

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 21 05 01 – Common Work Results for Mechanical.

1.2 QUALITY ASSURANCE

- .1 Thoroughly check system and make necessary corrections if system continually loses solution.
- .2 Perform tests determining strength of glycol solution before system is turned over to the Operator. Provide test prior to end of guarantee and replenish as required. Provide written test results for review.
- .3 Coils shall be the product of manufacturer regularly engaged in production of coils who issues complete catalogue data on such products.
- .4 Coil capacities, pressure drops, and selection procedures shall be certified in accordance with ARI Standards and bear ARI seal.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 00 10 – General Instructions.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for expansion tanks, air vents, separators, valves, and strainers and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to site in original factory packaging, labeled with manufacturer's name, address.

Part 2 Products**2.1 GLYCOL SOLUTION**

- .1 50% inhibited propylene glycol-based fluid mixed with 50% by volume demineralized water.
- .2 Determine the exact required solution quantity.
- .3 Characteristics at 30°F:
 - .1 Unit weight: 67.59 lb/ft³
 - .2 Specific heat: 0.765 BTU/lb.°F
 - .3 Freezing point: 34.7°F
 - .4 Alkalinity: ≥ 2000 ppm
 - .5 Phosphate: + 1000 ppm
 - .6 Other inhibitors: in accordance with manufacturer standards
 - .7 Iron: less than 1 ppm
 - .8 Copper: less than 0.1 ppm

- .9 pH: 8.5 to 9.5
- .10 Silicate: 0%

2.2 GLYCOL FEED SYSTEM

- .1 For each glycol system loop: Supply and install one (1), automatic glycol feed system for closed loop glycol network. The feed system shall include the following items:
 - .1 One (1) HDPE storage tank with removable cover for easy refilling, volume as indicated;
 - .2 One (1) brass positive displacement vane pump with graphite bearings. The pump is driven by a 1/3 HP, 1725 rpm ODP motor. The pump flow rate is 62 USG/h @ 50 psi and 60 USG/h @ 100 psi. It shall be supplied with an adjustable internal relief valve;
 - .3 One (1) pressure switch with field adjustable set-point and dead band;
 - .4 One (1) glycerin filled pressure gauge;
 - .5 One (1) spring loaded check valve;
 - .6 One (1) control panel including the following items;
 - .1 one (1) NEMA 1 housing;
 - .2 one (1) three position pump control switch (Manual-Off-Auto);
 - .3 one (1) two position audible alarm switch (On-Off);
 - .4 one (1) 10A fuse;
 - .5 one (1) alarm buzzer;
 - .6 one (1) power on indicator led;
 - .7 one (1) pump on indicator led;
 - .8 one (1) low level indicator led;
 - .9 one (1) pressure sensor status indicator led;
 - .10 one (1) remote alarm led;
 - .11 one (1) low level cutoff;
 - .12 one (1) remote alarm output;
 - .13 one (1) 5ft. electrical cord with 3 prong plug;
 - .7 Power supply to the unit is 115V/60Hz/1ph;
 - .8 One (1) transfer system enabling to fill the glycol storage tank from the glycol shipping container;
 - .9 One (1) agitation system to enable proper mixing of the glycol solution in the storage tank;
 - .10 NPS 1/2 type L copper interconnection piping;
 - .11 The pump, pressure switch, pressure gauge, check valve, isolation valves, low level switch, copper piping and control panel are factory assembled on a polyethylene platform on top of the glycol storage tank and tested prior to delivery. All electrical items are factory wired and tested;

2.3 MANUAL AIR VENTS

- .1 Provide manual air vents with 25 mm or line diameter pipe whichever is greater to form air collection chamber. Collection chamber to be 150 mm high.

2.4 AUTOMATIC AIR VENT:

- .1 Body: Stainless steel, welded construction.
- .2 Pressure Rating: 150-psig (1035-kPa) minimum pressure rating.
- .3 Float: Replaceable, corrosion-resistant metal.
- .4 Mechanism and Seat: Stainless steel.
- .5 Size: NPS 3/8 (DN 10) minimum inlet.
- .6 Inlet and Vent Outlet End Connections: Threaded.

2.5 AIR SEPARATORS

- .1 Provide centrifugal type with 861 kPa WSP steel tank, galvanised steel 5 mm perforated strainer, perforated stainless steel air collector tube and drain connection.

2.6 RELIEF VALVES

- .1 Provide ASME rated direct spring loaded type; lever operated non-adjustable factory set discharge pressure as indicated.

2.7 BYPASS FILTER

- .1 Unit to consist of cartridge filter, flow indicator, flow control valves and filter cartridges. Cartridge filter; stainless steel shell of single centre bolt construction with cast nickel-plated brass head, drain plug and air vent. Flow indicator - cast bronze body with two sight glasses of high temper, thermo shock-resistant glass and nylon rotor on stainless steel pin.
- .2 Flow Control Valves: Cast Bronze Globe Valves, 25 mm Female NPT Thread. Filter cartridges: 10 each of 10 micron retention, and 20 micron retention..

2.8 EXPANSION TANKS, DIAPHRAGM TYPE

- .1 Welded steel, rated for working pressure, supplied with steel support structure.
- .2 Precharged air chamber, heavy duty butyl diaphragm bonded with polypropylene liner to steel shell separating air chamber from water.
- .3 Provide with air side charge connection, and water side inlet connection pre-charged as scheduled.

Part 3 Execution**3.1 INSTALLATION**

- .1 Support coil sections on steel channel or double angle frames and secure to casings. Arrange supports for cooling coils so they do not pierce or short circuit drip pans. Level serpentine coils and install drainable tube coils with pitch within casing. Arrange galvanized steel casings for bolting to other section, ductwork or unit casings. Provide airtight seal between coils and duct or unit cabinets.
- .2 Make necessary connections to coils, including valves, air vents, unions and connections from drip pans. Provide isolating valve on supply line and eccentric plug valve on return line to each glycol coil.

- .3 Locate glycol supply at bottom of supply header and return glycol connection at top to provide self-venting and reverse return arrangement. Provide manual air vents at high points complete with stop valves. Ensure glycol coils are drainable and provide drain connection at low points.
- .4 Protect coils so fins and flanges are not damaged. Replace loose and damaged fins. Comb out bent fins unless required to be replaced.

3.2 AIR VENTS

- .1 Provide manual type at system high points and convection type heating units.
- .2 Where large air quantities can accumulate, provide enlarged air collection standpipe.
- .3 Connect vent discharge to drainage piping with rubber hose and stainless worm gear clamp of automatic air vents.

3.3 AIR SEPARATOR

- .1 Provide on suction side of system circulation pump and connect to expansion tank.

3.4 RELIEF VALVE

- .1 Provide relief valves on pressure tanks, low pressure side of reducing valves, heating convertors, expansion tanks and where indicated.
- .2 Drain relief valve to glycol collection tanks. Do not waste glycol to floor drains.
- .3 System relief valve capacity shall equal make-up pressure reducing valve capacity. Equipment relief valve capacity shall exceed input rating of connected equipment.
- .4 Where one line vents several relief valves, cross sectional areas shall exceed sum of individual vent areas.

3.5 BYPASS FILTER

- .1 Install between pump's suction and discharge. Provide isolation valves and sight glass as indicated.

3.6 EXPANSION TANKS

- .1 Provide air lines, checks, charging valves and pressure gauges for expansion tanks and glycol fill tanks.

3.7 INSTALLATION

- .1 Do necessary piping to complete installation as shown on the drawings specified.
- .2 Thoroughly clean and flush system before antifreeze solution is added.
- .3 Manually feed glycol to system through make-up line with pressure regulator.
- .4 Provide one extra 170 L drum of glycol, at turnover of the building to Operator.

END OF SECTION