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## PARAGON® Induced Draft Cooling Tower Specifications

PARAGON® cooling towers are induced draft counter-flow cooling towers with single module capacities from 55 to 250 cooling tons. These towers are a unique design that Delta Cooling Towers has been manufacturing since 1981 and have been very well received in both commercial and industrial applications. There are three overriding principles that make PARAGON® 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 galvanization wears away, often unevenly, exposing sheet metal to the rapid corrosive environment of cooling tower duty.

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 direct drive fan 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.

Finally, the PARAGON® induced draft cooling towers are a high efficiency design, which translates to very low energy costs to operate the towers. The design of the towers and the proprietary high efficiency fill material lead to this energy efficiency. The minimal operating costs, a track record of superior reliability and corrosion proof materials of construction makes the PARAGON® Induced Draft Cooling Tower the choice for cooling tower applications over 100 cooling tons.

## PARAGON® INDUCED DRAFT COOLING TOWER

### PART 1 GENERAL

#### 1.1 SCOPE

Work includes furnishing and installing Delta Cooling Tower model  $\Delta T$ \_\_\_\_\_ 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, induced 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.

2.1 Induced Draft Cooling Tower, Model  $\Delta T$  \_\_\_\_\_ , \_\_\_\_\_ 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. Conical transition for motor/fan assembly and 360° louvered air inlet panels around base of cooling tower integrated for optimum air distribution. The shell shall exceed 1/4" average thickness. 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. Cooling tower structural shell shall be guaranteed against corrosion for 20 years.
4. Removable PVC louver located above the integral cold sump for accessibility to automatic make-up valve and adjustable float.
5. PVC fittings shall be provided for inlet, outlet, overflow, drain and make up.
6. Outlet fitting for pump suction applications shall be provided with a vortex breaker.
7. Make up assembly shall be incorporated in the sump of the cooling tower. It shall be a mechanical valve assembly, adjustable height for varying operating condition.
8. Anti-Microbial Materials of Construction (Optional)
  - 8.1 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.

8.2 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 8.1.

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 20 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. Drift eliminator

Shall be non-corrosive polyethylene integral with rotating water distribution system

C. Water distribution

Self propelled PVC distribution system incorporating a rotating sprinkler head and lateral distribution arms with integral drift eliminators. An access port shall be provided in cooling tower shell at lateral arm elevation for access to removable end caps for ease of maintenance.

D. Wet decking

Continuously wrapped spiral configuration of lightweight polyvinyl chloride PVC, bonded for maximum cooling efficiency.

#### E. Fan assembly

1. Fan propeller shall be adjustable pitch direct drive. Fan blades shall be constructed of fiberglass reinforced polypropylene with aluminum silicon alloy hub with stainless steel hardware; statically and dynamically balanced prior to shipping.
2. Fan and motor shall be supported by heavy gauge rolled steel ring. The fan ring shall be coated with a premium Plastisol for corrosion protection.
3. Motors shall be Direct Drive, Totally Enclosed, Energy Efficient, 1200 RPM, Inverter Rated, with Double Sealed Bearings, Corrosion Resistant Mill & Chemical Duty Paint and designed for cooling tower duty.
4. Motor shall be provided with motor manufactures standard warranty.
5. Fan guard shall be coated steel mesh, 1/2" open area to allow air to pass through with minimal pressure loss while protecting personnel

Propeller type fan is attached to the shaft of the motor. The direct drive system has a twofold benefit. First and foremost, there are no extra bearings, pulleys, gear reducers or additional shafts to maintain or fail. The second benefit is the higher efficiency gained by connecting the motor to the motor shaft, there are no losses due to friction from bearings and gears, thus providing the highest efficiency available.

from contacting the rotating fan propeller.

#### F. Hardware

All fasteners are 304SS. Anchor and lifting lugs are aluminum.

### PART 3 EXECUTION

#### 1. GENERAL - INSTALLATION

Installation of equipment shall be in conformance with the manufacturer's 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 are 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.