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## **Pioneer<sup>®</sup> Forced Draft Cooling Tower Specifications**

Pioneer<sup>®</sup> cooling towers are a forced draft counter-flow cooling tower with single module capacities from 10 to 100 cooling tons. These towers are a unique design that Delta Cooling Towers has been manufacturing since 1971 and have been very well received in both commercial and industrial applications. There are two overriding principles that make Pioneer<sup>®</sup> cooling towers an excellent selection.

The towers are corrosion-proof, not corrosion-protected, which is an important distinction of Delta towers. Cooling towers are outdoor equipment, either on roofs or sides of buildings, and are subjected to weather extremes continuously. Delta towers are manufactured in a seamless engineered plastic (HDPE) structural shell, which is corrosion-proof, and will not rust, chip, peel, crack or ever need painting or additional protective coatings. Comparably priced towers are often sheet metal with a galvanized coating. Zinc galvanizing provides only an interim protection against corrosion. This galvanizing wears away, often unevenly, exposing sheet metal to the rapid corrosive environment of cooling tower duty. The first engineered plastic cooling towers Delta shipped in 1971 show no signs of degradation in the structural shell today!

The second principle of Delta towers is the engineering that led to simplicity of design, translating into reliability and a trouble-free life of the towers. From the seamless cooling tower shell to the easy-to-maintain blower assembly, there are less overall components and systems within the tower to maintain. The towers are shipped factory complete with little more installation steps than hooking up the electrical and water. This design simplicity is recognized in many other industries as a key goal and leads to greater reliability and owner peace of mind.

The Pioneer<sup>®</sup> design has a tremendous track record for long-term durability and continues to be the choice for cooling tower application up to 100 cooling tons.

## PART 1 GENERAL

### 1.1 SCOPE

Work included to furnish and install Delta Cooling Tower Model  $\Delta t$  \_\_\_\_\_ cooling tower(s) consisting of all equipment necessary to provide a complete operating system to remove specified heat load. Cooling towers shall be packaged, factory pre-assembled to the fullest extent possible, forced draft, counter flow design

### 1.2 RELATED WORK

{insert related work document here }

### 1.3 REFERENCES - STANDARDS

AMCA - Air Moving and Conditioning Association  
ASTM - American Society for Testing and Materials  
ANSI - American National Standards Institute  
ASME - American Society of Mechanical Engineers

### 1.4 QUALIFICATIONS

The cooling tower shall be manufactured by a company with at least 30 years experience manufacturer of seamless engineered polyethylene cooling tower systems.

### 1.5 WARRANTY

Shell shall be warranted for 20 years and all other equipment shall be warranted for one year against material and workmanship defects from date of shipment.

### 1.6 SUBMITTALS

Shop drawings shall be provided and shall include but not be limited to:

- A. System dimension
- B. Operating and dry weight
- C. Details of equipment
- D. Mounting and support requirements
- E. Descriptions and specifications

## PART 2 PRODUCT

The cooling tower specified shall be factory assembled to the fullest extent possible.

The cooling tower shall comply with the energy efficiency requirements of ASHRAE Standard 90.1

2.1 Forced Draft Cooling Tower, \_\_\_\_\_ tons capacity, \_\_\_\_\_ GPM, \_\_\_\_\_ °F hot water temperature, \_\_\_\_\_ °F cold water temperature, \_\_\_\_\_ °F wet bulb temperature

A. Cooling tower

1. Shell shall be seamless, non-corrosive, hi-impact high density polyethylene (HDPE) of leak proof design. Shell wall shall exceed 1/4" average thickness. Structural shell shall be warranted for 15 years by the manufacturer. The structural shell shall be capable of withstanding water temperatures up to 160° F on a continual basis.
2. Sump shall be integral with cooling tower shell, creating a one-piece seamless structure.
3. Inspection port with removable HDPE cover located above the integral cold sump for accessibility to automatic make-up valve and adjustable float.
4. Fittings shall be non-corrosive polyvinyl chloride (PVC) bulkhead fittings with neoprene gaskets for inlet, outlet, drain, overflow and make-up (FPT) connections.
5. All outlet fittings for pump suction applications shall be provided with a vortex breaker.
6. Make up assembly, when incorporated in the sump of the cooling tower, shall be a mechanical valve assembly, adjustable height for varying operating conditions.
7. Anti-Microbial Materials of Construction (Optional)
  - 7.1 Tower Shell Materials: Tower Shell to have compounded additive in resin base material that creates anti-microbial properties throughout the cross-section of the shell material. Anti-microbial properties of the Shell material shall be tested in accordance with Efficacy Standard JIS Z 2801 and produce an anti-microbial activity value of greater than R=4 as displayed by the test results. The purpose of this option is to minimize Bio film growth in the tower and significantly reduce the possibility of Legionella growth within the tower.
  - 7.2 Tower Fill Materials: Tower shall include Wet Decking (fill) with similar antimicrobial efficacy to the tower shell. The Wet Decking shall have an additive in the fill base material that inhibits the growth of microorganisms and resists the growth of biofilms. Anti-microbial properties of the Wet Decking shall be tested in accordance with Efficacy Standard JIS Z 2801 and produce an anti-microbial activity value of greater than R=4 as displayed by the test results. This fill selection is included with the antimicrobial shell upgrade detailed in item 7.1.

The engineered plastic shell is the optimum material for cooling tower construction. The material is molded into a totally seamless shell which will never leak, unlike conventional cooling towers which require many panels, joints, seams, seam gaskets, caulking and hundreds of bolts or other fasteners to maintain the integrity of the product. The Delta structural shell will never rust, chip, crack or ever need painting or further protective coatings. The structural shell is warranted for 15 years which is much longer than other available cooling towers.

Galvanized steel towers provide only interim corrosion protection. The zinc galvanizing is designed only to delay corrosion as the zinc wears steadily away. Moderately high temperatures and various water chemical treatments speed up this leaching of zinc into the water or atmosphere. With only ounces per square foot of corrosion protection, it is only a matter of time till corrosion of the underlying sheet steel sets in.

Thin fiberglass panels can also not match the structural integrity of Deltas' seamless engineered plastic. Over time, if that long, leaks can develop at the joints even with gaskets and caulking applied. Thin fiberglass when exposed to the wide range of outdoor weather elements is also subject to delaminating, wicking and overall degradation

#### B. Water distribution

Totally enclosed, non-corrosive, polyvinyl chloride (PVC) spray tree with non-clog full cone spray nozzle distribution system. Threaded nozzle(s) shall be interchangeable and shall be capable of being substituted with a larger diameter orifice for increased flow conditions without increasing inlet pressure.

#### C. Wet decking

Spirally wound and bonded, one-piece, non-corrosive, polyvinyl chloride (PVC) wet decking. Non-corrosive, (PVC) hand straps secured to wet decking and drift eliminator sections for easy removal.

#### D. Drift eliminator

Drift eliminator shall be spirally wound and bonded, one-piece, non-corrosive, polyvinyl chloride (PVC) with non-corrosive PVC straps for easy removal for internal inspection and maintenance.

#### E. Fan assembly

1. Forward curved centrifugal belt driven blower assembly, statically and dynamically balanced wheel, constructed of heavy duty, corrosion-resistant steel with dipped and baked alkyd finish.
2. Motor shall be Totally Enclosed Fan Cooled suitable for 208 or 230/460 volt, phase, 60 cycle operation.

3. Motor shall be warranted against defects in materials and workmanship for years.

F. Blower Hood

1. Blower hood shall completely enclose the blower, motor and rotating machinery to offer maximum protection to personnel.
2. Blower hood shall provide protection against rain and windblown debris entering blower inlet, also protect the motors and drives.
3. Blower hood shall be molded from high density polyethylene (HDPE) consistent with the tower shell.
4. Blower hood shall dampen sound of blower assembly by 3 dBA at 5 feet.
5. Hood inlets shall be covered with a PVC coated 3/8" #2 wire mesh screen fastened to the hood with stainless steel hardware.

G. Hardware

All hardware shall be 304 Stainless Steel

PART 3 EXECUTION

1. GENERAL - INSTALLATION

Installation of equipment shall conform to or be in compliance with the manufacturers recommendations.

2. TESTING

- A. Contractor shall perform all field-testing and final adjustment of cooling tower equipment in accordance with provision of manufacturer
- B. Contractor shall certify that all operation criteria is within normal operating range as specified by the manufacturer.
- C. Should any part of the cooling tower equipment fail to meet any specified requirement, adjust, repair or replace any and all defects or inoperative parts immediately with manufacturers recommended parts or procedures.