

ANTIFREEZE PACKAGE / RESISTANCE HEATING OPTION

The antifreeze package is supplied to provide protection against freezing of standing water in the cooling tower sump due to shutdown during winter operation. The option is provided when draining the system during periods of prolonged shutdown is not feasible, such as during weekends, or when a separate gravity feed indoor storage tank is not part of the re-circulation system. Resistance heating of the sump water provides protection, and this package includes the following components:

Immersion Heater:

Capacity sized for service ~ NEMA 4 enclosure

T100i thru T175i 6000 watt – 2.5” thread

T200i thru T250i 9000 watt – 2.5” thread

Thermostat Assembly:

Thermostat is to be set in field. Recommended setting is approximately 38°F.

NEMA 4 enclosure with SPDT switch ~ 30-130°F temperature range ~ 120/277 Volt with ¾” SCH 80 bulkhead fitting and a ¾” x ½” SCH 40 reducer

Liquid Level Switch Assembly:

NEMA 7 and 9 enclosures are standard on this SPDT level switch. This insures that the heating element is submerged prior to energizing to prevent immersion heater burn cause of low water level.

Heater Contactor:

NEMA 1 enclosure is standard. Open style for control panel mounting is available. This contactor is mounted in the control panel when the panel is purchased from Delta.

PVC bulkhead fittings, for local installation, are included in component prices. Protection of external piping by heat tracing and insulation is recommended but not included.

ANTIFREEZE PACKAGE / SOLENOID DRAIN VALVE

This option is utilized when freezing of standing water in the cooling tower sump could occur due to system shutdown during winter operation. An electrically actuated valve will open when the pumps are not operating and the temperatures approach freezing. The valve can be installed in the sump drain fitting of the tower (at the factory) or remotely at the piping low point (by others in the field).

Components provided are:

- A) Electrically actuated to close, spring to open, 2-way valve, 1” line size, with NEMA 4 enclosure.
- B) 1” PVC tee
- C) 1” PVC plug
- D) Temperature switch with bulkhead fitting

When power is removed the valve automatically reverts to the open position. This feature ensures freeze protection even during a power outage.

BOTTOM OUTLET

The Bottom Outlet is a convenient option when gravity draining a cooling tower. This minimized the amount of standing water in the sump of the cooling tower. A 125lb. Flanged fitting is provided.

Provisions must be made in the mounting platform for the fitting. The platform, indoor storage tanks and other fittings can be provided by Delta.

CONTROL PANEL

A control panel is required any time there are electrical devices involved in a system. The standard features of a Delta supplied control panel are:

- A) NEMA 3R water tight enclosure
- B) Single speed motor starter
- C) 110V transformer with fuses
- D) Blower operating lights
- E) Blower selector switches
- F) Terminal strips
- G) 208V or 230V or 460V or 575V / 3Ph / 60Hz

Optional items available:

- Disconnect switch: either fused, unfused or magnetic circuit breaker type.
- Motor starter fuses or circuit breakers.
- Additional motor starters, selector switches and lights to interface with existing systems, remote pumps, etc.
- Any other NEMA enclosure manufactured.
- Pre-mounting of control panel and pre-wiring of skid mounted options with Liquid-Tite conduit or EMT. (Consult factory for add pricing)

Delta also can provide programmable controllers, computer interfacing, telemetry, and any other type of control system required. Pre-mounting and pre-wiring of the control panel for a system installation are available. This minimizes the labor required for field installation.

EQUALIZER FITTINGS

This option is desirable for multiple module installations to provide equal liquid levels in the sumps of the individual modules and allows for the installation of only one (1) water make-up line. Delta provides the bulkhead fittings installed in the cooling towers to provide for gravity flow from one tower sump to another. The equalizer connection is not for full flow transfer (ex: pumping from one unit to another). The connecting piping should be field installed and is the responsibility of others.

FAN ASSEMBLY COATING

The standard fan coating provided for the cooling tower fan ring and guards is a cross linked epoxy-phenolic with an alkaline curing agent and formulated to withstand a wide range of chemicals and for ease of handling. This coating provides excellent chemical resistance to a wide range of acids, alkalies, solvent and water solutions. When dry, the coating can withstand up to 400°F temperature. The fan ring and guard steel surfaces are sand blasted and a primer is applied prior to the final application.

FLANGED ADAPTORS

Standard Paragon® inlet and outlet fittings are PVC socket connections. This option provides 125lb Schedule 80 PVC flanged connection at approximately 6" projection minimum from the cooling tower. Gaskets and hardware are not provided by Delta and should be provided by others with the piping companion flange.

HIGH SUMP LEVEL SWITCH

The hump sump level switch option is utilized when a potential overflow must be avoided. Switch elevation is set below the point when the water in the sump will overflow onto the ground. The switch can be used to illuminate a light, shut off the influent feed pump or initiate some other device

or alarm. This package consists of a NEMA 7 and 9 liquid level switch mounted in a PVC bulkhead fitting assembly with a 2" x 1" reducer bushing.

LADDER

The ladder assembly facilitates access to the upper section of the cooling tower for inspection and maintenance of the water distribution system and fan assembly as required. The assembly is fabricated of aluminum for lightweight installation and has skid resistant rungs and landing platform. The landing platform is specifically placed to maximize accessibility to the man-way located in the conical section of the tower for easy access and servicing of components. The ladder conforms to all OSHA requirements. In some cases the cage assembly may be required. The unit is attached to the tower via (4) bolted connections and two base mounting bolts.

MOTOR SPACE HEATER

Fan Motor Space Heaters are recommended for installations where temperature variations can cause excessive condensation within the motor. The Space Heater controls can be incorporated in our Control Panel and would be designed for automatic and manual operation. While the motor is operating, the heater remains off. When the motor shuts down, the heater is automatically energized during the off cycle. The Control Panel would be designed with manual on/off control for intermittent cycles of operation. Heaters are available for 115, 230, 460, or 550 volts, 3 phase, 60-cycle operation.

OUTLET STRAINER BASKET

This option is desirable to prevent debris that may have entered the cooling tower sump from getting into the pump, or the rest of the cooling water system. This option is recommended to minimize particle size that could foul chillers, heat exchangers, compressors or the cooling tower distribution laterals. A vortex breaker pipe, which is provided as standard on pump suction applications, is included to maximize the inlet area and prevent cavitation. The strainer is made from a vortex breaker pipe surrounded by 3/16" #2 PVC coated mesh screen. Finer mesh screens can be overlaid to minimize particle size. Consult Delta for add prices and availability.

PLATFORM

The platform is beneficial in installations where a flat and level surface is not available for mounting Delta's cooling towers. The steel platform is also utilized for replacement installations where only "I" beams, or other forms of support exist. This steel platform is finished in a black air-dried phenolic paint. The platform is shipped in two separate pieces, for transportation purposes, and must be supported in the field by others. An optional walkway can be supplied to allow for accessing the cooling tower sump, should the platform be elevated.

PUMP

The pump package is offered to allow for single source responsibility of cooling tower equipment. The size of the pump is determined by two factors:

- A) Flow rate
- B) Total dynamic head

The customer is responsible for supplying this information. The pumps come complete closed-coupled with mechanical seals and ODP, 208/230/460V, 3 phase motor. TEFC motors are available.

SAFETY CAGE

Complementary to the ladder option. Extends above the ladder-landing platform for extra protection while accessing the top of the cooling tower. The safety cage is assembled to the ladder at the factory for ease of installation. This assembly is attached directly to the cooling tower shell during installation. The safety cage may or may not be required depending on OSHA specifications. The cage assembly is manufactured of the same type of aluminum as the ladder.

STORAGE TANK

The tank is utilized when extra water capacity is required. Potential applications are for system modulation when pumping flow rates vary, or for water storage. A hot/cold tank arrangement may be required in those cases where the process hot water exceeds the maximum allowable inlet water temperature. The cooling tower would flow more water than the process and the difference would be mixed with the hot water to reduce its temperature. The tank and optional cover are fabricated of medium density polyethylene. All fittings are Type 1 PVC.

THERMOSTATS – Single Stage and Two-Stage

The fan thermostat is important to minimize operating costs. The thermostat senses water temperature and controls fan operation during cold weather service. When cold-water temperature drops below design, the fan will shut off saving motor hp operating costs.

A **single stage thermostat** controls the fan on/off and is provided with a standard single speed motors.

A **two-stage thermostat** is required for two speed motor operation and controls the fan from 'on' to 'half speed' and then to 'off'. At half speed operation the motor operates at only ¼ full load BHP. Two stage thermostats must be wired to Delta specifications.

As the cold-water temperature rises and approaches the design temperature, the thermostat signals the fan to start in order to maintain the cold water design temperature. The thermostat has a 5°F differential in its operating range of 30°F to 130°F. The contacts are SPDT and have a 15 Amp UL rating. They are complete with NEMA 4 enclosures suitable for outdoor mounting. The thermostat can be provided loose, or installed in the cooling tower sump, or an indoor storage tank. When the thermostat is supplied with a cooling tower or storage tank provided by Delta, the package includes installation with a ¾" Schedule 80 PVC bulkhead fitting and a ¾" x ½" Schedule 40 PVC reducer bushing. Thermostat operating range must be set in the field. Recommended setting is approximately 70°F to 72°F, but will vary depending on the application and the installation location.

TWO-SPEED FAN MOTOR

Two speed fan motors provide cold-water temperature control by means of airflow modulation, allowing for design cold-water temperature at minimum operating cost. When provided with a two-stage thermostat, the motor can be reduced to half speed when cold water sump temperature approaches design. The motor will shut off when the cold-water temperature falls below design. Two-speed TEFC motors are provided for single voltage 3-phase operation only. Single-phase dual voltage motors are not available. NOTE: a ½ reduction in motor speed corresponds to ½ reduction airflow. At half speed operation, only 1/8 BHP is consumed.

VIBRATION CUTOFF SWITCH

The vibration cutoff switch option is utilized to shut down the rotating mechanical fans in the event of excessive vibration. This device helps prevent further potential damage by shutting the motor off. It is wired in series with the motor starter coil and has dry contact rating of 10-ampere capacity at 120 VAC.

Delta provides the vibration cutoff switch installed on the blower when ordered as a component of a new cooling tower or on a replacement blower assembly.