

Vertiv™ Liebert® Air-cooled, Direct-drive Drycooler 50 Hz and 60 Hz Guide Specifications

1.0 GENERAL

1.1 Summary

These specifications describe requirements for a Liebert® Air-cooled drycooler for a Liebert Thermal Management system. The drycooler shall be designed to reject waste heat to outdoor air and to control glycol temperature as pumped glycol rates and outdoor ambient conditions change.

The manufacturer shall design and furnish all equipment in the quantities and configurations shown on the project drawings.

Standard 60Hz units are CSA certified to the harmonized U. S. and Canadian product safety standard CSA C22.2 No 236/UL 1995 for “Heating and Cooling Equipment” and are marked with the CSA c-us logo.

The drycooler model number shall be: _____.

1.2 Design Requirements

The drycooler shall be a factory-assembled unit, complete with integral electrical panel, designed for outdoor installation and vertical airflow only. (The drycooler shall be a draw-through design.)

The drycooler shall have a total heat rejection capacity of ____ kBtuh (kW) rated at an outdoor ambient of ____ °F (°C), an entering glycol temperature of ____ °F (°C) and a glycol flow rate of ____ GPM (LPM).

The unit is to be supplied for operation using a ____ volt ____phase, ____Hz power supply.

1.3 Submittals

Submittals shall be provided with the proposal and shall include: Dimensional, Electrical and Capacity data; and Piping and Electrical Connection drawings.

1.4 Quality Assurance

The specified system shall be factory-tested before shipment. Testing shall include but shall not be limited to: Quality Control Checks, “Hi-Pot” Test (two times rated voltage plus 1000V, per NRTL agency requirements) and Metering Calibration Tests. The system shall be designed and manufactured according to world class quality standards. The manufacturer shall be ISO 9001 certified.

2.0 PRODUCT

2.1 Standard Features—All Drycoolers

The drycooler shall consist of drycooler coil(s), housing, propeller fan(s) direct driven by individual fan motor(s), electrical controls and mounting legs. The Vertiv™ Liebert® Air-cooled drycooler shall provide glycol temperature control to the indoor cooling unit by adjusting heat rejection capacity. Various methods shall be available to match indoor unit type, minimum outdoor design ambient and maximum sound requirements.

2.2 Drycooler Coil

The Liebert manufactured coil shall be constructed of copper tubes in a staggered tube pattern. Tubes shall be expanded into continuous, corrugated aluminum fins. The fins shall have full-depth fin collars completely covering the copper tubes, which are connected to heavy wall Type “L” headers. Inlet coil connector tubes pass through relieved holes in the tube sheet for maximum resistance to piping strain and vibration. Coil shall be split flow into multiple coil circuits, combined to yield a drycooler with _____ internal circuits. The supply and return lines shall be (spun shut [1-4 fan models]), (brazed with a cap [6 or 8-fan models]) and shall include a factory-installed Schrader valve. Coils shall be factory leak-tested at a minimum of 300 psig (2068kPag), dehydrated, then filled and sealed with an inert gas holding charge for shipment. Field relief of the Schrader valve shall indicate a leak-free coil.

2.2.1 Housing

The drycooler housing shall be constructed of bright aluminum sheet and divided into individual fan sections by full-width baffles. Structural support members, including coil support frame, motor and drive support, shall be galvanized steel for strength and corrosion resistance. Aluminum legs shall be provided to mount unit for vertical air discharge and shall have rigging holes for hoisting the unit into position. An electrical panel shall be inside an integral NEMA 3R weatherproof section of the housing. The electrical panel shall provide at least 5,000A SCCR.

2.2.2 Propeller Fan

The propeller fan shall have aluminum blades secured to a corrosion protected steel hub. Fans shall be se-cured to the fan motor shaft by means of a keyed hub and dual setscrews. Fan diameter shall be 26" (660mm) or less. Fans shall be factory-balanced and run before shipment. Fan guards shall be heavy gauge, close-mesh steel wire with corrosion-resistant polyester paint finish that shall be rated to pass a 1000-hour salt spray test.

2.2.3 Fan Motor

The fan motor shall be continuous air-over design and shall be equipped with a rain shield and permanently sealed bearing. Motors shall be rigidly mounted on die-formed galvanized steel supports.

2.2.4 Electrical Control

Electrical controls, overload protection devices and service connection terminals shall be provided, and factory wired inside the integral electrical panel section of the housing. A locking disconnect switch shall be factory mounted and wired to the electrical panel and controlled via an externally mounted locking door handle. An indoor unit interlock circuit shall enable drycooler operation whenever indoor unit compressors are active. Only supply wiring, indoor unit interlock wiring and high voltage wiring to pumps when controlled by the drycooler shall be required at drycooler installation.

2.3 Specific Features by Drycooler Type

2.3.1 Fan Speed Control (DSF/DDF) Drycooler (1 Fan) with Integral Pump Control

The DSF/DDF drycooler shall have a fan speed controller that senses the leaving glycol temperature and varying the speed of an FSC duty motor in direct proportion to the heat rejection needs of the system. Fan speed controller shall be factory set to range of 70 to 100°F (21 to 38°C) for glycol-cooled applications. The fan speed control shall be field adjustable to a range of 30 to 60°F (-1 to 16°C) for free cooling applications. The motor shall be single-phase and include built-in overload protection. The motor shall have an ODP enclosure and a full speed of 1100rpm @ 60Hz (920rpm @ 50Hz). The DSF/DDF drycooler shall control operation of glycol pump(s) powered from the electrical panel. The Vertiv™ Liebert® Air cooled drycooler shall have a ____ volt, 1 ph, ____ Hz power supply.

2.3.2 Fan Cycling Control (DSO/DDO) Drycooler with Integral Pump Control (All Fan Quantities)

The DSO/DDO drycooler shall sense the leaving glycol temperature and cycle fixed speed fans to maintain glycol temperatures. Aquastats shall have field adjustable set-points. The fixed speed motors shall be three phase and have individual internal overload protection. Fixed speed motors shall have a TEAO enclosure and a full speed of 1140rpm @ 60Hz (950rpm @ 50Hz). The DSO/DDO drycooler shall control operation of glycol pump(s) powered from the electrical panel. The Liebert® Air cooled drycooler shall have a ____ volt, 3 ph, ____ Hz power supply

2.3.3 Fan Cycling Control DDNT Drycooler (All Fan Quantities)

The DDNT drycooler shall sense the leaving glycol temperature and cycle fixed-speed fans to maintain glycol temperatures. Aquastats shall have field adjustable setpoints. The fixed-speed motors shall be three-phase and have individual internal overload protection. Fixed-speed motors shall have a TEAO enclosure and a full speed of 1140 rpm @ 60Hz (950 rpm @ 50Hz). The Liebert® Air-cooled drycooler shall have a ____ volt, 3 ph, ____ Hz power supply.

2.3.4 Main Fan Control DDNL Drycooler (All Fan Quantities)

The DDNL drycooler shall control fixed-speed fans when an external contact closure completes the internal 24VAC circuit. The fixed-speed motors shall be three-phase and have individual internal overload protection. Fixed-speed motors shall have a TEAO enclosure and a full speed of 1140 rpm @ 60Hz (950 rpm @ 50Hz). The Liebert® Air-cooled drycooler shall have a ____ volt, 3 ph, ____ Hz power supply.

2.3.5 No Fan Control DDNC Drycooler (All Fan Quantities)

The DDNC drycooler shall activate all fixed-speed fans when supply power is applied to the drycooler. The fixed-speed motors shall be three-phase and have individual internal overload protection. Fixed-speed motors shall have a TEAO enclosure and a full speed of 1140 rpm @ 60Hz (950 rpm @ 50Hz). The Liebert® Air-cooled drycooler shall have a ____ volt, 3 ph, ____ Hz power supply.

2.3.6 Vertiv™ Liebert® Quiet-Line Drycooler (All Fan Quantities)

Liebert® Quiet-Line drycoolers shall be available for DSO, DDO, DDNT, DDNL, and DDNC control types. The fixed-speed fan motor(s) shall have a TEAO enclosure, provide individual overload protection and have a full speed of 570rpm @ 60Hz (475rpm @ 50Hz) for quiet operation.

2.3.7 Pump Controls

The control for pump(s) up to 7.5hp shall be incorporated into the drycooler electrical panel and shall be available on all Fan Speed and Fan Cycling Control drycoolers. The pump fuses, overload heaters and flow switch (dual pump control models) for the drycooler electrical panel shall be included with the Liebert pump packages or shall be field-supplied for field-supplied pumps.

The dual pump control option shall provide controls for primary and standby pump operation. A flow switch shall be field installed into glycol piping and wired into the drycooler electrical panel. A loss of glycol flow shall be sensed by the flow switch and the pump controls shall energize the standby pump and de-energize the primary pump. An internal switch shall allow manual selection of the lead/lag pump for the balance of run time.

2.4 Ancillary Items

An expansion tank shall be provided for expansion and contraction of the glycol fluid due to temperature change in the closed system. The tank and air vents shall be field installed at the system's highest elevation to allow venting of trapped air. A fluid pressure relief valve shall be provided for system safety. The system shall include (tank-steel [expansion, compression, diaphragm, bladder], air separator, air vent, fluid pressure relief valve, pressure gauges, flow switches, tempering valves, [primary, primary, and standby] pumps, supply and return piping).

3.0 EXECUTION

3.1 Installation of Air Conditioning Unit

3.1.1 General

The air conditioning unit shall be installed in accordance with the manufacturer's installation instructions. Install unit plumb and level, firmly anchored in location indicated, and maintain manufacturer's recommended clearances.

3.1.2 Electrical Wiring

Install and connect electrical devices furnished by manufacturer but not specified to be factory mounted. Furnish a copy of the manufacturer's electrical connection diagram submittal to the electrical contractor. Install and wire per local and national codes.

3.1.3 Piping Connections

Install and connect devices furnished by manufacturer but not specified to be factory mounted. Furnish a copy of manufacturer's piping connection diagram submittal to the piping contractor.

3.1.4 Field Quality Control

Start cooling units in accordance with manufacturer's startup instructions. Test controls and demonstrate compliance with requirements. These specifications describe requirements for a computer room environmental control system. The system shall be designed to maintain temperature and humidity conditions in the rooms containing electronic equipment.

The manufacturer shall design and furnish all equipment to be fully compatible with heat dissipation requirements.