

## PART 1 - GENERAL

### 1.1 RELATED REQUIREMENTS

- .1 Section 23 21 13.02 - Hydronic Systems: Steel
- .2 Section 23 25 00 - HVAC Water Treatment Systems
- .3 Section 23 54 14 - Halocarbon Management
- .4 Section 23 08 02 - Cleaning and Start-up of Mechanical Piping Systems.

### 1.2 REFERENCE STANDARDS

- .1 American National Standards Institute/Air Movement and Control Association (ANSI/AMCA)
    - .1 ANSI/AMCA 210/ASHRAE 51-07, Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.
  - .2 American National Standards Institute/Air-Conditioning, Heating and Refrigeration Institute (ANSI/AHRI)
    - .1 ANSI/AHRI 495-05, Performance Rating of Refrigerant Liquid Receivers.
    - .2 ANSI/AHRI 520-04, Performance Rating of Positive Displacement Condensing Units.
    - .3 AHRI 710-04, Performance Rating of Liquid Line Driers.
  - .3 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
    - .1 ASHRAE 17-2008, Method of Testing for Capacity Rating of Thermostatic Refrigerant Expansion Valves.
  - .4 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)
    - .1 ASME B16.26-2006, Cast Copper Alloy Fittings for Flared Copper Tubes.
    - .2 ASME B16.29-2007, Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.
    - .3 ASME B31.5-2006, Refrigeration Piping and Heat Transfer Components.
    - .4 ASME B16.34-2009, Valves Flanged Threaded and Welding End.
  - .5 American National Standards Institute/American Welding Society (ANSI/AWS)
    - .1 ANSI/AWS A5.8/A5.8M-2004, Specification for Filler Metals for Brazing and Braze Welding.
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- .6 American Society of Mechanical Engineers (ASME)
  - .1 ASME Boiler and Pressure Vessel Code, 2010.
- .7 ASTM International
  - .1 ASTM B 280-08, Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
- .8 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-19.13-M87, Sealing Compound, One Component, Elastomeric, Chemical Curing.
- .9 CSA International
  - .1 CSA B52-05 SMART, Mechanical Refrigeration Code.
- .10 Environment Canada, Environmental Protection Service (EPS)
  - .1 EPS 1/RA/2-[1996], Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems.

#### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for heating and cooling equipment and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Submit drawings and project specific data.
  - .2 Submit diagrams of field installation, internal wiring and piping for field assembly, with refrigerant flows, pipe sizes, pressure drops in equipment and suction lines.

#### 1.4 QUALITY ASSURANCE

- .1 Process refrigeration manufacturer: regularly engaged in production of specified equipment, and issues catalogue information [with correction factors where published ratings are based on parameters different from those specified].
  - .2 Installation: performed by certified refrigeration mechanics/technician.
  - .3 Installation must comply with requirements listed in EPS 1/RA/2.
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#### 1.5 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for heating and cooling equipment for incorporation into manual.
  - .1 Include exploded views of components.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Ship equipment factory dehydrated and sealed with full charge of refrigerant where permitted by authorities having jurisdiction and charge of lubricating oil.
- .4 Storage and Handling Requirements:
  - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect heating and cooling equipment from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

### PART 2 - PRODUCTS

#### 2.1 GENERAL

- .1 Provide complete systems capable of cooling and heating jacketed wine carboys as indicated. Glycol heating and glycol cooling systems shall be complete packaged units with all controls, wiring, starters, valves, and components as required to provide fully functional single point power connection systems. Tank temperature controllers shall be capable of individual tank control of both heating and cooling for the carboys and all other requirements indicated within the design documents.
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## 2.2 PACKAGED GLYCOL CHILLER UNIT

- .1 General: Provide complete, packaged glycol chiller system, including but not limited to:
    - .1 Air Cooled Condenser
    - .2 Evaporator
    - .3 Glycol Pump
    - .4 Insulated Glycol Storage Tank
    - .5 Control Panel
    - .6 ETL/UL508 Listed Electrical Enclosure
    - .7 Equipment enclosure
    - .8 Compressor
    - .9 Refrigerant & oil charge
    - .10 Extreme low ambient package
    - .11 Factory installed plumbing and wiring to allow for single point connections for power, chilled glycol supply and chilled glycol return.
  - .2 System Performance Requirements
    - .1 System ratings:
      - .1 4.4kW at -4°C, 32°C ambient
      - .2 4.8kW at -1°C, 32°C ambient
      - .3 5.2kW at 1.7°C, 32°C ambient
    - .2 Compressor: 1.5kW
    - .3 Circulation pump: 1.9l/s @ 21 m head.
    - .4 Single point power connection: 208/3/60, MCA 20, MOP 30, complete with disconnect.
    - .5 Minimum operating temperature -23°C ambient. Suitable for outdoor rooftop installation.
    - .6 Refrigerant: 404A
    - .7 Sound: 70 dB at 1 meter
    - .8 Connection size, inlet/outlet: 32 mm diameter
  - .3 Compressor and Condensing unit: air cooled, hermetic scroll compressor, internal motor protection.
  - .4 Evaporator: Spiral drum evaporator, internal finned copper tubing.
  - .5 Glycol storage tank: 76L insulated storage tank.
  - .6 Circulation pump: Stainless steel glycol pump to circulated glycol through evaporator and to plant.
  - .7 Control Panel: Mounted on chiller, NEMA 4 outdoor rated enclosure with adjustable electronic temperature control and display
  - .8 Unit Construction: Galvanized steel cabinet, system to be fully tested, assembled and refrigerant charged prior to shipping.
  - .9 Glycol: Propylene glycol 40%
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- .10 Standard of Acceptance: Pro Refrigeration Chilstar Series, 2hp model PE102D1R420-A, with extreme low ambient package or approved equivalent.

## 2.3 PACKAGED GLYCOL HEATER SYSTEM

- .1 General: Provide complete, packaged glycol heating system, including but not limited to:
  - .1 Low watt density heating elements specifically designed to for heating glycol without thermal damage to fluid properties.
  - .2 Insulated 114 L Stainless steel glycol storage tank.
  - .3 Storage tank low level alarm.
  - .4 Stainless steel glycol process pump.
  - .5 ETL/UL508 Listed Electrical enclosure.
  - .6 Equipment Enclosure.
  - .7 Factory installed plumbing and wiring to allow for single point connections for power, hot glycol supply and hot glycol return.
- .2 System Performance Requirements
  - .1 System ratings: 6kW heater, pump flow: 1.9l/s @ 21 m head.
- .3 ETL/UL508 Listed Electrical enclosure to include system function switches, system fusing, all motor starters, etc. 208/3/60 single point power connection, and disconnect..
- .4 Standard of Acceptance: PRO 6kW Portable Glycol Heater System Model PRH6KW30 or upproved equivalent.

## 2.4 CONTROL VALVES

- .1 Type: ball valve.
  - .1 Flow characteristic, equal percentage.
  - .2 Flow factor (CV)4.7: CV in imperial units.
  - .3 Normally closed.
  - .4 Fail in location.
  - .5 Two ports.
  - .6 Leakage rate ANSI class IV, 0.01% of full open valve capacity.
  - .7 Packing easily replaceable.
  - .8 Stem, stainless steel.
  - .9 Plug and seat, stainless steel, brass, bronze.
  - .10 Disc, replaceable, material to suit application.
  - .11 NPS 2 and under:
    - .1 Screwed National Pipe Thread (NPT) tapered female connections.
    - .2 Valves to ANSI Class 250, valves to bear ANSI mark.
- .2 Actuator: 120V, on/off, Non-Spring return, NEMA 2 enclosure, 0.5 watt power consumption holding, 2 watt power consumption running.

Compatible with tank controller.

## 2.5 BYPASS RELIEF VALVE

- .1 Stainless steel body/disk with bronze bonnet, stainless steel springs.
- .2 Field adjustable, single piece leak free bonnet, liquid relief valve.
- .3 Pressure Rating: 586 kPa
- .4 Size: 3/4" FNPT inlet and outlet
- .5 Temperature rating: 110 C

## 2.6 TANK TEMPERATURE CONTROL SYSTEM

- .1 Tank Controllers: Calibration-free probe, NEMA 4X Rated enclosure, Power line carrier networking, cool, heat, auto, 120V Digital display with tank temperature, setpoint, temperature control, 4 relay outputs for control of heating cooling control valves.
- .2 Temperature Probe: 2 wire analog temperature probe, precision temperature dependent current transducer, Accuracy +/- 0.5°C, effective range: -10°C to +100°C, probe length: 108mm, probe diameter: 6.35mm. Install temperature probe in tank well. Provide heat conductive material inside well.

## PART 3 - EXECUTION

### 3.1 GENERAL

- .1 Install as indicated and to manufacturer's recommendations.
- .2 Maintain proper clearance to permit service and maintenance.
- .3 Should deviations beyond allowable clearances arise, request and follow Departmental Representative's directive.
- .4 Check shop drawings for conformance of all tappings for ancillaries and for equipment operating weights.
- .5 Clean and startup in accordance with Section 23 08 02 - Cleaning and Start-up of Mechanical Piping Systems.