample collected from each monitoring station.
- (4) Flow will be monitored continuously via water meters.
- (5) Sample shall consist of a 24 hour time proportion composite sample from each approved discharge monitoring point.
- (6) Determination of quantities shall be derived from five (5) 24 hour proportion composite samples collected from each approved monitoring point.
- (7) Same as (3), however, five (5) samples will be collected per quarter from the monitoring station and analyzed by and at the City's expense.

**D. DISCHARGE MONITORING REPORTING REQUIREMENTS**

During the period beginning the effective date of this permit and lasting until its expiration date, discharge monitoring results shall be summarized and reported by the permittee, as noted below. Semiannual Self Monitoring Reports will be submitted February 28th and August 31st. Annual Reports will be submitted by February 28th.

OUTFALL NO.	PARAMETER	REPORTING FREQUENCY
MS # 1	See Attachment A	Annual
MS # 1	Soluble Organic Carbon	Annual
MS # 1	Total Suspended Solids	Annual
MS # 1	Flow	Annual
MS # 2	T. Phenol	Annual
MS # 2	Flow	Annual
MS # 2	Oil & Grease	Annual

Permit No.: 12-07-TR263  
EPA Categorical 40CFR403

Expiration Date: June 30, 2013  
Date Paid: March 13, 2012

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**BUFFALO SEWER AUTHORITY**  
**TRUCKER'S DISCHARGE PERMIT**

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**PERMITTEE: M & T Trucking**

**LOCATION ADDRESS: 532 Peoria Rd., Pavilion, New York 14525**

The above-named Permittee is hereby approved to discharge **landfill leachate** only, from:

**Waste Management / Chaffee Landfill, Inc.**  
**10860 Olean Rd., Chaffee, New York 14030**

to the Buffalo Sewer Authority facilities in accordance with the Buffalo Sewer Authority Regulations, Article VI, Section 14, and subject to the following conditions:

**ARTICLE 1 REGISTRATION**

The Permittee hereby certifies that he is registered with the New York State Department of Environmental Conservation as a waste transporter holding Permit Number 9A-662.

**ARTICLE 2 CONDITIONS OF ACCEPTANCE**

The discharge of the approved waste by the Permittee shall be subject to the following conditions:

a. Times and Locations

The following location(s) is/are designated for discharge during the hours listed and subject to the limit for rate of discharge specified:

<u>Location</u>	<u>Time Discharge is Permitted</u>	<u>Limit On Rate of Discharge</u>
Treatment Plant Settled Wastewater location only.	8:00 AM to 3:15 PM MONDAY THRU FRIDAY (except holidays)	Three (3) 5500 gallon loads per day.

Permit No.: 12-07-TR263  
EPA Categorical 40CFR403

b. Pollutant Discharge Limitations

The permitted waste stream is required to meet all pollutant limitations as specified below:

<u>Pollutant</u>	<u>Maximum Discharge Limit Per Load</u>
pH	5.0 – 12.0 S.U.
Total Extractable Hydrocarbons	100 mg/L.
Total Arsenic	0.083 lbs.
Total Chromium	0.229 lbs.
Total Copper	0.734 lbs.
Total Nickel	0.642 lbs.
Total Zinc	1.147 lbs.
1,1 Dichloroethane	0.023 lbs.
Toluene	0.031 lbs.
Benzene	0.007 lbs.
Total Phenol	0.367 lbs.
Lead	0.229 lbs.
Mercury	50 ng/L.
Silver	0.101 lbs.
Selenium	0.046 lbs.
Barium	4.587 lbs.

EPA Test 608	Limits as stated in
EPA Test 624	Guidance for BSA
EPA Test 625	Pollutant Limits.

c. Local Limits

Except as otherwise specified in this permit, the permit holder shall comply with all specific prohibitions, limits on pollutants or pollutant parameters set forth in the Buffalo Sewer Authority Sewer Use Regulations, as amended from time to time, and such prohibitions, limits and parameters shall be deemed pretreatment standards for purposes for the Clean Water Act.

d. Operations

The Permittee shall maintain cleanliness, minimize odors and protect the Buffalo Sewer Authority facilities during the Permittee's operations. The Permittee shall not permit any condition to arise which may pose a threat to public health, safety or welfare.

e. Instructions

Prior to discharge, the Permittee will identify in writing and submit to the Industrial Waste Section office, the source and characteristics of liquid wastes being discharged. Also, the Permittee must sign the log book provided at the Industrial Waste Section Office.

f. Samples and Analyses

The Buffalo Sewer Authority may from time to time, require the Permittee to sample and analyze its waste discharges. Such sampling and analyses shall be performed and results submitted by a New York State Dept. of Health certified laboratory. The analyses required shall be as specified by the Buffalo Sewer Authority, which also reserves the right, at its convenience, to sample wastes discharged by the Permittee.

g. Refusal to Discharge

The Buffalo Sewer Authority may refuse the Permittee permission to discharge wastes anytime and for any reason whatsoever, for the protection of sewer facilities against damage or flooding; to assure the proper operation and maintenance of said facilities; or to protect public health, safety or welfare; or cause the sewerage system to contravene any Federal, State or Buffalo Sewer Authority limits.

### ARTICLE 3 REGULATIONS

The Permittee must conform to all Buffalo Sewer Authority regulations and appropriate Federal, State and County Statutes, rules, mandates, directives, and orders concerning the collection, transportation, treatment and disposal of waste waters.

### ARTICLE 4 FEES & PAYMENT

a. Annual Fee

The Permittee will pay to the Buffalo Sewer Authority an annual fee of \$ 120.00 as stated in the latest edition of the "Schedule of Sewer Rents and Other Charges."

b. Charge per Load

Waste Management shall pay \$ 0.055 per gallon.

### ARTICLE 5 TERM OF AGREEMENT & RENEWAL

This permit shall be in effect for a period of one (1) year. Within sixty (60) days of termination of this permit all information required for renewal must be submitted to the Industrial Waste Section for review and approval.

## ARTICLE 6 INSURANCE AND INDEMNIFICATION

The Permittee shall provide certification of insurance to the Buffalo Sewer Authority in a form approved by the Industrial Waste Section, said insurance shall have at least the following minimum requirements:

<u>Type</u>	<u>Limits</u>	
	<u>Each Occurrence</u>	<u>Aggregate</u>
<b>General Liability</b>		
Bodily Injury	\$500,000	\$1,000,000
Property Damage	\$100,000	\$500,000
<b>Automobile Liability</b>		
Bodily Injury	\$500,000	\$1,000,000
Property Damage	\$100,000	\$500,000
<b>Excess Umbrella Liability</b>	\$1,000,000	
<b>Workmen's Compensation</b>	Statutory	
<b>New York State Disability</b>	Statutory	

The Permittee, (named insured) agrees to indemnify and hold harmless the Buffalo Sewer Authority and its agents and employees against any and all claims resulting from work performed under this permit. The Permittee shall be solely responsible for any and all injury or damage to its employees or property arising from use of Buffalo Sewer Authority facilities under this permit.

In the event of any alteration, non-renewal or cancellation of these policies, at least (45) forty-five days advance notice shall be given to the Industrial Waste Section, Bird Island Treatment Plant, 90 West Ferry Street, Buffalo, New York 14213 - before such change shall be effective.

## ARTICLE 7 TERMINATION FOR VIOLATION OF AGREEMENT

In the event of a violation of any of the terms and conditions of this permit by the Permittee or upon the failure to pay the charges herein specified, the Buffalo Sewer Authority shall terminate the permit by service of notice of termination by registered mail at the Permittee's office address as set forth above.



Permit No.: 12-07-TR263  
EPA Categorical 40CFR403

**ARTICLE 8 PERMITTEE APPLICATION & ACKNOWLEDGMENT**

Official: Mark P Cole Title: Pres  
Print Name Print Title  
Signature: Mark P Cole 4-5, 20 12

**ARTICLE 9 BUFFALO SEWER AUTHORITY APPROVAL**

Approved as to Content:

Signature: Loli Seduli April 13, 20 2012  
Industrial Waste Administrator

**ARTICLE 10 BUFFALO SEWER AUTHORITY ACKNOWLEDGMENT**

[Signature]  
General Manager  
Buffalo Sewer Authority

Signed this 13<sup>th</sup> day of April, 20 12

Permit No.: 12-07-TR262  
EPA Categorical 40CFR403

Expiration Date: June 30, 2013  
Date Paid: March 13, 2012

**BUFFALO SEWER AUTHORITY**  
**TRUCKER'S DISCHARGE PERMIT**

**PERMITTEE: M & T Trucking, Inc.**

**LOCATION ADDRESS: 532 Peoria Rd., Pavilion, N. Y. 14525**

The above-named Permittee is hereby approved to discharge shop tank wash water only, from:

Waste Management of New York/ Chaffee Landfill Inc.  
10860 Olean Rd., Chaffee, New York 14030

to the Buffalo Sewer Authority facilities in accordance with the Buffalo Sewer Authority Regulations, Article VI, Section 14, and subject to the following conditions:

**ARTICLE 1 REGISTRATION**

The Permittee hereby certifies that he is registered with the New York State Department of Environmental Conservation as a waste transporter holding Permit Number 9A-662.

**ARTICLE 2 CONDITIONS OF ACCEPTANCE**

The discharge of the approved waste by the Permittee shall be subject to the following conditions:

a. Times and Locations

The following location(s) is/are designated for discharge during the hours listed and subject to the limit for rate of discharge specified:

<u>Location</u>	<u>Time Discharge is Permitted</u>	<u>Limit On Rate of Discharge</u>
Treatment Plant Settled Wastewater location only.	8:00 AM to 3:15 PM MONDAY THRU FRIDAY (except holidays)	One (1) 5000 gallon load per day.

Permit No.: 12-07-TR262  
EPA Categorical 40CFR403

b. Pollutant Discharge Limitations

The permitted waste stream is required to meet all pollutant limitations as specified below:

<u>Pollutant</u>	<u>Maximum Discharge Limit Per Load</u>
pH	5.0 – 12.0 S.U.
Total Extractable Hydrocarbons	100 mg/L
Total Arsenic	0.074 lbs.
Total Chromium	0.208 lbs.
Total Copper	0.667 lbs.
Total Nickel	0.584 lbs.
Total Zinc	1.043 lbs.
1, 1 Dichlorethane	0.021 lbs.
Toluene	0.028 lbs.
Benzene	0.006 lbs.
Total Phenol	0.330 lbs.
Lead	0.208 lbs.
Mercury	50 ng/L
Silver	0.092 lbs.
Silenium	0.041 lbs.
Barium	4.128 lbs.
EPA Test 608	Limits as stated in the
EPA Test 624	Guidance for BSA
EPA Test 625	Pollutant Limits.

c. Local Limits

Except as otherwise specified in this permit, the permit holder shall comply with all specific prohibitions, limits on pollutants or pollutant parameters set forth in the Buffalo Sewer Authority Sewer Use Regulations, as amended from time to time, and such prohibitions, limits and parameters shall be deemed pretreatment standards for purposes for the Clean Water Act.

d. Operations

The Permittee shall maintain cleanliness, minimize odors and protect the Buffalo Sewer Authority facilities during the Permittee's operations. The Permittee shall not permit any condition to arise which may pose a threat to public health, safety or welfare.

e. Instructions

Prior to discharge, the Permittee will identify in writing and submit to the Industrial Waste Section office, the source and characteristics of liquid wastes being discharged. Also, the

Permittee must sign the log book provided at the Industrial Waste Section Office.

f. Samples and Analyses

The Buffalo Sewer Authority may from time to time, require the Permittee to sample and analyze its waste discharges. Such sampling and analyses shall be performed and results submitted by a New York State Dept. of Health certified laboratory. The analyses required shall be as specified by the Buffalo Sewer Authority, which also reserves the right, at its convenience, to sample wastes discharged by the Permittee.

g. Refusal to Discharge

The Buffalo Sewer Authority may refuse the Permittee permission to discharge wastes anytime and for any reason whatsoever, for the protection of sewer facilities against damage or flooding; to assure the proper operation and maintenance of said facilities; or to protect public health, safety or welfare; or cause the sewerage system to contravene any Federal, State or Buffalo Sewer Authority limits.

### ARTICLE 3 REGULATIONS

The Permittee must conform to all Buffalo Sewer Authority regulations and appropriate Federal, State and County Statutes, rules, mandates, directives, and orders concerning the collection, transportation, treatment and disposal of waste waters.

### ARTICLE 4 FEES & PAYMENT

a. Annual Fee

The Permittee will pay to the Buffalo Sewer Authority an annual fee of **\$120.00** as stated in the latest edition of the "Schedule of Sewer Rents and Other Charges."

b. Charge per Load

Waste Management shall pay \$ 0.055 per gallon.

### ARTICLE 5 TERM OF AGREEMENT & RENEWAL

This permit shall be in effect for a period of one (1) year. Within sixty (60) days of termination of this permit all information required for renewal must be submitted to the Industrial Waste Section for review and approval.

## ARTICLE 6 INSURANCE AND INDEMNIFICATION

The Permittee shall provide certification of insurance to the Buffalo Sewer Authority in a form approved by the Industrial Waste Section, said insurance shall have at least the following minimum requirements:

<u>Type</u>	<u>Limits</u>	
	<u>Each Occurrence</u>	<u>Aggregate</u>
<b>General Liability</b>		
Bodily Injury	\$500,000	\$1,000,000
Property Damage	\$100,000	\$500,000
<b>Automobile Liability</b>		
Bodily Injury	\$500,000	\$1,000,000
Property Damage	\$100,000	\$500,000
<b>Excess Umbrella Liability</b>	\$1,000,000	
<b>Workmen's Compensation</b>	Statutory	
<b>New York State Disability</b>	Statutory	

The Permittee, (named insured) agrees to indemnify and hold harmless the Buffalo Sewer Authority and its agents and employees against any and all claims resulting from work performed under this permit. The Permittee shall be solely responsible for any and all injury or damage to its employees or property arising from use of Buffalo Sewer Authority facilities under this permit.

In the event of any alteration, non-renewal or cancellation of these policies, at least (45) forty-five days advance notice shall be given to the Industrial Waste Section, Bird Island Treatment Plant, 90 West Ferry Street, Buffalo, New York 14213 - before such change shall be effective.

## ARTICLE 7 TERMINATION FOR VIOLATION OF AGREEMENT

In the event of a violation of any of the terms and conditions of this permit by the Permittee or upon the failure to pay the charges herein specified, the Buffalo Sewer Authority shall terminate the permit by service of notice of termination by registered mail at the Permittee's office address as set forth above.

**ARTICLE 8 PERMITTEE APPLICATION & ACKNOWLEDGMENT**

Official: Mark P. Cole Title: Pres.  
Print Name Print Title  
Signature: Mark P. Cole 4-5, 2012

**ARTICLE 9 BUFFALO SEWER AUTHORITY APPROVAL**

Approved as to Content:

Signature: Leo L. Seduk April 13, 2012  
Industrial Waste Administrator

**ARTICLE 10 BUFFALO SEWER AUTHORITY ACKNOWLEDGMENT**

Di P.C.  
General Manager  
Buffalo Sewer Authority

Signed this 13<sup>th</sup> day of April, 2012

**APPENDIX E**

**Reports**

New York State Department of Environmental Conservation  
Division of Materials Management  
Albany, New York 12233-7260

**ACTIVE (MUNICIPAL SOLID WASTE, INDUSTRIAL, OR ASH) LANDFILL**

A landfill is a solid waste management facility where solid waste is disposed. This form applies to municipal solid waste, industrial, and ash monofill landfills. Further information and a listing of the landfills are available online at <http://www.dec.ny.gov/chemical/23681.html>.

Note: If you operate a construction and demolition debris, land clearing debris landfill, or a Long Island landfill, DO NOT use this form. Forms for all solid waste management facilities and a brief description of each can be found at <http://www.dec.ny.gov/chemical/52706.html>.

**Annual/Quarterly Report**

Submit the Annual Report no later than March 5, 2012.

For use of this form as an Annual Report, complete line A and complete Sections 1 through 13 and 19 through 21. The Annual Report form is to be used to meet annual reporting requirements (excluding results from annual sampling events which require the use of the Quarterly Report form as noted in the following paragraph).

For use of this form as a Quarterly Report, complete line B and complete Sections 1 and 14 through 21. The Quarterly Report form is to be used for reporting of quarterly, semiannual, or annual results from each sampling event without regard for whether the sampling event is required on a quarterly, semiannual, or annual basis. Submit the Quarterly Report no later than 60 days after the last day of each calendar quarter or within 90 days of the conclusion of sample collection if Site Analytical Plan requirements must be met.

Reporting of the information indicated on this Active Landfill Annual/Quarterly Report form is required pursuant to 6 NYCRR 360-1.4(c); 360-1.8(e)(1)(ii); 360-1.14(e)(2), (i)(1); 360-2.9(j)(3); 360-2.11(c)(5)(iv), (d)(5), (d)(6); 360-2.14(a)(2)(vi); 360-2.17(a), (t); 360-2.19(b)(1)(ii), (c)(1)(ii), (d)(1)(i); 360-6.5(d); and 360-8.1. Failure to provide the required information requested is a violation of Environmental Conservation Law. Timely submission of a properly completed form to the Department's Regional Office that has jurisdiction over your facility and to the Department's Central Office is required to meet the Annual/Quarterly Report requirements of 6 NYCRR Part 360.

Where the Annual/Quarterly Report requirements have been modified, appropriate Sections (as necessary to reflect the modification) must be completed and submitted with a copy of the Department's written notification which allows the modification.

Entries on the report forms should be either typewritten or neatly printed in black ink. Attach additional sheets if space on the pages is insufficient or supplementary information is required or appropriate.

Please note that where reference is made to a "Quarter" such as in line B, Quarter 1 is from January 1st to March 31st, Quarter 2 is from April 1st to June 30th, Quarter 3 is from July 1st to September 30th and Quarter 4 is from October 1st to December 31st.

**Solid Waste Volume To Weight Conversion Factors**

MATERIAL	EQUIVALENT	
Construction and Demolition Debris	1 cubic yard	0.75 tons
Compacted Solid Waste	1 cubic yard	0.5 tons
Uncompacted Solid Waste	1 cubic yard	0.1 tons



## ANNUAL/QUARTERLY REPORT

A. This MSW, Industrial or Ash Landfill Report is for the year of operation from

\_\_\_\_\_, 2012 to \_\_\_\_\_, 2012

B. Quarterly Report for: \_\_\_ Quarter 1 \_\_\_ Quarter 2 \_\_\_ Quarter 3 \_\_\_ Quarter 4

### SECTION 1 – OWNER / FACILITY INFORMATION

FACILITY NAME:					
FACILITY ADDRESS:		FACILITY CITY:		STATE:	ZIP CODE:
FACILITY TOWN:		FACILITY COUNTY:		FACILITY PHONE NUMBER:	
FACILITY NYS PLANNING UNIT: (A list of NYS Planning Units can be found at the end of this report).				NYSDEC REGION #:	
360 PERMIT #:	DATE ISSUED:	DATE EXPIRES:	NYS DEC ACTIVITY CODE OR REGISTRATION NUMBER:		
FACILITY CONTACT:		CONTACT PHONE NUMBER:		CONTACT FAX NUMBER:	
CONTACT EMAIL ADDRESS:					
OWNER NAME:		OWNER PHONE NUMBER:		OWNER FAX NUMBER:	
OWNER ADDRESS:		OWNER CITY:		STATE:	ZIP CODE:

## SECTION 2 - SITE LIFE

### 1. Landfill Capacity Utilized Last Year (reporting year).

- a. What is the estimated landfill capacity that was utilized during the reporting year?

\_\_\_\_\_ Cubic Yards of Airspace

Please do not report  
units as pounds per  
cubic yard.

- b. What is the estimated in-situ waste density for the reporting year?

\_\_\_\_\_ Tons/Cubic Yard

### 2. Remaining Constructed Capacity

- a. What is the remaining capacity of the landfill that is already constructed?

\_\_\_\_\_ Cubic Yards of Airspace

- b. What is the estimated remaining life of the constructed capacity?

\_\_\_\_\_ Years \_\_\_\_\_ Months

at \_\_\_\_\_ Tons/Year.\*

\* Please note that this tonnage rate must include all materials placed in the landfill, i.e., waste, soil, cover, alternative daily covers, etc.

- c. Is the tonnage rate reported under 2.b. based on (select one):

\_\_\_\_\_ Last year's disposal amount?

\_\_\_\_\_ Estimated future disposal?

\_\_\_\_\_ Permit limit?

Other (explain): \_\_\_\_\_

### 3. Permitted Capacity Still to be Constructed

- a. What is the remaining but not yet constructed landfill capacity that is authorized by a Part 360 permit?

\_\_\_\_\_ Cubic Yards of Airspace

- b. What is the projected life of capacity reported in 3a.?

\_\_\_\_\_ Years \_\_\_\_\_ Months

at \_\_\_\_\_ Tons/Year.\*

\* Please note that this tonnage rate must include all materials disposed in the landfill, i.e., waste, and soil and alternative daily covers.

- c. Is the tonnage rate reported under 3.b. based on (select one):

\_\_\_\_\_ Last year's disposal amount?

\_\_\_\_\_ Estimated future disposal?

\_\_\_\_\_ Permit limit?

Other (explain): \_\_\_\_\_

4. Capacity Proposed in a Part 360 Permit Application

What is the capacity of any expansion proposed in a Part 360 permit application that has been submitted to the Department but not authorized by a permit as of the end of the reporting period?

Cubic Yards of Airspace

5. Estimated Potential Future Capacity Not Permitted or in an Application (optional)

What is the estimated capacity of any potential future expansion at the facility that is not yet authorized by a permit or proposed in a Part 360 permit application that has been submitted to the Department?

Cubic Yards of Airspace

### SECTION 3 - PRIMARY LEACHATE

Name of off-site leachate treatment facility(s) utilized: \_\_\_\_\_

Does the landfill have a constructed liner and a leachate collection system? \_\_\_\_ Yes \_\_\_\_ No

Enter the quantity of primary leachate that was collected, removed for on-site and off-site treatment, and recirculated each month, and the corresponding **Acreage, by Cell**:

(Note: For double-lined landfills this should not include the volume of leachate collected from secondary leachate collection and removal systems.)

For each cell, please report the acreage and the primary leachate amount.

	PRIMARY LEACHATE COLLECTED (GALLONS)						PRIMARY LEACHATE TREATED OFF SITE (GALLONS)					
	Cell 1 Acres	Cell 2 Acres	Cell 3 Acres	Cell 4 Acres	Cell 5 Acres	Cell 6 Acres	Cell 1 Acres	Cell 2 Acres	Cell 3 Acres	Cell 4 Acres	Cell 5 Acres	Cell 6 Acres
January												
February												
March												
April												
May												
June												
July												
August												
September												
October												
November												
December												
ANNUAL												

	PRIMARY LEACHATE RECIRCULATED (GALLONS)						PRIMARY LEACHATE TREATED ON SITE (GALLONS)					
	Cell 1 Acres	Cell 2 Acres	Cell 3 Acres	Cell 4 Acres	Cell 5 Acres	Cell 6 Acres	Cell 1 Acres	Cell 2 Acres	Cell 3 Acres	Cell 4 Acres	Cell 5 Acres	Cell 6 Acres
January												
February												
March												
April												
May												
June												
July												
August												
September												
October												
November												
December												
ANNUAL												

Submit (attached to this form) a copy of the maintenance logs which document compliance with the Operation and Maintenance Manual's schedule for the routine annual flushing and inspection of the primary leachate collection and removal system. List required submissions that have been attached to this form or the reason for not attaching a required piece of information:

Submit (attached to this form) a tabulated compilation of the semi-annual primary leachate quality data collected throughout the year including a summary comparing this year's data with the previous year's data and a summary discussion of results. This list should identify sample location(s) and method of analysis. List required submissions that have been attached to this form or the reason for not attaching a required piece of information:

#### SECTION 4 - SECONDARY LEACHATE

Does landfill have a double liner system with a secondary leachate collection and removal system? ☐ Yes ☐ No

Submit (attached to this form) a tabulated compilation of the semi-annual secondary leachate quality data collected throughout the year including a summary comparing this year's data with all previous years' data and a summary discussion of results. This list should identify sample location(s) and methods of analysis. List required submissions that have been attached to this form or the reason for not attaching a required piece of information:

Please report total cost for the year, not cost/gal.

Leachate Cost: (including transportation if appropriate) during the calendar year for leachate treatment: \$ \_\_\_\_\_

Total quantity treated: \_\_\_\_\_ gal

Enter the quantity of secondary leachate that was collected, removed for on-site and off-site treatment, and recirculated each month, and the corresponding **Acreage, by Cell**:

For each cell, please report the acreage and the secondary leachate amount.

	SECONDARY LEACHATE COLLECTED (GALLONS)						SECONDARY LEACHATE TREATED OFF SITE (GALLONS)					
	Cell 1 ___Acres	Cell 2 ___Acres	Cell 3 ___Acres	Cell 4 ___Acres	Cell 5 ___Acres	Cell 6 ___Acres	Cell 1 ___Acres	Cell 2 ___Acres	Cell 3 ___Acres	Cell 4 ___Acres	Cell 5 ___Acres	Cell 6 ___Acres
January												
February												
March												
April												
May												
June												
July												
August												
September												
October												
November												
December												
ANNUAL												

	SECONDARY LEACHATE RECIRCULATED (GALLONS)						SECONDARY LEACHATE TREATED ON SITE (GALLONS)					
	Cell 1 ___Acres	Cell 2 ___Acres	Cell 3 ___Acres	Cell 4 ___Acres	Cell 5 ___Acres	Cell 6 ___Acres	Cell 1 ___Acres	Cell 2 ___Acres	Cell 3 ___Acres	Cell 4 ___Acres	Cell 5 ___Acres	Cell 6 ___Acres
January												
February												
March												
April												
May												
June												
July												
August												
September												
October												
November												
December												
ANNUAL												

For each type of waste material that the Department has approved for use as alternate daily cover, intermediate cover, or other landfill material, provide the annual weight in tons, use (i.e., daily cover, intermediate cover, etc.), and source of material. (If material is from a solid waste facility also provide facility name, address, NYS Planning Unit, County/ Province, and State/Country.) **Refer to the list of NYS Planning Units that can be found at the end of this report.**

### Percent Alternative Daily Cover (ADC) Calculation

Please note the calculation is: Tons ADC (from table above)/Tons Solid Waste (from table in Section 6) x 100 and **Not:** Tons ADC / (Tons Solid Waste + ADC) x 100

## SECTION 6 - QUANTITY OF SOLID WASTE DISPOSED

### A. Quantity Disposed by Month/Year

Provide the tonnages of solid waste disposed. Exclude Beneficial Use Material amounts reported in Section 5 and Materials Recovered amounts reported in Section 7. Specify the methods used to measure the quantities disposed and the percentages measured by each method:

\_\_\_\_\_ % Scale Weight  
 \_\_\_\_\_ % Truck Count  
 \_\_\_\_\_ % Estimated  
 \_\_\_\_\_ % Other (Specify: \_\_\_\_\_)

Type of Solid Waste	January (tons)	February (tons)	March (tons)	April (tons)	May (tons)	June (tons)	July (tons)
Asbestos							
Ash (Coal)							
Ash (MSW Energy Recovery)							
Construction & Demolition Debris (mixed)							
Industrial Waste (Including Industrial Process Sludges)							
Mixed Municipal Solid Waste (Residential, Institutional & Commercial)							
Oil/Gas Drilling Waste							
Petroleum Contaminated Soil							
Sewage Treatment Plant Sludge							
Treated Regulated Medical Waste							
Other (specify)							
Total Tons Disposed							



# SECTION 6 - QUANTITY OF SOLID WASTE DISPOSED (CONTINUED)

## A. Quantity Disposed by Month/Year

Type of Solid Waste	Tip Fee (\$)	August (tons)	September (tons)	October (tons)	November (tons)	December (tons)	Total Year (tons)	Daily Avg. (tons)
Asbestos								
Ash (Coal)								
Ash (MSW Energy Recovery)								
Construction & Demolition Debris (mixed)								
Industrial Waste (Including Industrial Process Sludges)								
Mixed Municipal Solid Waste (Residential, Institutional & Commercial)								
Oil/Gas Drilling Waste								
Petroleum Contaminated Soil								
Sewage Treatment Plant Sludge								
Treated Regulated Medical Waste								
Other (specify)								
Total Tons Disposed								

## B. Quantity Disposed by Facility's Service Area

Identify the facility's service area by indicating the type of solid waste received, the Solid Waste Management facility (SWMF) from which it was received by your facility (or Direct Haul), the corresponding State/Country, the County/Province, and the NYS Planning Unit and the amount received. **Refer to the list of NYS Planning Units that can be found at the end of this report.** Note: "Direct Haul" means waste hauled directly to your SWMF which did not go through another SWMF. The total amount reported here should equal the total amount reported in Section 6A (Quantity Received by Month/Year). DO NOT REPORT IN CUBIC YARDS!

Specify transport method and percentages of total waste transported by each:

\_\_\_\_ % Road \_\_\_\_\_ % Rail  
 \_\_\_\_ % Water \_\_\_\_\_ % Other (specify: \_\_\_\_\_)

Please report the facility from which you received the solid waste. Note: This is not the facility identified in Section 1.

Explain which waste types and service areas below are included in these transport methods \_\_\_\_\_

B. SERVICE AREA					
TYPE OF SOLID WASTE	SOLID WASTE MANAGEMENT FACILITY FROM WHICH IT WAS RECEIVED (Name & Address)	SERVICE AREA STATE OR COUNTRY	SERVICE AREA COUNTY OR PROVINCE	SERVICE AREA NYS PLANNING UNIT	TONS RECEIVED
Asbestos	(Example 1) (Monroe County Transfer Station, Rochester)	(NY)	(Monroe)	(Monroe County)	(2,000)
	(Example 2) (Direct Haul)	(NY)	(Erie)	(NEST)	(500)
	(Example 3) (Appleton Transfer Station, Penn Yan)	(NY)	(Yates)	(WFLSWMA)	(1,000)
Ash (Coal)					
Ash (MSW Energy Recovery)					
Construction & Demolition Debris (mixed)					

B. SERVICE AREA						
TYPE OF SOLID WASTE	SOLID WASTE MANAGEMENT FACILITY FROM WHICH IT WAS RECEIVED (Name & Address)	SERVICE AREA STATE OR COUNTRY	SERVICE AREA COUNTY OR PROVINCE	SERVICE AREA NYS PLANNING UNIT	TONS RECEIVED	
Industrial Waste (Including Industrial Process Sludges)						
Mixed Municipal Solid Waste (Residential, Institutional & Commercial)						
Oil/Gas Drilling Waste						
Petroleum Contaminated Soil						
Sewage Treatment Plant Sludge						
Treated Regulated Medical Waste (TRMW)*						
Other (specify)						
TOTAL RECEIVED (tons):						

\* List generators that provide you Certificates of Treatment forms and quantities of TRMW from each \_\_\_\_\_

## SECTION 7 – RECYCLABLES & RECOVERED MATERIALS

### A. Quantity of Recyclable Material Received by Facility's Service Area

Identify the facility's service area by indicating the type of recyclable material received, the Solid Waste Management facility (SWMF) from which it was received by your facility (or Direct Haul), the corresponding State/Country, the County/Province, the NYS Planning Unit from which waste was received. **Refer to the list of NYS Planning Units that can be found at the end of this report.** Note: "Direct Haul" means waste hauled directly to your SWMF which did not go through another SWMF. DO NOT REPORT IN CUBIC YARDS!

Specify transport method and percentages of total waste transported by each:

\_\_\_\_\_ % Road  
 \_\_\_\_\_ % Rail  
 \_\_\_\_\_ % Water  
 \_\_\_\_\_ % Other (specify: \_\_\_\_\_)

Please report the facility from which you received the recyclable material. Note: This is not the facility identified in Section 1.

Explain which waste types and service areas below are included in these transport methods \_\_\_\_\_

RECYCLABLE MATERIAL	SERVICE AREA				SERVICE AREA NYS PLANNING UNIT	TONS RECEIVED
	SOLID WASTE MANAGEMENT FACILITY FROM WHICH IT WAS RECEIVED (Name & Address)	SERVICE AREA STATE OR COUNTRY	SERVICE AREA COUNTY OR PROVINCE	SERVICE AREA NYS PLANNING UNIT		
Brush, Branches, Trees, & Stumps						
Commingled Containers (metal, glass, plastic)						
Commingled Paper (all grades)						
Electronics						
Food Scraps						
Leaves & Grass						
Single Stream (total)						
Other (specify)						
TOTAL RECEIVED (tons):						

### B. Quantity of Recyclable Material Recovered

Identify the name of the destination facility to which the recyclable material was sent from your facility, the corresponding State/Country, the County/Province, the NYS Planning Unit, and the amount of recyclable material transported. Refer to the list of NYS Planning Units that can be found at the end of this report. DO NOT REPORT IN CUBIC YARDS!

Specify transport method and percentages of total waste transported by each:

\_\_\_\_\_ % Road \_\_\_\_\_ % Rail  
 \_\_\_\_\_ % Water \_\_\_\_\_ % Other (specify: \_\_\_\_\_)

Explain which waste types and service areas below are included in these transport methods \_\_\_\_\_

Please report the facility to which you send the recyclable material.  
 Note: This is not the facility identified in Section 1.

PAPER RECOVERED						TONS RECYCLED (out of facility)
RECYCLABLE MATERIAL	DESTINATION FACILITY (Name & Address)	DESTINATION STATE OR COUNTRY	DESTINATION COUNTY OR PROVINCE	DESTINATION NYS PLANNING UNIT		
Corrugated Cardboard						
Junk Mail						
Magazines						
Newspaper						
Office Paper						
Paperboard / Boxboard						
Other Paper (specify)						
TOTAL PAPER RECYCLED (tons):						
PAPER RESIDUE (tons):		DISPOSAL DESTINATION: (Name, Address, & State)				

B. Quantity of Recyclable Material Recovered (continued)

GLASS RECOVERED						
RECYCLABLE MATERIAL	DESTINATION FACILITY (Name & Address)	DESTINATION STATE OR COUNTRY	DESTINATION COUNTY OR PROVINCE	DESTINATION NYS PLANNING UNIT	DESTINATION NYS PLANNING UNIT	TONS RECYCLED (out of facility)
Container Glass						
Industrial Scrap Glass						
Other Glass (specify)						
TOTAL GLASS RECYCLED (tons):						
GLASS RESIDUE (tons):		DISPOSAL DESTINATION: (Name, Address, & State)				
METAL RECOVERED						
RECYCLABLE MATERIAL	DESTINATION FACILITY (Name & Address)	DESTINATION STATE OR COUNTRY	DESTINATION COUNTY OR PROVINCE	DESTINATION NYS PLANNING UNIT	DESTINATION NYS PLANNING UNIT	TONS RECYCLED (out of facility)
Aluminum Foil / Trays						
Bulk Metal						
Enameled Appliances / White Goods						
Industrial Scrap Metal						
Tin & Aluminum Containers						
Other Metal (specify)						
TOTAL METAL RECYCLED (tons):						
METAL RESIDUE (tons):		DISPOSAL DESTINATION: (Name, Address, & State)				

B. Quantity of Recyclable Material Recovered (continued)

PLASTIC						
RECYCLABLE MATERIAL	DESTINATION FACILITY (Name & Address)	DESTINATION STATE OR COUNTRY	DESTINATION COUNTY OR PROVINCE	DESTINATION NYS PLANNING UNIT	TONS RECYCLED (out of facility)	
PET (plastic #1)						
HDPE (plastic #2)						
Other Rigid Plastics (#3 - #7)						
Industrial Scrap Plastic						
Plastic Film & Bags						
Other Plastics (specify)						
TOTAL PLASTIC RECYCLED (tons):						
PLASTIC RESIDUE (tons):		DISPOSAL DESTINATION: (Name, Address, & State)				

**B. Quantity of Recyclable Material Recovered** (continued)

MISCELLANEOUS						
RECYCLABLE MATERIAL	DESTINATION FACILITY (Name & Address)	DESTINATION STATE OR COUNTRY	DESTINATION COUNTY OR PROVINCE	DESTINATION NYS PLANNING UNIT	TONS RECYCLED (out of facility)	
Commingled Containers						
Commingled Paper & Containers						
Electronics						
Textiles						
Other (specify)						
TOTAL MISCELLANEOUS RECYCLED (tons):						
DISPOSAL DESTINATION: (Name, Address, & State)						
MISC. RESIDUE (tons):						

**VOLUME TO WEIGHT CONVERSION FACTORS**

MATERIAL	EQUIVALENT	MATERIAL	EQUIVALENT	MATERIAL	EQUIVALENT
GLASS – whole bottles	1 cubic yard	GLASS - crushed mechanically	1 cubic yard	ALUMINUM – cans – whole	1 cubic yard
GLASS - semi crushed	1 cubic yard	GLASS - uncrushed manually	55 gallon drum	ALUMINUM – cans – flattened	1 cubic yard
PAPER - high grade loose	1 cubic yard	PLASTIC – PET – whole	1 cubic yard		
PAPER - high grade baled	1 cubic yard	PLASTIC – PET - flattened	1 cubic yard		
PAPER - mixed loose	1 cubic yard	PLASTIC – PET - baled	1 cubic yard	WHITE GOODS - uncompacted	1 cubic yard
NEWSPRINT - loose	1 cubic yard	PLASTIC - styrofoam	1 cubic yard	WHITE GOODS - compacted	1 cubic yard
NEWSPRINT - compacted	1 cubic yard	PLASTIC – HDPE – whole	1 cubic yard		
CORRUGATED – loose	1 cubic yard	PLASTIC – HDPE – flattened 1	1 cubic yard		
CORRUGATED - baled	1 cubic yard	PLASTIC – HDPE - baled	1 cubic yard	FERROUS METAL - cans whole	1 cubic yard
		PLASTIC – mixed (grocery bags)	45 gallon bag	FERROUS METAL - cans	1 cubic yard



## SECTION 8 - UNAUTHORIZED SOLID WASTE

Has unauthorized solid waste been received at the Landfill during the reporting period? \_\_\_\_\_ Yes \_\_\_\_\_ No  
 If yes, give information below for each incident (attach additional sheets if necessary):

Date Received	Type Received	Date Disposed	Disposal Method & Location

### Radiation Monitoring

Does your facility use a fixed radiation monitor? \_\_\_\_\_ Yes \_\_\_\_\_ No  
 Identify Manufacturer \_\_\_\_\_ and Model \_\_\_\_\_ of fixed unit.  
 Does your facility use a portable radiation monitor? \_\_\_\_\_ Yes \_\_\_\_\_ No  
 Identify Manufacturer \_\_\_\_\_ and Model \_\_\_\_\_ of fixed unit.

If the radiation monitors have been triggered give information below for each incident:

Incident Number	Received		Hauler	Origin	Truck Number	Reading	Disposal Status	Removed	
	Date	Time						Date	Time

## SECTION 9 - WASTE IN PLACE

### Summary by Waste Type and Year

Include all active and inactive sections of the landfill. Report waste disposed annually by type, if known, in tons per year. Report total waste disposed, if breakdown of types is not available. In the case where more than one landfill section operated in a given year identify each separately, if known. If the annual amount is not available, report the quantities for a range of years. If you include amounts from old, closed landfills then clearly identify them on the table and explain below. In each row, report quantities disposed each year (or group of years if individual years unknown) for each waste type. Report cumulative WIP at bottom (sum of annual quantities disposed). Add additional sheets as necessary.

[illegible]

\* Other waste could include, but not limited to, yard waste, paper, wood, textiles, or diapers.

Overall in place volume \_\_\_\_\_ cubic yards

Method for determining waste composition, if known.

Explain if closed landfills are included above

Waste Summary by Landfill Section

Provide waste in place information for all landfill sections.

Number of landfill sections: _____	Next* section used (years) from _____ to _____
Original* section used (years) from _____ to _____	Section Footprint _____ acres
Section Footprint _____ acres	Capped with approved final cover system Yes _____ No _____
Capped with approved final cover system Yes _____ No _____	Percent capped _____
Percent capped _____	Waste in Place: _____ Tons _____ Cubic Yards, if known _____
Waste in Place: _____ Tons _____	Cubic Yards, if known _____

\* If there are additional landfill sections, phases or cells, please provide the same waste in place information on additional sheets and attach to form.

**SECTION 10 - LANDFILL GAS**

Does the landfill have a landfill gas collection & control system?

Yes \_\_\_\_\_ No \_\_\_\_\_ If Yes: Active \_\_\_\_\_ Passive \_\_\_\_\_

Number of gas wells: \_\_\_\_\_

Total landfill footprint acreage \_\_\_\_\_

Total landfill acreage from which gas is collected \_\_\_\_\_

Landfill sections from which gas is collected \_\_\_\_\_

Landfill acreage from which gas is collected for energy recovery \_\_\_\_\_

Measured Methane Generation Rate\*, k \_\_\_\_\_

Measured Potential Methane Generation Capacity\*, L<sub>o</sub> \_\_\_\_\_ m<sup>3</sup>/Mg

NMOC Concentration\* \_\_\_\_\_ ppmv as hexane

Does the landfill require a Title V Permit? Yes \_\_\_\_\_ No \_\_\_\_\_

Name of Landfill Gas Recovery (gas to energy or other use) Facility: \_\_\_\_\_

\* Note: If Concentration NMOC, Lo and k are not known or included, default values will be used to calculate the NMOCs emissions from the Landfill.

## Flare

### **Open and Enclosed Flares located at the Landfill and the Landfill Gas Recovery Facility:**

Number of Flares: \_\_\_\_\_

Type of Flare: Opened Flare \_\_\_\_\_ Enclosed Flare \_\_\_\_\_

Please report units  
in cubic feet

Quantity of Gas Collected and Flared Annually \_\_\_\_\_ cubic feet

Flare Hours of Operation per Year \_\_\_\_\_ hours/year

Methane Percentage in Landfill Gas before flaring \_\_\_\_\_ %

Methane Destruction efficiency \_\_\_\_\_ %

### **Candlestick Flares:**

Number of Candlestick Flares \_\_\_\_\_

Estimate of Gas Flared Candlestick Flare \_\_\_\_\_ cubic feet

## Gas To Energy

Number of Internal Combustion Engines: \_\_\_\_\_

Please report units  
in cubic feet

Quantity of Gas collected for Internal Combustion Engine Annually \_\_\_\_\_ cubic feet

Methane Destruction efficiency \_\_\_\_\_ %

Methane Percentage in Landfill Gas before combustion \_\_\_\_\_ %

Utility Company Receiving Electricity \_\_\_\_\_

### **Gas Processed for Use (Other than gas to electricity)**

Quantity of Gas Collected for Processing \_\_\_\_\_ cubic feet

Methane Percentage in Landfill Gas before processing \_\_\_\_\_ %

On-site or Off-site User of Gas \_\_\_\_\_

### **Landfill Gas Recovery Facility/Landfill Data**

Facility Contact \_\_\_\_\_ Phone # (\_\_\_\_) \_\_\_\_ - \_\_\_\_\_

Contact e-mail address \_\_\_\_\_ Fax # (\_\_\_\_) \_\_\_\_ - \_\_\_\_\_

Operation and maintenance cost for calendar year: \$ \_\_\_\_\_

Does the LGRF experience shut downs: \_\_\_\_\_ Yes \_\_\_\_\_ No

If yes, indicate reasons for shut downs. List required submissions that have been attached to this form or the reasons for not attaching a required piece of information:

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Year landfill opened: \_\_\_\_\_ Anticipated landfill closure date: \_\_\_\_\_

### Results of Condensate Sampling

Submit (attached to this form) condensate quality monitoring results accomplished in accordance with condensate sampling. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

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### Landfill Gas Utilized For Energy Recovery

Provide the following information for the landfill gas recovered for energy. **DO NOT INCLUDE THE GAS FLARED!**

	Landfill Gas Collected for Energy Recovery (Cubic Feet)	Steam* Generated (Cubic Feet)	Total Electricity* Generated for onsite and offsite use (K.W.H.)	Total Gas Processed for use other than electricity generation (Cubic Feet)	Condensate Generated (Gallons)	Facility Operation (Hours)
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						
ANNUAL TOTAL						

\* Provide where applicable.

Normal Weekdays of Operation \_\_\_\_\_ Normal Hours of Operation \_\_\_\_\_

Electricity Generated and used/marketed offsite \_\_\_\_\_ KWH

Electricity Generated and used onsite \_\_\_\_\_ KWH

Gas Processed and used/marketed offsite \_\_\_\_\_ cubic feet

Gas Processed and used onsite \_\_\_\_\_ cubic feet

Describe the collection, storage, treatment and disposal techniques used in managing the condensate:

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## SECTION 11 - COST ESTIMATES AND FINANCIAL ASSURANCE DOCUMENTS

Submit (attached to this form) any required cost estimates and financial assurance documents for closure, post-closure care, and applicable corrective measures, all reflecting adjustments for inflation and any changes to the Closure, Post Closure or Closure Maintenance Plans to indicate updated dollars for the year of operation for which the Annual Report is made. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

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## SECTION 12 - PROBLEMS

Identify any problems encountered during the reporting period (e.g., specific occurrences which have led to changes in facility procedures) and methods for resolution of the problems. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

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## SECTION 13 - CHANGES

Identify any changes from approved reports, plans, specifications, permit conditions and fill progression plan with a justification for each change. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

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## SECTION 14 - ANALYTICAL RESULTS

Submit (attached to this form) tables showing the sample collection date, the analytical results [including all peaks even if below the Method Detection Limits (MDL)], designation of upgradient wells and location number for each environmental monitoring point sampled, applicable water quality standards, and groundwater protection standards if established, MDL's, and Chemical Abstracts Service (CAS) numbers on all parameters. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

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## SECTION 15 - COMPARING DATA

Submit (attached to this form) tables or graphical representations comparing current water quality with existing water quality and with upgradient water quality. These comparisons may include Piper diagrams, Stiff diagrams, tables, or other analyses. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

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## SECTION 16 - DISCUSSION OF RESULTS

Submit (attached to this form) a summary of any contraventions of State water quality standards, significant increases in concentrations above existing water quality, any exceedances of groundwater protection standards, and discussion of results, and any proposed modifications to the sampling and analysis schedule necessary to meet the Existing, Operational and Contingency water quality monitoring requirements. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

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## SECTION 17 - DATA QUALITY ASSESSMENT

Submit (attached to this form) any required data quality assessment reports. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

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## SECTION 18 - SUMMARIES OF MONITORING DATA

Submit (attached to this form) a summary of the water quality information presented in Sections 15 and 16 for the year of operation for which the Annual Report is made, noting any changes in water quality which have occurred throughout the year. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

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## SECTION 19 - SURFACE IMPOUNDMENTS

Does this landfill have a surface impoundment? ☐ Yes ☐ No

If yes, there are separate water quality reporting requirements for surface impoundments. Namely, for each surface impoundment, repeat Sections 14 through 17 above for Quarterly Reports and Section 18 above for Annual Reports. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

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## SECTION 20 - PERMIT/CONSENT ORDER REPORTING REQUIREMENTS

Are there any additional permit/consent order reporting requirements not covered by the previous sections of this form? \_\_\_\_\_ Yes \_\_\_\_\_ No

If yes, identify the reporting requirements with their respective responses below, attaching additional sheets as necessary. List submissions (required by this section) that have been attached to this form or the reasons for not attaching a required piece of information:

## SECTION 21 - SIGNATURE AND DATE BY OWNER OR OPERATOR

Owner or Operator must sign, date and submit one completed form with an original signature to the appropriate Regional Office (See attachment for Regional Office addresses and Solid Waste Contacts.)

The Owner or Operator must also submit one copy by email, fax or mail to:

**New York State Department of Environmental Conservation  
Division of Materials Management  
Bureau of Permitting and Planning  
625 Broadway  
Albany, New York 12233-7260  
Fax 518-402-9041  
Email address: swpermit@gw.dec.state.ny.us**

I hereby affirm under penalty of perjury that information provided on this form and attached statements and exhibits was prepared by me or under my supervision and direction and is true to the best of my knowledge and belief, and that I have the authority to sign this report form pursuant to 6 NYCRR Part 360. I am aware that any false statement made herein is punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name (Print or Type)

\_\_\_\_\_  
Title (Print or Type)

\_\_\_\_\_  
Email (Print or Type)

\_\_\_\_\_  
Address

\_\_\_\_\_  
City

\_\_\_\_\_  
State and Zip

(\_\_\_\_)\_\_\_\_-\_\_\_\_  
Phone Number

ATTACHMENTS: \_\_\_\_ YES \_\_\_\_ NO  
(Please check appropriate line)



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New York State Department of Environmental Conservation  
Division of Materials Management  
Bureau of Permitting and Planning

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**SOLID WASTE CONTACTS**

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**CENTRAL OFFICE**

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Bureau of Permitting and Planning  
625 Broadway  
Albany, NY 12233-7260  
Phone: (518) 402-8678

For Submission of Annual Reports only:

Fax: (518) 402-9041

Email : For solid waste management facilities: [swpermit@gw.dec.state.ny.us](mailto:swpermit@gw.dec.state.ny.us) ;  
for vehicle dismantler facilities: [vdinfo@gw.dec.state.ny.us](mailto:vdinfo@gw.dec.state.ny.us) .

**REGIONAL OFFICE ADDRESS & LEAD CONTACT PERSON**

**REGION 1 (Nassau, Suffolk)**

Syed Rahman  
SUNY @ Stony Brook  
50 Circle Road  
Stony Brook, NY 11790  
Phone: (631) 444-0375

**REGION 2 (Bronx, Kings, New York, Queens, Richmond)**

Samsudeen Arakan  
47-40 21st Street  
Long Island City, NY 11101-5407  
Phone: (718) 482-4896

**REGION 3 (Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester)**

Martin Brand  
21 South Putt Corners Road  
New Paltz, NY 12561  
Phone: (845) 256-3179

**REGION 4 (Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady, Schoharie)**

Richard Forgea  
1150 North Westcott Road  
Schenectady, NY 12306  
Phone: (518) 357-2243

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**REGION 5 (Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren, Washington)**

**Main Office (Clinton, Essex,  
Franklin, Hamilton)**

**Sub-office (Fulton, Saratoga, Warren,  
Washington)**

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Dale Becker  
Route 86, P.O. Box 296  
Ray Brook, NY 12977  
Phone: (518) 897-1241

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David Mt. Pleasant  
232 Golf Course Road  
Warrensburg, NY 12885  
Phone: (518) 623-1230

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**REGION 6 (Herkimer, Jefferson, Lewis, Oneida, St. Lawrence)**

**Main Office (Jefferson, Lewis,  
St. Lawrence)**

**Sub-office (Herkimer, Oneida)**

Peter Taylor  
State Office Building  
317 Washington Street  
Watertown, NY 13601  
Phone: (315) 785-2513

Robert Senior  
State Office Building  
207 Genesee Street  
Utica, NY 13501  
Phone: (315) 793-2745

**REGION 7 (Broome, Cayuga, Chenango, Cortland, Madison, Onondaga, Oswego, Tioga, Tompkins)**

Tim DiGiulio  
615 Erie Boulevard West  
Syracuse, NY 13204  
Phone: (315) 426-7419

**REGION 8 (Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne, Yates)**

Scott Foti  
6274 East Avon-Lima Road  
Avon, NY 14414  
Phone: (585) 226-5408

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**REGION 9 (Allegany, Cattaraugus, Chautauqua, Erie, Niagara, Wyoming)**

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Mark Hans  
270 Michigan Avenue  
Buffalo, NY 14203  
Phone: (716) 851-7220

## NYS PLANNING UNITS

When completing the annual report, please use the Planning Unit listed below that corresponds with the municipality and county. Note: The Planning Unit is not the DEC Region.

NYS PLANNING UNITS – R1	MUNICIPALITY	COUNTY
Babylon (Town) & North Hempstead Solid Waste Management Authority	Babylon (Town)	Suffolk
	North Hempstead (Town)	Nassau
Brookhaven (Town)		Suffolk
East Hampton (Town)		Suffolk
Fishers Island Waste Management District	Southold (Town)	Suffolk
Glen Cove (City)		Nassau
Hempstead (Town)		Nassau
Huntington (Town)		Suffolk
Islip Resource Recovery Agency	Islip (Town)	Suffolk
Long Beach (City)		Nassau
Oyster Bay Solid Waste Disposal District	Oyster Bay (Town) (see last page)	Nassau
Riverhead (Town)		Suffolk
Shelter Island (Town)		Suffolk
Smithtown (Town)		Suffolk
Southampton (Town)		Suffolk
Southold (Town) (except Fishers Island)		Suffolk
NYS PLANNING UNITS – R2	MUNICIPALITY	COUNTY
New York City	Bronx	Bronx
	Kings (Brooklyn)	Kings
	New York (Manhattan)	New York
	Queens	Queens
	Richmond (Staten Island)	Richmond
NYS PLANNING UNITS – R3	MUNICIPALITY	COUNTY
Dutchess County Resource Recovery Agency		Dutchess
Orange County		Orange
Putnam County		Putnam
Rockland County Solid Waste Management Authority		Rockland
Sullivan County		Sullivan
Ulster County Resource Recovery Agency		Ulster
Westchester County		Westchester
NYS PLANNING UNITS – R4	MUNICIPALITY	COUNTY
Capital Region Solid Waste Management Partnership (CRSWMP)	Albany (City)	Albany
	Altamont (Village)	Albany
	Berne (Town)	Albany
	Bethlehem (Town)	Albany
	East Greenbush (Town)	Rensselaer
	Green Island (Town / Village)	Albany
	Guilderland (Town)	Albany
	Knox (Town)	Albany
	New Scotland (Town)	Albany
	Rensselaer (City)	Rensselaer
	Rensselaerville (Town)	Albany
	Voorheesville (Town)	Albany
	Watervliet (City)	Albany
	Westerlo (Town)	Albany

## NYS PLANNING UNITS

When completing the annual report, please use the Planning Unit listed below that corresponds with the municipality and county. Note: The Planning Unit is not the DEC Region.

NYS PLANNING UNITS – R4 (continued)	MUNICIPALITY	COUNTY
Colonie (Town)	Cohoes (City)	Albany
	Colonie (Town)	Albany
	Colonie (Village)	Albany
	Menands (Village)	Albany
Columbia County		Columbia
Delaware County		Delaware
Eastern Rensselaer County Solid Waste Management Authority (ERCSWMA)	<b>Active Members</b>	
	Castleton-on-Hudson (Village)	Rensselaer
	Hoosick Falls (Village)	Rensselaer
	Nassau (Village)	Rensselaer
	Pittstown (Town)	Rensselaer
	Schaghticoke (Town)	Rensselaer
	Schaghticoke (Village)	Rensselaer
	Stephentown (Town)	Rensselaer
	Valley Falls (Village)	Rensselaer
	<b>Inactive Members</b>	
	Berlin (Town)	Rensselaer
	Grafton (Town)	Rensselaer
	Hoosick (Town)	Rensselaer
	Nassau (Town)	Rensselaer
	Petersburg (Town)	Rensselaer
	Poestenskill (Town)	Rensselaer
Greater Troy Area Solid Waste Management Authority (GTASWMA)	Brunswick (Town)	Rensselaer
	North Greenbush (Town)	Rensselaer
	Schodack (Town)	Rensselaer
	Troy (City)	Rensselaer
Greene County		Greene
Montgomery-Otsego-Schoharie Solid Waste Management Authority (MOSA)	Montgomery County	Montgomery
	Otsego County	Otsego
	Schoharie County	Schoharie
Schenectady County		Schenectady
NYS PLANNING UNITS – R5	MUNICIPALITY	COUNTY
Clinton County		Clinton
Essex County		Essex
County of Franklin Solid Waste Management Authority		Franklin
Fulton County		Fulton
Hamilton County		Hamilton
Saratoga County		Saratoga
Warren County		Warren
Washington County		Washington
NYS PLANNING UNITS – R6	MUNICIPALITY	COUNTY
Jefferson County		Jefferson
Lewis County		Lewis
Oneida-Herkimer Solid Waste Management Authority	Oneida County	Oneida
	Herkimer County	Herkimer
St. Lawrence County		St. Lawrence

## NYS PLANNING UNITS

When completing the annual report, please use the Planning Unit listed below that corresponds with the municipality and county. Note: The Planning Unit is not the DEC Region.

<b>NYS PLANNING UNITS – R7</b>	<b>MUNICIPALITY</b>	<b>COUNTY</b>
Broome County		Broome
Cayuga County		Cayuga
Chenango County		Chenango
Cortland County		Cortland
Madison County		Madison
Onondaga County Resource Recovery Agency		Onondaga
Oswego County		Oswego
Tioga County		Tioga
Tompkins County		Tompkins
<b>NYS PLANNING UNITS – R8</b>	<b>MUNICIPALITY</b>	<b>COUNTY</b>
Chemung County		Chemung
GLOW Region Solid Waste Management Committee	Genesee County	Genesee
	Livingston County	Livingston
Monroe County		Monroe
Ontario County		Ontario
Schuyler County		Schuyler
Steuben County		Steuben
Western Finger Lakes Solid Waste Management Authority (WFLSWMA)	Wayne County	Wayne
	Yates County	Yates
<b>NYS PLANNING UNITS – R9</b>	<b>MUNICIPALITY</b>	<b>COUNTY</b>
Allegany County		Allegany
Cattaraugus County		Cattaraugus
Chautauqua County		Chautauqua
GLOW Region Solid Waste Management Committee	Wyoming County	Wyoming
Niagara County		Niagara
Northeast - Southtowns Solid Waste Management Board (NEST)	Akron (Village)	Erie
	Alden (Town)	Erie
	Alden (Village)	Erie
	Angola (Village)	Erie
	Aurora (Town)	Erie
	Blasdell (Village)	Erie
	Boston (Town)	Erie
	Brant (Town)	Erie
	Cheektowaga (Town)	Erie
	Clarence (Town)	Erie
	Colden (Town)	Erie
	Collins (Town)	Erie
	Concord (Town)	Erie
	Depew (Village)	Erie
	East Aurora (Village)	Erie
	Eden (Town)	Erie
	Elma (Town)	Erie
	Evans (Town)	Erie
	Farnham (Village)	Erie
	Gowanda (Village)	Erie

## NYS PLANNING UNITS

When completing the annual report, please use the Planning Unit listed below that corresponds with the municipality and county. Note: The Planning Unit is not the DEC Region.

NYS PLANNING UNITS – R9 (continued)	MUNICIPALITY	COUNTY
Northeast - Southtowns Solid Waste Management Board (NEST) (continued)	Hamburg (Town)	Erie
	Hamburg (Village)	Erie
	Holland (Town)	Erie
	Lackawanna (City)	Erie
	Lancaster (Town)	Erie
	Lancaster (Village)	Erie
	Marilla (Town)	Erie
	Newstead (Town)	Erie
	North Collins (Town)	Erie
	North Collins (Village)	Erie
	Orchard Park (Town)	Erie
	Orchard Park (Village)	Erie
	Sardinia (Town)	Erie
	Sloan (Village)	Erie
	Springville (Village)	Erie
	Wales (Town)	Erie
	West Seneca (Town)	Erie
Northwest Communities Solid Waste Management Board (NWCB)	Amherst (Town)	Erie
	Grand Island (Town)	Erie
	Kenmore (Village)	Erie
	Tonawanda (City)	Erie
	Tonawanda (Town)	Erie
	Williamsville (Village)	Erie
<b>NOT CURRENTLY AFFILIATED WITH A RECOGNIZED PLANNING UNIT</b>		
Buffalo (City)		Erie
Canaan (Town)		Columbia
Coeymans (Town)		Albany
Orleans County		Orleans
Oyster Bay (Town) (portion) **See Below		Nassau
Ravena (Village)		Albany
Sand Lake (Town)		Rensselaer
Seneca County		Seneca
Skaneateles (Town)		Onondaga
Skaneateles (Village)		Onondaga
<b>**MUNICIPALITIES NOT PART OF THE TOWN OF OYSTER BAY SOLID WASTE DISPOSAL DISTRICT</b>		
Bayville (Village)	Laurel Hollow (Village)	Oyster Bay Cove (Village)
Brookville (Village)	Matinecock (Village)	Roslyn Harbor (Village) (portion)
Centre Island (Village)	Mill Neck (Village)	Sea Cliff (Village)
Cove Neck (Village)	Muttontown (Village)	Upper Brookville (Village)
East Hills (Village) (portion)	Old Brookville (Village)	Glenwood – Glen Head Garbage District
Lattington (Village)	Old Westbury (Village) (portion)	

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The figure displays a complex, multi-layered visualization of a 1D signal or spectrum. The top section shows a dense, noisy signal with a color gradient from blue to red. Below this, there are several horizontal tracks, each representing a different component or filter of the signal. These tracks are labeled with various parameters and values, such as 'FREQ', 'AMPL', 'PHASE', and 'TIME'. The bottom section shows a series of vertical lines and curves, likely representing the frequency response or power spectrum of the signal. The overall image is highly detailed and technical, typical of scientific or engineering data visualization.



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## MONTHLY TRAINING / SAFETY MEETINGS

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<u>TOPIC</u>	<u>DATE</u>	<u>NUMBER</u>
HAZARD COMMUNICATION – RIGHT TO KNOW	JAN	
WASTE MATERIAL HANDLING	FEB	
LANDFILL NUISANCE ENVIRONMENTS	MAR	
LEACHATE OPERATIONS	APR	
PETROLEUM, OIL & LUBRICANT HANDLING	MAY	
EMERGENCY PROCEDURES	JUN	
SUBSTANCE ABUSE	JUL	
CONTINGENCY OPERATIONS	AUG	
SAFETY – FIRST AID	SEP	
SEVERE WEATHER OPERATIONS	OCT	
EQUIPMENT OPERATIONS	NOV	
GROUND WATER / SURFACE WATER OPERATIONS	DEC	

---

## APPENDIX G

## Existing Backup Generator

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## **Switching to Back-up Generator Power**

---

**Steps 1-6 are performed at the Generator**

- 1. Remove Cover**
- 2. Turn Ignition key to the “Run” position**
- 3. Push and hold the “Glow Plugs” for 30 seconds**
- 4. Start The Generator**
- 5. Allow the generator to warm up then pull the throttle knob out and lock in place**
- 6. Flip the “Main Breaker” to the “On-Position”**

**Steps 7-9 are performed inside the Flare Building**  
**Breaker Panels are located along the right hand side of the back wall of the building**

- 7. Pull the Generator Breaker into the “On-Position”**
- 8. Move the “Main Breaker from the “Utilities-On” to Off then to the “Generator-On” position**

**You should now have power to the System!**

**9. Check the System by using the phone and dialing 496-5345 to get a status up-date.**

**Make sure to check all alarm conditions**

---

## **Switching back to Main Power**

**Reverse order of “Start –Up”**

- 1. Move “Main Breaker” from “Generator-On” to “Utility-On” position**
- 2. Move the “Generator Breaker” to the “Off” position**

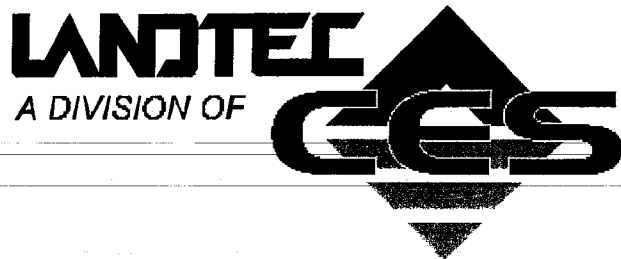
**Steps 3-6 are at the Generator**

- 3. Turn the “Breaker” off**
- 4. Idle down the Generator for a few minutes**
- 5. Turn the “Key” off**
- 6. Call 496-5345 and check the Status**

**Check All Alarm Conditions!**

**APPENDIX H**

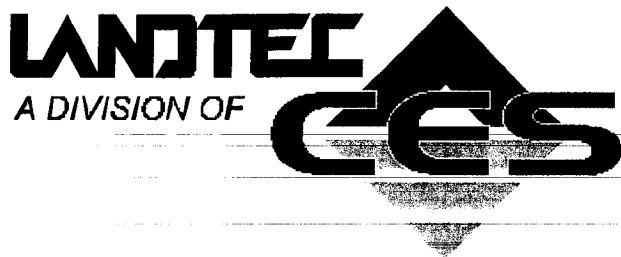
**Gem 2000 Gas Analyzer**



# **GEM<sup>TM</sup> 2000**

**GAS ANALYZER & EXTRACTION MONITOR**

## **OPERATION MANUAL**



# **GEM™ 2000**

**GAS ANALYZER & EXTRACTION MONITOR**

## **OPERATION MANUAL**

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[www.CES-LANDTEC.com](http://www.CES-LANDTEC.com)

**CES-LANDTEC Release Date: February 14, 2003**

1. The first part of the document is a title page, which includes the title, author, and date.

2. The second part of the document is an abstract, which provides a brief summary of the main findings of the study.

3. The third part of the document is an introduction, which provides background information on the topic and states the purpose of the study.

4. The fourth part of the document is a literature review, which discusses the existing research on the topic and identifies gaps in the knowledge.

5. The fifth part of the document is a methodology section, which describes the research design, data collection methods, and statistical analysis.

6. The sixth part of the document is a results section, which presents the findings of the study in a clear and concise manner.

7. The seventh part of the document is a discussion section, which interprets the results and discusses their implications for practice and research.

8. The eighth part of the document is a conclusion, which summarizes the main findings and provides recommendations for future research.

9. The ninth part of the document is a reference list, which lists the sources used in the study.

10. The tenth part of the document is an appendix, which contains additional information that supports the main findings of the study.

11. The eleventh part of the document is a glossary, which defines the key terms used in the study.

12. The twelfth part of the document is a list of figures and tables, which provides a summary of the visual elements used in the study.

13. The thirteenth part of the document is a list of abbreviations, which provides a summary of the abbreviations used in the study.

14. The fourteenth part of the document is a list of acknowledgments, which acknowledges the contributions of individuals and organizations to the study.

15. The fifteenth part of the document is a list of disclosures, which provides information about any potential conflicts of interest.

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## 1 Introduction

CES-LANDTEC is the premier manufacturer of products, instruments and software for landfill gas extraction and for regulatory monitoring compliance. CES-LANDTEC has provided the landfill industry with a technologically innovative family of products for more than a decade. These products are the result of field-proven experience in design, operation and maintenance of landfills for environmental compliance.

The GEM™2000, designed by CES-LANDTEC, is specifically for use on landfills to monitor landfill gas (LFG) extraction systems, flares and migration control systems. The GEM™2000 samples and analyses the Methane, Carbon Dioxide and Oxygen content of LFG. The readings are displayed and can be stored in the instrument or downloaded to a personal computer for reporting, analysing and archiving.

The GEM™2000 instrument is frequently shipped in an optional protective hard case with a foam interior offers additional protection, transportation convenience and component hardware storage. When properly sealed, the hard case is watertight. The hard case is equipped with a pressure relief valve (located under the handle on the case) that is normally kept closed. If there is a change in elevation, the hard case may not open until turning the pressure relief valve equalizes internal pressure. When shipping a GEM™2000 back to CES-LANDTEC for calibration or service, always ship it in the original packaging to protect unit from damage.

Carefully unpack the contents of the GEM™2000, inspect and inventory them. The following items should be contained in your package:

- The GEM™2000 instrument
- GEM™2000 Operation Manual
- Registration/Warranty Card
- Soft carrying case with replaceable protective window and carrying strap
- Clear ¼" vinyl sampling hose assembly (5 ft.) with external water trap filter assembly
- Blue ¼" vinyl pressure sampling hose (5 ft.)
- Spare internal particulate filter element
- Polypropylene male connector (hose barb) connects to blue vinyl tubing
- Spare external water trap filter element
- 100-240 volt battery charger
- DataField 3.0CS software on CD-ROM
- RS-232 serial cable for computer/printer data downloading
- Temperature probe (optional)
- Hard carrying case (optional)

Complete the Registration/Warranty Card and return it to CES-LANDTEC. The model and serial numbers are located on the back of the GEM™2000 instrument.

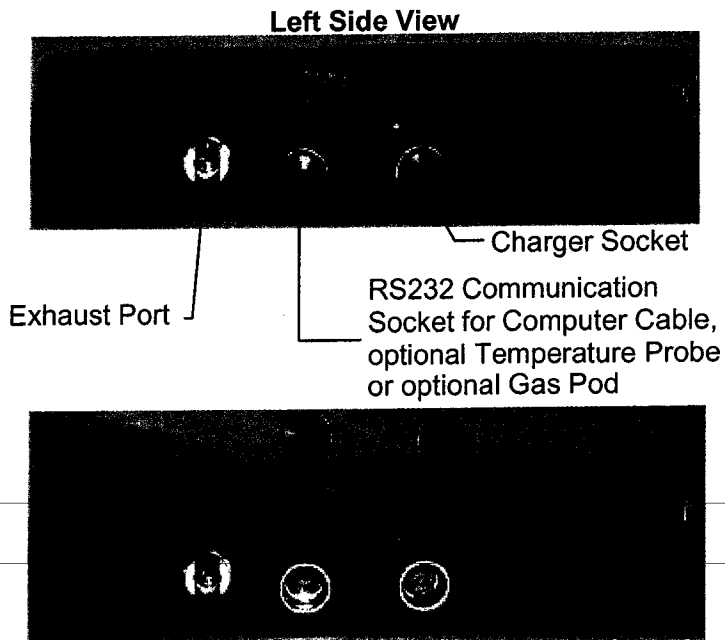
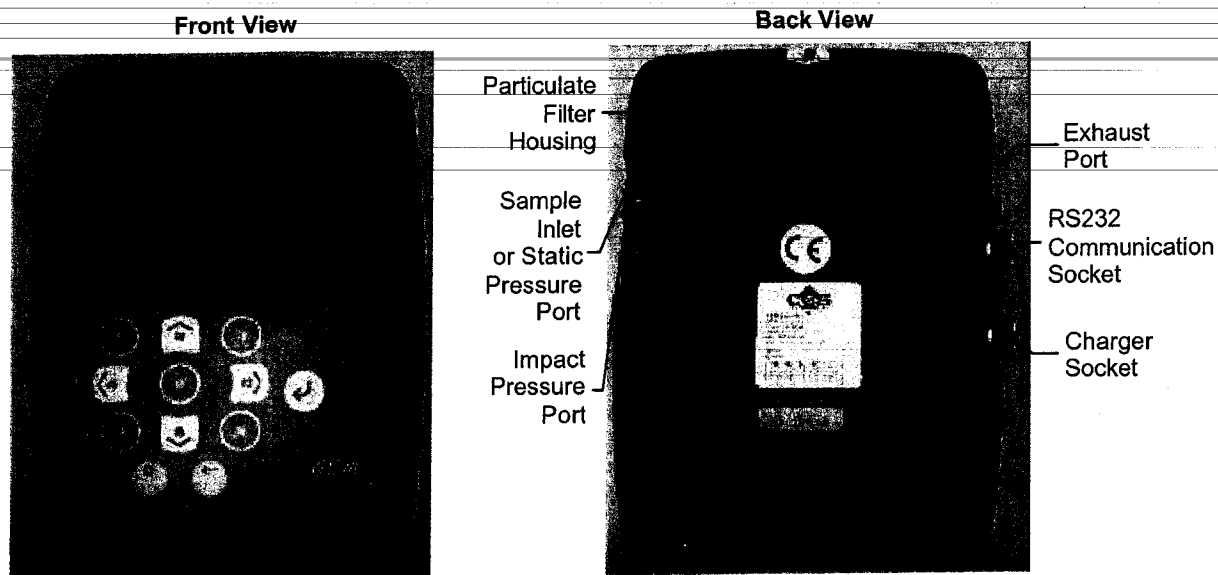
**Immediately notify shipper if the GEM™2000 unit or accessories are damaged due to shipping.** Contact CES-LANDTEC immediately if any items are missing.

For questions regarding instrument operation and procedures, please contact CES-LANDTEC at:

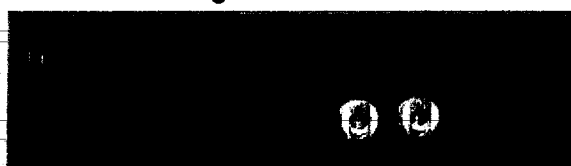
Customer Service or Technical Support	
Factory Service	(800) 821-0496
Spare Parts and Calibration Gas	
DataField Software Support	(888) 400-2272

## 2 General Operational Features

### 2.1 Physical Characteristics of the GEM™ 2000



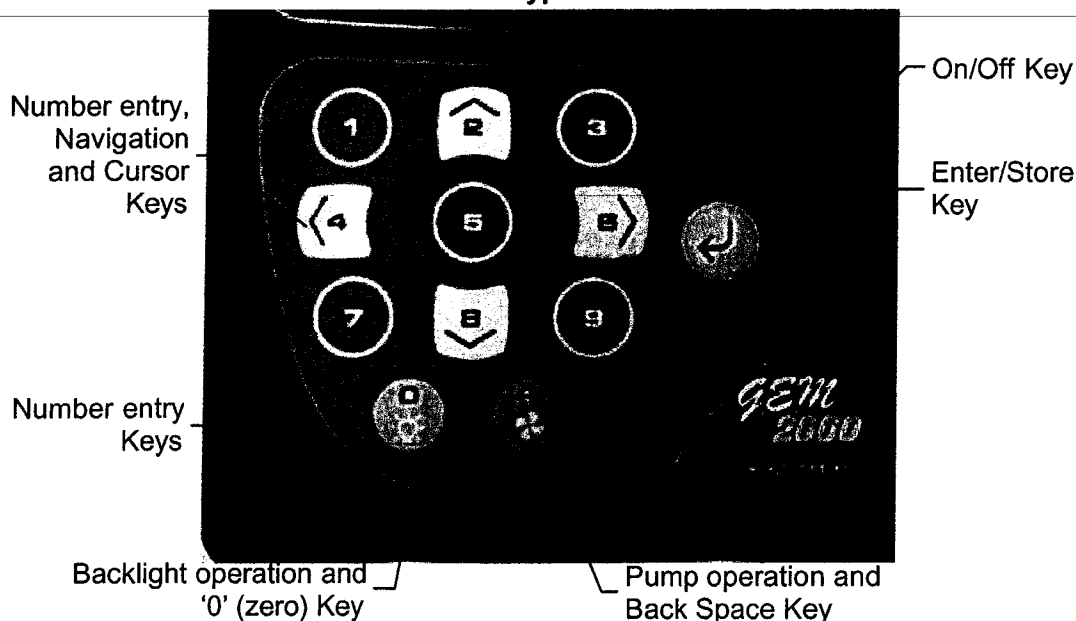
### Right Side View



Impact Pressure Port

Sample Inlet or  
Static Pressure Port

### Keypad



Whenever a key is pressed the unit will emit a short 'beep' as an acknowledgement. This function cannot be turned off.

## 2.2 Turning the Instrument On/Off

When switching the instrument on, a long beep will sound, followed by the CES-LANTEC logo being displayed and the self-test will commence.

When switching the instrument off, the On/Off button must be held down for approximately 15 seconds, at which point a clean air purge will be carried out. If for any reason the instrument 'locks-up' and will not switch off, press and hold the On/Off button for 15 seconds. This will force the instrument to switch off.

## 2.3 Warm-up Self Test

When switched on, the instrument will perform a predetermined self-test sequence taking approximately 20 seconds, during this time many of the instrument's functions are tested, including:

- General operation
- Pump function
- Gas flow measurement
- Calibration
- Backlight function
- Solenoid function

## **GEM™2000 Operation Manual**

During the self-test, the following information is also displayed:

- Calibration due date.
- Software version.
- Lifetime guarantee covered (or not).
- Date format.
- Serial Number.
- Operating language.

Upon self-test completion, the GEM™2000 should automatically enter read gas levels screen.

### **2.4 Warning and Error Display**

During the self-test, if any operational parameters are out of specification or the pre-programmed recommended calibration/service date has passed errors or warnings may be displayed. Only three errors/warnings can be displayed at any time. To ascertain if more errors occurred, use the '∧' and '∨' key to scroll up/down the list.

#### **2.4.1 WARNING Displayed**

All warnings displayed will be prefixed by the word '**WARNING**' followed by a relevant description. Two types of warnings may be displayed.

1. General warnings that may not have an effect on the instrument's function and those where the self-test has detected a function that is outside the usual programmed operating criteria (e.g. Battery charge low, memory nearly full, etc.).
2. Specific warnings of operational parameters that can affect the performance of the instrument (e.g. O<sub>2</sub> Cell out of calibration, CH<sub>4</sub> out of calibration, CO<sub>2</sub> out of calibration, etc.).

The most likely reason for the errors is either an incorrect user calibration, or sensor failure. If an incorrect user calibration has caused the warning, it should be correctable by way of returning the instrument to factory settings, zeroing or carrying out a user calibration as necessary for the relevant function.

#### **2.4.2 ERROR Displayed**

All errors displayed will be prefixed by the word '**ERROR**' followed by a number and description. The errors detected by the self-test are usually caused by a user calibration being out of specification or possibly memory corruption. This will have an effect on the functionality of the instrument and should be corrected before use (e.g. 01 - User cal data, CH<sub>4</sub> reading or channel out of specification, 02 - User cal data, CO<sub>2</sub> reading out of specification).

*If any other Warnings or Errors are displayed, contact CES-LANDTEC for further information.*

***CES-LANDTEC is the ONLY authorized service center for the GEM-2000 instruments for the Americas***

### **2.5 Storage**

Do not keep the instrument in the trunk of a car or shed because it may be exposed to temperature extremes.

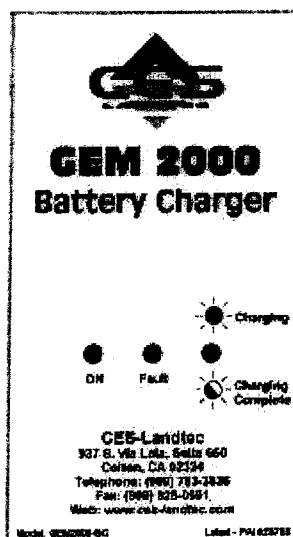
When not in use, instruments should be kept in a clean, dry and warm environment such as an office.

The instrument batteries should be discharged and fully charged at least once every four weeks regardless of indicated charge state. The discharge function may be carried out with the use of the Data Logging Function in GA mode of operation.

## **2.6 Battery/Charging**

***The Battery Charger IS NOT covered by the unit UL certification. Therefore, when connected to the Battery Charger, the instrument IS NOT intrinsically safe and should not be used in confined spaces.***

The battery used in the GEM™2000 is a Nickel Metal Hydride manufactured as an encapsulated pack from six individual cells. This type of battery is not so susceptible to “memory effects” as Nickel Cadmium batteries, although it is not recommended that the unit be given short-term charges. When the flashing LED indicates “Charging Complete”, disconnect the charger.



The battery charger indicates when the unit is charging, charged or if there is a fault. A full charge should take approximately 2 hours. Charge the batteries until the ‘Charging Complete’ indicator is flashing.

## **2.7 Read Gas Levels Screen (GA mode of operation)**

The read gas levels screen is also considered the normal operation screen and all operations are carried out from this starting point. The following information is displayed in various boxed sections at this time:

- Current programmed time and date.
- Current selected ID code.
- Pump status.
- Pump run time.
- Three main constituent gases – CH<sub>4</sub>, CO<sub>2</sub>, O<sub>2</sub> (in %).
- Balance gas.
- Last read time/date (if previous data is in memory), the benefits of this are, 1 – it is easily noted if a reading has been taken/stored, 2 – the current and previous readings can be easily compared.
- External Gas Pod “Not Fitted” (displays pod type when attached).
- Peak CH<sub>4</sub> reading (in %) (GA mode only).
- LEL CH<sub>4</sub> (GA mode only).
- Current barometric pressure reading.
- Current relative pressure reading (GA mode only).
- Gas Pod or Temperature Probe reading (if connected).
- Battery Charge graph (5 segment, flashes at 20% remaining).

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- Memory Usage graph (5 segment, flashes at 5% remaining).



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Other options:

① Menu	Allows access to all instrument user functions.
③ Next ID	Allows the next ID to be selected (if data available).
⑦ Previous Reading	Allows the previous reading of the selected ID to be viewed (if data available).
↵ Store Reading	Stores the current displayed reading. (GA mode only)

### 2.8 Optional Gas Pods

Optional gas pods are available for use with the GEM™2000. These pods are available in seven different gases with nine different PPM ranges. Connection to the instrument is made via the data port and exhaust port. The detected PPM level is displayed in the upper right area of the gas read screen and is saved in the same manner as the other gas readings.

Gas Type	Range (PPM)	Resolution (PPM)
H <sub>2</sub> S	0-50	0.1
	0-200	1.0
CO	0-1000	1.0
SO <sub>2</sub>	0-20	0.1
	0-100	1.0
NO <sub>2</sub>	0-20	0.1
CL <sub>2</sub>	0-20	0.1
H <sub>2</sub>	0-1000	1.0
HCN	0-100	1.0

Gas pods are intended for use as an inexpensive detection means and not for regulatory reporting purposes. Should their use indicate the presence of the selected gas, further testing should be performed with regulatory approved instrumentation. CES-LANDTEC recommends that field calibration be performed using the relevant gas and concentration, prior to sampling with a gas pod.

### 2.9 Cold Start

**THIS FUNCTION SHOULD BE USED ONLY AS A LAST RESORT.**

(For Gas Calibration Error Messages, confirm that Factory Setting and User Calibration is done).

A Cold Start should only be carried out to correct an instrument if no other course of action has proved successful. This function **WILL ERASE** the instrument memory entirely. After a cold start is performed the user will need to reset the instrument to factory settings, perform a field calibration and reset the internal time/date to the default settings. Please note, the time/date may only be updated through DataField 3.0 software. It cannot be updated manually.

To carry out a cold start, turn the instrument on, during the self-test press and continue to hold the '↵' key until the self-test has been completed. Upon completion of the self-test, a pass code entry screen will be displayed. At this point the '↵' key may be released. Enter the code **12345** and press '↵' to confirm.

After the pass-code entry has been accepted, the instrument serial number will be displayed along with the hours of operation and two options:

- 1 - Cold Start
- 0 - Continue

ONLY select option '1' if a Cold Start is to be carried out. Press key '1' to confirm this operation. The cold start menu will be displayed again, press key '0' to continue with normal operation.

### 3 General Operations Menu

The following features and functions are selectable from the main menu via key '① **Menu**' from the read gas levels screen. Various options are available to the user including:

#### 3.1 Zero Transducers

Allows the user to zero the pressure transducer(s). Upon selection, the current pressure reading is displayed. The operation will be carried out when the '↵' is pressed.

#### 3.2 Update Site Data

Allows the user to answer questions (pre-defined in DataField3.0 software) relating to the site (e.g. name of operator, weather conditions, etc.). Site Questions are different from Site Comments.

This is covered in more detail in Section 6 of this manual.

#### 3.3 Data Logging (GA mode only)

Enables the user to leave the Instrument unattended to take samples at a pre-determined time. The reading interval and pump run time may be edited prior to commencing the logging cycle. The ID code may ONLY be set in DataField3.0 communication software.

Once the logging function is activated, the instrument will carry out a 30 second 'Warm-up' countdown (displayed bottom right) and begin the first sample. After each sample, the unit will shut down (sleep) to conserve power if the time between the pump ending and the next sample is greater than 30 seconds.

The instrument is reactivated (awakened) during a logging cycle, the company logo will be displayed for a few seconds and the read gas levels screen will be displayed. This will initiate a 30 second countdown to the next sample being taken unless the operator stops the logging function.

If for any reason during a logging cycle the inlet port were to become blocked the Instrument will sense this as a flow fail during the 'pump on' time and will automatically retry until a reading can be obtained. Therefore, position the sample tubing carefully to ensure no blockage due to water/moisture can occur.

#### 3.4 Print Data

Allows ALL the data currently stored to be printed. This may ONLY be carried out with an appropriate RS232 cable (included with new instruments & available from CES-LANDTEC) and a printer with a serial port connection.

#### 3.5 Adjust Contrast

The GEM™2000 automatically adjusts the screen contrast according to the ambient temperature to maintain normal viewing.

The contrast can be manually adjusted by using the '<' and '>' cursor keys. The manual contrast setting is stored when the instrument is switched off.

#### 3.6 Field Calibration

*Whenever carrying out a user calibration function it is important to ensure the correct value is entered. Additionally, in the case of a zeroing function, ensure only ambient air is used and no connection is made to a probe or wellhead fitting. The calibration cylinders sold by CES-LANDTEC have a volume of 17 liters. The regulator, sold by same, is set to 0.5 liters per minute. A normal field calibration usually requires the*

## **GEM™ 2000 Operation Manual**

gas to be running for about two minutes. Therefore you can expect to get between 14 and 18 calibrations per cylinder of calibration gas.

Upon selecting this option, the Field Calibration screen is displayed. A brief description of the user span calibration procedure and the current reading (row 'R') and user span calibration gas values (row 'S') are displayed.

The span gas values may be changed via the '③ **Edit Target Concentrations**' option. Once this option has been selected, all the gas values will require entry. Each entry is to be confirmed by pressing the '↵' key.

### **3.6.1 Zero Channels**

Selected from the **Field Calibration** - '**↵-Calibration Menu**' allows the relevant reading to be zeroed. When selected, a list of the available options will be displayed, this usually includes CH<sub>4</sub>, and O<sub>2</sub>, also the Gas Pod (if fitted).

Supply a zero gas mixture to the instrument for the gas to be zeroed. Insure the reading for the selected gas has settled to its lowest value before selecting the zero function. When the required option is selected, the user zero function will be carried out automatically. The operation will be carried out when the '↵' key is pressed.

### **3.6.2 Span Channels**

Spanning Channels should be carried out prior to use or when the ambient operating temperature changes greater than +/- 20 degrees. Selected from the **Field Calibration** - '**↵-Calibration Menu**', allows the relevant reading to be span calibrated (in accordance with the calibration value entered). When selected, a list of the available options will be displayed, which includes CH<sub>4</sub>, CO<sub>2</sub>, O<sub>2</sub>, and Gas Pod (if fitted).

When the required option is selected from the list, the span calibration function will be carried out automatically. When carrying out this procedure, ensure the span calibration procedure (as outlined below) is followed:

1. Apply the relevant known certified gas concentration through the inlet port of the Instrument.
2. Wait until the current gas reading has stabilized.
3. Select the required calibration option via the '**↵-Calibration Menu**'.

### **3.6.3 Factory Settings**

This will clear any user zero and span calibration data. It will also restore the pre-programmed factory settings for **ALL** channels – CH<sub>4</sub>, CO<sub>2</sub>, O<sub>2</sub> or Gas Pod (if fitted) and pressure transducers.

### **3.6.4 Last Field Cal**

Displays the date the last field calibration was carried out (zero or span).

## **3.7 Mode of Operation**

Allows changing instrument between GA mode and GEM mode of operation.

## **4 Taking Probe Readings (GA Mode)**

CES-LANDTEC classifies non-extraction wells as Probes when **NOT** connected to an active vacuum extraction system. Probes, (commonly known as migration probes), may be placed on the perimeter of the landfill to test for gas migration or may be placed next to a building or road to test for the presence of Methane. The GEM™2000 instrument may be configured as a Gas Analyzer (GA mode) for sampling probes. To access this function from the gas read screen press 'Ⓢ' for menu and scroll down to **Mode of Operation**, press the '↓' key and highlight **Landfill Gas Analyzer**, pressing the '↓' key again will select GA mode of operation.

### **4.1 Preliminary Checks**

Prior to going to the test site, it is good practice to ensure:

- All necessary ID codes and readings have been uploaded via DataField3.0 software.
- The time and date are correct.
- The water trap has a clean and dry filter fitted.
- The inlet-port particulate filter is clean and dry.
- A supply of spare filters is available in case of accidental water blockage or contamination.
- The battery has a good charge (minimum 25% charge, even if only a few readings are required).
- The memory has sufficient space available.
- The CH<sub>4</sub>, CO<sub>2</sub>, and O<sub>2</sub> readings have been auto-zeroed, without gas concentration present.
- Check the span calibration with a known concentration calibration gas.

Travel to site with the analyzer in the vehicle's interior - not in the trunk or truck bed, where it may be subjected to extremes of temperature and possible shock damage. Do not place the analyzer against anything hot (e.g. gas extraction pipe, car body or in an unattended car during the summer). This may cause erroneous readings.

When moving around a site, protect the instrument from strong direct sunlight, heavy rain or wind-chill. Strong direct sunlight can raise the temperature of the instrument beyond its operating range. If this occurs, the LCD display will appear almost black and the contrast setting cannot alter the contrast.

**Always use the water trap!** If the water trap becomes flooded, change the filter immediately and ensure all tubes are clear before re-use.

### **4.2 Update Site Data**

Prior to taking the readings at a particular site, the Site Data should be updated (if programmed). This is accessed via the General Menu Ⓢ **Update Site Data**'. This function removes the need for the site conditions to be recorded manually.

A series of up to five questions can be pre-programmed with the use of DataField 3.0 and answered at this time. The answers to these questions are stored and appended to each reading stored thereafter, until the site data is updated for another site.

### **4.3 Taking Readings – With ID**

For this function to be used it is essential that the relevant ID and if required, previous readings are uploaded to the Instrument. An ID **cannot** be entered from the Instrument.

1. When the read gas levels screen is displayed, option 'Ⓢ **Next ID**' should be selected. A list of stored ID's is displayed for selection via the '↑' and '↓' cursor keys, the 'next' ID on the list is automatically

highlighted. To confirm selection, press the '↓' key. The display may be toggled to display any relevant ID information such as a description of the probe location, work to be carried out, etc.

2. A reminder is displayed to disconnect sample tubes, as a clean air purge will automatically remove the previous sample from the instrument. Purge time may be set via DataField 3.0 (default is 30 seconds). Once the '↓' key is pressed, purge will begin and the Read Gas Levels screen will be displayed upon completion. The purge may be aborted by pressing the '①EXIT' key.
3. The ID number selected and the pump runtime is displayed in the upper left corner of the read gas levels display.
4. At this point, connect the sample tube (with water trap) from the sample point to the inlet port of the instrument, ensuring the connector 'clicks' into place. Then connect the sample tube to the probe sample port. **Do not connect the sample tube to the probe port before connecting to the instrument as this will cause any pressure in the probe to dissipate and a proper pressure reading will not be taken.**
5. As soon as the connection is made, the relative/static pressure reading will be displayed. No sample is taken from the probe at this time. Once the reading stabilizes and the pump starts, the relative/static pressure reading is stored. The relative/static reading will remain displayed as the pressure last taken.
6. The pump will run for the pre-programmed time and a countdown timer will be displayed. The pump may be stopped or started at anytime by way of the '⊕' (pump) key. The reading may be stored at anytime with the use of the '↓' key. When the pump automatically stops this should be used as a prompt to store the reading.
7. Upon storing the reading, any pre-programmed questions will be displayed for response. This may require a numeric, alphanumeric selectable comment, or exclusive comment answer. A maximum of eight selectable and exclusive comments may be entered.
8. Disconnect the sample tubing from the probe and proceed to Step 1 for the next probe.

For each reading, the following information will be stored:

- ID code.
- Current time/date.
- Site data (if entered).
- All gas readings and balance (CH<sub>4</sub>, CO<sub>2</sub>, O<sub>2</sub>).
- LEL CH<sub>4</sub>.
- Barometric Pressure.
- Relative Pressure.
- Questions/comments.
- Temperature (if temperature probe is connected).
- Gas Pod (if connected).

When the instrument is switched off, a clean air purge is automatically started for a pre-determined period. This may be aborted with the use of the '↓' key, although it is not recommended.

A tone will sound and a flashing bell will be displayed next to the appropriate gas reading value if a preset alarm condition has been exceeded.

### 4.4 Taking Readings – Without ID

1. From the ID list press '⑤ Select No ID' or, if ID information has not been uploaded to the instrument, an ID list will not be available. In either case, the ID will be displayed and stored as '-----'.
9. A reminder is displayed to disconnect sample tubes, as a clean air purge will automatically remove the previous sample from the instrument. Purge time may be set via DataField 3.0 (default is 30 seconds). Once '↓' is pressed, purge will begin and the Read Gas Levels screen will be displayed upon completion. The purge may be aborted by pressing the '①EXIT' key.

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2. At this point, connect the sample tube (with water trap) from the sample point to the inlet port of the instrument, ensuring the connector 'clicks' in to place.
3. Now connect the sample tube to the probe sample port. **Do not connect the sample tube to the probe port before connecting to the instrument as this will cause any pressure in the probe to dissipate and a proper pressure reading will not be taken.**
4. The pump may be started or stopped at anytime by way of the '⊕' (pump) key and a 'time-on' timer will be displayed. The pump should always be stopped using the '⏏' key, before storing a reading.
5. Upon storing the reading, a virtual keyboard will be displayed for any alphanumeric comments to be entered.
6. Disconnect the sample tubing from the probe and proceed from step 1 for the next probe.

Except for the ID code information, which will be stored as '-----', and probe questions, for each reading the information stored will be the same as that for a reading with an ID.

A tone will sound and a flashing bell will be displayed next to the appropriate gas reading value if a preset alarm condition has been exceeded.

### 4.5 Temperature Probe Reading

The GEM™2000 has the facility to automatically display and record the probe temperature via an optional temperature probe (TP-100). When a temperature probe is fitted to the RS232 Communication Socket, the temperature will be displayed in the read gas levels screen and recorded with all other data. The temperature probe is part of the GEM™2000 UL certification and is therefore certified for use under the same conditions as the instrument.

### 4.6 Cross-Gas Effects

#### 4.6.1 Methane, Carbon Dioxide and Oxygen

The Methane reading is filtered to an infrared absorption frequency of 3.41μm (nominal), the frequency specific to hydrocarbon bonds. Instruments are calibrated using certified Methane mixtures and will give correct readings provided there are no other hydrocarbon gasses present within the sample (e.g. ethane, propane, butane, etc.). If there are other hydrocarbons present, the Methane reading will be higher (never lower) than the actual Methane concentration being monitored.

The extent to which the Methane reading is affected depends upon the concentration of the Methane in the sample and the concentration of the other hydrocarbons. The effect is non-linear and difficult to predict.

The Carbon Dioxide reading is filtered to an infrared absorption frequency of 4.29μm (nominal), the frequency specific to Carbon Dioxide. Therefore, any other gases usually found on landfill sites will not affect the Carbon Dioxide reading.

The Oxygen sensor is a newly developed galvanic cell type and suffers virtually no influence from CO<sub>2</sub>, CO, H<sub>2</sub>S, NO<sub>2</sub>, SO<sub>2</sub> or H<sub>2</sub>, unlike many other types of Oxygen cell.

The infrared sensors will not be "poisoned" by other hydrocarbons. Normal operation will resume as soon as the gas sample has been purged.

Note - there has been one reported incident of a high reading due to the presence of Carbon Disulphide, which has a similar absorption frequency to Carbon Dioxide.

#### 4.6.2 H<sub>2</sub>S, CO and other Optional Gas Pods

The Gas Pods used to measure H<sub>2</sub>S and CO do suffer from cross-gas effects. Such effects are not accurately specified. However, the following table may be useful as a guide. This table represents how many ppm would be read by a Gas Pod if 100ppm of the interfering gas was applied, (with no other cross-contaminates being present in the sample).

Cell	CO	H <sub>2</sub> S	SO <sub>2</sub>	NO <sub>2</sub>	CL <sub>2</sub>	H <sub>2</sub>	CH <sub>4</sub>	CO <sub>2</sub>
CO	100	<3	0	<-20	0	<40	0	0
H <sub>2</sub> S	<0.5	100	~20	~-20		~0.1	0	0

**NOTE:** All readings are given in parts per million (ppm). The life of an electrochemical cell is determined by exposure to gasses, typical life being one to two years. It is recommended that Gas Pods be field calibrated at regular intervals.

#### 4.7 Memory

The instrument's memory is volatile. It is maintained by a battery back-up system, which will maintain the memory while the battery is being changed.

The memory is not to be used as a permanent storage medium and any data should be transferred to a more permanent storage medium as soon as possible. An Instrument should never be stored for prolonged periods with valuable data in its memory.

Although unlikely, sudden shocks, high levels of electromagnetic interference or static discharge may cause memory corruption or loss. If this occurs, the instrument should be Cold Started and the calibration reset to factory settings before further use. **Cold starting will erase all data in the instrument including resetting the time and date to the default value.**

### 5 Taking Extraction Well Readings (GEM Mode)

CES-LANDTEC classifies gas-producing penetrations on landfills as wells when used with vacuum extraction systems and flow determining devices such as the Accu-Flo wellheads, orifice plates or pitot tubes. The GEM™ 2000 may be configured as a Gas Extraction Monitor (GEM mode) for the purpose of sampling wells and obtaining flow measurements. To access this function from the gas read screen press '①' and scroll down to **Mode of Operation**, press the '↵' key and highlight **Gas Extraction Monitor**, pressing the '↵' key again will select GEM mode of operation.

#### 5.1 Preliminary Checks

Prior to going to site, it is good practice to ensure:

- All necessary ID codes and readings have been uploaded via DataField 3.0 software.
- The time and date are correct.
- The water trap has a clean and dry filter fitted.
- The inlet-port particulate filter is clean and dry.
- A supply of spare filters is available in case of accidental water blockage or contamination.
- The battery has a good charge (minimum 25% charge, even if only a few readings are required).
- The memory has sufficient space available.
- The CH<sub>4</sub>, CO<sub>2</sub> and O<sub>2</sub> readings have been auto-zeroed without gas concentration present.
- Check the span calibration with a known concentration calibration gas.

Travel to the site with the analyzer in the vehicle's interior - not in the trunk or truck bed, where it may be subjected to extremes of temperature and possible shock damage. Do not place the analyzer against anything hot (e.g. gas extraction pipe, car body or in an unattended car during the summer). This may cause erroneous readings.

When moving around a site, protect the instrument from strong direct sunlight, heavy rain or wind-chill. Strong direct sunlight can raise the temperature of the instrument beyond its operating range. If this occurs, the LCD display will appear almost black and the contrast setting cannot alter the contrast.

**Always use the water trap!** If the water trap becomes flooded, change the filter immediately and ensure all tubes are clear before re-use.

#### 5.2 Update Site Data

Prior to taking the readings at a particular site, the Site Data should be updated (if programmed). This is accessed via the General Menu '①'. This function removes the need for the site conditions to be recorded manually. A series of up to five questions can be pre-programmed with the use of DataField 3.0 and answered at this time. The answers to these questions are stored and appended to each reading stored thereafter, until the site data is updated for another site.

#### 5.3 Taking Gas and Flow Readings (GEM Mode)

The GEM mode of operation is designed to allow for gas flow (SCFM) and energy measurements (BTU) to be calculated at the wellhead. This function requires the use of an ID that has been uploaded from DataField 3.0 software with the type of flow device defined. **Gas flow and BTU will not be calculated if this action has not been performed.**

1. When the gas read screen is displayed select '③ Next ID'. A list of stored ID's will be displayed for selection via the '↵' and '↵' cursor keys, the 'next' ID is automatically highlighted, to confirm the selection press the '↵' key. The screen may be toggled to display any relevant ID information such as a description of the well location, work to be carried out, etc.



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2. A reminder is displayed to disconnect sample tubes, as a clean air purge will automatically remove the previous sample from the instrument. Purge time may be set via DataField 3.0 (default is 30 seconds). Once the '↵' key is pressed, purge will begin and the Read Gas Levels screen will be displayed upon completion. The purge may be aborted by pressing the 'ⓂEXIT' key.
3. Connect the sample tubes (with water trap filter) to the wellhead ensuring the gas sample tube and impact pressure tubes are properly oriented. Insert the temperature probe if used.
4. Press the 'Ⓜ' key to start the sample pump; a countdown timer will be displayed in the upper left area of the display. The pump may be stopped and restarted any time by pressing the 'Ⓜ' key. The pump run time is set in DataField 3.0 software. Allow the gas readings to stabilize and press 'ⓂMeasure Flow' key, this will store the gas level readings and display the '**PRESSURE READINGS**' screen. Note; a flashing bell will be displayed next to the appropriate gas and a beeping tone will be heard, if a preset alarm condition has been exceeded.
5. The '**PRESSURE READINGS**' screen will prompt the user to disconnect the sample tubes and allow the pressure to stabilize. Once the pressure has stabilized press '↵ Zero Transducers'. Press 'Ⓜ' to continue. **Note**; if Accu-Flo wellheads are used this zero function may be performed prior to connecting the sample tubes to the well head by selecting 'Ⓜ MENU' and highlighting '**ZERO TRANSDUCERS**'. This eliminates the need to disconnect and re-connect the sample tubes on the same wellhead.
6. If a temperature probe is not connected, the user is prompted to manually input the gas temperature, press the '↵' key when entry is finished.
7. The gas flow and energy screen is now displayed showing all the gas level readings taken in the gas read screen as well as the level of gas flow (SCFM) and power (BTU). In addition, Adjusted, Current and Previous (if downloaded) readings are displayed so modifications may be made to the well if required.
8. Pressing '↵ **STORE**' will save the readings to memory. Then, the comments screen (if comments were loaded) will display and allow you to answer questions or select comments about the condition of the well. A total of seven comments and one exclusive comment may be stored with each ID.
9. Press 'Ⓜ **NEXT ID**' and proceed to the next wellhead. An automatic purge will be performed at this time to ensure the sample has been exhausted from the instrument.

For each reading, the following information will be stored:

- ID code.
- Current time/date.
- Site data (if entered).
- All gas readings and balance gas (CH<sub>4</sub>, CO<sub>2</sub>, O<sub>2</sub>).
- Barometric Pressure.
- Temperature.
- Gas Pod (if connected).
- Gas flow (SCFM) and Power (BTU).
- Comments and exclusive comment.

When the Instrument is switched off, a clean air purge is automatically started for a pre-determined global period. This may be aborted by pressing the '↵' key, although we do not recommend this action.

### 6 DataField 3.0CS Software

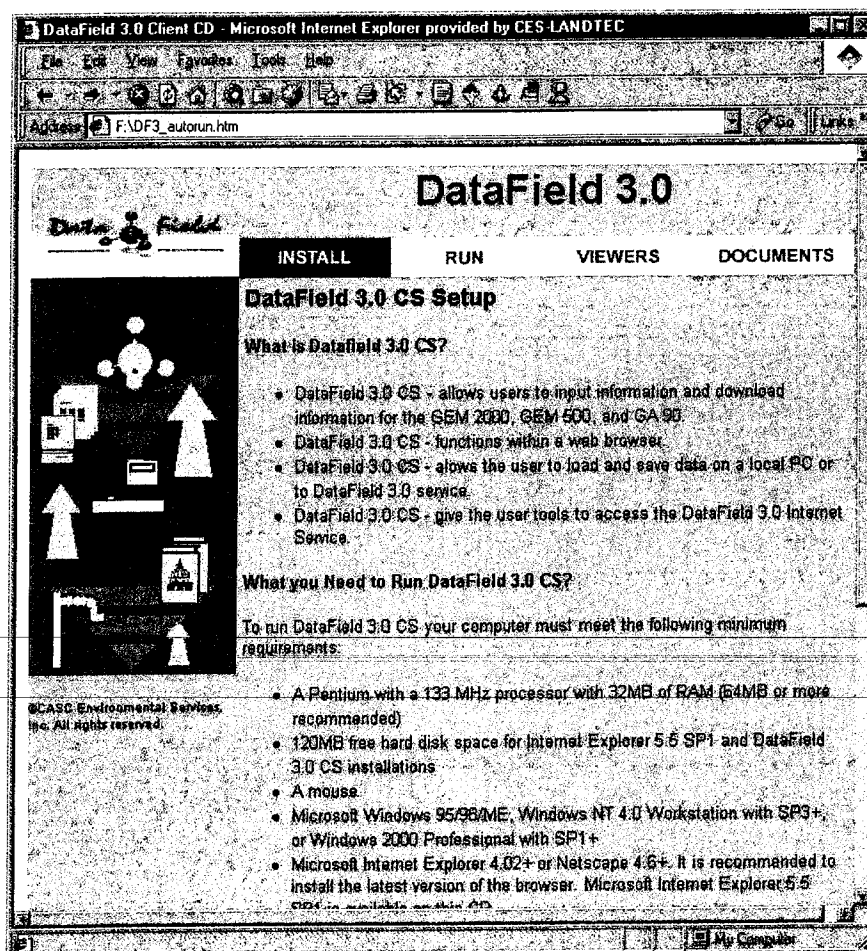
DataField 3.0CS is an integrated software program designed to communicate with the GEM™ 2000, 500 and GA90 instruments. The software will create files used for storing gas read data, ID data, comments and instrument configuration data. The files created are significantly different from the files created with GEM\_COMM or GA\_COMM software and are not compatible with these versions of software.

DataField 3.0CS is browser based (Java enabled) and will operate on Windows95b and higher Windows operating systems. Minimum hardware requirements are:

- Pentium 133 level microprocessor or equal.
- 32MB RAM.
- 120MB hard disk space.
- CDROM drive.
- Mouse or pointer system.
- Standard keyboard.
- Installed printer.

#### 6.1 Installing DataField 3.0CS

Be sure your computer is turned on and all software programs have been properly closed. Place the program disk in the CD ROM drive and close the tray. DataField 3.0CS will self start and display the DataField C.S. set-up screen.



## GEM™ 2000 Operation Manual

**Install** – Scroll to the bottom of the set-up screen and follow steps 1 thru 3.

**Note:** Make sure to reboot the computer after step 1, re-insert CD Rom to start autorun to go to step2.

**Run** – Allows the user to run the application from the CD Rom Drive.

**Note:** This option could make the application run slower due to the speed of the CD Rom.

**Viewers** – Allows the viewing of electronic information as supplied by CES-LANDTEC (after installing the appropriate viewer.)

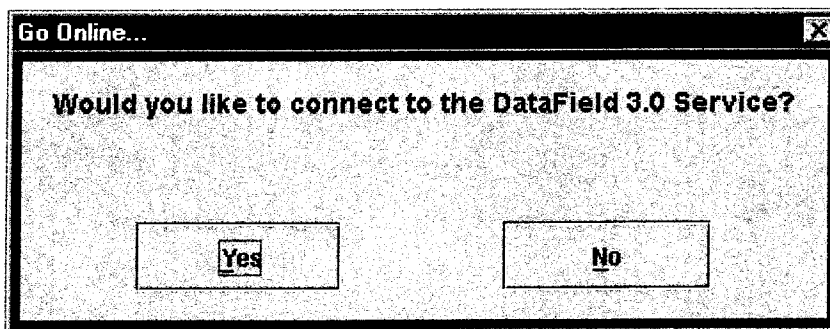
**Documents** – Electronic Manuals and Data sheets.

### 6.2 Establishing Communications

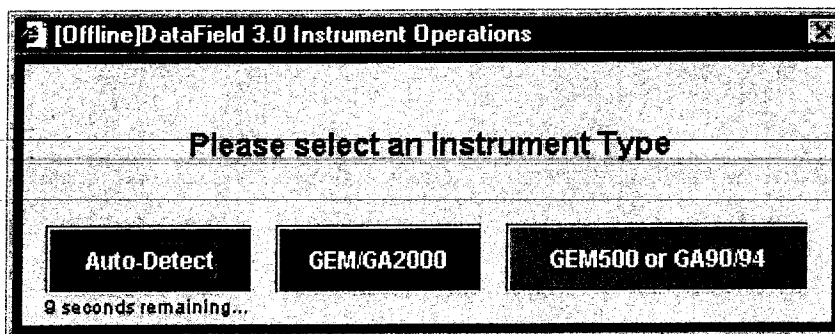
Connect the RS-232 download cable to an open COM port on your computer. Connect the other end of the RS-232 download cable to the GEM™2000 data port. DataField 3.0CS has the ability to automatically scan the different COM ports on your computer to find where the instrument is connected.

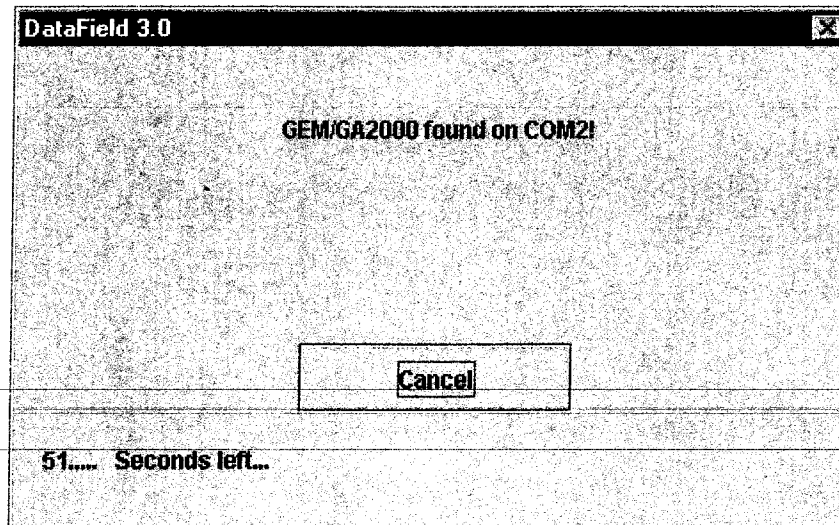
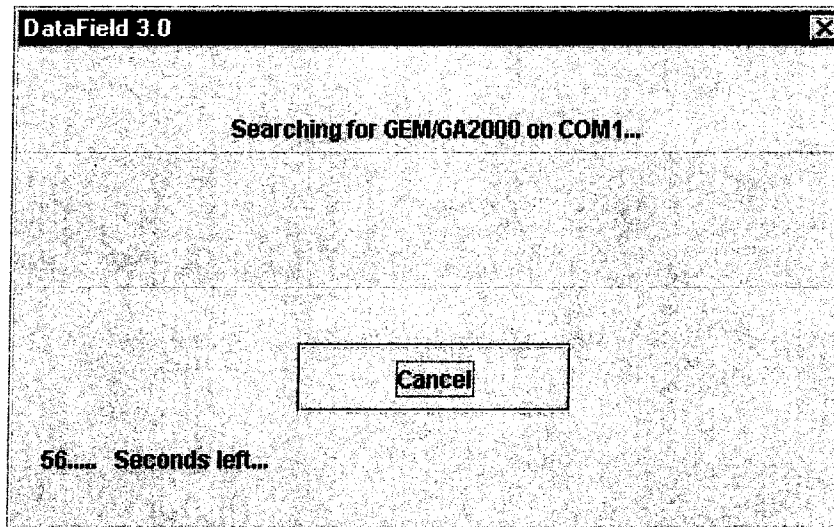
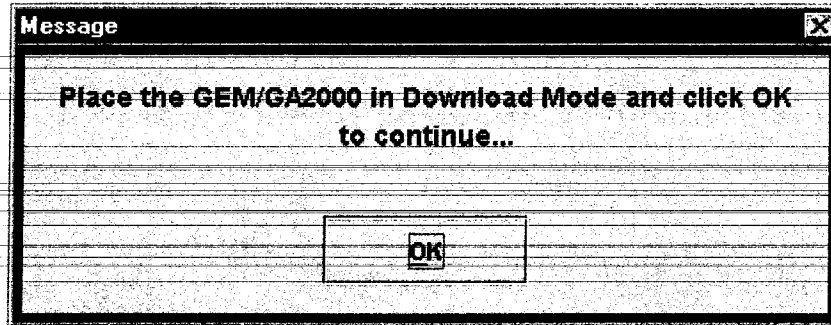
Turn the instrument On, wait for the self-test function to finish. The Gas Readings screen will display, if not, then turn off the GEM and re-start the instrument. The GEM™2000 must be in the Gas Reading screen in order to establish communications.

Once the instrument is in the proper communications mode, click on the Start menu then Programs menu. Scroll to DataField and then DataField 3.0CS to initialise the software. The following screen will appear on the computer.



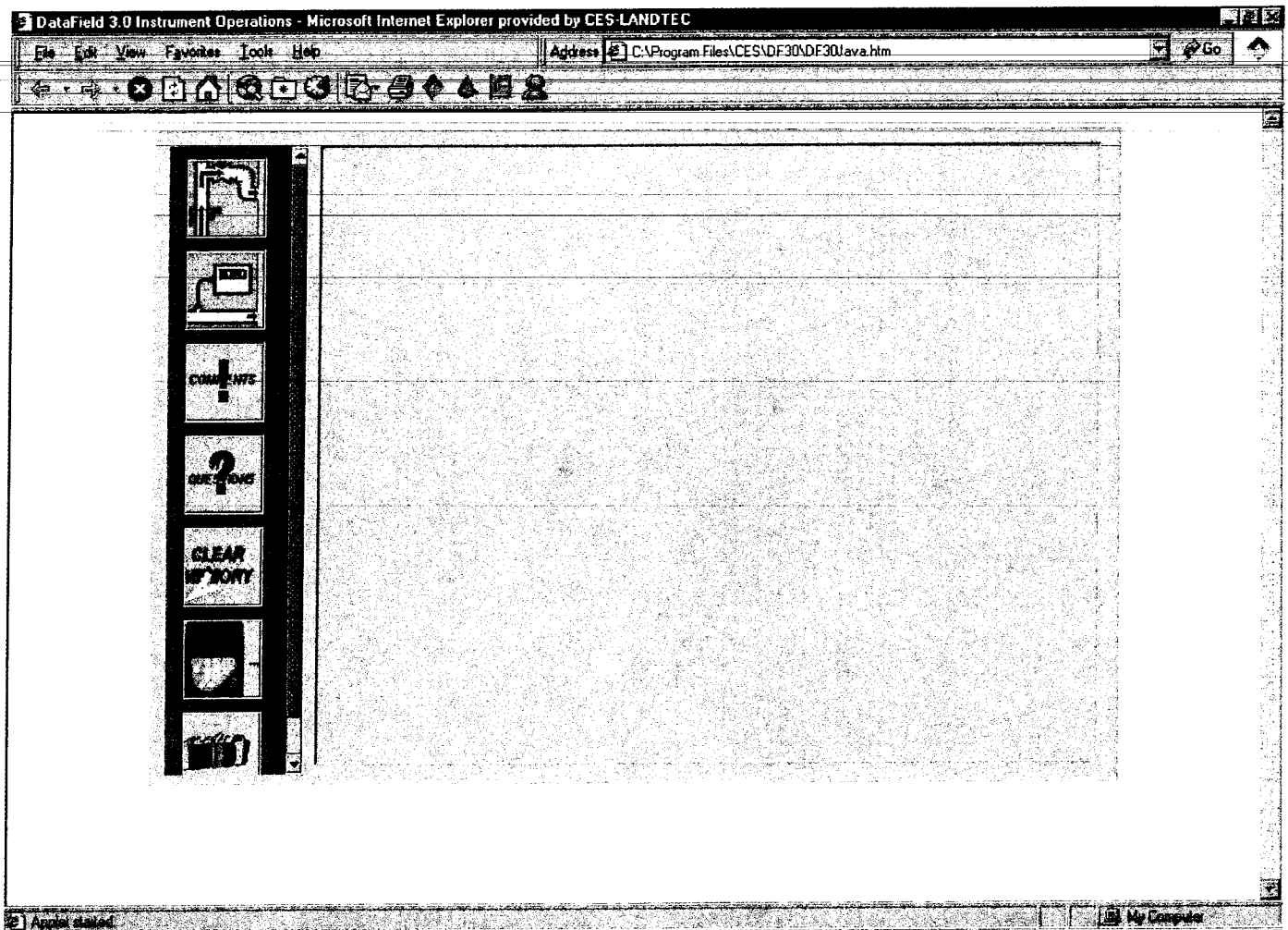
Click OK and DataField 3.0CS will automatically search for the instrument. This may take a few minutes. When an instrument is found and communications is established, the software will display a box that indicates what type of instrument was found. If the software does not find the instrument, it will display a box that indicates no instrument was found.





### 6.3 Main Screen

Once DataField 3.0CS establishes communications with the instrument, the main software screen will appear.



Seven main categories (buttons) are listed down the left side of the screen: ID Functions, Readings, Comments, Site Questions, Clear Memory, Instrument Settings and Resource Links. Clicking on any one of the buttons will take the user to that functionality of the application.

### 6.4 File

Clicking on the **File** heading will allow you to select **Exit** from program. This will close all files and exit the program.

### 6.5 Communications

It is not possible to change instruments and establish communications without re-starting the software.

## 6.6 Functions

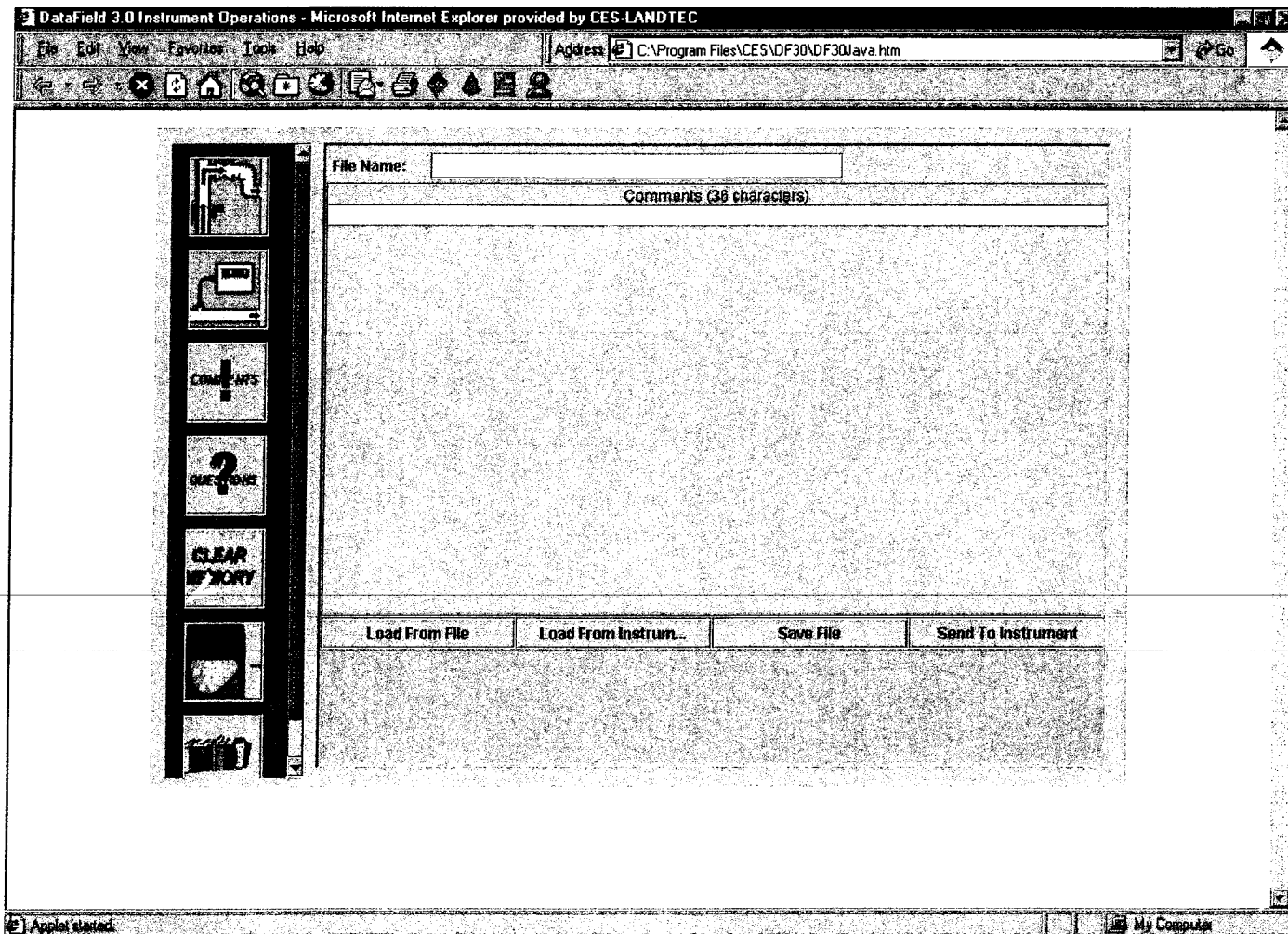
Each button has a specific function as listed below:

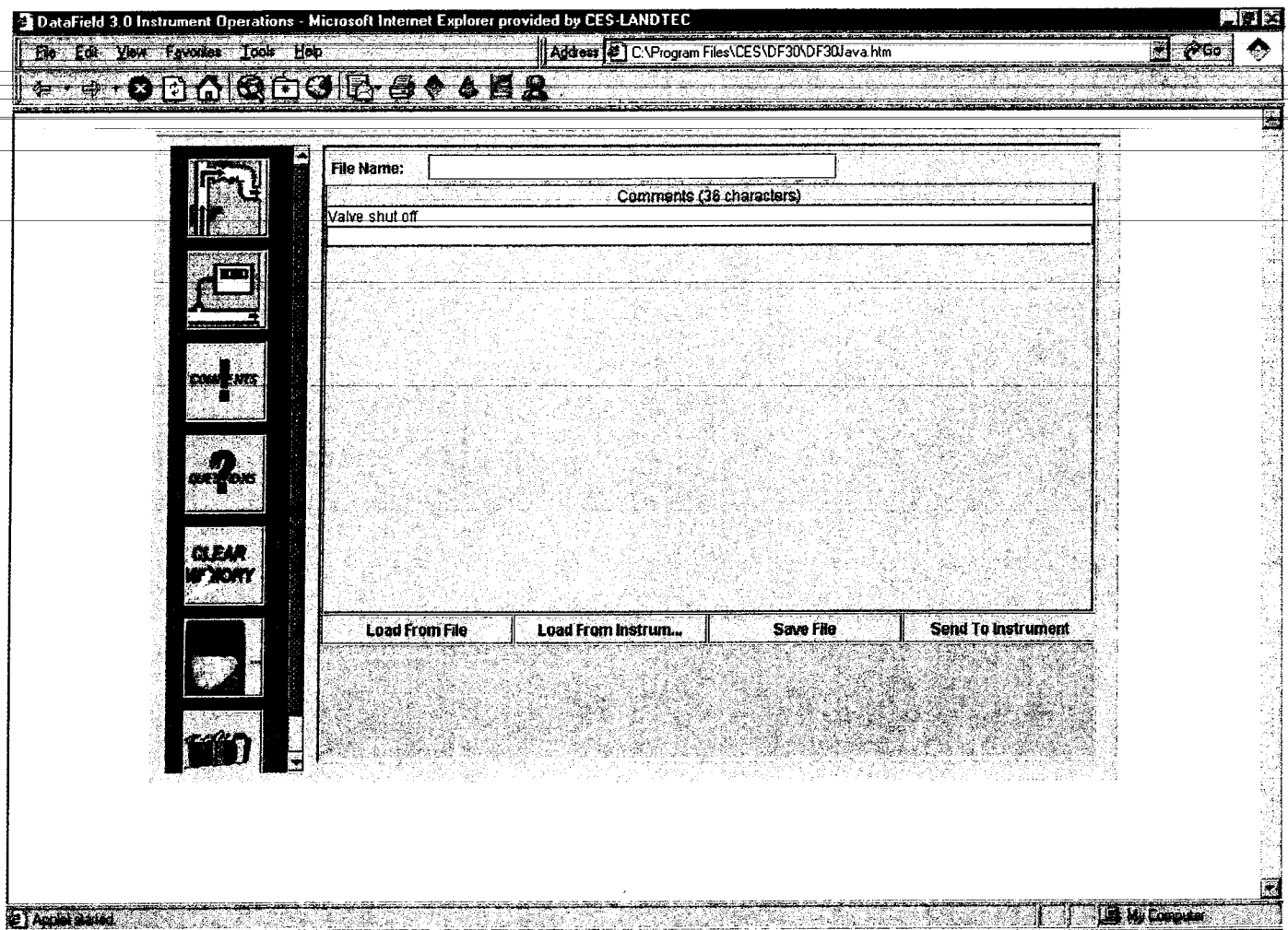
1. **Comments** – Allows entry of comments that may be selected for the ID's. A total of seven comments and one exclusive comment may be selected for each ID.
2. **IDS** – Used for adding new ID's, editing ID's or deleting ID's and entry of ID parameters such as pump run time, flow device, comments and questions for the ID.
3. **Readings** – Allows downloading and viewing data from instrument and uploading of previous data to the instrument.
4. **Site Questions** – DataField 3.0CS supports a total of five site questions that are answered by the technician and saved to the ID data.
5. **Clear Memory** – Allows the deletion of selective ID's, readings, comments, site questions or all memory loaded in instrument memory.
6. **Resource Links** – Allows the user to directly access information via the www.

### 6.6.1 Comments

DataField 3.0CS allows up to 64 comments to be created for upload to the GEM™ 2000. Each comment may be 36 characters in length and may be alphanumeric or any character on the computer keyboard.

**Select Comment** or **Exclusive Comment** must be turned on when the ID is created for comments to be selected for that ID. See section 6.6.1. From the opening screen, click on the **Comments** button to open the following screen.



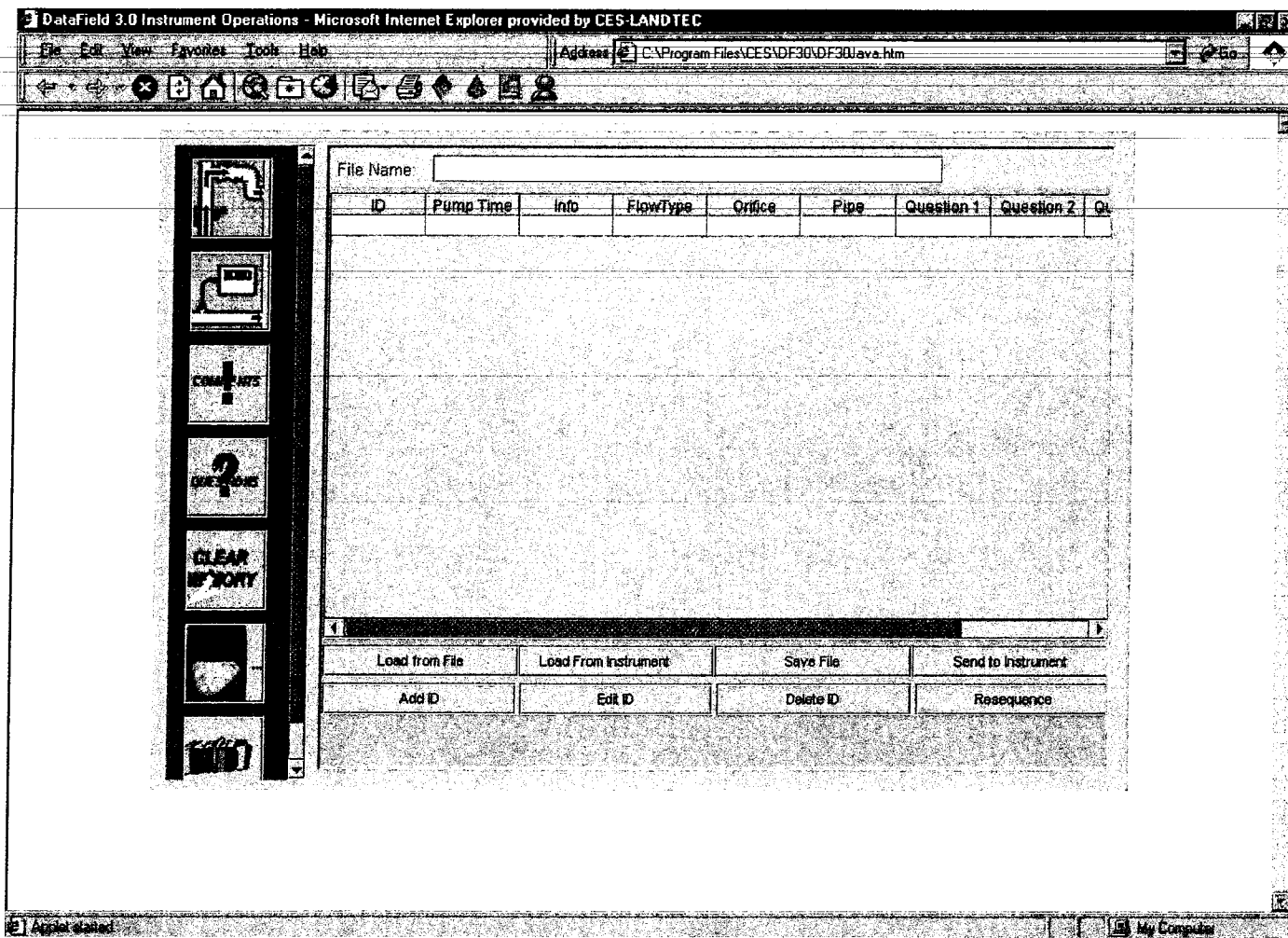


Enter the comment on the comment line and press **Enter** to continue entering comments until all the desired comments have been entered. Click on **Save File** to save the data to disk and then click on **Send to Instrument** to save the comments in the instrument. To delete a comment, click on the comment to highlight the comment and press the **Delete** key on the computer keyboard to remove the highlighted comment. It is always suggested to save the comment file because of the potential size and time required to recreate the comments. Once created, the comment file may be modified and saved under a different file name at any time.

**Note:** Comments must be created and sent to the instrument through the software. They can not be hand input into the instrument in the field.

## 6.6.2 Entering ID's

From the opening screen select the **ID** button. The following screen will open:



Selecting the **Save File** button will allow you to enter the name for the file you wish to save. The naming of files follows the extended naming convention for Windows.

Selecting the **Load from File** button will allow a previously created file to be loaded from the computer disk drive.

Selecting the **Load from Instrument** button will allow previously loaded ID's in the instrument to be downloaded for modification such as increasing the pump run time or adding additional comments to a specific ID. **CAUTION:** Loading ID's from an instrument can be a dangerous practice and is not



recommended if using DF3.0 online service. The possibility exists of introducing into a project ID's from another project. When the ID's are downloaded from the instrument and stored on line all ID's that are present in the instrument will be stored to the current project **IRRESPECTIVE** of if the ID's belong to the project.



**Add ID** button is used for the creation of a new ID or multiple ID's that may be sent to the instrument or saved to a new file for later use.

To enter a new ID or create a new ID set, click on the **Add ID** button and the following screen will open:

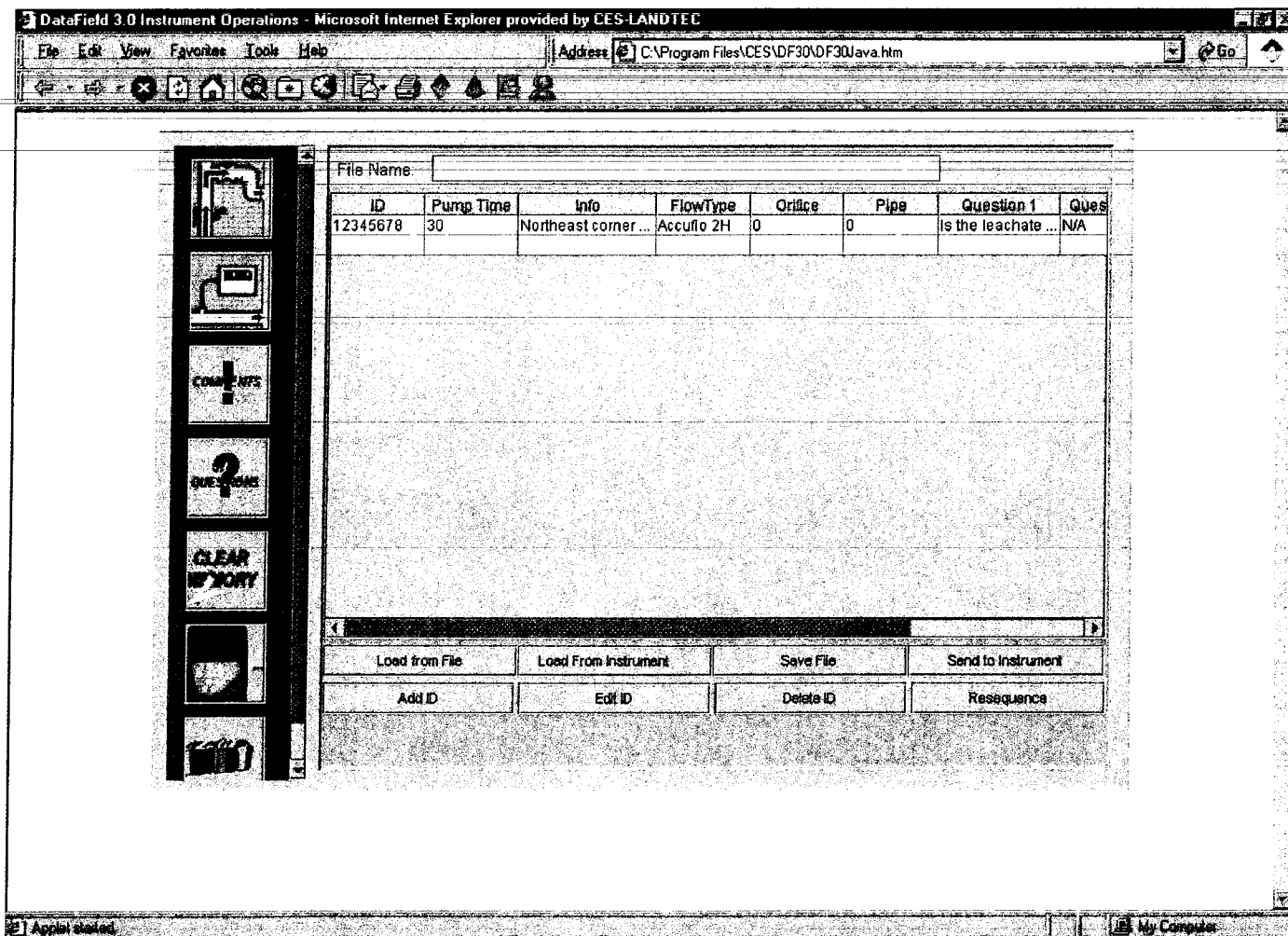
The screenshot shows a web browser window titled "DataField 3.0 Instrument Operations - Microsoft Internet Explorer provided by CES-LANDTEC". The address bar shows "C:\Program Files\CES\DF30\DF30Java.htm". The main content area displays a form for creating or editing an ID set. On the left is a vertical sidebar with icons and labels: "COMMENTS", "QUESTIONS", "CLEAR MEMORY", and "PLOT". The main form has the following fields and options:

- ID:** A text input field.
- Pump Running Time (s):** A text input field.
- Info: (84 chars):** A text input field.
- Flow Device:** A dropdown menu.
- Question1 Question2 Question3:** Three tabs for selecting questions.
- Question Type:** A section with radio buttons:
  - ☒ None
  - ☐ Alphanumeric
  - ☐ Numeric
  - ☐ Select Comments (Multi-Selection in Instrument)
  - ☐ Exclusive Comments (Single-Selection in Instrument)
- Buttons:** "Save", "Cancel", and "Set as Default" at the bottom.

Enter the Well ID in any combination of alpha or numeric characters for a maximum of eight characters. **All eight characters must be used.** Enter the pump run time in seconds (maximum of 999 seconds), pump run time must be entered in order for the pump to be turned on for gas sampling. Enter information about the well, such as its location, previous problems, etc or leave blank. Enter the type of flow device used with the well (Accu-Flo wellhead, Pitot tube, or orifice plate); user input may also be selected. If Pitot tube or orifice plate is selected, the **inside** pipe diameter and **orifice diameter** must be entered. If the pump run time and the flow device are going to be the same for multiple wells, click on **Set as Default** to lock these two values. Three questions may be asked about the well for reply by the technician at the time a sample is taken. These can take the form of alphanumeric, numeric, selected comments or exclusive comments. If none is selected then no questions will be asked for this ID. Note: **If Select Comments or Exclusive Comments is selected, Comments must be created and sent to the instrument.** See Comments section.

## GEM™ 2000 Operation Manual

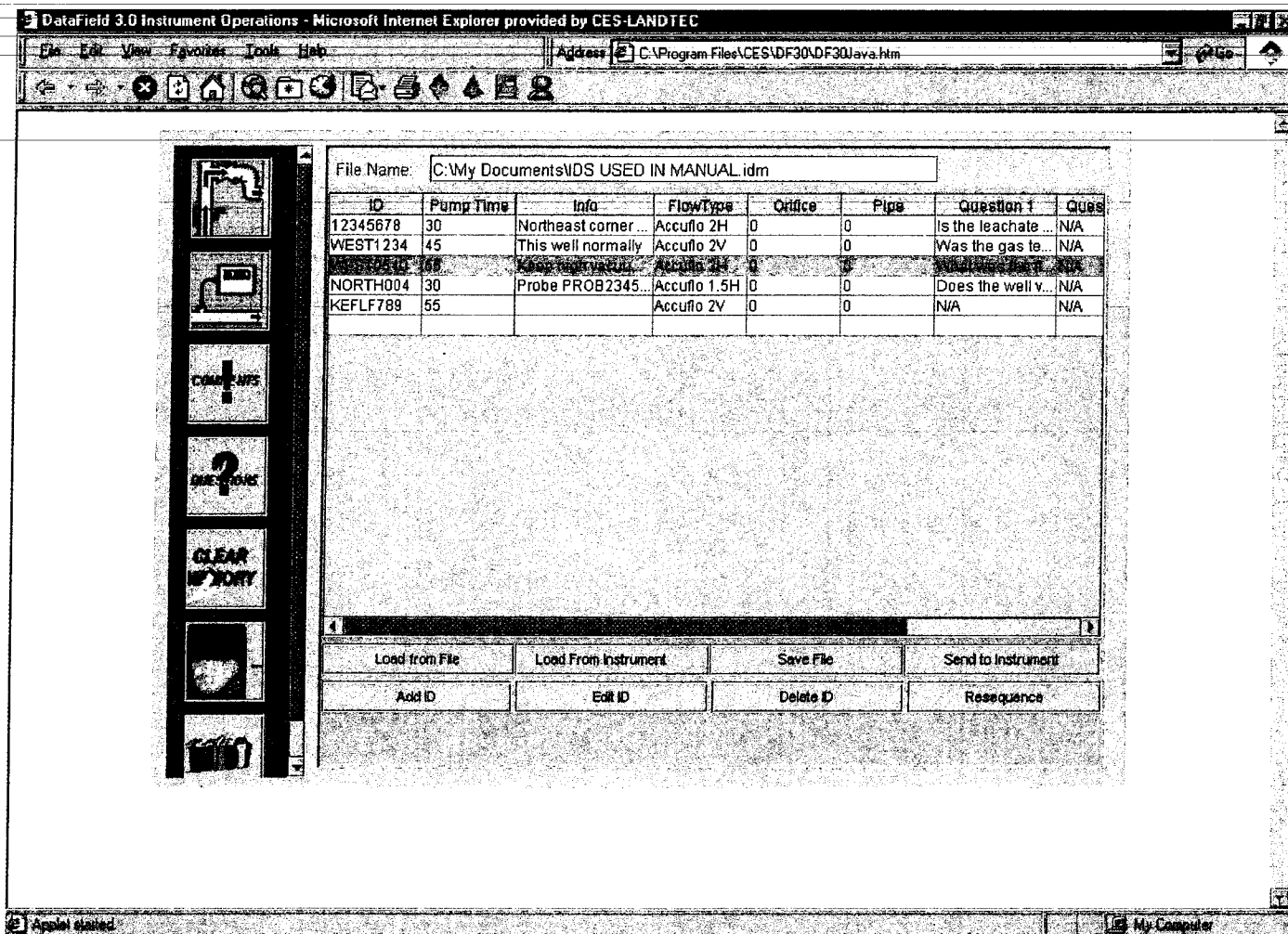
Click on **Add** to add this to the editor screen seen below. If additional ID's need to be entered, simply click on **Add ID** and enter the data as before.



Once all the ID's have been entered, click **Save to File** button to save the ID data to a file or **Send to Instrument** button if data is to be uploaded to an instrument for field sampling.

## 6.6.3 Editing ID's

ID's may be edited in a similar manner to entering a new ID. Click on the **ID** button. Click on **Load from File** button if the ID's to be edited are in a saved file on disk or click on **Load from Instrument** if the ID's to be edited reside in the instrument. Once the ID's have been opened, the **ID Editor** screen will appear as below.



To select an ID for editing, click on the ID to highlight the ID, and then click on **Edit ID** at the bottom of the screen. The Edit ID screen will open and allow information for the selected ID to be changed. When finished with the changes, click on **Save** to save the edited ID to the ID list.

## GEM™ 2000 Operation Manual

DataField 3.0 Instrument Operations - Microsoft Internet Explorer provided by CES-LANDTEC

File Edit View Favorites Tools Help Address C:\Program Files\CES\DF30\DF30Java.htm

ID: WEST0540 Pump Running Time (s): 55

Info (84 chars): Keep high vacuum on well

Flow Device: Accuflo 3H

Question1 Question2 Question3

Question Type Question: (up to 70 characters total for all fields)

☐ None Question: It was the final vacuum adjusted?

☒ Alphanumeric

☐ Numeric

☐ Select Comments (Multi-Selection in Instrument)

☐ Exclusive Comments (Single-Selection in Instrument)

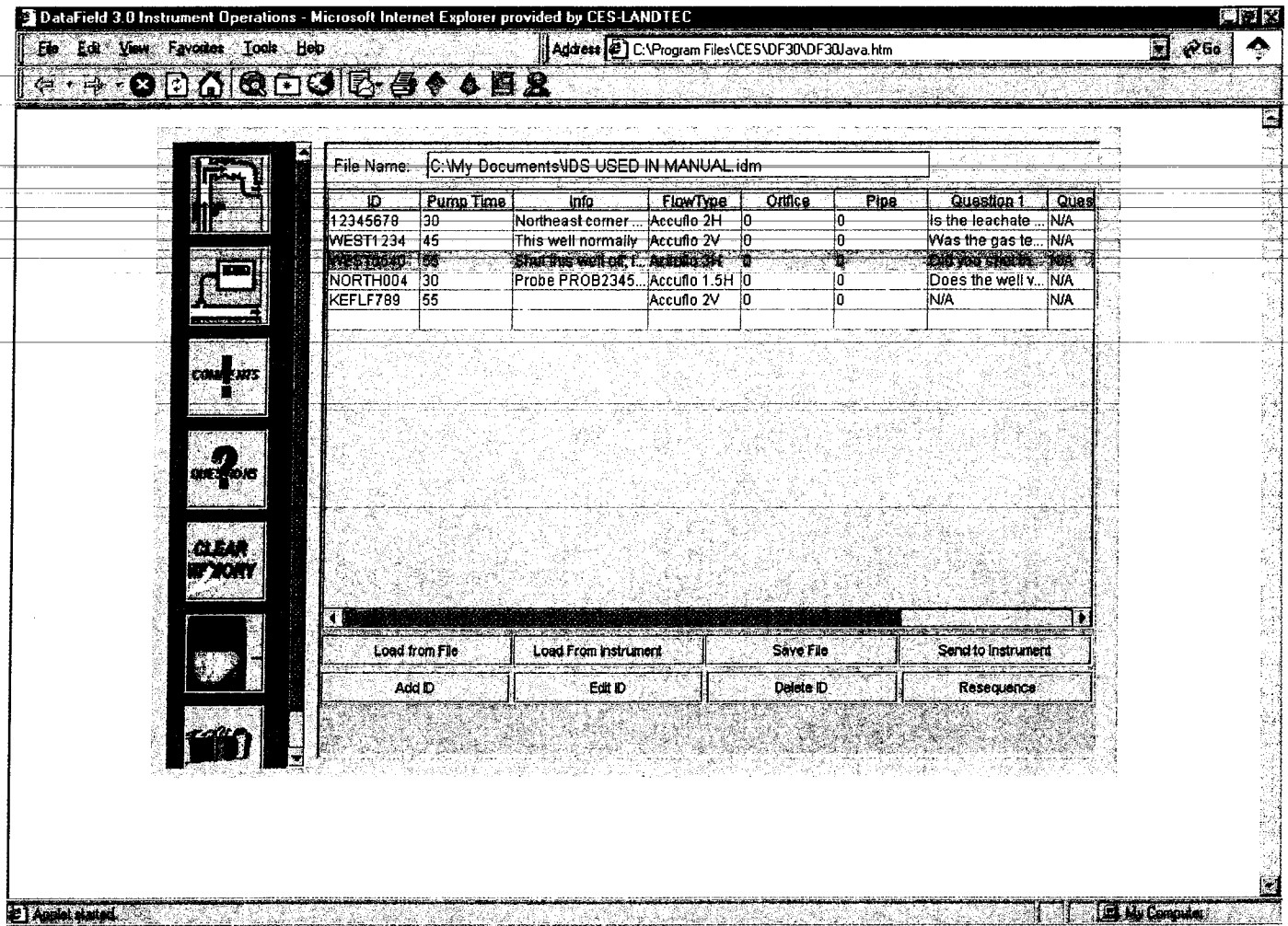
Save Cancel Set as Default

Applet started

My Computer

When editing is completed, click on **Save** to return to the previous screen. Click on save file to save the edited data to disk or click on **Send to Instrument** to append the ID's to the ID's in the instrument.

**Note:** ID's are only appended to the unit. It is strongly recommended to erase/clear ID's from unit prior to sending new ID's to the unit. One obvious exception is in the case of loading ID's for multiple sites in an instrument.



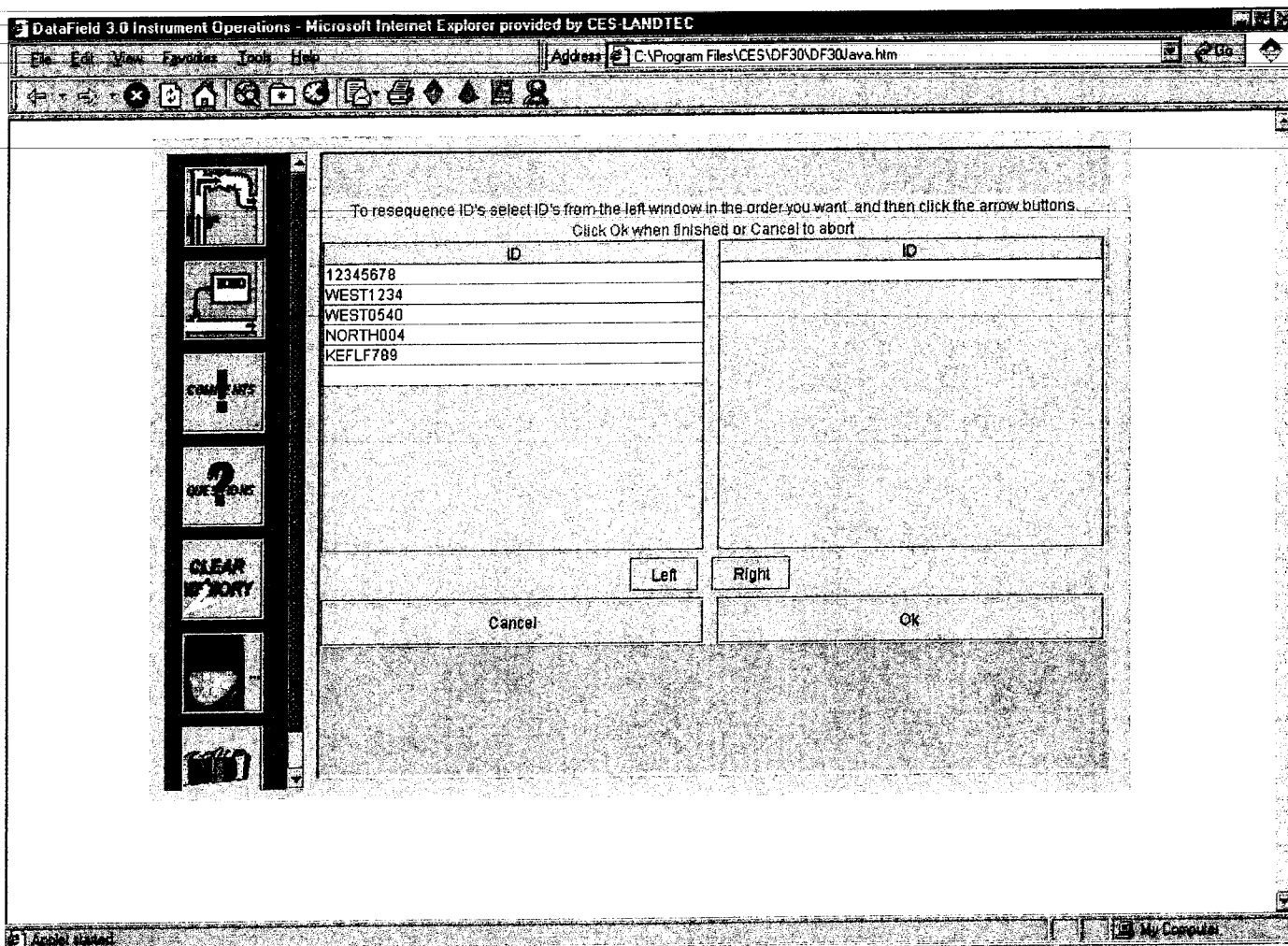
## 6.6.4 Delete ID's

To delete an ID select either **Load from File** (if the ID to be deleted is in a file saved on disk) or **Load from Instrument** (if the ID to be deleted is in the instrument). The **ID Editor** screen will open with the ID information listed. Select the ID to delete and click on the ID to highlight the ID. Click on **Delete ID** at the bottom of the screen. A prompt will appear to verify the action. Clicking **Yes** will delete the ID. Click on **Save File** to save the updated file to disk or click on **Send to Instrument** to update the instrument for field sampling.

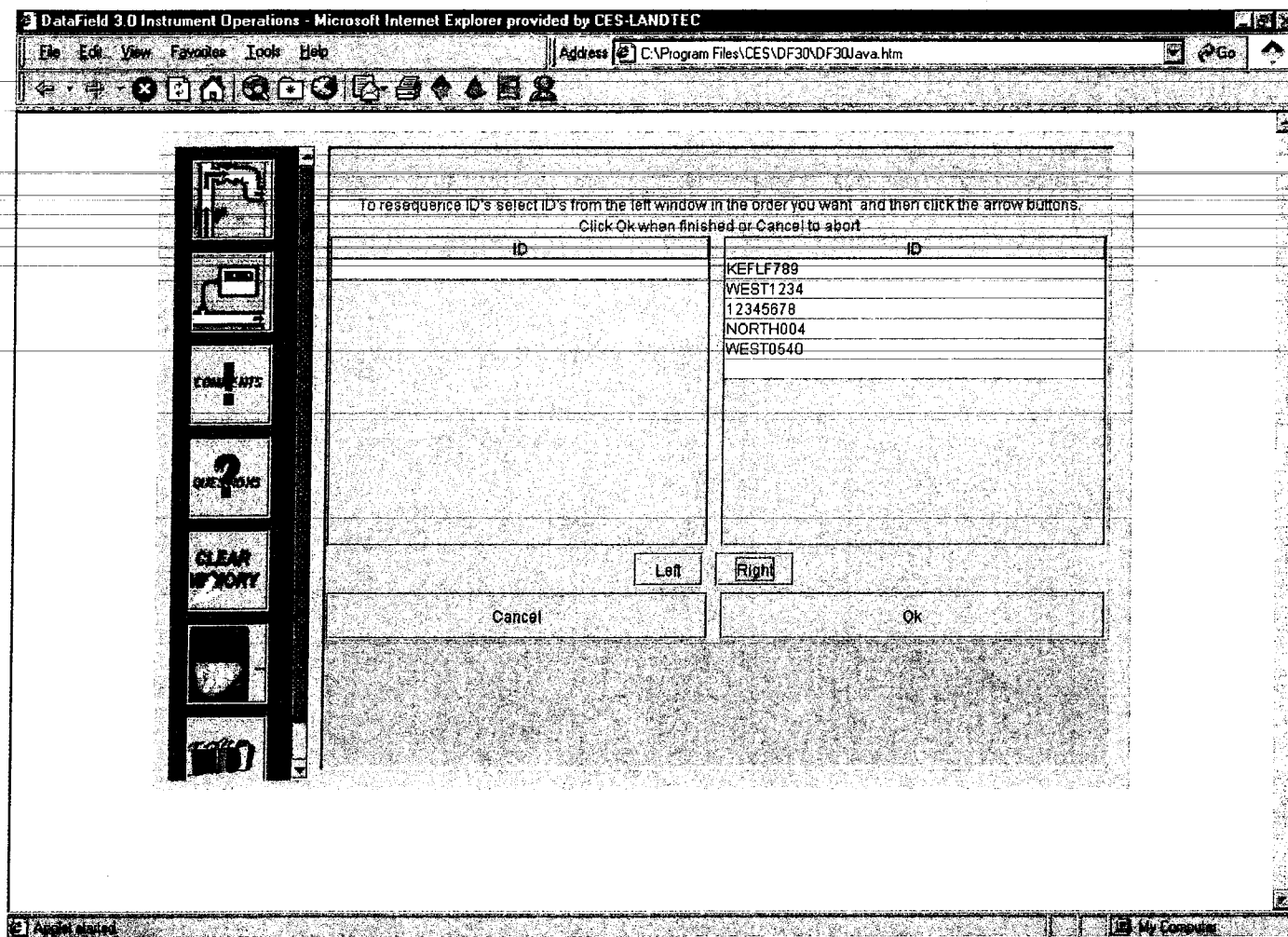
**Note:** It is suggested to clear ID information from the instrument prior to uploading the revised ID list. Otherwise the new ID list will be appended to the existing list. Clearing ID's in the instrument will clear ID's in the both GEM & GA modes of operation.

## 6.6.5 Re-sequencing

With DataField 3.0CS it is possible to change the order of the ID's in a file to be in the same order as they are sampled in the field, this is called **Re-sequencing**. To re-sequence an ID data set, click on the **ID** button to open the ID editor. Load the ID data set from a file or download the data set from the instrument. Click on the **Re-sequencing** button to open the screen shown below.



Select the ID from the left side window and click on the **Right** button to move ID to the right window to create the new sequence order. Repeat this process moving all ID's to the right side of the desired order.



Click OK when the desired new sequence is obtained, this will return you to the well ID screen. Click on the **Save File** button to save the new data set to a file on disk or click on **Send to Instrument** to upload the new data to the instrument.

**Note:** It is suggested to clear ID information from the instrument prior to uploading the re-sequenced ID list. Otherwise the new ID list will be appended to the existing list. Clearing ID's in the instrument will clear ID's in the both GEM & GA modes of operation.

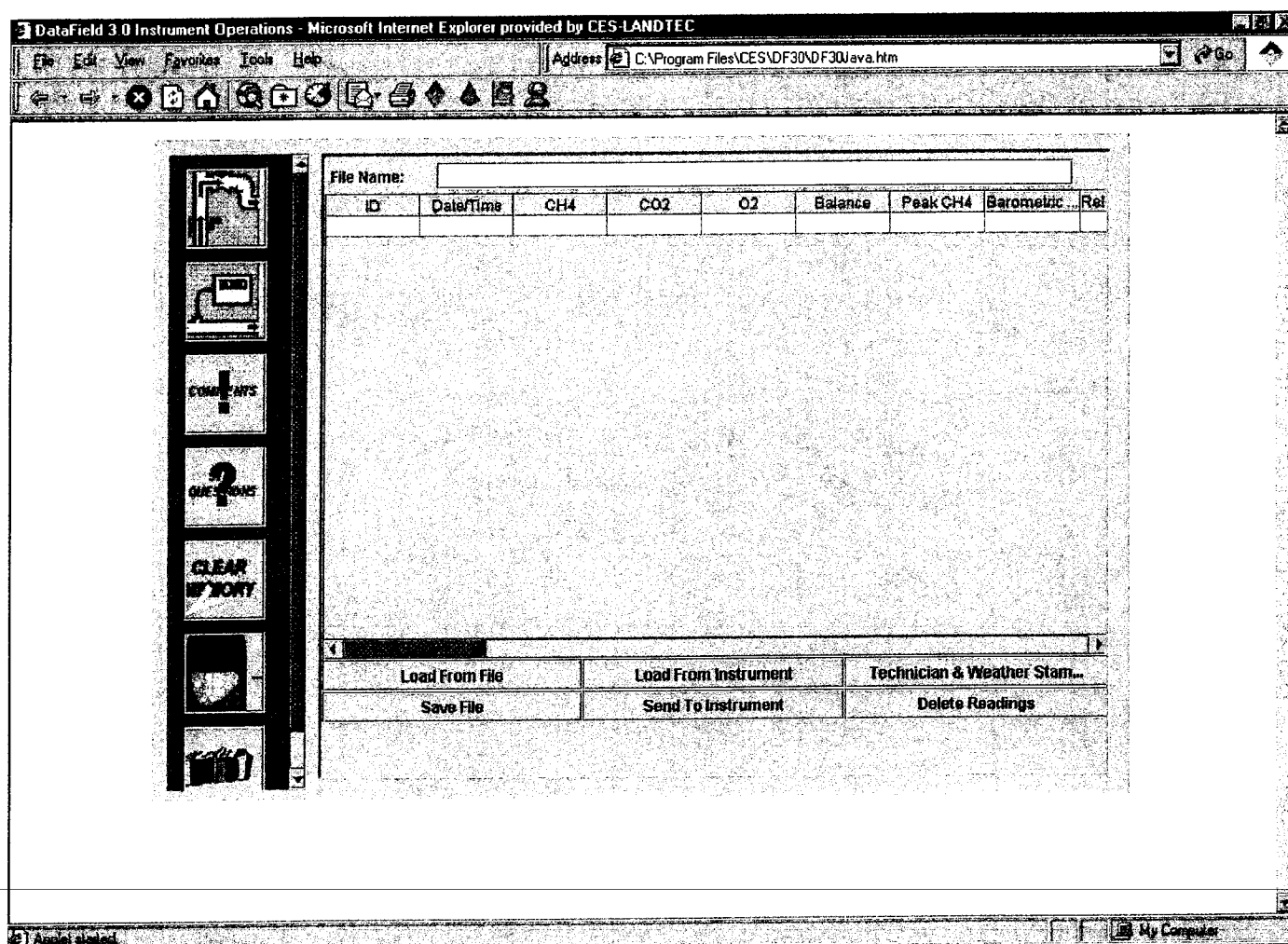


## 6.6.6 Readings

The Readings screen provides the capability to download, upload, view, save data to a file and delete individual or multiple readings from a data set.

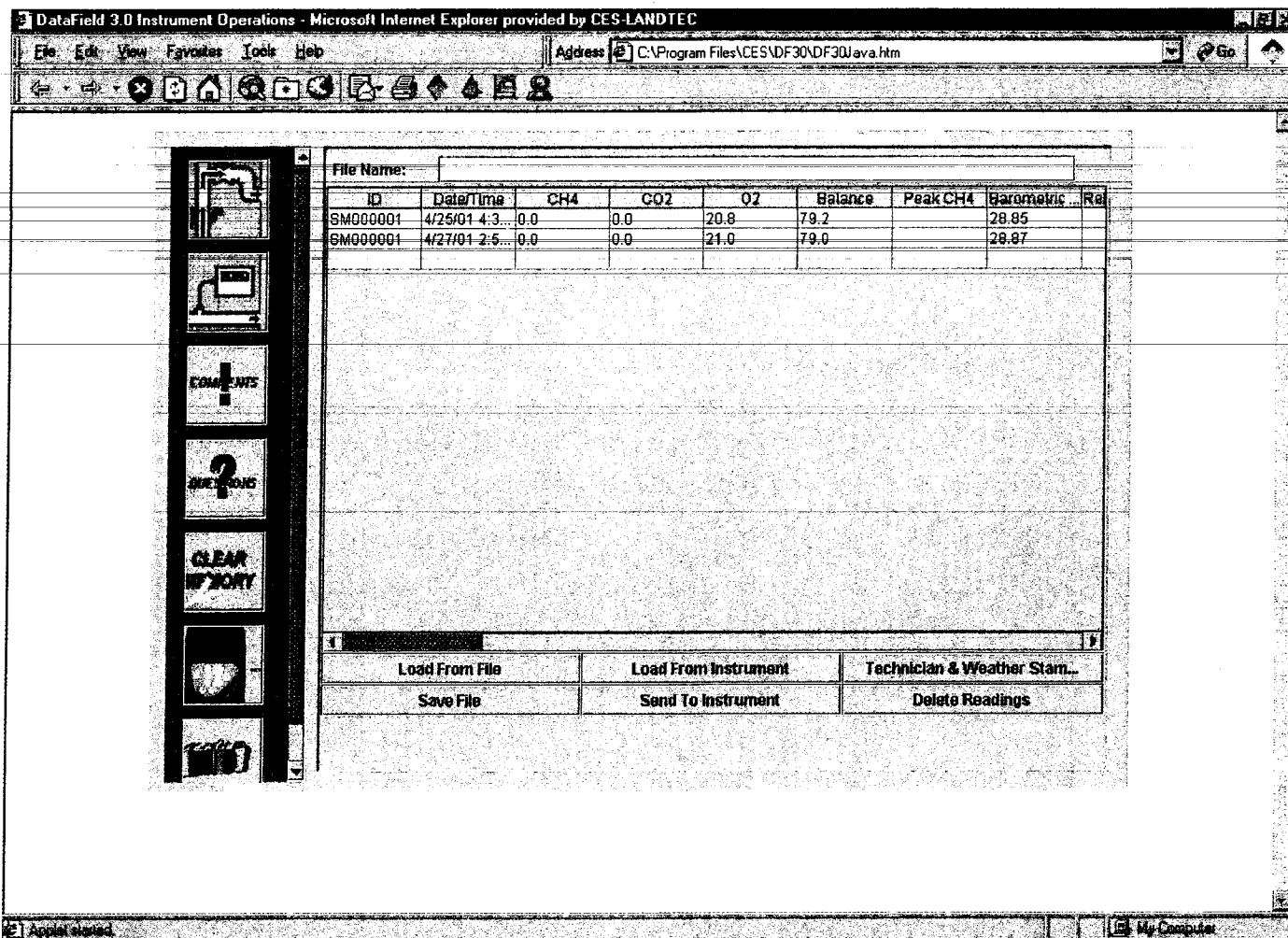


Click on **Readings** to open the screen shown below.



Click on **Load from File** to open a file folder of saved data on the disk drive or click on **Load from Instrument** to download data from the instrument. Either action will open the following screen. All readings should be downloaded on a daily basis. While the instrument can hold readings for an extended period of time, it is recommended to download them to a non-volatile memory device (e.g. hard drive, CD, etc.).





Once the file has been opened or data downloaded from the instrument, either **Save File** or **Send to Instrument** may be selected. If an attempt is made to save the data to an existing file, a warning message will display indicating the file will be overwritten and data lost. Data sent to the instrument will be displayed as the previous sampled readings for the selected ID.

To delete data from the data set, click on the button to the left of the desired ID to highlight that ID and click on **Delete Readings**. If multiple consecutive readings need to be deleted, click and highlight the first reading, hold down the **Shift** key on the computer keyboard and click on the last reading to highlight all consecutive readings. (See figure 6.6A) Click on **Delete Readings** to delete the selected readings. If multiple separated readings need to be deleted, highlight the first reading; hold down the **Ctrl** key on the computer keyboard and click on subsequent readings to be deleted. (See figure 6.6B) When all the readings have been selected, click on **Delete Readings**.

Fig. 6-6A

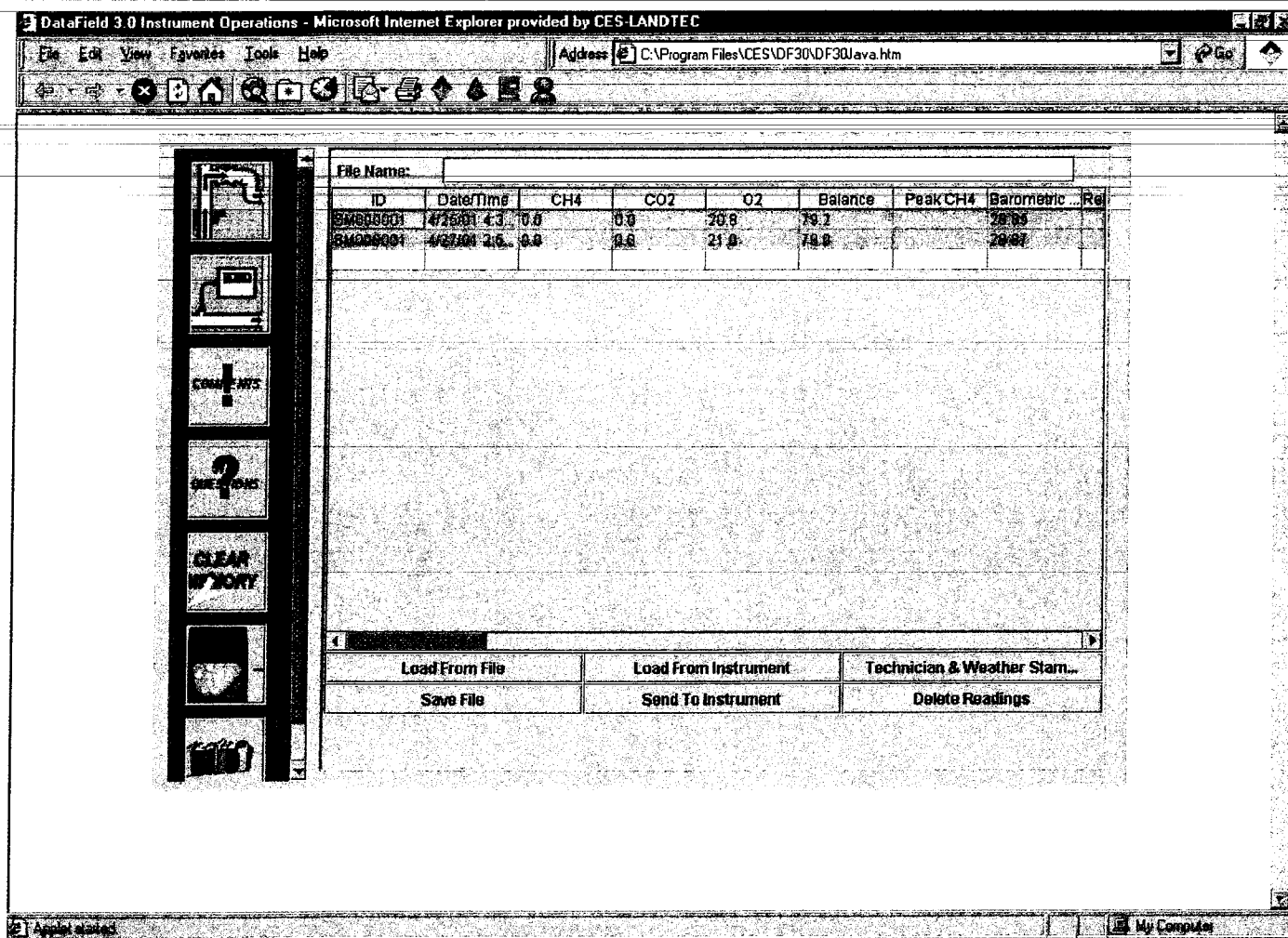
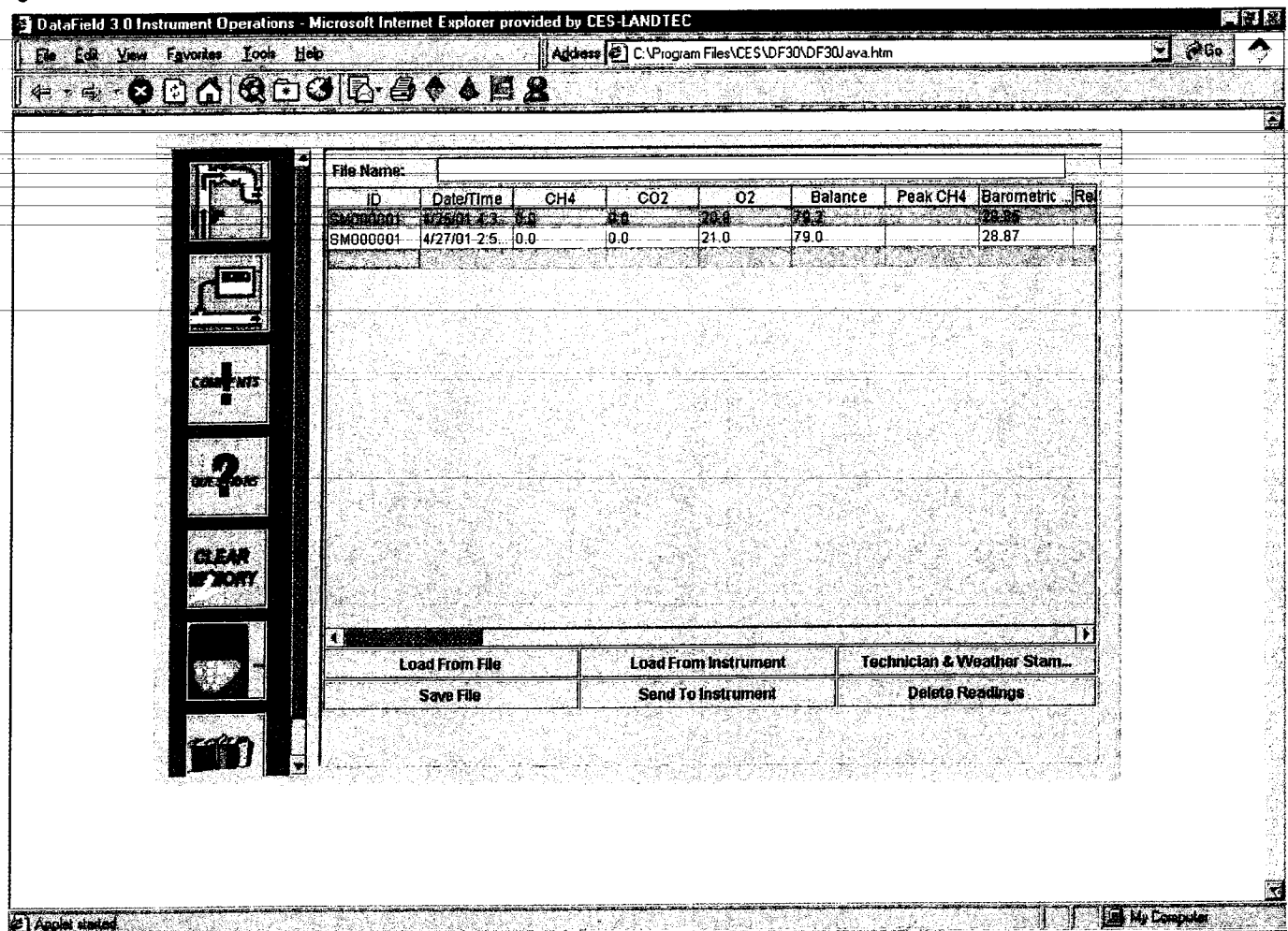


Fig. 6-6B



## 6.6.7 Site Questions

DataField 3.0CS supports up to five site questions. Site questions are answered only when **Update Site Data** is selected from the GEM menu screen and appended to all ID's taken thereafter until Update Site Data is again selected. This is a useful feature if conditions change in various locations on the landfill site or for selected wells/probes. Site questions can take the form of alphanumeric, numeric, select comment (the technician selects the comment from a list of ten answers) or exclusive comments (the technician may select only **ONE** exclusive question from a list of 10 answers). From the opening screen, click on the **Site Questions** button to open the following screen.

**Note:** Site questions must be created and sent to the instrument by the software prior to going into the field. They can not be hand input into the instrument in the field.

## GEM™ 2000 Operation Manual

DataField 3.0 Instrument Operations - Microsoft Internet Explorer provided by CES-LANDTEC

File Edit View Favorites Tools Help Address  Go

File Name:

Question 1 Question 2 Question 3 Question 4 Question 5

Question Type Question: (up to 70 characters total for all fields)

☐ None Question:

☒ Alphanumeric

☐ Numeric

☐ Select Comments

☐ Exclusive Comments

Load From File Load From Instrum... Save File Send To Instrument

Applet started My Computer

Click on the open spot, to the left of the alphanumeric category in **Question Type** to define Question 1 and type in the question.

## GEM™ 2000 Operation Manual

DataField 3.0 Instrument Operations - Microsoft Internet Explorer provided by CES-LANDTEC

File Edit View Favorites Tools Help Address C:\Program Files\CES\NDF30\NDF30Java.htm Go

File Name: C:\My Documents\Biglandfill.sq

Question 1 Question 2 Question 3 Question 4 Question 5

Question Type Question: (up to 70 characters total for all fields)

☐ None Question: What is the leachate depth in tank

☐ Alphanumeric Answer Format: XXXX

☒ Numeric Unit of Measurement: inches

☐ Select Comments

☐ Exclusive Comments

Load From File Load From Instrum... Save File Send To Instrument

Comments

Questions

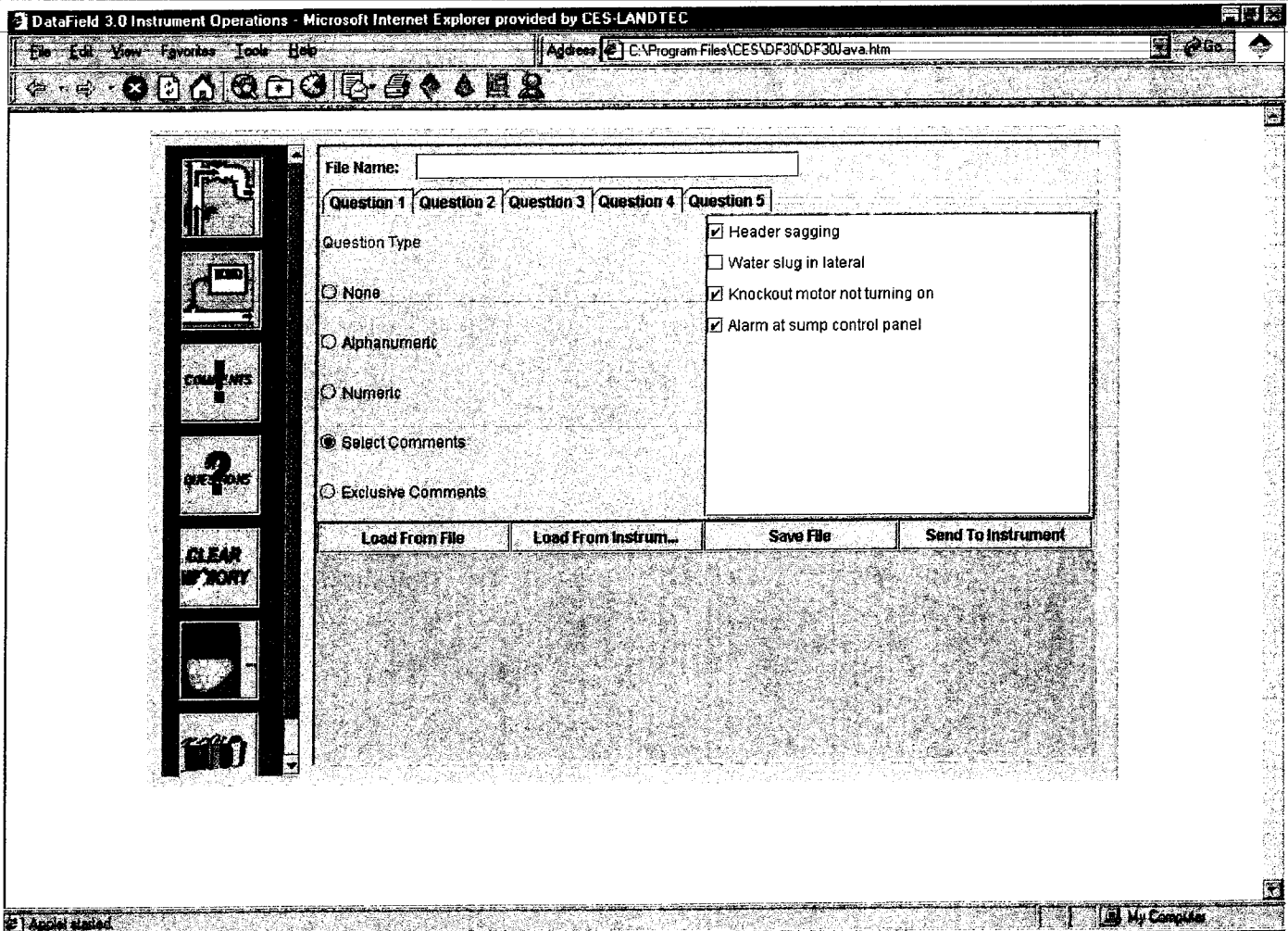
Clear Memory

My Computer

Click on Question 2 and then select Numeric as the Question Type. Note that Answer Format and Units of Measure fields appear with this type of question. Answer format refers to the number of digits and decimal places required for the answer. Units of Measure, refers to inches, feet, yards, etc for the answer. In this example, XXX.X could be equal to 020.5 Inches as per the question 'What is the leachate depth in tank'.

## GEM™ 2000 Operation Manual

Comments may also be used as a site question, however comments must be downloaded from an instrument that has already had comments loaded in it. Connect the GEM™ 2000 and be sure it is in the read gas screen. Click on Select Comments and the list of comments from the instrument will open in the window for selection. Ten comments may be selected from the list to become **Site Questions**. Click on the box to the left of the comment to select it. The operator may choose any or all of the ten comments when **Update Site Data** is selected on the instrument.



Exclusive comments are treated in a similar manner as select comments in that they also must be downloaded from the instrument. Ten exclusive comments may be selected, however only **ONE** may be chosen by the operator to become an **Exclusive Comment**.

DataField 30 Instrument Operations - Microsoft Internet Explorer provided by CES-LANDTEC

File Edit View Favorites Tools Help Address C:\Program Files\CES\DF30\Java.htm

Question 1 Question 2 Question 3 Question 4 Question 5

File Name: \_\_\_\_\_

Question Type

☐ None

☐ Alphanumeric

☐ Numeric

☐ Select Comments

☒ Exclusive Comments

☐ Valve wide open

☒ Broken flex hose

☒ Broken header

☒ Cracked valve

Load From File Load From Instrum... Save File Send To Instrument

Applet started My Computer

When all the desired questions have been entered, click on **Save File** to retain the information for later use and then click on **Send to Instrument** to update site data in the instrument.



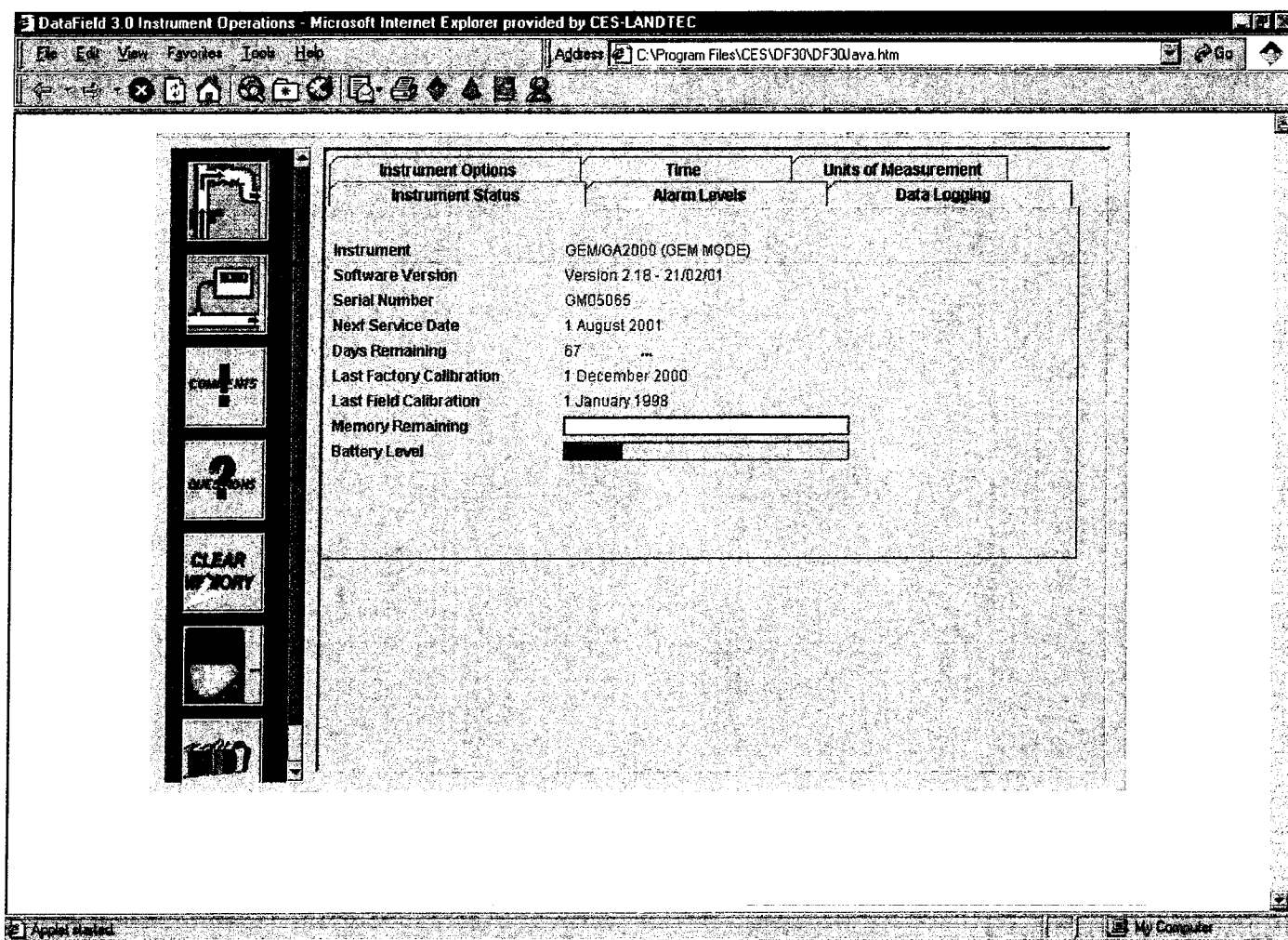
## 6.7 Settings

Clicking on the **Settings** button on the main screen will display the **Instrument Settings**. Instrument settings provides the capability to set or change optional controls in the instrument, such as time/date, data logging (GA mode only), purge times, etc.

### 6.7.1 Instrument Settings

Set the instrument for RS-232 communications and click on the **Settings** button and the following screen will open. The software will establish communications and download the current instrument settings.

Once the current settings have been obtained, the following screen will open.

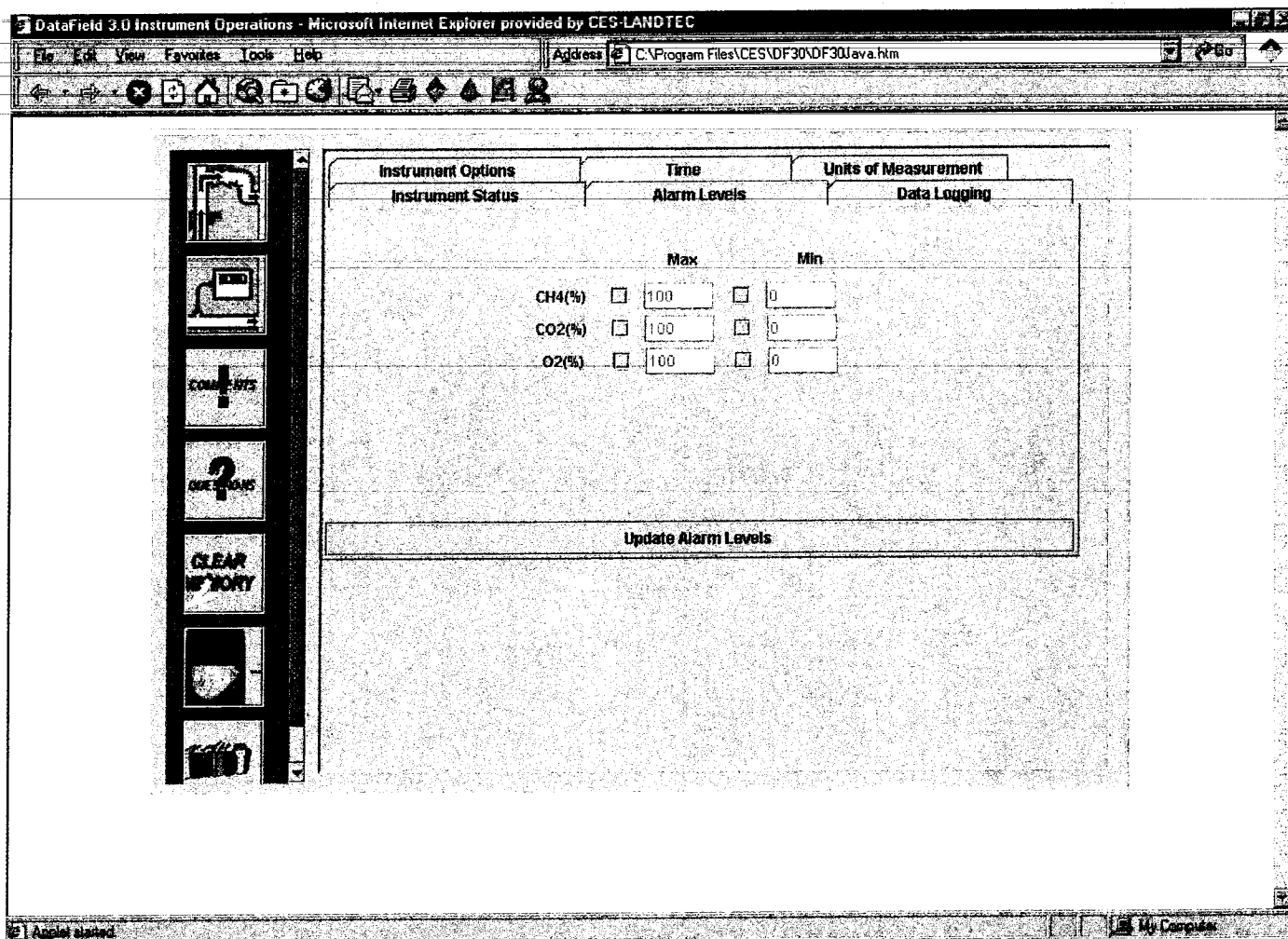


There are six different "Menu Cards" under instrument settings. Each card provides different information or instrument settings that may be changed to update the operation of the GEM™ 2000. The instrument status card will always be shown first, providing calibration and maintenance information in addition to instrument serial number and software version number.



## GEM™ 2000 Operation Manual

Click on the card tab for **Alarm Levels** to open the alarm levels screen. Both a maximum alarm and a minimum alarm may be set. Note these are global settings and will be the same for all ID's entered in the instrument. Turn off the alarm by clicking off the check mark next to the gas. Click on **Update Alarm Levels** to send the new settings to the instrument.



## GEM™ 2000 Operation Manual

Click on the **Data Logging** card tab to open the data-logging screen. Data logging may only be used in the GA mode of operation. In this screen enter the Logging ID; this may be any alphanumeric combination of eight characters. Enter the interval between readings in minutes and pump run time in seconds. Click on **Update Logging Data** to send to instrument. Only one logging ID may be loaded in the instrument.

DataField 3.0 Instrument Operations - Microsoft Internet Explorer provided by CES-LANDTEC

Address: C:\Program Files\CES\DF30\DF30Java.htm

Instrument Options	Time	Units of Measurement
Instrument Status	Alarm Levels	Data Logging

Logging ID:

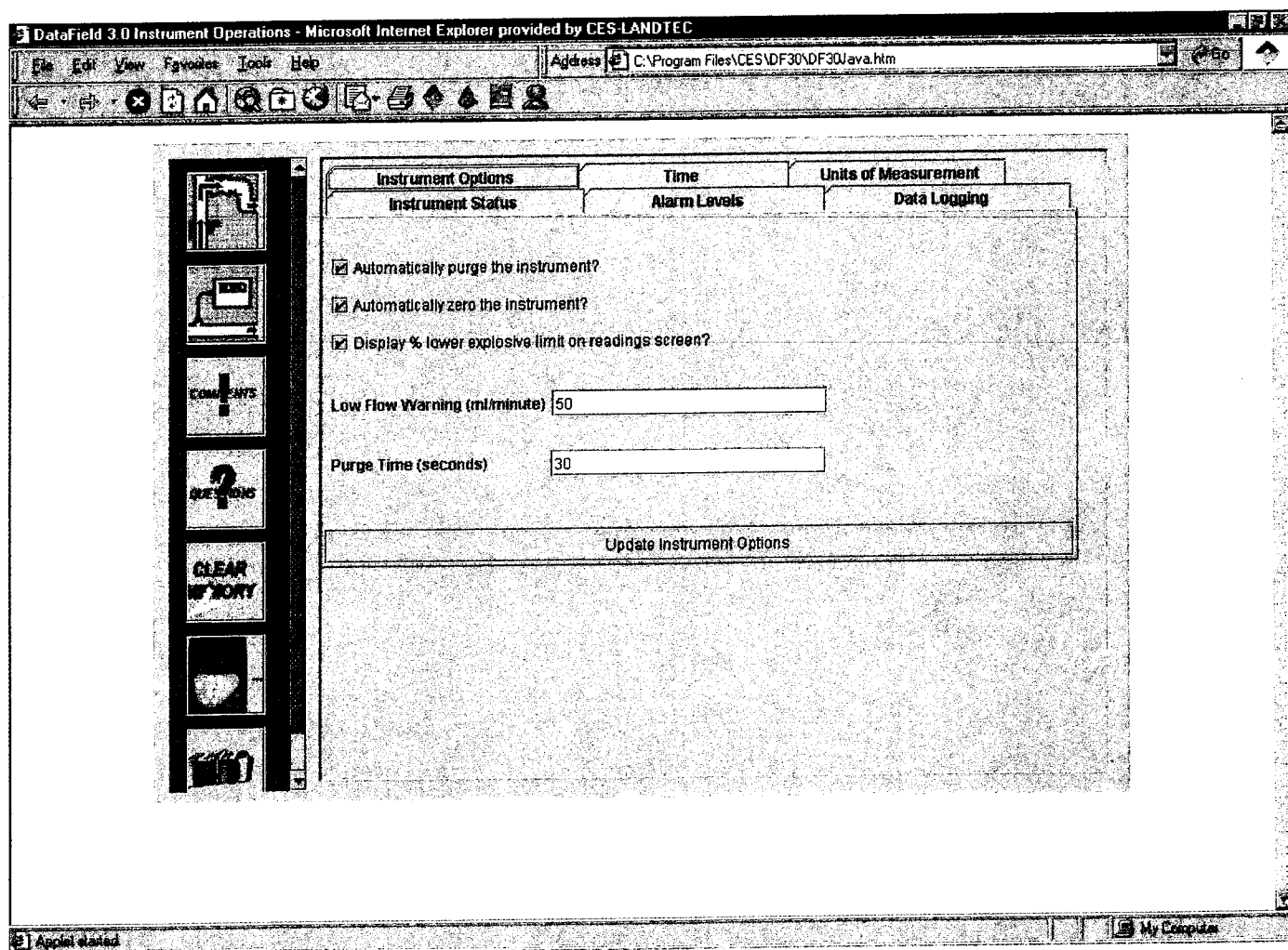
Interval Between Readings (minutes):

Pump Running Time (seconds):

Applet loaded My Computer

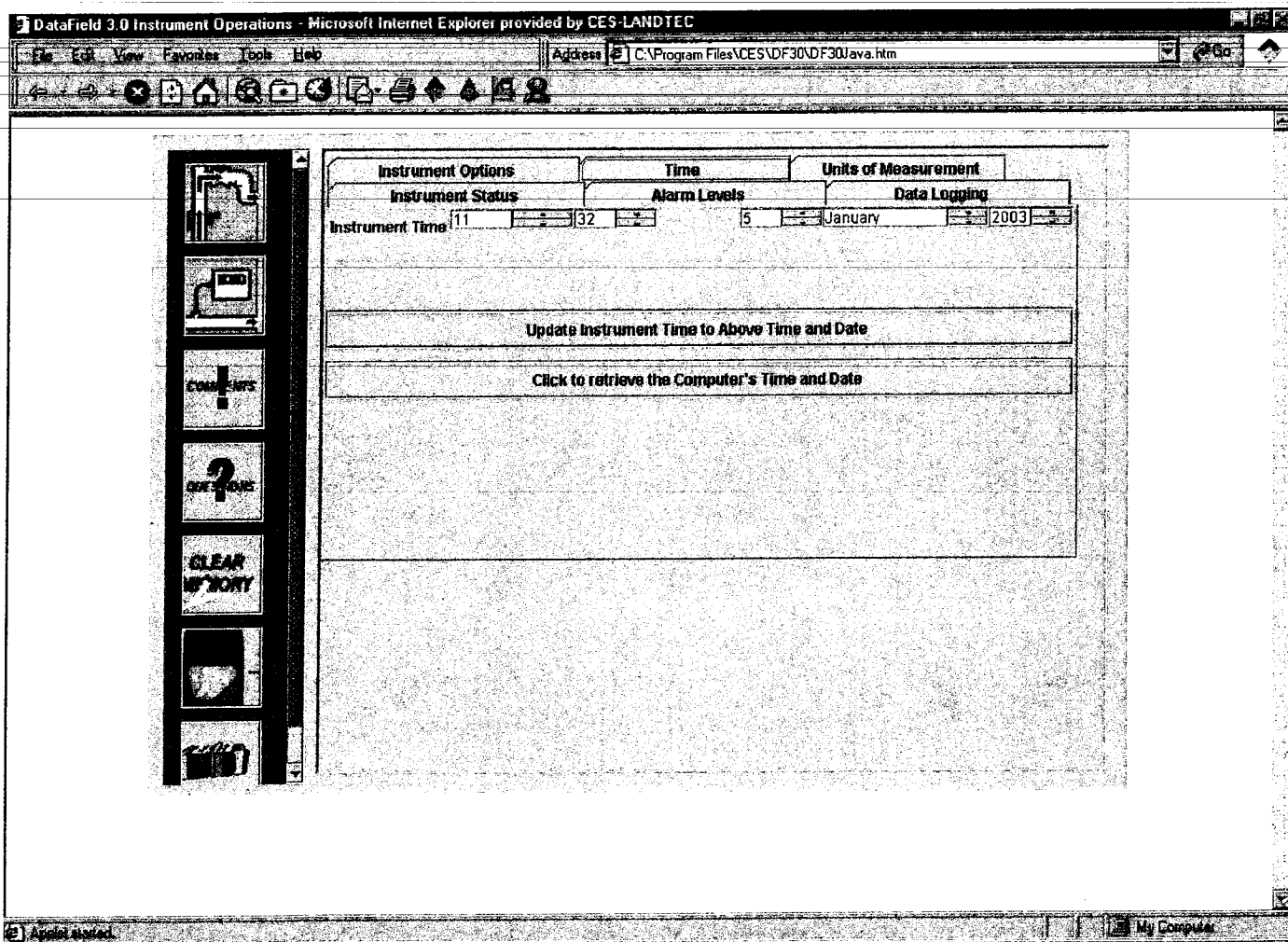
## GEM™ 2000 Operation Manual

Click on the **Instrument Options** card tab to open the instrument options screen. The settings in this screen affect different global functions of the instrument. Click on the check box to turn on or off automatic purge of the instrument during shut down, automatic pressure transducer zero and the percent lower explosive limit display. **Clicking OFF this feature will disable % LEL display in both GA and GEM modes of operation.** The **Low Flow Warning** setting controls the point at which the pump is shut off due to low flow conditions. The default setting for this feature is 50 milliliters per minute but may need to be set to a lower number or even zero, if sampling on high vacuum systems. The **Purge Time** default is 30 seconds and may be reset to any length required. Turning off this feature is not recommended. Click on **Update Instrument Options** to send the new settings to the instrument.



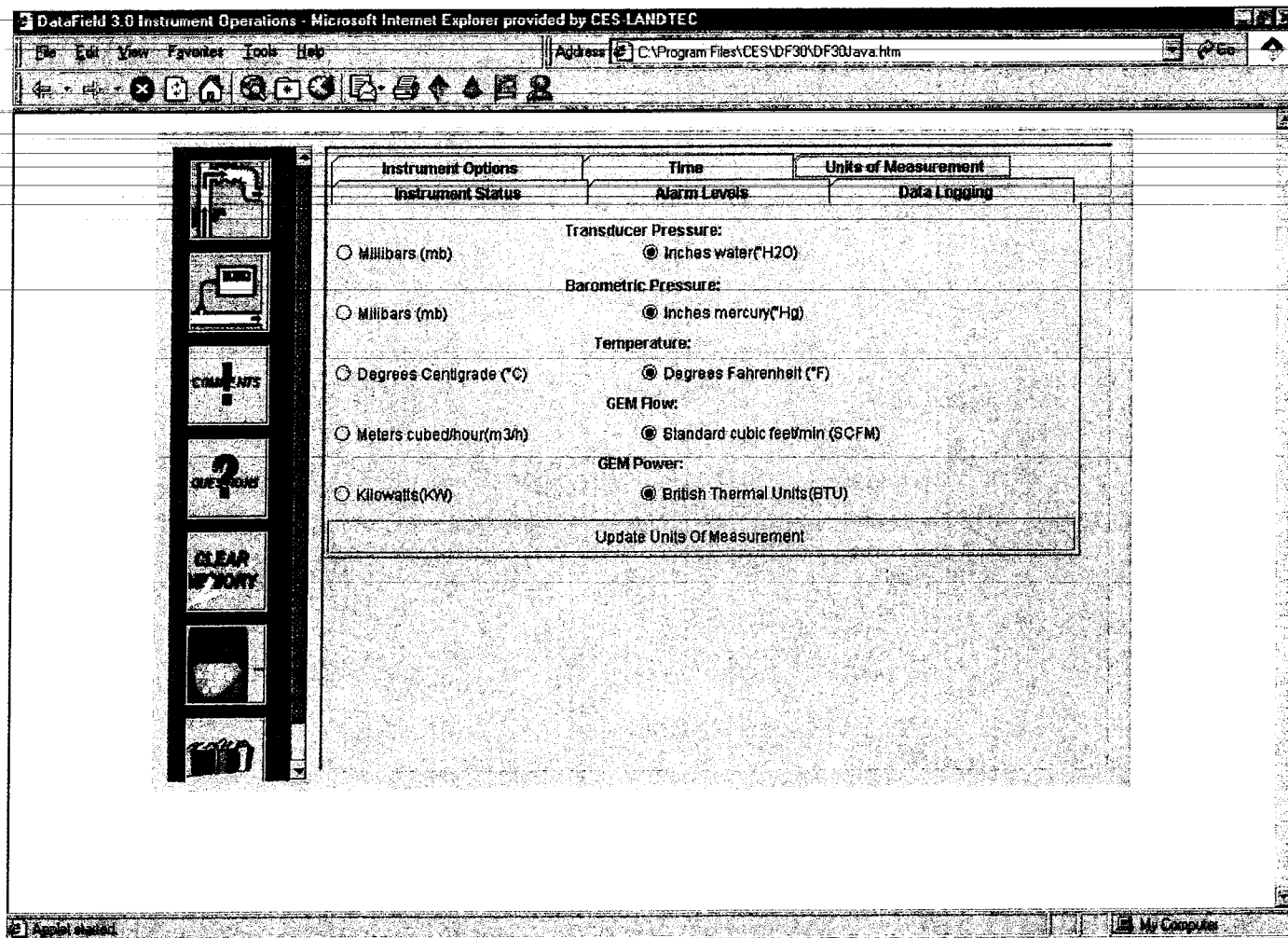
## GEM™ 2000 Operation Manual

Click on the Time card tab to open the time and date setting screen. Time and date may be set to the computer time and date settings by clicking on **Set Instrument to System** time. Manual setting of the time and date may be accomplished by clicking on **Update Instrument Time**. Any time updates must be done through the software. The instrument time can not be manually updated in the field.



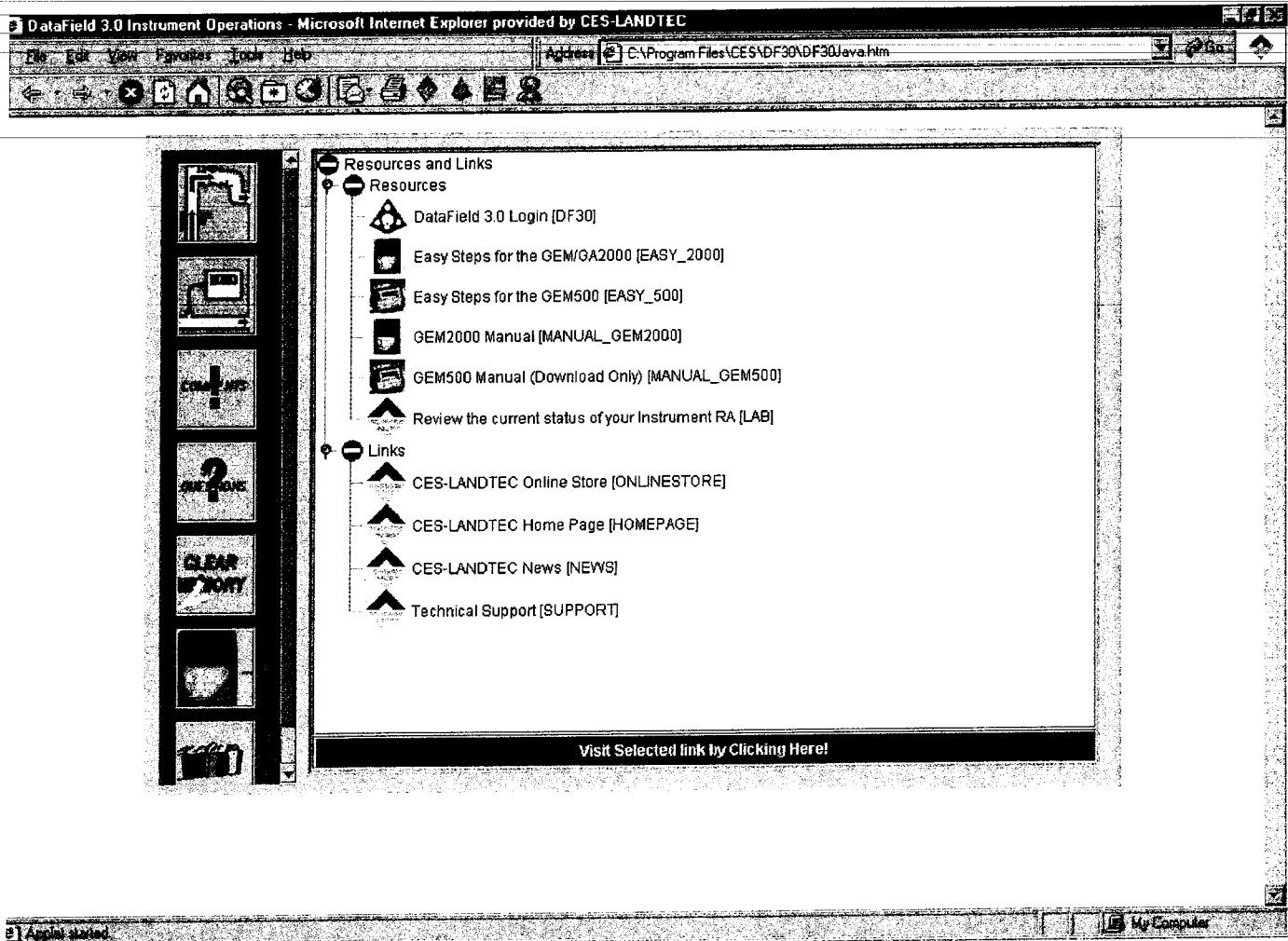
## GEM™ 2000 Operation Manual

Units of Measurement screen allows the units to be changed.



**Note:** EXTREME CAUTION should be taken if changing the Units of Measure. All data in instrument should be downloaded and stored from both GEM and GA modes before updating the Units of Measure. Updating Units of Measure will erase readings from instrument. The instrument should be turned off and restarted once the units of measure have been updated.

## 6.7.2 Resource Links



By clicking on the supplied link the user is taken directly to the www and the information listed.

---

## **7 Field Operations**

### **7.1 Landfill Gas Generation**

A brief overview of the theory of landfill gas generation and methane recovery follows. Initially, when decomposable refuse is placed into a solid waste landfill, the refuse is entrained with air from the surrounding atmosphere. Through a natural process of bacterial decomposition, the oxygen from the air is consumed and an anaerobic (oxygen free) environment is created within the landfill. This anaerobic environment is one of several conditions necessary for the formation of methane-CH<sub>4</sub>.

If oxygen is reintroduced into the landfill, those areas are returned to an aerobic (oxygen present) state and the methane-producing bacteria population are destroyed. A period of time must pass before the productive capacity is returned to normal. Since there is some methane of a given quality within the landfill void space, a decline in methane quality is only gradually apparent depending upon the size of the landfill.

Carbon Dioxide is also produced under either an aerobic or anaerobic condition. Under static conditions, the landfill gas will be composed of roughly half methane and half Carbon Dioxide with a little nitrogen.

As air is introduced into the landfill, the oxygen is initially converted to Carbon Dioxide and residual nitrogen remains. Measurement of residual nitrogen is usually a good indicator of the anaerobic state of the landfill; however, it cannot be directly measured. It can, however, be assumed and estimated using a subtraction basis as the balance gas. Hence, the measurement of Carbon Dioxide is an intermediary step. Because Carbon Dioxide levels may fluctuate depending on the changing concentrations of the other constituent gases, Carbon Dioxide levels are not evaluated directly but are considered in light of other data.

In evaluation of residual nitrogen, allowances must be made if there has been any air leakage into the gas collection system or if there has been serious over pull. If enough air is drawn into the landfill, not all oxygen is converted into Carbon Dioxide and the oxygen is apparent in the sample. It is ideal to perform routine analysis of individual wells, as well as an overall well field composite sample, by a gas chromatography. This is not always practical at every landfill.

Under some conditions there may be a small amount of hydrogen in the LFG, (about 1 percent, usually much less). This may affect field monitoring response factors, but otherwise it can be ignored.

### **7.2 Subsurface Fires**

If very large quantities of air are introduced into the landfill, either through natural occurrence or overly aggressive operation of the LFG system, a partly unsupported subsurface combustion of the buried refuse may be initiated. Subsurface fire situations are difficult to control or extinguish once started, present health and safety hazards, and can be quite costly. Therefore, prevention by good operation of the collection system and maintenance of the landfill cover is the best course of action. The presence of Carbon Monoxide, Carbon Dioxide, and Hydrogen Sulphide are indicators of poorly supported combustion within the landfill.

### **7.3 Techniques for Controlling Landfill Gas**

There are many techniques for controlling landfill gas extraction. These techniques represent tools, which are used together to control landfill gas. The Accu-Flo wellhead is designed to work with all of these techniques. Below is a discussion of the individual techniques, how to use them, and their limitations. Reliance on only a few of the techniques discussed can lead to misinterpretation of field data and improper operation of the well field. Later the best use of these techniques to optimize landfill gas control will be discussed.

#### **7.3.1 Controlling by Wellhead Valve Position**

Unless the valve handle is calibrated for a given flow rate, this method is unreliable. The position of the valve handle alone does not provide sufficient information about the well to control it. It is useful to note the relative position of the valve, and essential to know which valves are fully open or fully closed.

#### **7.3.2 Controlling by Wellhead Vacuum**

This technique relies on the relationship of well pressure/vacuum to flow for a given well. Reliance upon this method, however, can be misleading. This is because the square root relationship between flow and pressure is difficult to affect while performing day-to-day well field adjustments. As decomposition, moisture, and other conditions change, this method shows itself to be inadequate and imprecise.

#### **7.3.3 Controlling by Gas Composition**

This method determines methane, nitrogen (balance gas) and other gas composition parameters at wellheads and at recovery facilities using portable field instruments and, sometimes, analytical laboratory equipment. Complete knowledge of gas composition (i.e., major fixed gases: Methane, Carbon Dioxide, Oxygen and Nitrogen) is desirable. It is also necessary to check other gas parameters, such as Carbon Monoxide, to fully evaluate the condition of the well field. Reliance on this information can lead to improper operation of the well field. Indications of excessive extraction often do not show up right away. This method often leads to a cycle of damage to the methane producing bacteria population and then to over-correction. This cycling of the well and producing area of the landfill is not a good practice. It leads to further misinterpretation of the condition of the well field and has a disruptive effect on the operation of the well field. The use of analytical laboratory instrumentation such as a gas chromatograph is a valuable supplementary tool to verify gas composition. This normally requires collection of samples at the wellhead and analysis at some fixed location where the equipment is located. The drawbacks of this method as a primary means of obtaining information for well field adjustment are the time expended, cost, and probably most important, responsiveness to the needs of the well field for timely adjustment. The laboratory equipment required is also very costly. Some analysis is recommended for verification of field readings from time to time. It is recommended a monthly sample of the composite gas be taken at the inlet to the flare or gas recovery facility.

#### **7.3.4 Controlling by Flow Rate**

This is a more exacting technique for determining and adjusting gas flow at individual wells. It requires using a fixed or portable flow measurement device at each wellhead to obtain the data needed to calculate volumetric (or mass) flow rates. It is normally convenient to use cubic feet per minute or per day, as a standard unit of measure for volumetric flow. It is important to distinguish between the volumetric quantity of



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landfill gas and the volumetric quantity of methane extracted from each well and the landfill in total. The two variables are somewhat independent of each other and it is the total quantity of methane extracted we are interested in. It is possible for the total quantity of landfill gas extracted to increase while the total quantity of methane extracted decreases. To monitor this, the quantity of methane extracted (LFG flow x percent methane) or the quantity of BTUs recovered per hour (LFG flow x percent methane x BTUs per cubic foot of methane x 60 minutes per hour) can be calculated. It is conventional to measure BTUs per hour as a unit of time. There are approximately 1012 BTUs of heat per cubic foot of pure methane (like natural gas), although this figure varies a little among reference texts.

Measuring flow is an essential part of monitoring and adjusting a well field. The well should be adjusted until the amount of methane recovered is maximized for the long term. A greater amount of methane or energy can usually be recovered over the short term; however, this ultimately leads to diminishing returns. This is seen in stages as increased CO<sub>2</sub> and gas temperature and later as increased oxygen from well over-pull. In time, the methane will also decline. This is the result of a portion of the landfill, usually at the surface, being driven aerobic. In this portion of the landfill, the methane-producing bacteria will have been destroyed (due to the presence of oxygen). With the methane-producing capacity of the landfill reduced, the pore space in the area no longer producing may become filled with landfill gas equilibrating (moving in) from an unaffected producing area. This leaves the impression that more gas can be recovered from this area, and may lead to the operator opening the well or increasing flow.

### **7.4 Well field Monitoring**

The frequency of LFG well field monitoring varies depending upon field requirements and conditions. Normal monitoring frequency for a complete field monitoring session with full field readings (suggested normal and abbreviated field readings list follows) will vary from typically once a month to once a week. Well field monitoring should not normally be extended beyond one month. The importance of regular, timely monitoring cannot be overemphasized.

### **7.5 Typical Field Readings**

- Name of person taking readings
- Date/time of each reading
- Methane (CH<sub>4</sub>)
- Oxygen (O<sub>2</sub>)
- Carbon Dioxide (CO<sub>2</sub>)
- Balance Gas (primarily nitrogen N<sub>2</sub>)
- Wellhead gas temperature (flowing)
- Ambient air temperature
- Static pressure (PS) (from GEM™2000 or magnehelic) or other device(anemometer/velometer)
- Velocity head (P or PT) (from GEM™2000 or pitot tube and magnehelic)
- Wellhead gas flow (from GEM™2000, or pitot tube & magnehelic, or anemometer/velometer)
- Wellhead adjustment valve position (initial and adjusted)
- New wellhead vacuum and flow information after adjustment
- Calculation of each well's LFG and methane flow and sum total
- Observations/comments

Additionally, Carbon Monoxide (CO) or Hydrogen Sulphide (H<sub>2</sub>S) readings may be taken if problems are suspected. Supplementary monitoring once to several times a week may be performed using an abbreviated form of field readings.

### **7.6 Abbreviated Field Readings**

- Name of person taking readings
- Date/time of each reading
- Methane (CH<sub>4</sub>)
- Oxygen (O<sub>2</sub>)
- Wellhead gas temperature (flowing)
- Ambient air temperature
- Static pressure (PS) (from GEM™2000 or magnehelic)
- Velocity head (P or Pt) (from GEM™2000 or pitot tube and magnehelic)
- Wellhead gas flow (from GEM™2000, or pitot tube and magnehelic, or anemometer/velometer)
- Wellhead adjustment valve position (initial and adjusted)
- New wellhead vacuum and flow information after adjustment
- Observations/comments

Line vacuums and gas quality may be taken at key points along the main gas collection header and at subordinate branches. This helps to identify locations of poor performance, excessive pressure drop, or leakage. Perform systematic monitoring of the well field, taking and logging measurements at each wellhead and major branch junction in the collection system.

During monitoring, examine landfill and gas collection system for maintenance issues. Record needed maintenance or unusual conditions. Examples of unusual occurrences or conditions are unusual settlement, signs of subsurface fires, cracks and fissures, liquid ponding, condensate/leachate weeping from side slopes, surface emissions and hot spots, and liquid surging and blockage in the gas collection system. Field readings should be kept in a chronological log and submitted to management on a timely basis.

### **7.7 Well field Adjustment Criteria**

There are several criteria used in well field adjustment. The primary criterion is methane quality. Methane quality is an indicator of the healthy anaerobic state of the landfill and thus proper operation of the LFG collection system. However, a decline in the healthy productive state of the landfill is usually not immediately apparent from methane quality. Due to this, several criteria must be considered at once.

Conditions within the landfill favor methane production. Following are well field adjustment criteria and typical conditions for consideration:

- Methane quality (ranging from 26 percent upwards)
- pH
- Temperature
- General overall quality
- Moisture conditions
- Waste stream characteristics
- Placement chronology
- Insulation characteristics
- Oxygen quality (ranging below 1 percent, preferably less than ½ percent)
- Landfill cover porosity and depth in the proximity of the well
- Landfill construction factors including:
  - Type of fill
  - Size and shape of refuse mass
  - Depth of fill

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- Compaction
- Leachate control methods
- Seasonal, climatic, geographical, and recent weather, or other considerations, including seasonally arid or wet conditions, precipitation, drainage, groundwater
- Surrounding topography and geologic conditions
- Proximity of the well to side slopes (within 150 to 200 feet and less may require conservative operation of the well)
- Nitrogen (typically 8 to 12 percent and less)
- Temperature (between ambient and about 130 °F)
- LFG and methane flow from the wellhead
- Design of the gas collection system
- Landfill perimeter gas migration and surface emission control, or energy recovery objectives
- Diurnal fluctuation (day to night) of atmospheric pressure

### **7.8 Establishing Target Flows**

For a given individual well, a target flow is established which will likely support maintenance of methane and oxygen quality objectives while maximizing the recovery of landfill gas. Typically, small adjustments are made in flow to achieve and maintain quality objectives. The well must not be allowed to over pull. High well temperatures, (130° to 140°F and greater), are an indication of aerobic activity and, thus, well over-pull. These effects may not be immediately apparent.

Well adjustment should be made in as small an increment as possible, preferably an increment of ten percent of the existing flow or less. There may be obvious conditions when this is not appropriate, such as when first opening up a well or when serious over-pull is recognized. Every effort should be made to make adjustments and operations as smooth as possible. Dramatic adjustments, or operating while switching between a high flow mode and a well shutoff mode, should be avoided.

### **7.9 Well field Optimization**

Every effort should be made to continuously locate and correct or eliminate conditions (e.g., gas condensate, surging and blockage, settlement, etc.), which inhibit efficient operation of the gas collection system. This allows well monitoring and adjustment to be significantly more effective.

### **7.10 Migration Control—Dealing with Poor Methane Quality**

If methane and oxygen quality objectives cannot be maintained at a given well, such as a perimeter migration control well, then an attempt should be made to stabilize the well as closely as is practical, avoiding significant or rapid down trending of methane or up trending of oxygen.

It is not uncommon for perimeter migration control wells to be operated at less than 40 percent methane or greater than one-percent oxygen. It should be recognized that these wells are likely in a zone where some aerobic action is being induced, and that there is some risk of introducing or enhancing the spread of a subsurface fire. Sometimes a judicious compromise is necessary to achieve critical migration control objectives or because existing conditions do not allow otherwise. Such situations should be monitored closely.

### **7.11 Well field Adjustment—Purpose and Objectives**

The objective of well field adjustment is to achieve a steady state of operation of the gas collection system by stabilizing the rate and quality of extracted LFG in order to achieve one or several goals. Typical reasons for recovery of LFG and close control of the well field are:

- Achieve and maintain effective subsurface gas migration control.
- Achieve and maintain effective surface gas emissions control.
- Assist with proper operation of control and recovery equipment.
- Avoid well “over-pull” and maintain of a healthy anaerobic state within the landfill.
- Optimize LFG recovery for energy recovery purposes.
- Control nuisance landfill gas odors.
- Prevent or control subsurface LFG fires.
- Protect structures on and near the landfill.
- Meet environmental and regulatory compliance requirements.

Well field adjustment is partly subjective and can be confusing because it involves judgment calls based on simultaneous evaluation of several variables, as well a general knowledge of site specific field conditions and historical trends. Well field evaluation and adjustment consist of a collection of techniques, which may be used, in combination, to achieve a steady state of well field operation.

## 8 Troubleshooting

Problem	Corrective Action/Reason
Unit does not turn on or operation is erratic	Battery charge is too low-recharge batteries. Unit is too hot - cool down unit and try again. Contact Factory Service.
"Flow Fail" is displayed and an audible alarm is heard	The inlet is blocked. Remove blockage and retry.
Readings taken are not what was expected	The particulate filter or water trap filter needs replacing. Unit may be out of calibration. Calibrate unit with known gas concentration. Water trap or particulate filters are clogged. Replace filter(s).
Unit displays***** or >>>>>	These symbols are substituted when the measured reading is out of range of the instruments capabilities in some fields or when a value needs to be entered manually such as temperature.
Oxygen reading is high on all wells	Check that the water trap housing is screwed on tight. Check or replace O-rings on the water trap and instrument inlet. Check the wellhead inset for cracks, replace O-ring on insert. Field calibrate oxygen channel.
Unit will not download readings or an error occurs while downloading.	Verify that the communications software is the right version for the instrument being used. Check that the proper serial port is selected in the software. Contact Factory Service.
Methane and Carbon Dioxide readings drift	Perform a field calibration and check well again. Verify cal gas is flowing when regulator is turned on. Verify all connections are tight and filters are not clogged. Contact Factory Service.
Oxygen readings drift	Perform a field calibration - zero and span. Contact Factory Service.
Black screen displayed when unit turned On	Charge unit over night and try again. Unit too hot - cool down and try again. Try adjusting contrast level. Contact Factory Service.
Nothing happens when the Gas Pod is installed	Remove and re-seat the Gas Pod. Contact Factory Service.
Temperature does not update when temperature probe is installed	Check the probe fitting is fully seated. Check the probe plug is screwed together tightly. Contact Factory Service.

## 9 Technical Specifications

### 9.1 Physical

Weight	4.4 lbs.
Size	L 2.48" x W 7.48" x D 9.92".
Case material	Anti-static ABS.
Keys	Membrane panel.
Display	Liquid Crystal Display 40 x 16 characters. Fibre optic woven backlight for low light conditions.
Filters	User replaceable integral fibre filter at inlet port and an external PTFE water trap filter.

### 9.2 General

Temperature measurement	With optional probe 14°F to 167°F.
Temperature accuracy	±0.4°F (± probe accuracy).
Visual and audible alarm	User selectable CO <sub>2</sub> , CH <sub>4</sub> and O <sub>2</sub> alarm levels via DataField 3.0.
Communications	RS232 protocol via download lead with variable baud rate.
Relative pressure	±250 mbar from calibration pressure

### 9.3 Power supply

Battery type	Rechargeable Nickel Metal Hydride battery pack containing six 4AH cells. <b>Not user replaceable.</b> Lithium Manganese battery for data retention.
Battery life	Typical use 10 hours from fully charged condition.
Battery charger	Separate intelligent 2A battery charger powered from AC voltage supply (110-230V).
Charge time	Approximately 2 hours from complete discharge.
Alternative power	Can be powered externally for fixed-in-place applications only. Contact CES-LANDTEC for further information.
Battery lifetime	Up to 1,000 charge/discharge cycles.

### 9.4 Gas Ranges

Detection principle	CO <sub>2</sub> and CH <sub>4</sub> by dual wavelength infrared cell with reference channel. O <sub>2</sub> by internal electrochemical cell.			
Oxygen cell lifetime	Approximately 3 years in air.			
Typical Accuracy 0 - Full Scale	<b>Gas</b>	<b>0-5% volume</b>	<b>5-15% volume</b>	<b>15%-FS</b>
	CH <sub>4</sub>	±0.5%	±1%	±3% (100%)
	CO <sub>2</sub>	±0.5%	±1%	±3% (60%)
	O <sub>2</sub>	±1%	±1%	±1% (21%)
Response time, T90	CH <sub>4</sub>	≤20 seconds		
	CO <sub>2</sub>	≤20 seconds		
	O <sub>2</sub>	≤20 seconds		
Range	CH <sub>4</sub>	0-70% to specification, 0-100% reading.		
	CO <sub>2</sub>	0-40% to specification, 0-100% reading.		
	O <sub>2</sub>	0-25%		

**9.5 Pump**

Typical flow	300 cc/min.
Flow fail point	50 cc/min approximately.
Flow with 200 mbar vacuum	250 cc/min approximately.
Vacuum	70 inches H <sub>2</sub> O.

**9.6 Operating Conditions**

Operating temp range	32°F to 104°F.
Relative humidity	0-95% non-condensing.
Atmospheric pressure range	700-1200 mbar. Displayed in Inches of Mercury (5.9 – 35.4"Hg). Not corrected for sea level.
Atmospheric pressure accuracy	±5 mbar approximately.
Case seal	IP65.

**9.7 Optional Gas Pods**

Typical Accuracy (Subject to User calibration).	Gas	0-Full Scale
	CO	±10% FS
	H <sub>2</sub> S	±10% FS
	SO <sub>2</sub>	±10% FS
	NO <sub>2</sub>	±10% FS
	CL <sub>2</sub>	±10% FS
	H <sub>2</sub>	±10% FS
	HCN	±10% FS
Response time, T90	CO	≤60 seconds
	H <sub>2</sub> S	≤60 seconds
	SO <sub>2</sub>	≤60 seconds
	NO <sub>2</sub>	≤60 seconds
	CL <sub>2</sub>	≤60 seconds
	H <sub>2</sub>	≤60 seconds
Range	CO	0-500ppm
	H <sub>2</sub> S	0-50 or 0-200ppm
	SO <sub>2</sub>	0-20 or 0-100ppm
	NO <sub>2</sub>	0-20ppm
	CL <sub>2</sub>	0-20ppm
	H <sub>2</sub>	0-1000ppm
	HCN	0-100ppm





# APPENDIX I

## Phonetics, Inc. Autodialer, Model 1104

# Model 1104

## User's Manual



Version 1.03



***Phonetics, Inc.***

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## ***Sensaphone® Model 1104 User's Manual***

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Every effort has been made to ensure that the information in this document is complete, accurate and up-to-date. Phonetics, Inc. assumes no responsibility for the results of errors beyond its control. Phonetics, Inc. also cannot guarantee that changes in equipment made by other manufacturers, and referred to in this manual, will not affect the applicability of the information in this manual.

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Touch-Tone™ is a registered trademark of AT&T.

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## IMPORTANT SAFETY INSTRUCTIONS

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Your Model 1104 has been carefully designed to give you years of safe, reliable performance. As with all electrical equipment, however, there are a few basic precautions you should take to avoid hurting yourself or damaging the unit:

- Read the installation and operating instructions in this manual carefully. Be sure to save it for future reference.
- Read and follow all warning and instruction labels on the product itself.
- To protect the Model 1104 from overheating, make sure all openings on the unit are not blocked. Do not place on or near a heat source, such as a radiator or heat register.
- Do not use your Model 1104 near water, or spill liquid of any kind into it.
- Be certain that your power source matches the rating listed on the AC power transformer. If you're not sure of the type of power supply to your facility, consult your dealer or local power company.
- Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.
- Do not overload wall outlets and extension cords, as this can result in the risk of fire or electric shock.
- Never push objects of any kind into this product through ventilation holes as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock.
- To reduce the risk of electric shock, do not disassemble this product, but return it to Phonetics Customer Service, or other approved repair facility, when any service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the unit is subsequently used.

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- If anything happens that indicates that your Model 1104 is not working properly or has been damaged, unplug it immediately and follow the procedures in Appendix C for having it serviced. Return the unit for servicing under the following conditions:
  1. The power cord or plug is frayed or damaged.
  2. Liquid has been spilled into the product or it has been exposed to water.
  3. The unit has been dropped, or the cabinet is damaged.
  4. The unit doesn't function normally when you're following the operating instructions.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
- Do not use the telephone to report a gas leak in the vicinity of the leak.

### **CAUTION**

To Reduce the Risk of Fire or Injury to Persons, Read and Follow these Instructions:

1. Use only the following type and size batteries:  
Alkaline, size D.
  2. Do not dispose of the batteries in a fire. The cell may explode. Check with local codes for possible special disposal instructions.
  3. Do not open or mutilate the batteries. Released electrolyte is corrosive and may cause damage to the eyes or skin. It may be toxic if swallowed.
  4. Exercise care in handling batteries in order not to short the battery with conducting materials such as rings, bracelets, and keys. The battery or conductor may overheat and cause burns.
  5. Do not mix old and new batteries in this product.
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## FCC Requirements

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**Part 68:** The Sensaphone® Model 1104 complies with Part 68 of the FCC rules. On the back of the unit there is a label that contains, among other information, the FCC Registration Number and the Ringer Equivalence Number (REN) for this equipment. You must, upon request, provide this information to your local telephone company.

The REN is useful to determine the quantity of devices that you may connect to your telephone line and still have all of those devices ring when your telephone number is called. In most, but not all areas, the sum of the REN's of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices that you may connect to your line, you may want to contact your local telephone company to determine the maximum REN for your calling area.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

Should the Model 1104 cause harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice isn't practical, the telephone company may temporarily discontinue service without notice and you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC. The telephone company may make changes in its facilities, equipment, operations, or procedures where such action is reasonably required in the operation of its business and is not inconsistent with the rules and regulations of the FCC that could affect the proper functioning of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

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The telephone company may ask that you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning.

**Part 15:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

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## Canadian Department of Communications Statement

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**Notice:** The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, where the company's inside wiring is associated with a single line, individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**CAUTION:** Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device to prevent overloading. The termination on loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100. For the Sensaphone® Model 1104, the Load Number is 8.



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# Model 1104

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## Chapter 1: Introduction

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The Sensaphone® Model 1104 is a fully-programmable, environmental monitoring system that offers extensive on-site and remote monitoring capability to small businesses, private homes, farms, greenhouses, computer rooms, and remote facilities. Designed for desktop or wall mounting, the Model 1104 is simple to install, program and operate; no changes to standard electrical or telephone service are required. Connected to a telephone line, it will respond to an alarm by dialing up to four separate telephone numbers. When the call is answered, an “*Alert Condition*” message is delivered in digitized speech.

The Model 1104 features built-in sensors to monitor a variety of conditions:

- High sound level
- AC electric power failure
- Battery backup
- Temperature\*

\*Note: While technically not a “built-in” sensor, temperature is factory installed on input 1, and if left installed will limit your additional inputs as listed below to 3.

1104 is equipped with 4 alert inputs. Additional sensors\* can be added to extend monitoring capabilities to include:

- Intrusion or unauthorized entry
- Water leaks and seepage
- Temperature
- Humidity
- Equipment operation
- Many other conditions that may require unique monitoring solutions

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\* Refer to Appendix B for information on additional sensors (available separately from Phonetics) best suited to your application.

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## ***Sensaphone® Model 1104 User's Manual***

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The status of each monitored condition is readily obtained at the unit's installation site, or remotely by telephone. At the close of every Status Report, time is provided for listening to on-site sounds.

To ensure reliable operation, the Model 1104 features power backup capability; in the event of AC power failure, six D-cell batteries (not included) will continue to power the unit for approximately 24 hours.

This manual comprises the instructions and commands for installing and operating the Model 1104. The Quick Start chapter is included to speed understanding of programming and operation. Communication and Alarm Programming chapters demonstrate step-by-step methods for utilizing the full range of available features. The Troubleshooting chapter provides assistance in the event that problems are encountered.

***Phonetics, Inc.***

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## Chapter 2: Installation

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Correctly installing the Model 1104 will ensure proper functioning of the unit. Please read the entire chapter before starting the installation process.

Within the packaging will be a Warranty Registration Card. Please take the time to fill this out and mail. The One Year Limited Warranty is explained in the back of this manual.

### 2.1 Operating Environment

The Model 1104 should be installed and operated in an area that provides space for wiring sensors to the screw terminals, near an AC power source and telephone line. Operating temperature ranges from 32° Fahrenheit (0° Celsius) to +120° Fahrenheit (+49° Celsius).

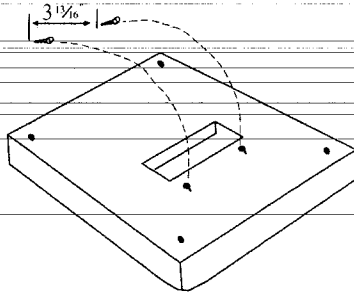
#### NOTE

The Model 1104 is a sensitive electronic device. Do not install the Model 1104 near strong electrostatic, electromagnetic or radioactive fields. Do not expose to fumes or corrosive vapors.

### 2.2 Mounting

Flat Mount: Place the Model 1104 on top of a desk or other horizontal surface. Wall Mount: Mount on a wall with two screws using the keyholes on the back panel of the unit. Place the screws or bolts  $3\frac{13}{16}$ " apart at the desired height from the floor. Hook the unit over the screws and toward the floor. Refer to Figure 2-1.





**Figure 2-1. Wall Mount**

### **2.3 Power Surge Protection**

The Model 1104 can be damaged by power surges and lightning through the telephone line and the 120 VAC power supply. Although the Model 1104 has built-in surge protection, **we recommend that additional protection be obtained for the unit and for any electronic equipment that is attached to your power supply and telephone lines. Power surge protection is especially important if you live in a lightning-prone area.** The ISOTEL Surge Protector Model IB-4 is available through Phonetics. See Appendix B.

### **2.4 Power Supply and Battery Backup**

The Model 1104 is provided with an AC power transformer that will plug into any standard 120 VAC outlet and a battery backup (batteries not included) that enables the unit to continue functioning if AC power is removed (due to electric power disruption or failure). The Model 1104 uses six, D-cell alkaline batteries. Do not use rechargeable nicad batteries.

#### **NOTE**

Be sure that the AC transformer is plugged into an outlet before installing batteries.

To install the batteries, open the battery compartment hatch located underneath the unit, align batteries according to the diagram shown in Figure 2-2, and replace the hatch.

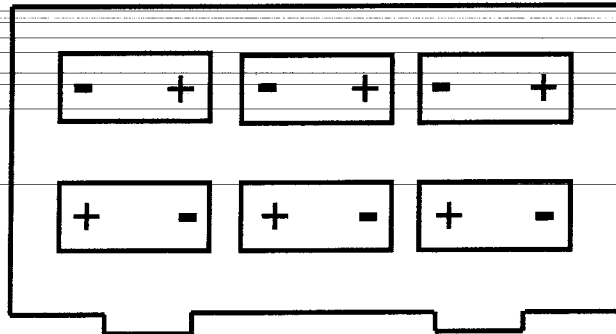


Figure 2-2. Battery Installation

## 2.5 Starting the Model 1104

When the AC power transformer is first plugged into the electrical outlet, the Model 1104 automatically starts in RUN mode. The red LED light will begin to glow. The unit will respond with, *"Hello, this is Sensaphone® 1104."*

## 2.6 Run Mode and Standby Mode

Pressing the RUN/STANDBY key on the Model 1104 keypad will alternately activate or deactivate the unit. If the unit is activated and in RUN mode, the red LED (small red light on the upper right of the unit's front panel) glows steadily. In STANDBY mode, the red LED goes out, but will blink every few seconds to indicate that power is still supplied to the unit.

In RUN mode, the Model 1104 is able to receive incoming calls and to dial out automatically in the event of an alarm on one of the monitored conditions. To enter STANDBY mode, press RUN/STANDBY.

As soon as the Model 1104 enters STANDBY mode, it responds with *"Have a good day."* The red light immediately goes out and then resumes with a blink every few seconds.

While in STANDBY mode, all functions are disabled, but programmed memory is preserved. Upon exiting STANDBY mode, any currently existing alert conditions will be announced.

**NOTE**

STANDBY mode is not equivalent to "power off"—an electrical source, such as the 120 VAC, or the battery backup, continues to provide full power to the unit. If the unit is placed in STANDBY mode, unplugged from the 120 VAC outlet, and placed in storage, the batteries will continue to power the Model 1104, discharging until they fail. Consequently, batteries should always be removed from the unit following disconnection from any 120 VAC outlet, prior to storage.

Press the RUN/STANDBY key again to return to RUN mode.



**Figure 2-3. The RUN/STANDBY Key**

## **2.7 Telephone Line**

The Model 1104 will operate with all standard telephone systems that accept pulse or tone dialing. The Model 1104 cannot be used on an extension line to dial its own telephone number. Also, it may not be installed on a party line or pay telephone line.

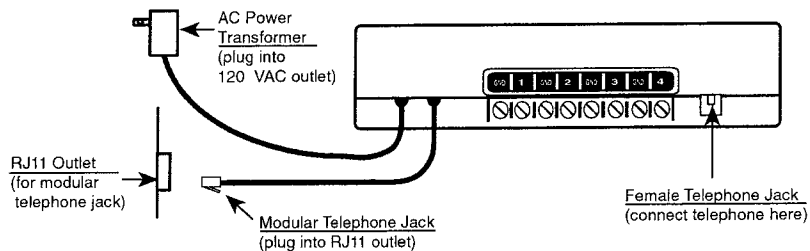
Certain private telephone systems and public switching equipment may not accept the Model 1104 dialing or may generate an unacceptable ring signal. In those cases, a dedicated line may be required. Consult the supplier of your telephone system if you encounter problems.

If you do not have a modular telephone extension at the Model 1104's location, you must contact your local telephone company to have one installed (there is a charge for this service). If you have four-pin jacks, adapters are available to convert them to the modular plugs. Contact your local telephone company or electronics parts store.

**CAUTION**

Never install telephone wiring during a lightning storm. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Use caution when installing or modifying telephone lines.

To install the telephone line, plug the modular telephone jack provided into any standard RJ11 phone outlet. Refer to Figure 2-4.



**Figure 2-4. Installing the Telephone Line**

On the back of the Model 1104 is a female telephone jack. This is provided so that a telephone or other answering device may be used on the same line as the unit. It is not necessary to hook up a telephone for the Model 1104 to operate.

## **2.8 The Microphone**

The Model 1104 is provided with a built-in microphone which is used to monitor high sound levels produced near the installation site. The sensitivity of the microphone is configurable and will detect a continuous as well as a beeping alarm.

Other programming options that apply to the microphone include setting the length of time before a high sound causes an alarm.

If this sound level exists for 8 consecutive seconds (default) or for the programmed length of time, the Model 1104 will dial out with an alarm message.

**NOTE**

The proximity of the audible alarm to the microphone is extremely important.

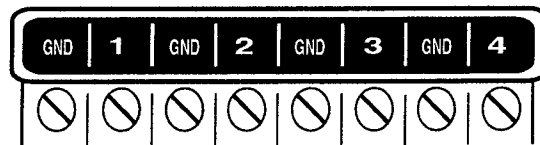
Normally, the Model 1104 and the audible alarm must be in the same room. The maximum distance can vary considerably depending on the alarm, the acoustics, and the size of the room.

During an alarm dial-out, the microphone allows four-second intervals to listen-in to sounds at the Model 1104's location.

When calling for a Status Report, the microphone permits listening to on-site sounds for a programmed time interval.

## **2.9 Alert Inputs**

The Model 1104 can monitor up to 4 inputs (represented by the numbered terminal screws shown in Figure 2-5, below).



**Figure 2-5. Alert Inputs**

Inputs are configured as either dry contact or temperature. An input configured as dry contact can be used with any normally open (N.O.) or normally closed (N.C.) device. "Open" refers to an opened circuit path; if conditions cause the circuit to close, an alert condition occurs. "Closed" refers to a continuous circuit path; if a closed circuit is opened, an alert condition occurs. The Model 1104 determines the way inputs are configured by the type of sensor connected to each alert input (refer to Chapter 5, Section 5.1).

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## Chapter 2: Installation

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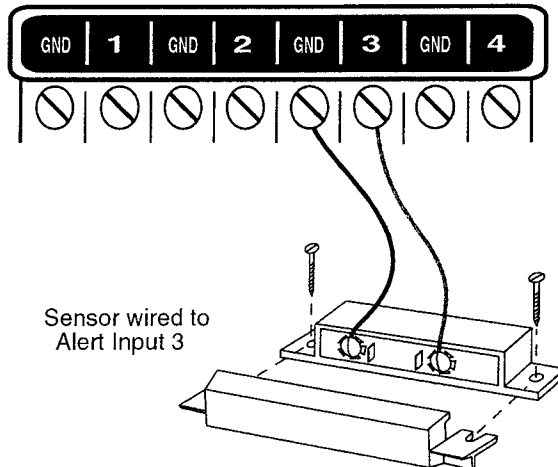
An input configured as “temperature” is designed to evaluate a range of settings. The Model 1104 will read the temperature at the sensor’s location and compare that value to programmed high and low temperature limits. Temperature inputs *must* be used with Phonetics Remote Temperature Sensor.

### NOTE

Before wiring, it is advisable to disable the inputs to prevent accidentally tripping an alarm. See Chapter 5, Section 5.2.

## 2.10 Installing the Sensor

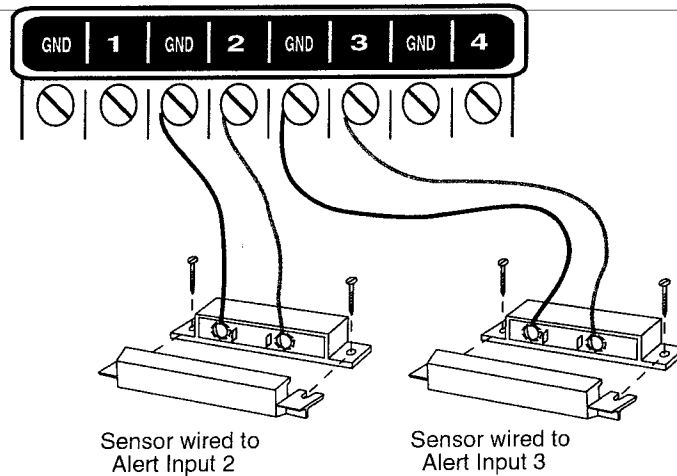
After you have selected the sensor, loosen the screw of the alert input and its corresponding ground. Two wire leads are used to connect any monitoring sensor. Fasten one lead to the numbered screw and the other lead to GND. Tighten both screws. If the input was not disabled, the Model 1104 may recite its “Alert Condition Exists” message as you connect the sensor. If it does, just press any key to stop it. Re-enable the input after wiring. Refer to Figures 2-6 and 2-7 for connecting a sensor to an alert input.



**Figure 2-6. Sensor Connected to an Alert Input**

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Any sensor can be attached to the Model 1104 using 22-gauge wire. The sensor can be several hundred feet from the unit, as long as the total resistance of the circuit is not greater than 50 ohms. Use wire appropriate for the application.



**Figure 2-7. Two Sensors Wired to Adjacent Inputs**

### **NOTE**

Do not use sensors, switches, or relays that supply any voltage or current to the Model 1104. Be aware of proximity to other electrical wires or components when placing wires that lead from the sensors to the unit. Avoid running the wires near electrical devices that use high voltage or current, such as motors, heavy machinery, etc. This voltage may be inductively coupled into the sensor wiring and could result in damage to the the Model 1104's circuitry. Try to place wires at least 6 inches from other electrical wiring or devices.

## 2.11 Multiple Sensors

The Model 1104 may have more than one sensor connected to the same alert input, as long as the normal condition for each sensor on the same alert input is identical (either all N.O. or all N.C.). However, only one remote temperature sensor can be used on each input.

When wiring several normally closed sensors on one input, they must be connected in series. Connect one lead from the first sensor to the numbered screw of the alert input. Next, take the other lead from the first sensor and connect it to one lead from the next sensor. Continue connecting sensors end-to-end until you have connected all of your sensors. Take the second lead from the last sensor and connect it to the ground screw on the Model 1104. See Figure 2-8. Multiple N.C. sensors are typically magnetic reed switches to monitor the security of windows and doors.

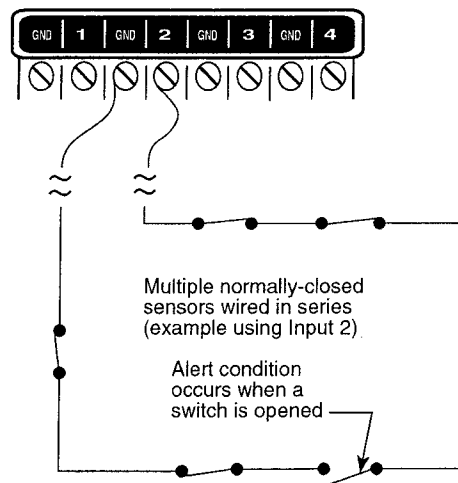
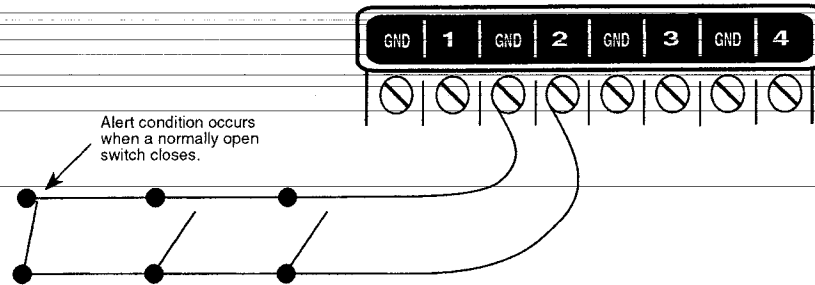


Figure 2-8. Multiple Normally Closed Sensors

To wire several normally open sensors to one alert input, connect them in parallel. To do this, take one lead from each sensor and attach it to the numbered terminal. Then, take the second lead from each sensor and attach each to the corresponding ground screw. Refer to Figure 2-9.

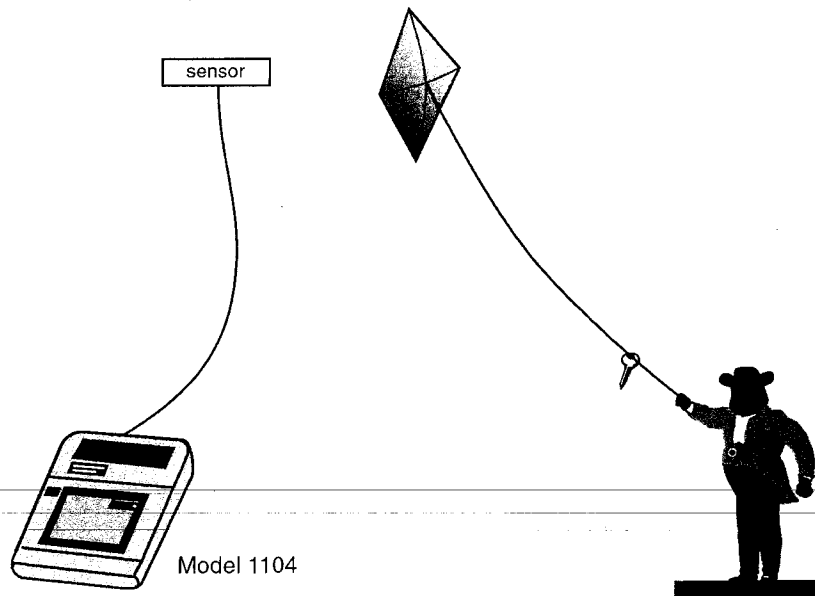




**Figure 2-9. Multiple Normally Open Sensors**

## **2.12 Outdoor Wiring**

When wiring sensors outdoors, **DO NOT** allow exposed wires to run freely in open air; under such conditions, the Model 1104 is susceptible to serious damage during a lightning storm. Depending upon the distance outdoor wiring must travel, consideration should be given to the use of shielded wire inside a metal conduit. Both shield and conduit should be connected to an earth ground. This prevents stray voltage from entering the unit.



**Figure 2-10. Potential Sensor Damage from Stray Electrical Noise**

### **2.13 Disconnecting the Model 1104 Storage or Seasonal Use.**

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If you plan to employ the Model 1104 as a seasonal “watch-dog” for a few months during the year, **you must disconnect all wires from the unit completely to avoid damage to the circuitry when the unit is not in use.** If the unit is unplugged but left in place with all the sensors still connected, the wires act as antennae that draw in any stray “electrical noise” from such devices as fans, blowers, microwaves, etc.

Additionally, it is important to remove the batteries, or they will discharge until they fail.

Preserve your Model 1104 during the off-season, or when not in use:

- Remove the sensor wires at the screw terminals
- Remove the batteries
- Unplug the unit and store in a safe place

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## NOTES

[illegible]

## Chapter 3: Quick Start

This section presents a useful guide for first-time programming of the Model 1104. Follow instructions for installation before attempting to program the Model 1104. Refer to Chapter 2: Installation.

### 3.1 The Local Keypad

Programming is accomplished using the local keypad (shown below, Figure 3-1). Notice that a single key has several functions assigned to it; *programming results are determined by the order in which keys are pressed.*

Individual keystrokes are illustrated to show programming steps in the correct order. If you make a mistake by entering the wrong key, do not press another key until you hear the message “Error 1.” Then, start over with the first key in the programming sequence.

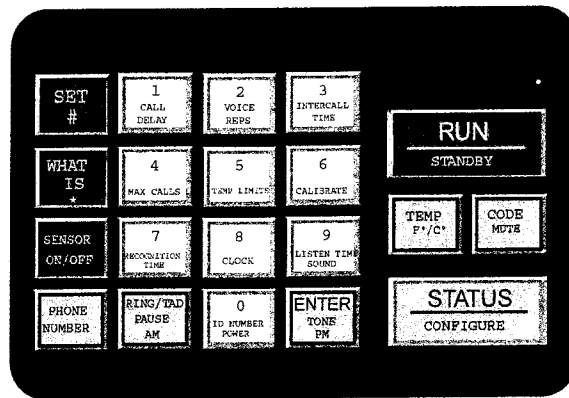


Figure 3-1. The Model 1104 Keypad

### **3.2 Preparation for Programming**

Read complete instructions in Chapter 2: Installation, and make sure to follow these steps first:

1. Plug the AC adaptor into the 120 VAC outlet.
2. Install the batteries.
3. Connect the Model 1104 to a telephone line.

When these steps are completed, the Model 1104 is fully operational and able to monitor temperature, high sound, AC power failure and battery backup condition; it can also be called on the telephone for a Status Report or used for listening to on-site sounds from any remote location. Now, the unit is ready for programming.

### **3.3 Quick-Start Programming Steps**

#### **Step 1: Set Configuration of Inputs**

The Model 1104 will scan the 4 external inputs and determine if they are N.O. (normally open), N.C. (normally closed), or Temperature. If external sensors are added, make sure they are in their *normal* positions before proceeding—refer to Chapter 5, Section 5.1.

1. Press STANDBY to place the Model 1104 in Standby mode.



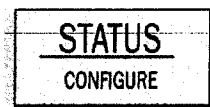
2. If you have external sensors available, wire the sensors to the inputs on the back of the Model 1104 (see Chapter 2, Section 2.10). Otherwise, skip this step and move to step 3.
3. Press RUN. The red light glows when the Model 1104 returns to Run mode.



4. Press SET.



5. Press CONFIGURE.



6. The Model 1104 will audibly recite the new configuration for each of the four inputs, responding with "OK," if it detects N.O. (normally open), "beep-OK," if it detects N.C (normally closed) or "Temperature," if it detects temperature (regardless of whether all the inputs have attached sensors or not). If an input is unused, it is treated as normally open.

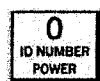
## Step 2: Set the ID Number

It is recommended that you set the ID number to reflect the telephone number on which the Model 1104 is installed.

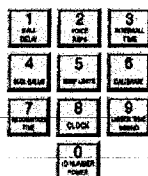
1. Press SET.



2. Press ID NUMBER.



3. Using the number keys, enter the digits (up to 16 are permitted) for the ID number. The Model 1104 will recite the digits as they are pressed.



## Sensaphone® Model 1104 User's Manual

4. Press ENTER. The 1104 will respond: "Enter."



### Step 3: Set Dial-Out Telephone Numbers

To program dial-out telephone numbers:

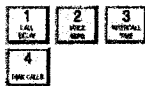
1. Press SET.



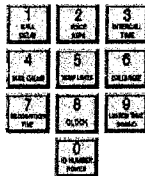
2. Press PHONE NUMBER.



3. Select which telephone number to program. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. Model 1104 will respond: "Enter number."



4. Enter the complete telephone number using the number keys. The Model 1104 will recite the digits as they are pressed.



5. Press ENTER. The unit will respond: "Enter."



6. Repeat above procedure to program up to four separate telephone numbers.

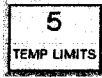
## Step 4: Set Temperature Limits

High and low temperature limits can be separately programmed for each input that is configured as temperature. Limits can range from  $-20^{\circ}$  to  $+150^{\circ}$  Fahrenheit, or from  $-30^{\circ}$  to  $65^{\circ}$  Celsius. Default settings are:  $10^{\circ}$  F for low temperature and  $100^{\circ}$  F for high temperature. Do not set temperature limits too close to normal room temperature, since minor fluctuations could result in frequent and unnecessary alarm dialouts.

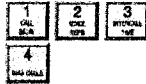
1. Press SET.



2. Press TEMP LIMITS.

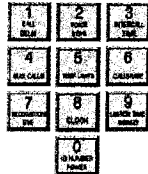


3. From the number keys, press a number (from 1 to 4) that corresponds to the temperature input being programmed.



The Model 1104 responds: “Enter low temperature limit.”

4. Using the number keys, enter a value for low temperature limit. The Model 1104 will recite the digits as they are pressed. If a negative number is required, first press PAUSE, then enter the number.



5. Press ENTER.





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The Model 1104 responds: *"Enter high temperature limit."*

- Using the number keys, enter the value for high temperature limit. The Model 1104 will recite the digits as they are pressed.



- Press ENTER. The Model 1104 responds: *"Enter."*



This concludes minimum programming to achieve normal operation of the Model 1104. In addition to the programming just accomplished, default settings for many more features take effect when the unit is first powered. You will be able to reprogram most of these factory-set defaults to suit your application.

For a complete explanation of each feature (with illustrations of keystrokes), refer to Chapter 4: Communications Programming and Chapter 5: Alarm Programming.

To gain a basic understanding of how the alarm dial-out feature works, refer to this chapter, Section 3-4. For extended information regarding dial-out and related programmable parameters, refer to Chapter 7: Operation.

### 3.4 Summary of the Alarm Dial-Out Process

Action—Response	Programmable Feature
<p><b>1. THE MODEL 1104 DETECTS AN ALERT CONDITION</b></p> <p>An alert condition is not the same as a valid alarm—the condition must continue for the programmed time period, or <i>Recognition Time</i>, before it is recognized as a valid alarm.</p>	<ul style="list-style-type: none"> <li>• <b>Recognition Time</b> This is the programmed waiting period to determine if an alert condition has persisted long enough to be considered a valid alarm. If the sensor returns to normal within recognition time, then no alarm will occur.</li> </ul>
<p><b>2. A VALID ALARM IS CONFIRMED</b></p> <p>An audible, on-site alarm message begins and continues until the alarm is acknowledged. (If the Mute feature is turned on, there is no on-site message.) <i>Call Delay</i> is activated.</p>	<ul style="list-style-type: none"> <li>• <b>Call Delay</b> This is the programmed waiting period, before the first telephone number is called, to report an alarm.</li> </ul>
<p><b>3. DIAL-OUT BEGINS</b></p> <p>Dial-out begins by calling telephone number 1 to report an alarm. If there is no acknowledgment, the Model 1104 waits the programmed <i>Intercall Time</i> before dialing subsequent telephone numbers. Dial-out continues in this manner, cycling through the remaining telephone numbers, for the programmed <i>Max Calls</i>.</p>	<ul style="list-style-type: none"> <li>• <b>Intercall Time</b> This is the programmed waiting period, in between sequential dialing of telephone numbers, to report an alarm.</li> <li>• <b>Max Calls</b> This is the total number of telephone calls that will be dialed in response to any valid alarm. Telephone numbers are dialed sequentially, and continue to cycle until the maximum number of calls is reached. If no acknowledgment occurs, then at the completion of Max Calls, all alarms are automatically acknowledged.</li> </ul>
<p><b>4. THE ALARM IS ACKNOWLEDGED</b></p> <p>When the alarm is acknowledged, the dial-out process is cancelled and the audible, on-site alarm message stops.</p>	

# Sensaphone® Model 1104 User's Manual

## NOTES

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## Chapter 4: Communications Programming

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This chapter explains the keypad commands for communications programming of the Model 1104, including interrogation and resetting of the following:

- The Unit ID Number
- Dial-out Telephone Numbers
- Tone or Pulse Dialing
- Special Dialing with Pagers, Beepers and Access Numbers.
- Rings Until Answer and Telephone Answering Device Compatibility
- Listen-in Time
- Call Delay
- Local Voice Mute
- Voice Repetitions
- Intercall Time
- Maximum Number of Calls
- The Clock
- Security Code

### 4.1 The Unit ID Number

The Unit ID Number is the identification number of the Model 1104. This number may be the same as the telephone number where the unit is installed, or it may be designated using any number that best suits your application.

The purpose of the Unit ID Number is to immediately provide the source of any alarm, especially when using multiple Model 1104 units in a complex monitoring system. When the Model 1104 is called from a remote location, it always begins its message with the identification number:

*“Hello, this is telephone number (Unit ID Number).”*

### **4.1.1 Programming the ID Number**

To program the ID Number:

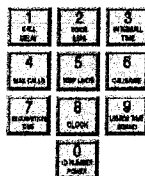
1. Press SET.



2. Press ID NUMBER.



3. Using the number keys, enter up to 16 digits for the ID number. The Model 1104 will recite the digits as they are pressed.



4. Press ENTER. The Model 1104 will respond: "Enter."



### **4.1.2 Interrogating the ID Number**

To interrogate the ID numbers:

1. Press WHAT IS.



2. Press ID NUMBER. The Model 1104 will recite the Unit ID Number programmed.



## 4.2 Dial-outTelephone Numbers

The Model 1104 can store up to four 32-digit phone numbers.

These are the numbers that will be called during dial-out.

In the event of an alarm, the numbers are dialed sequentially, 1 through 4. Begin programming the first telephone number by assigning it to the key labeled with the number 1 on the keypad, and continue to assign any other telephone numbers in numerical order. *A pause, pound or asterisk can be added to an individual phone number to access different phone and beeper systems. See Special Dialing, Section 4.4.*

### 4.2.1 Programming Dial-outTelephone Numbers

To program dial-out telephone numbers:

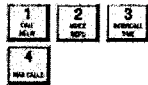
1. Press SET.



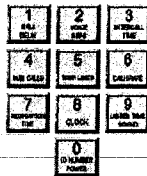
2. Press PHONE NUMBER.



3. Select which telephone number to program. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. The Model 1104 will respond: "Enter number."



4. Enter the complete telephone number using the number keys.



## **Sensaphone® Model 1104 User's Manual**

5. Press ENTER. The unit will respond with "Enter."



6. Repeat above procedure to program up to four separate telephone numbers.

### **4.2.2 Interrogating a Dial-out Telephone Number**

To interrogate dial-out telephone numbers:

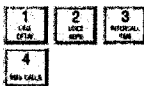
1. Press WHAT IS.



2. Press PHONE NUMBER.



3. Press a number key (from 1 to 4).



Model 1104 will recite the corresponding telephone number. If there is no number programmed for a particular key, the unit will respond: "No number."

### **4.2.3 Erasing a Telephone Number**

To erase a telephone number:

1. Press SET.

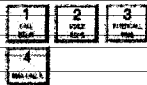


2. Press PHONE NUMBER.



## Chapter 4: Communications Programming

3. Press the number key (from 1 to 4) representing the telephone number you want to erase.



4. Press ENTER. The Model 1104 will say "Enter."



### 4.3 Tone or Pulse Dialing

The Model 1104 can dial out in pulse or Touch Tone™. Select the type of dialing, in either pulse or tone, depending upon the type of service provided by your telephone company. The default is tone.

To program for either pulse or tone:

1. Press the SENSOR ON/OFF key.



2. Press TONE.



The Model 1104 will respond: "Off" to indicate that tone dialing is off and pulse is enabled, or "On" to indicate that tone dialing is on and pulse is disabled.

3. Repeat key sequence to switch between settings.

### 4.4 Special Dialing

The Model 1104 has provisions for special dialing sequences. Special dialing sequences allow:

- Dialing that requires an access number to connect with an outside line.



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## **Sensaphone® Model 1104 User's Manual**

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- Dialing that requires the pound (#) or asterisk (\*).
  - Dialing to a beeper or pager.
- 

### **4.4.1 Special Dialing Keys**

The following designated keys represent special functions when used with PHONE NUMBER entries:

1. ***Pause***



PAUSE represents a four second pause in dialing. It can be used when an access number is required before dialing to an outside line. (For example, in some cases a "9" or other number, must be dialed first, in order to get a dial tone for an outside line.) When interrogating telephone numbers, PAUSE is audibly represented by a "beep."

2. ***Pound (#)***



A pound may be required when calling some phone or beeper systems. When interrogating telephone numbers, pound (#) is audibly represented by the word "twelve."

3. ***Asterisk (\*)***



An asterisk may be required when calling some phone or beeper systems. When interrogating telephone numbers, asterisk (\*) is audibly represented by the word "eleven."

4. ***Code***



CODE instructs the Model 1104 to wait until the call is answered before continuing. When interrogating telephone numbers, CODE is audibly represented by the word "fourteen."

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## Chapter 4: Communications Programming

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### NOTE

Each time a pause, pound (#) or asterisk (\*) is incorporated in a programming sequence, it is counted as one digit toward the total of 32 digits allowed.

#### 4.4.2 Incorporating a Pause

Incorporate PAUSE to access an outside telephone line:

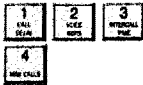
1. Press SET.



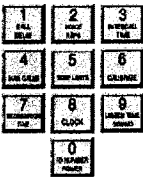
2. Press PHONE NUMBER.



3. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. Model 1104 will respond: *"Enter number."*



4. From the number keys, enter the access digit (i.e., 9). The Model 1104 will recite the digit.

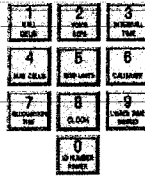


5. Press PAUSE. The Model 1104 will *"beep."*



## Sensaphone® Model 1104 User's Manual

6. Enter the complete telephone number (1 + area code) using the number keys. The Model 1104 will recite the digits as they are pressed.



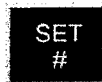
7. Press ENTER. The Model 1104 will say "Enter."



### 4.4.3 Incorporating a Pound (#) or Asterisk (\*)

Incorporate a pound or asterisk if it is normally included in telephone number:

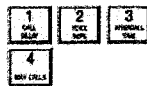
1. Press SET.



2. Press PHONE NUMBER.

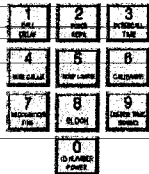


3. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. Model 1104 will respond: "Enter number."



## Chapter 4: Communications Programming

4. Enter the telephone number using the number keys. The Model 1104 will recite the digits as they are pressed.



5. Position the pound (#) or asterisk (\*) within the telephone number where required by pressing SET (where the pound is located) or WHAT IS (where the asterisk is located). The Model 1104 will *beep* each time pound or asterisk is pressed.



—OR—



6. Enter any remaining digits of the telephone number.
7. Press ENTER. The Model 1104 will say “Enter.”



### 4.4.4 Special Dialing to a Beeper or Pager

The following example demonstrates just one solution to programming the Model 1104 for dialing to a beeper or pager. Many other key sequences will also work. Start with steps 1–3 below; next, enter special dialing keys where required for your beeper or pager service.

To incorporate a pound or asterisk:

1. Press SET.

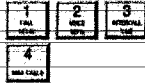


2. Press PHONE NUMBER.

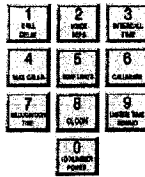


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3. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry.



4. Enter the complete telephone number using the number keys. The Model 1104 will recite the digits as they are pressed.



5. Press CODE. This instructs the Model 1104 to wait for the telephone call to be answered by the beeper or pager service. (A voice message will not occur—only digital tones are used.) Note that CODE may not work with beepers where there is no ring before the beeper connects. If that proves to be the case for your particular beeper, skip the CODE step and proceed from Step 4 to Step 6.



6. Now press PAUSE once to activate a four second delay. This assumes the call is answered by a beeper/pager service that immediately delivers a prerecorded voice message. PAUSE may be pressed more than once to program more time for the beeper/pager service to finish its message. Each press of PAUSE allocates four additional seconds. The Model 1104 will "beep" with each press.

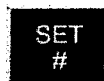


## Chapter 4: Communications Programming

7. Enter a telephone number or custom code number that will identify the Model 1104 as the caller to your beeper or pager. A code may consist of any number(s) you designate. Many users find it convenient to use the telephone number to which the Model 1104 is connected.



8. A pound or asterisk may be required in some dialing situations. If required, position the pound (#) or asterisk (\*) within the telephone number where required by pressing SET (where the pound is located) or WHAT IS (where the asterisk is located). The Model 1104 will "beep" each time pound or asterisk is pressed. Enter any remaining digits of the telephone number.



-OR-



9. Press ENTER. The Model 1104 will say "Enter."



### 4.5 Rings UntiAnswer

Rings Until Answer is the programmed number of times the telephone rings before the Model 1104 will answer an incoming call. This can be set from 1 to 15 rings. The default value is 4.

#### 4.5.1 Programming Rings Until Answer

To program Rings Until Answer:

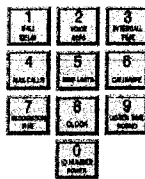
1. Press SET.

SET  
#

2. Press RING/TAD. The Model 1104 will respond: "*Enter number.*"

RING/TAD  
PAUSE  
AM

3. Using the number keys, enter a value.



4. Press ENTER. The Model 1104 will respond: "*Enter.*"

ENTER  
TONE  
PM

#### **4.5.2 Interrogating Rings Until Answer**

To interrogate Rings Until Answer:

1. Press WHAT IS.

WHAT  
IS  
\*

2. Press RING/TAD.

RING/TAD  
PAUSE  
AM

#### **4.6 TAD (Telephone Answering Device)**

The TAD feature is especially useful because it integrates the operation of the Model 1104 with your telephone answering device in a way that retains the full flexibility of each system. This allows you to have on-demand telephone access to the Model 1104, for obtaining a Status Report, or for issuing call-in

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## Chapter 4: Communications Programming

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commands, while your telephone answering device is set to receive outside calls. Programming for use with a telephone answering device (TAD) is always used in conjunction with Rings Until Answer, detailed in section 4.5.

### NOTE

The TAD feature only applies to answering devices connected to the same telephone line as the Model 1104.

#### 4.6.1 TAD Enable/Disable

To enable/disable the TAD feature:

1. Press SENSOR ON/OFF.



2. Press RING/TAD.



The Model 1104 will respond: "On." (If the Model 1104 says "Off," repeat steps 1 and 2 to reactivate TAD.)

#### 4.6.2 Using theTAD Feature

1. Make sure the TAD feature is *enabled* on the Model 1104. (The default setting is *disabled*, so you must enable it first.)
2. Determine the number of rings your telephone answering device uses to answer the telephone. (Most answering devices require 4 rings; others are selectable.)
3. On the Model 1104, program Rings Until Answer to a greater number than the number of rings set on your answering machine.

Example:

Telephone answering device, rings = 4

Model 1104, Rings Until Answer = 6



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Using the procedure just outlined, all incoming calls will be answered by the telephone answering device, allowing it to operate normally. With the programming just accomplished, the Model 1104 can be accessed remotely, by telephone, to obtain the Status Report.

1. Dial the telephone number of the Model 1104.
2. Let the telephone ring once and then hang up.
3. Wait approximately ten seconds
4. Call the Model 1104 back.  
It will answer the telephone on the first ring.

Explanation: The pattern of one ring, followed by a second call (within 30 seconds), signals the Model 1104 to answer your incoming call, excluding the telephone answering device.

### **NOTE**

Special Case: If the Model 1104 shares the same line with a telephone answering device, and during certain time periods, frequent, incoming calls are expected on that line, then you may want to temporarily disable the TAD feature. If you leave the TAD enabled, it will not adversely affect normal operation, but if two outside telephone calls are received within the same 30-second time window, the Model 1104 will interpret this pattern as a signal to answer the telephone. If this occurs, press any key on the Model 1104 to hang up.

#### **4.6.3 No TAD In Use**

If a telephone answering device is not used on the same telephone line as the Model 1104, make sure that the TAD feature is disabled, or turned off. Only Rings Until Answer programming will determine how incoming calls are answered. For example, if you program Rings Until Answer to 3, incoming calls will be answered in 3 rings.

## 4.7 Listen-inTime

The Listen-in Time is the amount of time you can listen to sounds from the Model 1104's built-in microphone at its installation site. When you call in for a Status Report, the Model 1104 announces Listen-in Time at the end of its first round of status readings, saying, "*Listen to the sound level for (programmed time entered).*" The programmable range is from 0 to 255 seconds (or up to 4.17 minutes). The default value is 15 seconds.

### NOTE

The microphone is also used to monitor high sound level. See Chapter 5, Section 5.10 through Section 5.11.1.

### 4.7.1 Programming the Listen-inTime

To program the Listen-in Time:

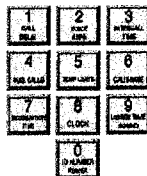
1. Press SET.



2. Press LISTEN TIME. The Model 1104 will respond: "*Enter seconds.*"



3. Using the number keys, enter the seconds. The Model 1104 will recite the digits as they are pressed.



4. Press ENTER. The Model 1104 will respond: "*Enter.*"



### **4.7.2 Interrogating the Listen-in Time**

To interrogate the Listen-in Time:

1. Press WHAT IS.



2. Press LISTEN TIME. The Model 1104 will recite the listen time in seconds programmed.



## **4.8 Call Delay**

Call Delay is the programmed length of time the Model 1104 waits, following detection of an alarm, before it begins the dial-out sequence. *This applies only to the first call.* (Delay time between calls is also programmable: refer to Intercall Time, Section 4-11.)

The purpose for Call Delay is to allow time for personnel at the Model 1104's installation site to respond to and cancel an alarm before dial-out begins. During this time, the Model 1104 will audibly repeat its "alert condition" message (unless the Local Voice Mute feature has been activated—refer to Section 4.9). The default for Call Delay is 30 seconds. Call Delay can be programmed from 0 seconds to 60 minutes (1 hour).

### **4.8.1 Programming the Call Delay**

To program the Call Delay:

1. Press SET.



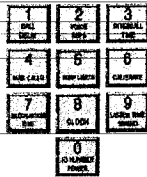
2. Press CALL DELAY.



The Model 1104 will respond: "Enter minutes."

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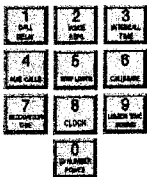
- Using the number keys, enter the minutes.  
The Model 1104 recites the digits as they are pressed.



- Press ENTER. The Model 1104 responds: "Enter seconds."



- Using the number keys, enter the seconds. The Model 1104 recites the digits as you press them.



- Press ENTER. The Model 1104 responds: "Enter."



### 4.8.2 Interrogating Call Delay

To interrogate Call Delay:

- Press WHAT IS.



- Press CALL DELAY.



The Model 1104 will recite the programmed Call Delay.

## **4.9 LocalVoice Mute**

When the Model 1104 dials out to report an alarm, it also audibly recites the alarm message at its installation site. The Local Voice Mute command allows you to turn off the voice at the Model 1104's site during alarm dialouts and status call-ins. This feature is used to prevent intruders or unauthorized persons from hearing the alarm dial-out message or from hearing the Status Report during an off-site call.

### **4.9.1 Enable/Disable LocalVoice Mute**

To enable/disable Local Voice Mute:

1. Press SENSOR ON/OFF.



2. Press MUTE.



The Model 1104 will say "*On*" to indicate that Local Voice Mute is enabled, or "*Off*" to indicate that it is disabled.

3. Repeat key sequence to switch between enabled or disabled Local Voice Mute.

## **4.10 Voice Repetitions**

The Voice Repetitions feature allows programming of the number of times the alarm message is delivered *per phone call* during alarm dial-out.

The maximum repetitions may be set to 10; the default is 3 repetitions.

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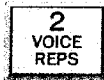
### 4.10.1 Programming Voice Repetitions

To program Voice Repetitions:

1. Press SET.

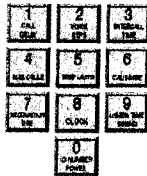


2. Press VOICE REPS.



The Model 1104 will respond: "Enter number."

3. Using the number keys, enter a value from 0 to 10.



4. Press ENTER. The Model 1104 will respond: "Enter."



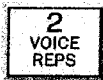
### 4.10.2 Interrogating Voice Repetitions

To interrogate Voice Repetitions:

1. Press WHAT IS.



2. Press VOICE REPS.



The Model 1104 will recite the number programmed.

## **4.11 Intercall Time**

The Intercall Time is the programmable period of time the Model 1104 waits in calling subsequent telephone numbers. Intercall Time is activated *only after alarm dial-out to the first telephone number fails to be acknowledged*. This period can be programmed from 10 seconds to 60 minutes. The default intercall time is 1 minute.

If an incoming telephone call is made to the Model 1104 during Intercall Time (in between its dialing of subsequent telephone numbers to report an alarm), it will answer the incoming call and immediately report any existing alarms. The manner in which the incoming call is answered depends upon whether or not TAD is enabled or disabled:

- If TAD (Telephone Answering Device) is enabled, Rings Until Answer will be 1.
- If TAD is disabled, Rings Until Answer will be 10.

Refer to Section 4.5, Rings Until Answer, and Section 4.6, TAD (Telephone Answering Device).

### **4.11.1 Programming Intercall Time**

To program Intercall Time:

1. Press SET.

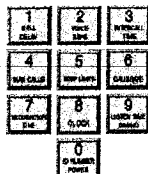


2. Press INTERCALL TIME.



The Model 1104 will respond: *"Enter minutes."*

3. Using the number keys, enter the minutes.  
The Model 1104 recites the digits as you press them.

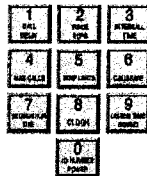


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4. Press ENTER. The Model 1104 will respond: "Enter seconds."



6. Using the number keys, enter the seconds. The Model 1104 recites the digits as you press them.



7. Press ENTER. The Model 1104 responds: "Enter."



### 4.11.2 Interrogating Intercall Time

To interrogate Intercall Time:

1. Press WHAT IS.



2. Press INTERCALL TIME.



The Model 1104 will recite the programmed Intercall Time.

### 4.12 Maximum Number of Calls (Max Calls)

The Max Calls feature controls the total number of repeated calling attempts by the Model 1104 in the event of an alarm. When an alarm occurs, the dial-out process begins, and continues to cycle through your programmed telephone



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numbers until a maximum number of calls is reached. The Max Calls setting regulates the number of calls that will be made as a result of any alarms; if more than one alarm is detected at once, or if a second alarm occurs during dial-out on the first alarm, the Max Calls setting will start the calling process from zero, until the programmed number of calling attempts are completed.

The default setting for Max Calls is 100, but it may be programmed from 0 to 255 calls. Max Calls is cancelled when an alarm is acknowledged. If the maximum number of calls is completed and no alarm acknowledgement has occurred, the Model 1104 will automatically acknowledge any alarm and stop the dial-out.

### NOTE

If only one telephone number is programmed, the Model 1104 will dial out a maximum of 15 times to report an alarm.

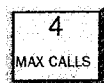
#### 4.12.1 Programming Max Calls

To program Max Calls:

1. Press SET.

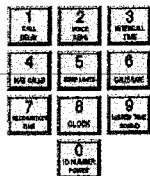


2. Press MAX CALLS.



The Model 1104 will respond: "Enter number."

3. Using the number keys, enter a value. The Model 1104 will recite the digits as you press them.



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5. Press ENTER. The Model 1104 responds: "Enter."



### 4.12.2 Interrogating Max Calls

To interrogate Max Calls programmed:

1. Press WHAT IS.



2. Press MAX CALLS.



The Model 1104 will recite the value set for Max Calls.

### 4.13 The Clock

The Model 1104 has a built-in clock. The power-up time is 12 AM. The clock will keep time from 12 AM until you program the current time. It will then keep time from your programmed time. If the AC power fails, the clock will continue to keep time until the battery back-up fails. It will then reset to 12 AM when power is restored. *An incorrect time is a good indication that the power has failed and the batteries have been expended.*

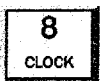
#### 4.13.1 Setting the Clock

To set the clock:

1. Press SET.



2. Press CLOCK.



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- Using the number keys, enter the correct time. The Model 1104 will recite the digits as they are pressed.



- If the time is AM, press the AM key. The Model 1104 will "beep." (If the time is PM, there is no key to press—the clock will be automatically set to PM if AM is not set.)



- Press ENTER. The Model 1104 will say "Enter."



Example: You want to set the clock to 12:45 AM. Press the following keys in the order shown:

SET...CLOCK...1...2...4...5...AM...ENTER.

### 4.13.2 Interrogating for the Current Time

To interrogate the Model 1104 for the current time:

- Press WHAT IS.



- Press CLOCK. The Model 1104 will recite the programmed time.



## 4.14 The Security Code

The Security Code is the last step after setting all other programming parameters for the Model 1104. The code consists of a 4-digit number you select and will effectively prevent unauthorized changes to the Model 1104's programming. When the Security Code is activated, all keyboard programming is inaccessible. The Model 1104 may be interrogated using the WHAT IS key, but the keyboard must be unlocked, via the Security Code, before any additional programming is possible.

### 4.14.1 Locking the Keypad

To program the Security Code:

1. Press SET.

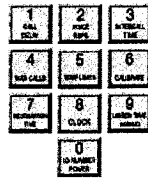


2. Press CODE.



The Model 1104 will say *"Enter security code."*

3. Using the number keys, enter 4 digits. The Model 1104 says, *"OK."* The keyboard is now locked.



If unauthorized persons attempt to set a parameter, an error message, *"Error 2,"* is returned. Whenever any operation except WHAT IS takes place without entering the security code first, this error message occurs.

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### 4.14.2 Unlocking the Keypad

To unlock the keyboard:

1. Press WHAT IS.

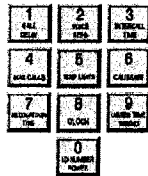


2. Press CODE.



The Model 1104 will say *"Enter Security Code."*

3. Using the number keys, enter the digits for the code.



If the correct code is entered, the Model 1104 will say "OK." If the wrong code is entered, the Model 1104 will say *"Error 2."*

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## Chapter 5: Alarm Programming

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This chapter explains the alarm programming and monitoring capabilities of the Model 1104, with specific instructions for the following features:

- Configure inputs as dry contact or temperature
- Enable/disable inputs
- Program alarm Recognition Time for each input
- Program high and low temperature limits
- Disable alarm response to high or low temperature
- Program temperature in Fahrenheit or Celsius scale
- Calibrate temperature
- Obtain current temperature
- Program AC power-failure Recognition Time
- Enable/disable AC power monitoring
- Program sound level sensitivity
- Program high sound Recognition Time
- Disable alarm response to high sound
- Use Exit Delay via Status Report

### 5.1 Input Configuration

In preparing the Model 1104 to sense an alert condition, the inputs must be configured as dry contact (either open or closed) or as temperature inputs. The default setting for input 1 is temperature; for inputs 2-4, the default is dry contact and open. To configure input normality, sensors are first wired to the terminal strip at the back of the unit. (Refer to Chapter 2, Section 2.9–2.12, for an explanation on wiring inputs.)

The configuration process directs the Model 1104 to initialize the 4 inputs and establish normal settings. Any change in the status of an input (for example, from a normally open contact to a suddenly closed contact) is recognized as an ***alert condition***. In the case of a temperature input, an alert condition is recognized when established temperature limits are exceeded.

**NOTE**

Before starting keyboard commands to configure input normality on the Model 1104, *it is very important to check that the sensors you have wired to the unit are set in their normal, non-alarm positions.* For example, if a magnetic reed switch (a normally-closed sensor used to detect unauthorized entry) has been wired to the Model 1104, make sure that the door or window to be monitored is shut before configuring the input. If a motion-detector is wired to the unit, it is advisable to block all sources of motion from the sensor before and during configuration.

**5.1.1 Programming Input Configuration**

1. Press STANDBY to place the Model 1104 in Standby mode.



2. Wire sensors to the inputs to the back of the Model 1104 (see Chapter 2, Section 2.10).
3. Press RUN. The red light glows when the Model 1104 returns to Run mode.



4. Press SET.



5. Press CONFIGURE.



### 6. The Model 1104 audibly recites the configuration for each of the four inputs:

- If the input is normally open, the Model 1104 recites the number of the input and says “OK.”
- If the input is normally closed, the Model 1104 recites the number of the input, followed by a “beep” and “OK.”
- If the input is configured as temperature, the Model 1104 recites the number of the input, followed by “Temperature.”

### 5.1.2 Verifying Input Configuration

Input configuration can be verified when interrogating the Model 1104 for a complete Status Report. Refer to Chapter 6 for a more detailed description of the Status Report.

### 5.2 Enable/Disable Inputs

This function allows you to enable or disable an input's response to an alert condition. An enabled input will respond to an alert condition and allow dial-out. A disabled input will cause dial-out to be suppressed, but any existing alert conditions will be revealed during the Status Report. Enable/disable programming is useful during wiring of inputs (see Chapter 2) or when a condition needs to be monitored, but is not critical enough to be programmed for dial-out reporting. It is important to verify input status after performing any task that requires disabling. The default setting for all inputs is enabled (ON). If an alert condition exists when inputs are re-enabled, Recognition Time will restart—refer to Section 5.3.

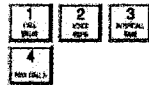


## 5.2.1 Changing Enabled/Disabled Input Status

1. Press SENSOR ON/OFF.

SENSOR  
ON/OFF

2. Press the number (1 to 4) of the selected input to enable/disable. The Model 1104 says "Off" to indicate disabled or "On" to indicate enabled.



## 5.2.2 Verifying Enabled/Disabled Input Status

1. Press WHAT IS.

WHAT  
IS

2. Press STATUS.

STATUS  
CONFIGURE

The Model 1104 audibly recites the current status of every input. In a Status Report, each input is first identified by its input number, followed by a report that specifies parameters currently affecting that input. *If an input is disabled, the word "Off" immediately follows the number recited for that input.*

For example, input 3 is configured as a normally open, dry contact input. During the Status Report:

- *If disabled*, the Model 1104 recites:  
"Number 3—Off—OK," for input 3.
- *If enabled*, the Model 1104 recites:  
"Number 3—OK," for input 3.

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## Chapter 5: Alarm Programming

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In another example, input 2 is configured as a temperature input. The current temperature is 76 degrees. During a Status Report:

- **If disabled**, the Model 1104 recites, “Number 2—Off—76 degrees—OK.”
- **If enabled**, the Model 1104 recites, “Number 2—76 degrees—OK.”

### 5.3 Input Recognition Time

The Input Recognition Time is the length of time an alert condition must be present before a valid alarm exists and dial-out is activated. This time period is programmable, from 0 minutes, 0 seconds (for immediate response) up to a period of 272 minutes, 0 seconds. If an alert condition begins and then clears within the established Recognition Time, no dial-out will occur. When an alert condition continues beyond the programmed Recognition Time, the Model 1104 initiates dial-out. The default setting for Input Recognition Time is 0 minutes, 3 seconds.

#### 5.3.1 Programming Input Recognition Time

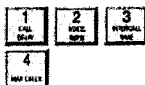
1. Press SET.



2. Press RECOGNITION TIME.



3. Press the number (1 to 4) of the selected input to be programmed.

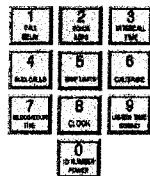


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The Model 1104 responds: “Enter minutes.”

## Sensaphone® Model 1104 User's Manual

- Using the number keys, enter the minutes. For example, to set a Recognition Time of five minutes, simply press "5" on the keypad. The Model 1104 recites the digits as they are pressed.



- Press ENTER. The Model 1104 responds: "Enter seconds."



- Using the number keys, enter the seconds. The Model 1104 recites the digits as they are pressed.



- Press ENTER. The Model 1104 responds: "Enter."



### 5.3.2 Interrogating Input Recognition Time

- Press WHAT IS.



- Press RECOGNITION TIME.



## Chapter 5: Alarm Programming

3. Press the corresponding input key (1 to 4).



The Model 1104 recites the programmed Recognition Time for that input.

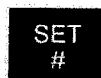
### 5.4 Establishing High and Low Temperature Limits

High and low temperature limits can be separately programmed for each input configured as temperature. Limits can range from  $-20^{\circ}$  to  $+150^{\circ}$  Fahrenheit, or from  $-30^{\circ}$  to  $65^{\circ}$  Celsius.

When temperature limits exceed high or low settings, the Model 1104 will dial out with an alarm message. Default settings are:  $10^{\circ}$  F for low temperature and  $100^{\circ}$  F for high temperature.

#### 5.4.1 Programming Temperature Limits for a Selected Input

1. Press SET.



2. Press TEMP LIMITS.



3. From the number keys, press a number (from 1 to 4) that corresponds to the temperature input being programmed.



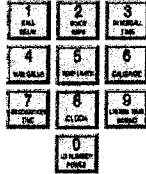
The Model 1104 responds: "*Enter low temperature limit.*"

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4. Using the number keys, enter a value for low temperature limit. The Model 1104 will recite the digits as they are pressed. If a negative number is required, first press PAUSE, then enter the number.

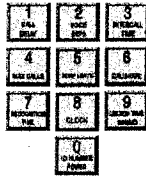


5. Press ENTER.



The Model 1104 responds: *“Enter high temperature limit.”*

6. Using the number keys, enter the value for high temperature limit. The Model 1104 recites the digits as they are pressed.



7. Press ENTER. The Model 1104 responds: *“Enter.”*



### NOTE

Do not set temperature limits too close to normal room temperature. Minor temperature fluctuations could result in frequent and unnecessary alarm dialouts.

#### 5.4.2 Disabling Alarm Response to High or Low Temperature

To disable alarm response to either high or low temperature settings exclusively, enter the maximum temperature limit when programming the selected input. (The Model 1104 will

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## Chapter 5: Alarm Programming

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not respond to temperatures encountered at maximum settings or beyond.) Begin by following the key sequence shown in Section 5.4.1, and when prompted to enter the high or low temperature value:

- Set high temperature to either +150° F or +65° C (high temperature limit) to prevent the Model 1104 from responding to a high temperature alarm.
- Set low temperature to either -20° F or -30° C to prevent the Model 1104 from responding to a low temperature alarm.

### 5.4.3 Interrogating High and Low Temperature Limits

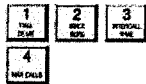
1. Press WHAT IS.



2. Press TEMP LIMITS.



3. Press the number key corresponding to the selected temperature input.



### 5.5 Temperature Scale

Temperature inputs may be set in either Fahrenheit or Celsius degrees. The default temperature scale is Fahrenheit. To change to Celsius:

1. Press SENSOR ON/OFF.



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2. Press TEMP. The Model 1104 responds: "*Off*," indicating Celsius scale has replaced Fahrenheit scale.



3. To return to Fahrenheit scale, repeat the key sequence. The Model 1104 responds: "*On*," indicating Fahrenheit scale is in effect.

### **NOTE**

When switching from Fahrenheit to Celsius, or vice versa, the change applies to all inputs configured to read temperature. When switching temperature scales it is important to reset high and low temperature limits on all temperature inputs. Refer to Section 5.4.1 to reset temperature limits.

## **5.6 Temperature Calibration**

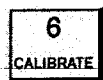
To compensate for minor variances in sensor accuracy, an offset may be programmed for each temperature input. The amount of offset is measured in degrees Fahrenheit or degrees Celsius. Adjustments are possible within a range from -10 degrees to +10 degrees. For example, if input 3 is sensing temperature and is reading 1 degree too high, then the calibration for input 3 is set at -1 to obtain an accurate reading.

### **5.6.1 Programming Temperature Calibration**

1. Press SET.

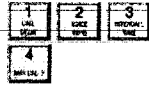


2. Press CALIBRATE.

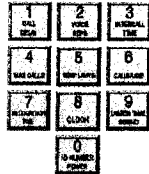


## Chapter 5: Alarm Programming

- Press the number (1 to 4) of the selected temperature input to be calibrated.



- Enter the number required to offset the current temperature reading so a correct reading is obtained.



- To program a positive offset number (up to +10 degrees), enter the number on the keypad. The Model 1104 recites the digits as they are pressed.
  - To program a negative offset number (up to -10 degrees), first press PAUSE. The unit responds with a "beep." Next, enter the number on the keypad. The unit recites the digits as they are pressed.
- Press ENTER. The Model 1104 responds: "Enter."



### NOTE

If you find that your calibration offset exceeds more than + 5 or - 5 degrees, other complicating factors could be affecting normal operation of the Model 1104. Call for technical assistance.



### **5.6.2 Interrogating Temperature Calibration**

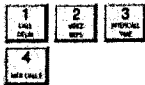
1. Press WHAT IS.



2. Press CALIBRATE.



3. Press the number key corresponding to the selected temperature input.



If a "beep" precedes the number as it is recited, then a **negative** offset is indicated.

## **5.7 Obtaining Current Temperature**

Current temperature readings for each temperature input may be accessed at any time. The Model 1104 recites the input number, and the actual temperature detected by the attached sensor, for all inputs configured as temperature. To obtain current temperature:

1. Press WHAT IS.



2. Press TEMP.



## 5.8 AC Power Monitoring Enable/Disable

The Model 1104 monitors AC power failure. This command enables or disables the power failure detection feature. When enabled, the Model 1104 will monitor power and dial out when AC power failure exceeds a programmable span of time (refer to AC Power Failure Recognition Time, Section 5.9). The default setting for AC power monitoring is enabled (on). When disabled, the Model 1104 will not dial-out to report power failure.

### 5.8.1 Enabling/Disabling the AC Power Alarm

1. Press SENSOR ON/OFF.



2. Press POWER.



- The Model 1104 will say, “Off” to indicate that the power alarm is disabled, or
- The Model 1104 will say, “On” to indicate that the power alarm is enabled.

3. Repeat key sequence to change settings.

## 5.9 AC Power Failure Recognition Time

The AC Power Failure Recognition Time is the length of time that AC electric power is off before a valid alarm is recognized and dial-out begins. The default setting is 5 minutes, 0 seconds, but is programmable from 0 seconds to a maximum of 272 minutes.

When AC power failure occurs, and throughout the programmed Recognition Time, the Model 1104 steadily repeats the message “the electricity is off” at the unit’s installation site. There is no Call Delay programming available for AC power failure. Immediately following Recognition Time, the Model 1104 begins the dial-out process to report power failure.

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To cancel the power-failure message locally at the keypad (during or after Recognition Time) press any key on the Model 1104 keypad. This action also cancels the dial-out process. The AC power failure alarm may also be cancelled remotely, by telephone acknowledgment (see Chapter 6, Section 6.1).

### 5.9.1 Programming Power Failure Recognition Time

1. Press SET.



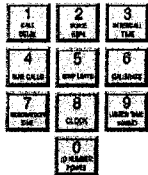
2. Press RECOGNITION TIME.



3. Press POWER. The Model 1104 responds: "Enter minutes."



4. Using the number keys, enter the number of minutes. The Model 1104 will recite the digits as they are pressed.

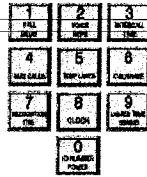


5. Press ENTER. The Model 1104 responds: "Enter seconds."



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- Using the number keys, enter the number of seconds. The Model 1104 will recite the digits as they are pressed.



- Press ENTER. The Model 1104 responds: "OK."



### 5.9.2 Interrogating Power Failure Recognition Time

- Press WHAT IS.



- Press RECOGNITION TIME.



- Press POWER.

The Model 1104 will recite the power Recognition Time.



## 5.10 Sound Alarm Monitoring

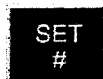
This feature allows you to program the level and duration of sound that will cause the Model 1104 to respond to an alarm and dial-out. It may be useful to desensitize the Model 1104 to sound if it is installed in an area with a relatively high noise level, or where a loud noise occurs frequently but is not associated with an alarm. In some applications, it may be desirable to increase sound sensitivity to low sound levels.

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### 5.10.1 Programming Sound Alarm Sensitivity

The sensitivity setting for sound alarm monitoring ranges from 1 to 255. A value of 1 makes the microphone the MOST sensitive to changes in sound. The value 255 makes the microphone the LEAST sensitive to sound. The default value is 32.

1. Press SET.



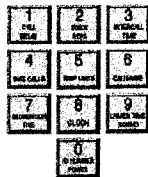
2. Press CALIBRATE.



3. Press SOUND. The Model 1104 responds: *"Enter number."*



4. Using the number keys, enter a value for sound sensitivity. The Model 1104 recites the digits as you press them.



5. Press ENTER. The Model 1104 responds: *"Enter."*



### 5.10.2 Interrogating Sound Sensitivity

1. Press WHAT IS.



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2. Press CALIBRATE.



3. Press SOUND. The Model 1104 recites the programmed sound sensitivity level.



### 5.10.3 Programming High Sound Alarm Recognition Time

The Recognition Time for sound alarm monitoring ranges from 2 seconds to 59 seconds. The default value is 8 seconds.

1. Press SET.



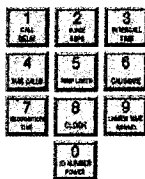
2. Press RECOGNITION TIME.



3. Press SOUND. The Model 1104 responds: "Enter seconds."



4. Using the number keys, enter the number of seconds. The Model 1104 will recite the digits as they are pressed.



5. Press ENTER.



## **5.11 High Sound Alarm Enable/Disable**

The Model 1104 monitors sound through the built-in microphone. When the sound level suddenly exceeds the programmed high sound limit, the Model 1104 will respond to an alert condition. The increased sound level must continue throughout the programmed recognition time. The default for high sound alarm is enabled (on).

### **NOTE**

The microphone is also used for listening to on-site sounds. Refer to Chapter 4, Section 4.7. Disabling the sound alarm does not affect listen-in capability.

### **5.11.1 Changing Enabled/Disabled High Sound Alarm**

1. Press SENSOR ON/OFF.



2. Press SOUND. The Model 1104 will say "Off" to indicate disabled or "On" to indicate enabled.



3. Repeat key sequence to change settings.

## **5.12 Exit Delay**

When tripping an alarm is unavoidable, yet a true alert condition has not actually occurred, the alarm response, including dial-out, can be temporarily suppressed.

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## ***Chapter 5: Alarm Programming***

The Model 1104 is able to suppress and then reset its dial-out function automatically through use of the Status Report. This is especially convenient when an alert condition is created upon exiting a monitored door, and there is no way to cancel from the local keypad.

**Example:** You are planning to exit through a monitored door. Prior to exiting, you initiate a Status Report recitation at the Model 1104 keypad by pressing WHAT IS, followed by STATUS, (key sequence shown below). This allows you approximately 30 seconds to exit without activating the Model 1104's programmed response to an alarm. At the conclusion of the status report, normal alarm response is reactivated.

To use exit delay, initiate the Status Report.

1. Press WHAT IS.



2. Press STATUS. The Model 1104 recites the full Status Report; during this time, you are able to exit the monitored area without tripping an alarm.





## Sensaphone® Model 1104 User's Manual

## NOTES

[illegible]

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## **Chapter 6: Acknowledgment, Status Report, and Remote Access**

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In addition to communication and alarm monitoring capabilities, the Model 1104 will also respond to your instructions and provide you with access to information on monitored conditions at all times.

By issuing commands to the unit, either at the installation site or over standard telephone lines, the following features may be activated:

- Acknowledgment of existing alarms
- The Status Report on all monitored conditions.

### **6.1 Alarm Acknowledgment**

When the Model 1104 dials out with an alarm message, it will request acknowledgment before hanging up. Acknowledgment indicates to the unit that the alarm message has been received. Upon acknowledgment, the Model 1104 will cancel the dial-out sequence.

There are three ways\* that an alarm is acknowledged directly:

- Local Acknowledgment
- Touch-Tone™ Acknowledgment
- Callback Acknowledgment

\* A fourth method of alarm acknowledgment is indirect. Refer to Max Calls, Chapter 4, Section 4.12 for an example of automatic alarm acknowledgment.

#### **6.1.1 Local Acknowledgment**

To acknowledge an alarm locally (directly at the installation site of the Model 1104), press any key.

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### **6.1.2 Touch-Tone™ Acknowledgment**

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This method of remote alarm acknowledgment works with a Touch-Tone™ telephone.

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Example: You receive a call from the Model 1104, reporting that an alarm exists. The message concludes: "Indicate you have received warning message." Now, or at any time during this call, you may acknowledge the alarm with the code "555" if you are using a Touch-Tone™ telephone.

- To enter "555," press the number (5) key on the Touch-Tone™ phone keypad three times. The Model 1104 will respond: \* ***"Warning message received by telephone number (last number dialed)."*** The Model 1104 will hang up and the dial-out sequence, including any further response to the alarm, will be cancelled.
- If you enter the wrong code or do not enter it within 10 seconds following the conclusion of the message, the Model 1104 will respond: ***"Dial telephone number (the programmed unit phone number) within (Intercall Time)."*** Then, the Model 1104 will hang up. The alarm is still not acknowledged until you call back. You have a period equal to the programmed Intercall Time to call the unit back in order to acknowledge the alarm. Refer to Callback Acknowledgment, Section 6.1.3, below.

### **6.1.3 Callback Acknowledgment**

This method of remote alarm acknowledgment works with ***any telephone***: pulse, rotary, or Touch-Tone™.

Example: The Model 1104 calls you with an alarm message. You answer the call with a rotary or pulse telephone, and do the following:

- You listen to the message and hang up.
- Then you call the Model 1104 back on any telephone. You must wait for 10 rings—this signals the Model 1104 to answer your telephone call. (Make sure to call back within the programmed setting for Intercall Time—refer to Chapter 4, Section 4.11.)

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## Chapter 6: Acknowledgment, Status Report, and Remote Access

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When the Model 1104 answers your return call, it gives a Status Report (refer to Section 6.2). Then it says: *“Warning message received by ...”* and recites the telephone number last dialed. This indicates that the alarm has been acknowledged.

### NOTE

If you have the TAD feature ( telephone answering device) enabled, the Model 1104 will answer the telephone on the first ring. If it is disabled, the telephone must be allowed to ring 10 times. This serves as a precaution against a random alarm acknowledgment. Refer to Chapter 4, Section 4.6, for complete information on using the TAD feature.

## 6.2 Status Report

The Status Report allows access to complete information on all monitored conditions either locally, from the keypad, or by telephone, from any location. The Model 1104 will answer an incoming telephone call following the programmed Rings Until Answer (refer to Chapter 4, Section 4.5). Included with the Status Report are messages related to alarm conditions, AC power, battery backup and sound level. It also provides an opportunity for listening to on-site sounds (refer to Listen-in Time, Chapter 4, Section 4.7).

To initiate the Status Report:

1. Press WHAT IS.



2. Press STATUS.



Sections 6.2.1, 6.2.2, and 6.2.3 demonstrate two different Status Report recitations. The Status Report starts with:

*“Hello. This is telephone number 555-1234 (or the programmed ID).”*

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## **Sensaphone® Model 1104 User's Manual**

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*"The time is 12:15 PM (or the current time)."*

The Model 1104 proceeds with a separate report for each input.  
Each input identifies itself by reciting the input number.

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### **6.2.1 Example: Status Report, No Alarms**

Inputs 2, 3, and 4 are configured as dry contact and input 1 is configured as temperature. No alarms exist. The Status Report begins by saying, *"Hello, this is telephone number 555-1234; the time is 12:15 PM."* Following this introduction, the report continues:

*"Number 1, 74 degrees, OK."*

*"Number 2, OK."*

*"Number 3, OK."*

*"Number 4, OK."*

*"The electricity is ON."* This refers to AC power.

*"Battery condition, OK."* Other responses: *"Battery condition low"* or *"Replace batteries."* (Refer to Section 6.2.4 for additional information regarding battery condition.)

*"Sound level, OK."*

*"Listen to the sound level for 10 seconds."* In this case, the programmed Listen-in Time is set at 10 seconds. (This feature is not available when obtaining the Status Report on-site, directly at the keypad.)

The Status Report repeats once more and the Model 1104 concludes the call, saying: *"Have a good day."* (The Status Report will not repeat if obtained at the keypad; *"Have a good day,"* is also not recited.)

The phrase *"no number"* at the end of a Status Report indicates that no dial-out phone numbers have been programmed.

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## Chapter 6: Acknowledgment, Status Report, and Remote Access

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### 6.2.2 Example: Status Report, ExistiAlarms

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Inputs 2, 3, and 4 are configured as dry contact and input 1 is configured as temperature. An emergency situation is at hand: a fire in a greenhouse has tripped a smoke alarm and electrical power has been disrupted. In addition to high sound and AC power alarms, separate alarms exist on inputs 1, 2, 3, and 4. You happen to call in for the Status Report, which begins with, "Hello, this is telephone number 555-1234; the time is 12:15 PM." Following this introduction, the report continues:

*"Number 1, 110 degrees, HIGH."*

*"Number 2, EXISTS."*

*"Number 3, EXISTS."*

*"Number 4, EXISTS."*

*"The electricity is OFF."*

*"Battery condition, OK."*

*"Sound level, HIGH."*

*"Warning message received by ...(last telephone number dialed\*)."*

*"Listen to the sound level for 10 seconds."*

The Status Report repeats once more and the Model 1104 concludes the call by saying: *"Have a good day."*

\* The "last telephone number dialed" refers to any one of the programmed, dial-out telephone numbers through which the Model 1104 was able to receive alarm acknowledgment, prior to your call for a Status Report; this could also refer to the Model 1104's I.D. Number (identification number), if the alarms are acknowledged at the keypad by someone present at the site.

### **6.2.3 Example: Status Report, Disabled Inputs**

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If an input is *disabled*, the dial-out feature for that input is deactivated, but all other programmed parameters remain in effect. In the example below, all 4 inputs are disabled, although inputs 1 and 3 are detecting alarms. AC power and Sound Level is also disabled for dial-out. (Note that to indicate disabled status, only AC power will return two audible “beeps,” rather than the word “OFF.”) When you call the Model 1104 for a Status Report, you hear the following:

*“Hello, this is telephone number 555-1234.*

*“The time is 12:15 PM.”*

*“Number 1, OFF, 96 degrees, HIGH.”*

*“Number 2, OFF, 74 degrees, OK.”*

*“Number 3, OFF, EXISTS.”*

*“Number 4, OFF, OK.”*

*“The electricity is (beep, beep) ON.”* If the electricity is off, or the AC adaptor is disconnected, you will hear:

*“The electricity is (beep, beep) OFF.”*

*“Battery condition, OK.”*

*“Sound level OFF, OK.”* If the sound level is high you will hear: *“Sound level OFF, HIGH.”*

*“Listen to the sound level for 10 seconds.”*

The Status Report repeats once more and the Model 1104 concludes the call, saying: *“Have a good day.”*

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## Chapter 6: Acknowledgment, Status Report, and Remote Access

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### 6.2.4 Battery Condition

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During a Status Report, you may hear one of three possible messages regarding battery power. The Model 1104 determines the appropriate message by measuring battery voltage. Depending upon the remaining voltage, it may respond:

- “Battery Condition , OK,” if over 8.2 Volts.
- “Battery Condition , low,” if between 7.2 and 8.2 Volts.
- “Replace batteries,” if below 7.2 Volts.

### 6.2.5 Remote Access by Touch-Tone™ Telephone

Calling the Model 1104 for a Status Report provides the opportunity to access other functions, using Touch-Tone™ push-button commands. Remote telephone commands include:

- Disabling/enabling any input.
- Disabling/enabling High Sound Alarm monitoring.
- Disabling/enabling AC Power monitoring.
- Activation of Listen-In Time.
- Activation of the Status Report.

To issue commands by telephone, first dial the number of the Model 1104 to access the Status Report. The Status Report will be followed by the programmed Listen-In Time. If you remain on the telephone, the Status Report will be repeated, followed by a 10 second waiting period and hang-up. During this 10 second waiting period, or *at any time during the call, other commands may be accessed by pressing any push button on the telephone.*

If a Security Code is in effect, the Model 1104 will prompt you with: “Enter Security Code.” If no Security Code is set, then it will say “O.K.”

- Enter your Security Code (4 digits) with the telephone push buttons. If the code you enter is correct, the Model 1104 will respond: “OK.”
- If you enter the wrong Security Code, the Model 1104 says, “Error. Have a good day,” and hangs up.



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***Disabling/enabling inputs*** – If an input is set to detect an alert condition, it can be disabled to prevent the Model 1104 from dialing out, or re-enabled at any time.

This feature allows the convenience of disabling an input, even if you are away from the site of the Model 1104. One such application may involve an input programmed to detect unauthorized entry. You are in another locale, but must allow someone else temporary access to the area monitored by the Model 1104. Using a Touch-Tone™ telephone, you can disable the appropriate input (thereby disabling any alarm dial-out response). The input remains disabled until you issue the same command, which effectively returns it to its former, enabled state.

Press the following push-buttons on the Touch-Tone™ telephone to execute the desired command:

**\* (asterisk), 1**

...equal to Sensor On/Off, for input 1. To re-enable the input, repeat the same Touch-Tone™ button sequence used for disabling.

**\* (asterisk), 2**

...equal to Sensor On/Off for input 2, and so on, for inputs up to 4. To re-enable the input, repeat the same Touch-Tone™ button sequence used for disabling.

***Disabling/enabling High Sound Monitoring*** –

**\* (asterisk), 9**

...equal to SENSOR ON/OFF for High Sound Alarm monitoring. To re-enable High Sound Alarm, repeat the command.

***Disabling/enabling AC Power*** –

**\* (asterisk), 0**

...equal to Sensor On/Off for AC Power monitoring. To re-enable AC Power monitoring, repeat the command.

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## ***Chapter 6: Acknowledgment, Status Report, and Remote Access***

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### ***Activating Listen-In Time –***

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**# (pound), 1**

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...initiates Listen-In Time for listening to on-site sounds  
for the programmed time available.

### ***Activating Status Report –***

**# (pound), 2**

...initiates a full recitation of the Status Report.

### ***Exiting –***

**# (pound), # (pound)**

...forces exit. The 1104 says, “*Have a good day,*” and  
hangs up.

**Sensaphone® Model 1104 User's Manual**

## NOTES

[illegible]

## **Chapter 7: Operation**

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After installation and programming is completed, the Model 1104 is fully operational. This chapter explains the sequence of events that occur during an alarm dialout to illustrate how the Model 1104 operates.

### **7.1 Alarm Detection, Dial-out and Acknowledgment**

Generally, an alarm event is structured in the following manner:

- I. The Model 1104 detects an alert condition due to a change at the sensor.
- II. A valid alarm is recognized.
- III. Dial-out begins.
- IV. The alarm is acknowledged.

Often, an alarm does not proceed through all stages: either an alert condition does not persist long enough to be considered valid, or a valid alarm is cancelled.

The table on the following page explains the alarm detection, dial-out and acknowledgment features and lists important variable factors affecting their operation.

## Sensaphone® Model 1104 User's Manual

I. Model 1104 Detects a Change at the Sensor	Variable Factors
<ul style="list-style-type: none"> <li>Model 1104 detects a change in the monitored condition (from the sensor wired to one of the inputs). This is considered an <i>alert condition</i>, and does not qualify as a valid alarm at this point.</li> <li>The condition continues throughout the programmed Recognition Time. If the condition (or sensor) reverts to its normal state before the Recognition Time is reached, no alarm will occur.</li> </ul>	<p><i>Input Type:</i> (1) An open circuit closes, (2) a closed circuit opens, or (3) temperature limits are exceeded.</p> <p><i>Recognition Time:</i> Activated</p>
II. A Valid Alarm Is Recognized	Variable Factors
<ul style="list-style-type: none"> <li>The condition must persist long enough to meet or exceed the programmed Recognition Time. When Recognition Time has expired, but the alert condition continues, the Model 1104 will determine that a valid alarm exists.</li> <li>When a valid alarm is determined, Call Delay is activated, forcing the Model 1104 to wait for a programmed period of time before starting the dial-out process. Call Delay applies to the period just prior to dial-out, before the first telephone call is made.</li> <li>Call Delay provides the opportunity to cancel a valid alarm at the Model 1104's installation site, before dial-out occurs. An audible voice message indicates which of the inputs is in alarm. If on-site personnel acknowledge the alarm within the Call Delay time, the Model 1104 will not dial out. (Local Voice Mute is disabled, so that alarm messages can be heard at the site.)</li> </ul>	<p><i>Recognition Time:</i> Expired</p> <p><i>Valid Alarm:</i> Exists</p> <p><i>Call Delay:</i> Activated</p> <p><i>Alarm Message:</i> Audible, On-site Activated</p> <p><i>Local Voice Mute:</i> Disabled</p>

## Chapter 7: Operation

III. Dial-out Begins	Variable Factors
<ul style="list-style-type: none"> <li>• The dial-out process is activated as soon as the Call Delay time expires (if the alarm has not been cancelled at the Model 1104's installation site.) The dial-out begins with telephone number 1 and proceeds sequentially, through the remaining telephone numbers.</li> <li>• If the alarm is not acknowledged with the first dial-out telephone call, the Model 1104 waits the duration of Intercall Time before dialing the next telephone number. Intercall Time is the programmed waiting period in between each dial-out telephone call.</li> <li>• When the telephone is answered, the programmed Voice Repetitions determine the number of times per call the Model 1104 recites the alarm message.</li> <li>• Call Progress, an automatic feature, enables the Model 1104 to detect whether or not the telephone call is answered. After 8 rings, or if a busy signal is encountered, the Model 1104 will hang up, wait the programmed Intercall Time, and proceed to dial the next telephone number.</li> <li>• If no telephone calls are answered, the Model 1104 dials out sequentially, through the remaining telephone numbers and continues to cycle until the programmed Maximum Number of Calls is reached.</li> <li>• When the telephone is answered, the Model 1104 will immediately begin reciting a message that indicates which of the inputs is in alarm. At the same time, the alarm message is repeating at the Model 1104's installation site. The Model 1104 will request acknowledgment, if it has not yet occurred.</li> </ul>	<p><i>Call Delay:</i> <i>Expired</i></p> <p><i>Intercall Time:</i> <i>Activated</i></p> <p><i>Voice Repetitions:</i> <i>Activated</i></p> <p><i>Call Progress:</i> <i>Activated</i></p> <p><i>Max Calls:</i> <i>Activated</i></p> <p><i>Alarm Messages:</i> <i>By Telephone</i> <i>and</i> <i>On site</i></p>

## Sensaphone® Model 1104 User's Manual

IV. The Alarm is Acknowledged	Variable Factors
<ul style="list-style-type: none"> <li>At any time after a valid alarm is determined, the alarm may be acknowledged at the Model 1104's installation site, by pressing any key.</li> <li>When the Model 1104 dials out and the call is answered via Touch-Tone telephone, any alarm may be instantly acknowledged by pressing "555."</li> <li>If the alarm message repeats for the number of programmed Voice Repetitions, and "555" has not been entered, the Model 1104 will say:   <i>"Indicate that you have received warning message."</i>   The Model 1104 waits 10 seconds for the Touch-Tone code "555" to be entered. If the code is entered within 10 seconds, it responds:   <i>"Warning message received by telephone number...(the Unit ID Number)."</i>   The alarm is considered acknowledged and the dialout concludes.</li> <li>If the Model 1104 does not receive the Touch-Tone code within 10 seconds, it recites the following and then hangs up:   <i>"Dial telephone number (gives the Unit ID Number) within...(the programmed Intercall Time.)"</i>   The recipient of this message must call the Model 1104 back within the period programmed for Intercall Time, in order to acknowledge the alarm. If Local Voice Mute is off, the unit will beep at the installation site while waiting for this call.</li> <li>Callback: The Model 1104 waits 10 rings before answering to guard against random acknowledgment. If an answering device is connected to the</li> </ul>	<p><i>Local, On-site Acknowledgment</i></p> <p><i>Touch-Tone Acknowledgment: Fast Code 555</i></p> <p><i>Touch-Tone Acknowledgment: Normal Code 555</i></p> <p><i>Tone or Pulse Callback Acknowledgment: Within Intercall Time</i></p>

## Chapter 7: Operation

### IV. The Alarm is Acknowledged

### Variable Factors

same line as the Model 1104 (and TAD is enabled), the Model 1104 will answer on the first ring. First, it recites the Status Report, followed by:

*"Warning message received by telephone number...(the number of your present location)."  
"Have a good day."*

When the Model 1104 hangs up, the alarm is acknowledged and dial-out stops.

- If calls remain unanswered, or if they are received by an answering machine or FAX, the Model 1104 continues the dialout sequence; it waits the Intercall Time and proceeds to dial the next telephone number. Telephone numbers are dialed sequentially, and this cycle continues for the number of Max Calls programmed. If no acknowledgment occurs, then at the completion of Max Calls, the alarm is automatically acknowledged and the dial-out process is terminated.

*Tone or Pulse  
Callback  
Acknowledgment:  
TAD Enabled*

*Max Calls  
Acknowledgment*

### NOTE

Acknowledging the alarm does not correct the situation! The alarm condition will still exist until the sensor is restored to its normal state.



## **7.2 Example:A Dial-out Telephone Call**

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The following parameters are selected for demonstration purposes:

- Model 1104 Unit ID Number is set to 555-5674.  
It is currently installed at your place of business.
- Dial-out Telephone Number 1 is programmed to 555-1234, your home telephone number.
- Voice Repetitions are set to 4.

The Model 1104 is detecting an alarm on input 2.

The telephone rings at 555-1234, your home number.

You answer the telephone and hear the following message:

*"Hello, this is telephone number 555-5674. The time is 8.30 P.M.  
Alert condition two exists."  
(4-seconds to hear on-site sound from unit's microphone.)*

*"Hello, this is telephone number 555-5674. The time is 8.30 P.M.  
Alert condition two exists."  
(4-seconds to hear on-site sound from unit's microphone.)*

*"Hello, this is telephone number 555-5674. The time is 8.30 P.M.  
Alert condition two exists."  
(4-seconds to hear on-site sound from unit's microphone.)*

*"Hello, this is telephone number 555-5674. The time is 8.30 P.M.  
Alert condition two exists."  
(4-seconds to hear on-site sound from unit's microphone.)*

*"Indicate you have received warning message."*

### **NOTE**

It is important that your dial-out telephone numbers be answered by you or other authorized personnel in order to ensure adequate response to an alarm.

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## Appendix A: Troubleshooting

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In the event that a problem is encountered, this section will assist you in determining the cause, so you can return the unit to its usual monitoring routine with minimal interruption.

Most problems with the Model 1104 are easy to identify and quickly corrected, and are found under the following general headings:

- Communications/dial-out functions
- Temperature monitoring
- Sound level monitoring
- Other monitoring functions

If you have tried the solutions outlined in this section and are not satisfied with the results, call Customer Service

**Communications / Dial-out:**

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
1. The Model 1104 fails to dial out.	<p>a) The telephone number may be incorrectly programmed.</p> <p>b) Tone or pulse (the current dialing method) is not compatible with the telephone line on which the Model 1104 is installed.</p> <p>c) Recognition Time is too long. An alert condition does not remain in effect long enough to become a valid alarm.</p> <p>d) Max Calls is set to zero.</p>	<p>Recheck programming steps. Refer to Chapter 4, Section 4.2.1.</p> <p>Switch from the current setting: from tone to pulse, or from pulse to tone. Refer to Chapter 4, Section 4.3.</p> <p>Reprogram Recognition Time. Set the Recognition Time to the minimum duration required to create a valid alarm. If possible, test the new setting by deliberately creating an alert condition. Refer to Chapter 5, Section 5.3.</p> <p>Reprogram Max Calls. It is a good idea to set your Max Calls to at least equal the number of dial-out telephone numbers programmed. Refer to Chapter 4, Section 4.12.1.</p>

## Appendix A: Troubleshooting

<p>e) The Model 1104 is connected to an incompatible telephone line.</p>	<p>The Model 1104 must be connected to a standard (2-wire analog) telephone line, <i>not</i> a <i>digital extension</i> to a phone system. If the unit will not dial out and the factors previously listed have been ruled out, try connecting the unit to a standard residential telephone line.</p>
<p>2. The Model 1104 will not answer the telephone when called for a Status Report or alarm acknowledgment.</p>	<p>a) Rings Until Answer is incorrectly programmed.</p> <p>Recheck programming of Rings Until Answer. Refer to Chapter 4, Section 4.5.1.</p> <p>b) The Model 1104 is connected to an incompatible telephone line.</p> <p>Some telephone systems will not allow the telephone to ring beyond 4 rings. If your Model 1104's Rings Until Answer is set at more than 4 rings, you may not be able to access the unit. Try setting the Rings Until Answer to less than 4 rings. If this does not correct the problem, it may indicate telephone line incompatibility. In this case, try connecting the Model 1104 to a standard, residential telephone line.</p>

**Communications / Dial-out:**

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
<p>(Continued from previous page)</p> <p>3. The Model 1104 will not answer the telephone for Callback Acknowledgement.</p>	<p>You did not allow the telephone to ring 10 times. <b>Note:</b> If the TAD (telephone answering device) is disabled, the telephone rings ten times before the Model 1104 answers. If the TAD is enabled, the telephone rings once before the Model 1104 answers the call.</p>	<p>When calling the Model 1104, and the TAD is disabled, allow the telephone to ring 10 times. Refer to Chapter 6, Section 6.1.3, and Chapter 4, Section 4.6.3.</p>
<p>4. The Model 1104 recites the alarm message or Status Report over the telephone, but is silent at the installation site.</p>	<p>The local voice mute feature is in effect.</p>	<p>Deactivate local voice mute. Refer to the programming steps in Chapter 4, Section 4.9.</p>
<p>5. The Model 1104 dials out correctly but fails to audibly recite its alarm message when you answer the call.</p>	<p>Voice Reps is set to zero.</p>	<p>Reprogram Voice Reps to 1 or greater. Refer to Chapter 4, Section 4.10.</p>
<p>6. The Model 1104 and telephone answering device (sharing the same line) answer incoming calls simultaneously.</p>	<p>The Model 1104's number of Rings Until Answer is set to equal the number of rings set for the telephone answering device.</p>	<p>Change the number of Rings Until Answer for the Model 1104. Refer to Chapter 4, Section 4.5.</p>

### Temperature Monitoring:

Problem	Cause	Solution
1. Can't program temperature limits; or the unit won't read the temperature sensor.	The input isn't configured to read a temperature sensor.	Press SET and CONFIGURE to program the input. (See Section 5.1.1 for more information on configuring inputs.)
2. The temperature reading is -20° F or -30° C.	The temperature sensor has been disconnected or has broken wires.	Examine the wires to temperature sensor and connect or replace wiring.
3. Temperature reads 150° F or 65° C.	Temperature sensor wires are touching or have shorted.	Verify and correct wiring.
4. Temperature reading is inaccurate.	<p>a) Temperature sensing may be affected by a source of ambient heat (ie., direct sunlight, or heat duct proximity).</p> <p>b) Temperature may require calibration.</p> <p>c) The unit is using the wrong temperature scale (Fahrenheit vs. Celsius).</p>	<p>Try moving the unit to a different location.</p> <p>After moving or placing the unit away from ambient heat sources, the temperature may be calibrated to offset inaccurate normal reading by several degrees. Refer to Chapter 5, Section 5.6.</p> <p>Verify temperature scale. See Chapter 5, Section 5.5.</p>

**Sound Level Monitoring:**

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
1. False high sound alarms occur frequently.	The programmed sound sensitivity results in over-sensitivity to non-alarm sound as well as alarm sound.  Sound Recognition Time is too short.	Reprogram the sound sensitivity. Refer to Chapter 5, Section 5.10.  Lengthen the sound Recognition Time. Refer to Chapter 5, Section 5.10.
2. High sound does not cause an alarm.	The unit is not close enough to the high sound source, or the programmed sound setting results in a lack of sensitivity to high sound.	Move the unit closer or reprogram the sound sensitivity. Refer to Chapter 5, Section 5.10.

**Other Monitoring:**

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
1. Alarm status of an alert input is incorrect.	Incorrect input normality.	Reconfigure the input. See Chapter 5, Section 5.1.
2. False power out alarms	Programmed Recognition Time is too short.	AC power is often subject to brief interruptions. To avoid frequent, false alarms, increase the power Recognition Time. Refer to Chapter 5, Section 5.9.

## Appendix A: Troubleshooting

<p>3. The Model 1104 does not recognize power failure.</p>	<p>a) Batteries are either incorrectly installed or drained.</p> <p>To verify proper battery function, unplug the unit and verify continued operation using batteries only. If unit ceases to function, first try reinstalling the batteries. If this is not successful, replace the batteries. Refer to Chapter 2, Section 2.4 for complete instructions.</p> <p>b) Recognition time setting is too long.</p> <p>Reprogram Recognition Time. Set the Recognition Time to the minimum required before a valid alarm occurs. If possible, test the condition by deliberately creating an alert condition. Refer to Chapter 5, Section 5.9.</p>
<p>4. The Model 1104 does not recognize any alarm.</p>	<p>a) Inputs for alarm are disabled.</p> <p>Enable the inputs for alarm. Refer to Chapter 5, Section 5.2.</p> <p>b) Programmed Recognition Time is too long.</p> <p>Reprogram Recognition Time. Set the Recognition Time to the minimum required for a monitored condition to become a valid alarm. If possible, test the condition by deliberately creating an alert condition. Refer to Chapter 5, Section 5.3.</p>



## Other Monitoring:

Problem	Cause	Solution
1. The batteries drain prematurely.	The unit's AC transformer is unplugged or for some other reason, full AC power is not available to the unit.	The batteries will take over powering the unit when the AC transformer is unplugged from the 120 VAC outlet. When storing the unit, be sure to remove the batteries. Refer to Chapter 2, Section 2.4. Be sure to use alkaline batteries—do not use rechargeable nicad batteries.
<p>If the solutions offered above do not appear to correct the problem, apply the following steps, in the order shown.</p> <ul style="list-style-type: none"> <li>• Remove the batteries.</li> <li>• Unplug the unit.</li> <li>• Wait one minute for the Model 1104 to completely power down.</li> <li>• Plug in the unit's AC adaptor into a standard 120 VAC outlet.</li> <li>• Replace the batteries.</li> <li>• Reconfigure the inputs. Refer to Chapter 5, Section 5.1.</li> </ul> <p>Refer to Chapter 2, Installation, for additional information on batteries and installation procedures.</p>		

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## **Appendix B: Checking your Sensaphone for Proper Operation**

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We recommend that you test your Sensaphone weekly to be sure it is functioning properly. This will ensure that when a problem arises the Sensaphone will be ready to alert the appropriate personnel.

There are several tests that can be performed:

- 1) Call the unit and listen to the Status Report. This will test the unit's ability to answer the phone and speak a message. It will also verify that all of the inputs are reading properly, the alarm conditions are OK, the electricity is on, the microphone is functioning, and the batteries are OK.
- 2) Create an alarm on each input and allow the unit to contact all programmed telephone numbers. This will make sure that the Sensaphone is programmed properly. It will also prepare personnel to respond appropriately when they receive a call from the Sensaphone.
- 3) Test the batteries by unplugging the AC adapter and making sure that the Sensaphone continues to function. Press WHAT IS, then STATUS on the keypad, and listen to the status report. Make sure the report states that "the electricity is off" and "battery condition OK". Keep the AC adapter unplugged so that a Power Failure alarm occurs. Allow the unit to dial all programmed telephone numbers while running on battery backup. Plug in the AC adapter after the unit has finished dialing all of the telephone numbers.
- 4) If you are using your Sensaphone to listen for a smoke alarm, then be sure to test the smoke alarm to make sure that the Sensaphone picks up the audible signal and triggers a high-sound-level alarm. Allow the unit to dial all programmed telephone numbers.

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## ***Sensaphone® Model 1104 User's Manual***

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## Appendix C

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### Accessories

The sensors listed below are available from Phonetics, and represent the most commonly used input devices. Other dry contact sensors, designed for more specialized applications, may also be used. Commercial or industrial electrical supply houses can provide devices to monitor virtually any condition. For further information, contact Phonetics Customer Service at (610) 558-2700.

PART NUMBER	SENSOR / SWITCH
FGD-0006	Magnetic Reed Switch
FGD-0007	Passive Infra-Red Detector
FGD-0010	Accessory Hook-Up Wire
FGD-0013	Water Detection Sensor
FGD-0022	Temp° Alert
FGD-0023	ISOTEL Surge Protector
FGD-0027	Humidistat
FGD-0049	Smoke Detector with Built-in Relay
FGD-0100	Remote Temperature Sensor
FGD-0101	Weatherproof Temperature Probe
FGD-0200	Phonecell SX3e Cellular Phone

# Sensaphone® Model 1104 User's Manual

## NOTES

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## **Appendix D: Returning the Unit for Repair**

In the event that the Model 1104 does not function properly, we suggest that you do the following:

- 1) Record your observations regarding the Model 1104's malfunction.
- 2) Call the Technical Service Department

## **1 YEAR LIMITED WARRANTY**

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1. **WARRANTOR:** Dealer, Distributor, Manufacturer

2. **ELEMENTS OF WARRANTY:** This Product is warranted to be free from defects in materials and craftsmanship with only the limitations and exclusions set out below.

3. **WARRANTY AND REMEDY: One-Year Warranty** — In the event that the Product does not conform to this warranty at any time during the time of one year from original purchase, warrantor will repair the defect and return it to you at no charge.

This warranty shall terminate and be of no further effect at the time the Product is (1) damaged by extraneous cause such as fire, water, lightning, etc. or not maintained as reasonable and necessary; (2) modified; (3) improperly installed; (4) repaired by someone other than warrantor; (5) used in a manner or purpose for which the Product was not intended; or (6) sold by original purchaser.

WARRANTORS' OBLIGATION UNDER THIS WARRANTY IS LIMITED TO REPAIR OR REPLACEMENT OF THE PRODUCT. THIS WARRANTY DOES NOT COVER PAYMENT OR PROVIDE FOR THE REIMBURSEMENT OF PAYMENT OF INCIDENTAL OR CONSEQUENTIAL DAMAGES.

It must be clear that the warrantors are not insuring your premises or guaranteeing that there will not be damage to your person or property if you use this Product. The warrantors shall not be liable under any circumstances for damage to your person or property or some other person or that person's property by reason of the sale of this product or its failure to operate in the manner in which it is designed. The warrantors' liability, if any, shall be limited to the original cost of the Product. The warrantors assume no liability for installation of the Product and/or interruptions of the service due to strikes, riots, floods, fire, and/or any cause beyond Seller's control.

4. **PROCEDURE FOR OBTAINING PERFORMANCE OF WARRANTY:** In the event that the Product does not conform to this warranty, the Product should be shipped or delivered freight prepaid to a warrantor with evidence of original purchase.

5. **LEGAL REMEDIES:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state to the extent allowed by law expressly in lieu of any other express or implied warranty, condition, or guarantee.

Effective date 07/01/90

***Phonetics, Inc.***

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