Delta Cooling Towers, Inc.

Pioneer® Forced Draft Cooling Towers

Installation, Operation and Maintenance Manual

WARNING.....
Before unloading tower, read entire manual and follow instructions.
Failure to do so could void Warranty
Important: Delta’s cooling towers have been designed to provide trouble-free service over an extended period of time. To obtain the design performance, it is necessary that the cooling tower be installed, operated and maintained as prescribed in these instructions.

Only persons possessing the skill and experience described herein should attempt to install this equipment. Prior to installation, these instructions should be read carefully by the person who is to install the cooling tower to be certain that its installation, operation and maintenance are thoroughly understood.

Questions regarding the installation, operation or maintenance of this equipment should be directed to Delta Cooling Towers, Inc., Rockaway, New Jersey, (Telephone: 973/586-2201).

Step-by-step instructions contained in this brochure are based on normal installation conditions only. Abnormal or unusual combinations of field conditions should be brought to the attention of Delta Cooling Towers or its representative prior to installation of the equipment. The information contained herein is subject to change without notice in the interest of product improvement.

If installation instructions are not clearly understood, consult Delta Cooling Towers for additional information before commencing erection.

Improper Storage, Handling, Installation, or Field Modifications of equipment may result in damage and loss of warranty protection.
**Principle of Cooling Towers**

All Cooling Towers operate on the principle of removing heat from water by evaporating a small portion of the water that is recirculated through the unit. The heat that is removed is called the latent heat of vaporization. Each one pound of water that is evaporated removes approximately 1,000 BTU's in the form of latent heat.

**Cooling Tower Terms and Definitions**

**BTU** - A BTU is the heat energy required to raise the temperature of one pound of water one degree Fahrenheit in the range from 32° F. to 212° F.

**Cooling Range** - The difference in temperature between the hot water entering the tower and the cold water leaving the tower is the cooling range.

**Approach** - The difference between the temperature of the cold water leaving the tower and the wet-bulb temperature of the air is known as the approach. The approach fixes the operating temperature of the tower and is a most important parameter in determining both tower size and cost.

**Drift** - The water entrained in the air flow and discharged to the atmosphere. Drift loss does not include water lost by evaporation. Proper tower design and operation can minimize drift loss.

**Heat Load** - The amount of heat to be removed from the circulating water through the tower. Heat load is equal to water circulation rate (gpm) times the cooling range times 500 and is expressed in BTU/hr. Heat load is also an important parameter in determining tower size and cost.

**Ton** - An evaporative cooling ton is 15,000 BTU's per hour.

**Wet-Bulb Temperature** - The lowest temperature that water theoretically can reach by evaporation. Wet-Bulb Temperature is an extremely important parameter in tower selection and design and should be measured by a psychrometer.

**Pumping Head** - The pressure required to pump the water from the tower basin, through the entire system and return to the top of the tower.

**Make-Up** - The amount of water required to replace normal losses caused by bleed-off, drift, and evaporation.

**Bleed Off (Blowdown)** - The circulating water in the tower which is discharged to waste to help keep the dissolved solids concentrating in the water below a maximum allowable limit. As a result of evaporation, dissolved solids concentration will continually increase unless reduced by bleed off.
Installation of Your Pioneer® Cooling Tower

Safety Procedures

CAUTION:
Observe safety procedures during installation and whenever construction is under way.

- Always disconnect & lock out main power supply before working on motors and other electrical equipment.
- Stand clear of rotating equipment during start-up.
- Before start-up replace all guards removed during installation, that protect pinch areas of V-belts, sheaves and other rotating equipment.
- Avoid contact with open flame or heat source that could cause combustion.

Observe recommended safety precautions whenever construction involving welding, a cutting torch, a blowtorch or any other such equipment is under way within the immediate area.

How to Prevent Reverse Siphoning:
Reverse siphoning is a back flow of non-potable, recirculating water into a potable water system which can occur through the make-up float valve assembly located in the water reservoir of a cooling tower.

Should the valve malfunction, blockage of the overflow or outlet lines would cause a high water level in the reservoir, causing the make-up water pressure to drop below atmospheric pressure creating a vacuum at the make-up inlet. To prevent reverse siphoning, install a check valve in the water make-up supply line to the cooling tower.

NOTE: Do not cap the overflow connection.

Location of the Pioneer® Cooling Tower
Proper location of the cooling tower is essential to its satisfactory operation. The following are recommendations for selecting a cooling tower location. Consult the factory or our representatives for additional assistance in selecting equipment and equipment locations.

- Select an open site having an unobstructed air supply and free air motion.
- If the site is adjacent to a wall or other structure that blocks prevailing winds, install the cooling tower so the top discharge is slightly higher than the structure. Locate blower at the farthest point from the structure, facing the direction of the prevailing winds.
- Gravity drain to an indoor storage Sump requires proper head differential and pipe design considerations. Allowance must be given based on flow, pipe size, piping layout and distance cooling tower is located from the indoor storage sump. (See chart page 3)
- Should it be necessary to locate the cooling tower near walls, within enclosures, or indoors, choose a location that will not restrict airflow. Do not install the cooling tower in a well or below the level of an obstruction that might impede air discharge, cause short circuit of air flow, or result in recirculation of the discharge air back into the blowers.
- Do not locate the cooling tower near heat-generating equipment, exhaust vents or pipes which could interfere with the temperature of inlet air and raise the ambient wet-bulb temperature to the cooling tower.
- Do not install a canopy or roof of any kind over the cooling tower that would deflect discharge air back down around the cooling tower and cause recirculation of the discharge air back into the blowers.

Hoisting

Cooling Tower
For roof mounted installations, it is recommended that a hoist using two or more safety slings and spreader bars, as shown in the illustration, be used-to lift the cooling tower onto the building.

Secure the safety slings completely around and under the cooling tower. Provide padding to protect the edges of the polyethylene shell at points of sling contact. The slings should be secured in a girdle fashion for a double secure point of lift. Slings should be brought up snug around the tower before lifting onto the building.

NOTE: Do not use guy wire U-bolts for hoisting.

Blower Assembly
The blower assembly should be hoisted separately onto the building, prior to the removal of the shipping skid, in the same manner as the cooling tower.

Note: Do not use blower support frame for hoisting.

Any questions regarding hoisting for roof mounted installations should be directed to Delta.

Cooling Tower Installation
Delta cooling towers have been designed to provide maximum performance, long life and trouble-free service. To assure optimum performance, the following recommendations should be followed as closely as possible.

Positioning the Tower
The cooling tower should be installed on a continuous firm, smooth and level concrete, steel or wood foundation.

Note: The tower must be anchored to the foundation with ¼” guy wires using the four U-bolts provided at the top of the cooling tower shell. Hand tightening of guy wires is sufficient. Do not over-tension.

Spacing for piping and service access should be considered when positioning the cooling tower. Also to insure an adequate positive suction head, the pump should be located below the bottom of the cooling tower sump.

Indoor installation
Typically, cooling towers are placed outside, either on the roof or adjacent to a building. If the situation dictates indoor installation, make sure there is ample fresh air available around the blower inlets of the tower. Restricted amounts of fresh air will lead to poor tower performance. It is also necessary to attach a duct to the tower discharge to convey the hot, humid air to the outside. All ducting should be independently supported and be kept as short and straight as possible. The duct size must not be smaller than the inlet and
discharge openings. Blowers may require adjustment to accommodate ducting for indoor installation. Consult the factory for the recommended motor and drive selection when duct exterior static pressure (ESP) is 1/8" W.C. or greater. It is recommended that the inlet and discharge ducting be screened to prevent foreign objects from entering. Should prevailing winds blow into a horizontal discharge, it is recommended that a suitable windbreak be installed several feet away.

**Cold Weather Protection**

The cooling tower may require protection against freezing at light heat loads when the wet-bulb temperature is under 32°F, or during shutdown when the temperature drops below 32°F.

The following methods are recommended for use with Delta cooling towers for protection during cold weather conditions. Recommended equipment is optional and may be ordered from the factory. Consult the factory for further information on which equipment to choose for your specific application.

**Separate Indoor Sump**

This method is a virtually foolproof anti-freeze protection system with the added advantage of minimum maintenance. The indoor sump tank should be large enough to fill the entire recirculation system without danger of pump cavitation. As a general rule, the tank should be sized to hold three times the rate of circulation in gallons per minute (gpm).

The tank should be provided with properly sized overflow, makeup, drain and suction connections. When a separate sump tank is ordered with a cooling tower, the water makeup valve assembly and the overflow and drain connections are installed in the indoor sump only. A bottom outlet can be provided for gravity drain to the indoor sump tank. See illustration on page 6.

### Gravity Drain Outlet Size Selection Chart

<table>
<thead>
<tr>
<th>Outlet Size (inches)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Feet (gpm)</td>
<td>0.5</td>
<td>20</td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>65</td>
<td>95</td>
<td>215</td>
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<tr>
<td>2</td>
<td>35</td>
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<td>305</td>
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<td>3</td>
<td>40</td>
<td>110</td>
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<td>53</td>
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<td>7</td>
<td>62</td>
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</tr>
<tr>
<td>8</td>
<td>66</td>
<td>180</td>
<td>270</td>
<td>600</td>
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<tr>
<td>9</td>
<td>70</td>
<td>190</td>
<td>285</td>
<td>645</td>
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<td>10</td>
<td>74</td>
<td>200</td>
<td>300</td>
<td>675</td>
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<tr>
<td>12</td>
<td>81</td>
<td>220</td>
<td>325</td>
<td>715</td>
</tr>
<tr>
<td>15</td>
<td>90</td>
<td>245</td>
<td>365</td>
<td>825</td>
</tr>
</tbody>
</table>

Notes: The above gpm flow rates, for the outlet sizes shown, are calculated for cold water gravity drain through piping designed for direct and short horizontal runs before dropping vertically to the indoor sump tank.

### Electric Immersion Heater

Cooling towers ordered with anti-freeze systems are shipped with a protective seat secured under the immersion heater element that is to remain in place during operation to protect the polyethylene shell from direct contact with the heater element.

Note: This protective seat is **NOT** a shipping brace and **must not be removed**.

Final installation and wiring of the Heater Element, Control Panel, and Heater Probe must be completed in strict accordance with the enclosed manufacturer’s Installation, Operation, and Maintenance Instructions. Failure to follow the manufacturer’s IOM can lead to potential equipment damage and voiding of equipment warranties.
Thermostatic On-Off Control
A thermostatically controlled blower for on-off operation should be considered as an energy-saving feature during winter operation. The thermostatic control can be field set to insure automatic blower shut-down when cold water drops below design temperature, as well as blower start-up when cold water rises to design temperature. A thermostatic control provides excellent cooling tower anti-freeze protection while reducing operating costs through out cold weather operation.

PVC Distribution system
To prevent damage to the PVC distribution system during cold weather shut-down, install an automatic or manual drain line from the hot water inlet piping as close to the cooling tower inlet as possible. Locate this drain line to allow the water to drain either to waste or to an indoor storage tank. This precaution will prevent water from being trapped and possibly freezing inside the distribution system.

Piping
When the cooling tower is located outdoors, adequate measures including the use of heat tracing tape and insulation should be considered to protect outdoor water lines from freezing.

Piping and Tower Connections
- Piping should be adequately sized according to accepted standard practices. Refer to cooling tower drawings for size and types of cooling tower connections furnished as standard.

- On multiple tower installations, pipe sizing should balance pressure drops to provide equal inlet pressures. Equalizing fittings can be provided in cooling tower sumps and are available as an option from the factory. Each unit should be valved separately to allow for flow balance or isolation from service.

- All supply and return piping must be independently supported. See page 5 for instructions for the preparation and cementing of internal and external piping.

- An inlet pressure gauge should be installed immediately before the cooling tower inlet connection. See Operating Design Condition Checklist page 6, and illustration page 3.

- The makeup connection is provided with a float valve and ball assembly for proper water level control.

- The overflow connection includes an elbow with extension pipe that drops below the water level in the tower sump.

Note: Never block overflow connection. Water should be allowed to flow freely without obstruction. See how to prevent reverse siphoning page 2.

- The outlet connections for pump suction applications are provided with a vortex breaker.

Note: For gravity flow applications, a vortex breaker is not required or provided. A vent pipe or bleed valve should be installed at the highest elbow of the piping system, to prevent air locks and insure free flow of water. Air locks can cause gravity flow restriction resulting in excessive water accumulation and eventual overflow of the cooling tower.

- The outlet, makeup and overflow connections are notched at the outer ridge and should be held in position with the notch at 12 o’clock. This is to insure proper spray nozzle position.

- PVC bulkhead connections must be held steady and in their factory-installed positions when the connecting piping is being installed.

- When threading pipe to the bulkhead fittings, do not allow fittings to turn. Turning can loosen the locknut or squeeze the gasket out of position and may cause leaks. PVC bulkhead fittings should be tightened with a chain wrench so that the gaskets sit property between the cooling tower shell and the fitting. Do not over tighten. A bulkhead fitting that is too tight or too loose can cause the gasket to crimp or squeeze away from the locknut, causing leaks around these connections.

Duct To Blower Housing Installation
- To install the cooling tower air duct to the blower housing, place the lip of the duct over the lip of the blower housing as shown. With seven screws supplied, fasten duct to housing using two screws on each side and three on the bottom.

- Seal off air leaks around the duct with duct tape.

Note: the blower support frame must be bolted to the foundation. The assembly is furnished with pre-drilled bolt holes. Shimming may be required for perfect fit.

- Damage to painted surface of blower housing during installation must be repaired immediately to prevent corrosion.
PVC Solvent Cementing Instructions

The following procedure is recommended for the preparation and cementing of internal and external piping for Delta cooling towers:

- Cut ends of pipe square using a hand saw and miter box. Tube cutters with wheels designed for use with PVC are acceptable, providing they do not leave a raised bead on the outside diameter of the pipe.

- Use a chamfering tool or file to put a 10° to 15° chamfer on the end of the pipe. Lightly sand the area to be cemented to remove gloss. Using a clean rag, wipe pipe surface and fitting socket to remove dirt, moisture and grease. Acetone or similar solvent is recommended for cleaning.

- Check “dry fit” of pipe and fitting by inserting the pipe at least 1/3 of the way into the fitting. Position pipe and fitting to assure alignment. Pipe and fitting should be at same temperature condition.

Using a clean, natural bristle brush about ½ and size of the pipe diameter, apply P-70 primer to the fitting socket. Apply primer with a scrubbing motion until the surface is penetrated. Primer should never be applied with a rag. Repeated applications may be necessary to achieve the desired dissolving action. In the same manner, apply primer to the pipe surface equal to the depth of the fitting socket, making sure the surface is well penetrated. Reapply primer to the fitting socket to make sure it is still wet.

- While both surfaces are still wet with primer, use a clean brush to apply a liberal coat of solvent cement to the male end of the pipe. The amount should be more than sufficient to fill any gap.

- While both surfaces are still wet with solvent cement, insert the pipe into the socket with a quarter-turn twisting motion. The pipe must be inserted the full length of the socket. The application of solvent cement to pipe and fitting, and the insertion of the pipe into the fitting, should be completed in less than one minute. If necessary, two persons should apply solvent cement to the pipe and fitting simultaneously.

- Hold the joint together for approximately 30 seconds until both surfaces are firmly gripped. After assembly, a properly made joint will usually show a bead of cement around its entire perimeter. This should be brushed off.

It is recommended that the joint be allowed to cure for 24 ours before pressure testing.

V-belt Alignment and Tensioning

Proper belt tension is the most important factor in the successful operation of a V-belt drive. The belt tension should be checked frequently during the first 24 hours of operation and then periodically on a maintenance schedule. Loose belts cause slippage which reduces air flow and can adversely affect belt life and cooling tower performance.

The following belt tensioning procedure is recommended:

- Check that the driver and driven sheaves are in alignment by placing a straight edge across the sheaves at four contact points as shown. If realignment is required, loosen the motor sheave bushing screws and align the sheaves.

- To tension the belts, adjust the motor base so that the belt will deflect about ½" when moderate pressure is applied to the belt midway between the sheaves as shown in the illustration.

Note: Excessive belt tension can shorten belt and bearing life. Loose belts or misaligned sheaves can cause unseating and breakage of belts. Replacement of multiple belt systems should be made in matched sets.

Initial Start-Up

- Clean accumulated debris from inside shell bottom.

- Check that blower fan motor is properly wired for counter-clockwise (ccw) rotation of the blower wheel as viewed from the sheave side of the blower assembly. Reverse leads will cause incorrect rotation and inhibit required airflow.

- Fan bearings should be re-lubricated if tower has been in the field three months or longer prior to start-up.

- Check sheave alignment and belt tension. See illustration.

- Fill cold water sump to overflow level.

Operation of Your Pioneer® Cooling Tower.
Water recirculation pump(s) should be primed and all piping below the tower sump filled with water. Check pump for proper shaft rotation.

Start water recirculation pump(s) and adjust flow to produce proper inlet spray pressure. An inlet pressure gauge should be installed immediately before the cooling tower inlet connection.

Water Treatment
The Delta cooling tower shell and internal components are fabricated of corrosion-resistant plastics and are resistant to water treatment chemicals including common fungicides and bactericides.

Follow appropriate water treatment practices as required and take frequent sample tests to avoid possible water contamination. We also recommend water treatment maintenance as a measure of protection for the environment in the vicinity of any cooling tower or evaporative condenser equipment.

To determine the appropriate water treatment practices for your particular application, it is suggested that you contact a water treatment firm for their recommendation. A list of water treatment firms is available for your reference.

It is not necessarily complete nor do we recommend a specific firm. The list will be mailed to you on request.

Bleed off is also important to water quality. Evaporation of the recirculated water does not remove the dissolved solids that are present in the water. Without bleed off, the continual buildup of these solids will impair the proper functioning of the piping and other equipment in the system.

A bleed line can be connected in any part of the system with routing to the sewer. Normally, it is most desirable to make this connection in the hot water line at the cooling tower. A petcock type valve, installed in the bleed line for proper control is recommended. The required amount of bleed-off water must be substituted with properly controlled amounts of make-up water.
Disassembly and Cleaning

For Pioneer® Models DT-10 through DT-40

- Remove the drift eliminator from the cooling tower. It is flexible enough to push the outer perimeter toward the center and lift over the top lip of the cooling tower shell. Begin at one point and work carefully around the entire circumference of the drift eliminator.

- Models DT-30 and DT-40 are designed without a top lip so the drift eliminator can be easily lifted up and away from the shell.

- Remove the water distribution spray system from inside the cooling tower. The spray system is installed across the top of the tower directly under the drift eliminator. Disconnect locknuts at each end of system and remove piping by elongating top of tower shell slightly.

- Remove the wet decking from the cooling tower shell using the plastic hand straps attached for lifting. The wet decking has a smaller diameter than the drift eliminator and will lift easily out of the shell once the distribution spray system is removed.

- When the internal components are removed the empty shell can be cleaned and inspected, it is recommended that the water distribution laterals and nozzles be cleaned and flushed before reassembly.

- To reassemble components, reverse the above procedure. Before installing the drift eliminator, pump water through the distribution system to be sure there is a good spray pattern and proper water distribution over the wet decking surface.

For Pioneer® Models T-50 through T-100

Same procedure as above except:

- These models are designed so the drift eliminator can be easily lifted up and away from the cooling tower shell. The spray tree sections of the water distribution system are threaded to a coupling and unscrew easily. Hold and turn the entire riser below the lateral and nozzles, then carefully remove the whole assembly.

- The wet decking can now be easily removed using the plastic hand straps attached for lifting.
**Preventative Maintenance Checklist**

To avoid costly cooling tower downtime, the following replacement parts should be carried in inventory at the installation site:
- V-belts
- Blower bearings
- Make-up float, or complete make-up valve assembly
- Blower shaft
- Blower motor
- Or, a complete blower assembly including bearings, shaft, sheaves, V-belts and motor.

When ordering, include model number and serial number of the cooling tower as it appears on the tower nameplate.

Under normal conditions, shipment of factory replacement parts is made within one day after the order is received. Spare pumps and pump parts as well as control panel components, such as fuses and heaters for magnetic starters, are also available.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Monthly</th>
<th>Every 3 Months</th>
<th>Every 6 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspect general condition of cooling tower. (It is never necessary to scrape or paint a Delta Cooling Tower.)</td>
<td></td>
<td></td>
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<tr>
<td>Check water level in cold water basin. Adjust if necessary.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Check float ball and make-up valve for proper operation.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Check line voltage, motor amperage and fan wheel rpm.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Check belt tension and general condition of V-belts.</td>
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<td></td>
</tr>
<tr>
<td>Clean outside of blower motor to help assure proper cooling.</td>
<td></td>
<td></td>
<td>✫</td>
</tr>
<tr>
<td>Lubricate blower bearings and fan motor using a low pressure grease gun.</td>
<td></td>
<td>✫</td>
<td></td>
</tr>
<tr>
<td>Check All Bolts that can cause unbalance and vibration. Retighten to specified torque. Also check for fan base/motor corrosion that may lead to failure or dislodged piece falling into the airstream.</td>
<td></td>
<td></td>
<td>✫</td>
</tr>
<tr>
<td>Clean and flush cold water basin.</td>
<td></td>
<td></td>
<td>✫</td>
</tr>
<tr>
<td>Lubricate motor base and adjusting screw.</td>
<td></td>
<td></td>
<td>✫</td>
</tr>
</tbody>
</table>

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**Pioneer® Recommended Replacement Parts**
C. Terms and Conditions

1. Sale Not a Consumer Transaction: Buyer agrees that the purchase of Delta’s Products (hereinafter “Product”) is not for consumer, household or family purposes.

2. Agreement of Sale: Acceptance: Any acceptance contained herein is expressly made conditional on Buyer’s assent to any terms contained herein that are additional or different from those proposed by Buyer in its purchase order and hence any terms and provisions of Buyer’s purchase order which are inconsistent with the terms and conditions hereof shall not be binding on the Seller. Unless Buyer shall notify Seller in writing to the contrary as soon as practicable after receipt hereof, acceptance of the terms and conditions hereof by Buyer shall be deemed made and, in the absence of such notification the sale and shipment by the Seller of the goods covered hereby shall be conclusively deemed to be subject to the terms and conditions hereof.

3. Entire Contract: This contract constitutes the final and entire agreement between Seller and Buyer and any prior or contemporaneous understandings or agreements, oral or written are merged herein.

The sales and technical representatives of the Seller are not authorized to make warranties about the product. Seller’s representatives’ oral statements do not constitute warranties, shall not be relied upon by the Buyer, and are not part of the contract for sale. Any product literature, operating instructions, and statements contained therein, do not constitute warranties, shall not be relied upon by the Buyer and are not part of the contract for sale. The entire contract is evidenced in this writing and no other warranties are given beyond those set forth in this contract. This writing constitutes the final written expression of the parties’ agreement, and it is a complete and exclusive statement of the terms of the agreement.

4. Prices: Except where expressly agreed, all prices are subject to change without notice. If there is a delay in approval of drawings related to this contract beyond 30 days, an escalation in selling price may occur due to a rise in labor and/or material prices.

5. Taxes: The price of goods does not include sales, use, excise, ad valorem, property or other taxes now or hereafter imposed, directly or indirectly by any governmental authority or agency with respect to the manufacture, production, sale, delivery, consumption or use of goods covered by this contract. Buyer shall pay such taxes directly or reimburse Seller for any such taxes which it may be required to pay.

6. Payment: The specific terms of payment are as specified in writing by Seller. If the Buyer shall fail to make any payments in accordance with the terms and provisions hereof, the Seller, in addition to its other rights and remedies, but not in limitation thereof, may, at its option, defer shipments or deliveries hereunder, or under any other contract with the Buyer, except upon receipt of satisfactory security or of cash before shipment.

7. Shipment: Risk of Loss Title: The goods shall be shipped FOB Seller’s shipping points. Risk of loss shall pass to Buyer upon delivery to the carrier. Title shall pass to Buyer on delivery to the carrier. The date of delivery provided herein is an approximation based on Seller’s best judgment. Seller shall be excused for delay in delivery, may suspend performance and shall under no circumstances be responsible for failure to fill any orders when due to acts of God or the public enemy; fires; floods; riots; strike, employee work stoppage; delays caused by material shortages; or power at current prices or on an account of shortages thereof; any existing or future laws or acts of the Federal or of any State Government or administrative body (including specifically, but not exclusively, any orders, rules or regulations issued by any official or agency of any such government).

8. Limited Warranty: Seller warrants that the cylindrical, seamless molded polyethylene shell of the Product shall be free from defects in materials and workmanship for a period of TWO (20) years from the date of shipment. Since the Product once in operation is under the sole control of the User, this warranty is further subject to and shall be applicable only if all of the following conditions are met:

a. The Product has been properly erected in accordance with the Seller’s instructions and in accordance with good installation practices;

b. Seller’s instructions and recommendations as to operation and maintenance have been followed, including those contained in the manual furnished with the Product;

c. The Product has been used under normal operating conditions;

d. The Product has not been affected by misuse, neglect, accident or abrasion;

e. The User has not attempted or performed corrective work on the Product without Seller’s prior written consent; and

f. The Seller shall have received notice of any defect no later than 10 days after User first has knowledge of same.

Except where expressly noted otherwise, Seller warrants all Product components, other than moving parts, against defects in workmanship and material for a period of ONE (1) year from the date of shipment, provided the equipment has been properly maintained and operated under normal conditions. Motors carry a normal manufacturer’s FIVE (5) year warranty against defects in workmanship and materials beginning from the date of shipment and subject to the same conditions of proper use and operation as other components of the Product. Bearings, pulleys, belts or other moving parts and components are sold without any warranty.

10. Disclaimer of All Other Warranties and Guarantees: The sole warranty is the sole and only warranty or guarantee relating to the product provided under this Agreement, and is in substitution for, and in lieu of, any and all other warranties, written or oral, expressed, implied or statutory including any warranty of merchantability or of fitness for a particular purpose.

11. Correction of Defects as Sole Remedy: If the Buyer/User notifies Seller in writing of any defects in the product within any period of warranty described herein and the Seller’s inspection confirms the existence of such defect, the Seller, at its option, shall correct the defect or defects either by repair, providing repair tools and instructions, or replacement, FOB Seller’s shipping point, or refund the purchase price of the product. The remedies provided Buyer/User herein for breach of Seller’s warranty shall be exclusive.

No expense, liability or responsibility will be assumed by the Seller for repairs made by other than Seller’s agent without written authority from the Seller. Remedial action, in the manner and for the period of time provided above, shall constitute fulfillment of all liabilities of Seller to the Buyer / User, and Buyer/User’s sole remedy hereunder, whether based on contract, tort or otherwise. The sole purpose of stipulated exclusive remedy shall be to provide the User with free repair and replacement of defective parts in the manner provided herein. This exclusive remedy shall not be deemed to have failed of its essential purpose so long as the Seller is willing and able to repair or replace defective parts in the manner provided herein. This exclusive remedy shall not be deemed to have failed of its essential purpose so long as the Seller is willing and able to repair or replace defective parts in the manner provided herein. In the event of breach of this limited warranty or any other action otherwise arising out of this contract must be commenced within one (1) year from the date the right, claim, demand or cause of action shall first occur, or be barred forever.

12. Statement of Buyer/User’s Responsibilities: It is the sole responsibility of the Buyer/User, and not in any manner the responsibility of the Seller to control and properly dispose of all discharges, both gaseous and liquid, from the product to assure:


b. Adequate protection for the health and safety of people, property, wildlife and environment; and

c. Adequate protection for all persons, including employees, coming in contact with the Product and its discharge(s) for all purposes including, but not limited, installation, maintenance, use and repair of the Product.

It is also the sole responsibility of the Buyer/User to:

d. Maintain the Product in accordance with the “Installation, Operating and Maintenance Instructions”;

e. Comply with the maintenance checklist contained in the “Installation, Operating and Maintenance Instructions”;

f. Periodically monitor and test the Product to verify proper functioning, and to insure the Product performs properly.

It is further the sole responsibility of the Buyer/User to comply with all laws, codes, and regulations relating to the Product and its use. Seller makes no warranty or representation with respect thereto.

Buyer/User assumes the responsibility for providing and installing all devices required to protect the health and safety of people, property, wildlife and environment.

Buyer/User acknowledges having read the “Installation, Operating and Maintenance Instructions”, including all warnings contained therein, and is aware of the precautions recommended for protection to the health and safety of people, property, wildlife, and the environment, including employees coming in contact with the Product discharges.

Buyer/User assumes full responsibility to assure proper use of the Product, including the determination and control of what chemicals, pollutants and toxic substances are introduced into the product, and the determination and control of all discharges from the Product.

13. Disclaimer of Tort, Contract, Statutory and All Other Liability: The Seller hereby disclaims all tort, contract or statutory liability to the Buyer/User, and any other basis of liability to Buyer/User regarding claims for injury or damage to property, personal, wildlife, or the environment, including employees coming in contact with the Product discharges. (Limited Warranty), breach of contract or violation of statute, law, ordinance, code, rule or law.
regulation. Seller also disclaims any liability to the Buyer/User in contribution or indemnification for the Buyer/User’s liability or alleged liability to any third person or entity for injury or damage to people, property, wildlife or the environment. Without limiting the generality of the foregoing, Seller disclaims any liability for all claims for compensatory, consequential, incidental or other damages and for damages for personal injury and property loss, loss of use, revenue or profit, injury to good will, inability to fulfill contracts to third parties, other economic loss, response costs and other environmental clean-up costs or other damages arising out of the actual, alleged or threatened discharge, dispersal, release or escape of pollutants, contaminants, hazardous wastes, or liquid or gaseous materials discharged from or through the Product and any loss, cost or expense arising out of any governmental or other request to test for, monitor, clean-up, remove, contain, treat, detoxify or neutralize the foregoing. 

EXCLUSORY AND INDEMNIFICATION AGREEMENT: Buyer/User hereby agrees that the Seller will not be liable to the Buyer/User for the matters referred in paragraph 13 entitled “Disclaimer of Tort, Contract, Statutory and All Other Liability.” This exclusory agreement applies even if the defect and/or loss, damage or injury to persons, property, wildlife and the environment resulted solely in or in part from any negligence or injury, breach of warranty, breach of any statute, law, ordinance, rule or regulation, or actions resulting in strict liability. 

BUYER/USER’S ACKNOWLEDGMENT: Buyer/User hereby agrees to defend, hold harmless and indemnify the Seller and Seller’s agents from and against all claims, suits, actions, and liabilities for any injury or damage to people, property, wildlife or the environment. Without limiting the generality of the foregoing, Buyer/User hereby agrees to defend, hold harmless and indemnify Seller and Seller’s agents from and against all claims, suits, actions, and liabilities for compensatory, consequential, incidental or other damages and for damages for personal injury and property damage, loss of use, revenue or profit, injury to good will, inability to fulfill contracts to third parties, other economic loss, response costs and other environmental clean-up cost or other damages arising out of the actual, alleged or threatened discharge, dispersal, release or escape of pollutants, contaminants, hazardous wastes, or liquid or gaseous materials discharged from or through the Product and any loss, cost or expense arising out of any governmental or other request to test for, monitor, clean-up, remove, contain, treat, detoxify or neutralize the foregoing. 

10. Assignment: No right or interest in this contract shall be assigned by Buyer/User without prior written agreement by the Seller. No delegation of any obligation by the Buyer/User shall be made without prior written agreement by the Seller.