

GENERAL:

This section provides criteria for selection and installation of water cooled chillers.

DESIGN GUIDELINES:

A. Design General

1. In general, chiller size, type, and location will be determined by the Campus.
2. Refrigerant HCFC-123 will not be allowed.

B. Chillers

1. The following chiller types are acceptable:
 - 1.1 Open Drive Electric Centrifugal (Variable or Constant Speed)
 - 1.2 Hermetically Sealed Drive Electric Centrifugal (Variable or Constant Speed)
 - 1.3 Double Effect Steam Absorption derated to operate on 45 PSIG steam if approved by the Project Manager
 - 1.4 Steam Turbine Driven Centrifugal if approved by the Project Manager
2. Dual Compressor Electric Centrifugal is not acceptable.
3. Variable speed drives shall be used on all chiller pumps.
4. Chiller variable speed drives shall be cooled by chilled water or refrigerant. If chilled water is used, a duplex strainer shall be installed to allow cleaning without interrupting operation of the chiller.
5. Active Harmonic Distortion Filter: Factory mounted and wired to limit total voltage and current distortion to 5%. Drive shall meet IEEE-519 harmonic distortion requirements at the input line terminal.
6. Housekeeping pads should be located beneath the chiller support legs only, to allow maintenance access to components under the chiller.
7. Sufficient open space must be provided to allow tube pulling and replacement.
8. Oil coolers shall be cooled with refrigerant. Water cooled oil coolers will not be allowed.
9. Marine Water Boxes with hinges shall be provided and both ends of the chiller and sufficient clear space to allow cleaning tubesheets and brushing of tubes.
10. Chiller should be selected to minimize pressure drop across heat exchangers (evaporator, condenser, and absorber).
11. Chiller capacity listed on the drawings shall be the minimum capacity acceptable. Capacity listed shall not be the nominal capacity.

SPECIFICATION REQUIREMENTS:

The following statements shall be included in the contract specification.

1. Factory performance test chillers, before shipping, according to the testing methodology required by AHRI 550/590.

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- 1.1. Capacity tolerances for capacity, tons, EER, COP, and power input kW/ton as described in AHRI 550/590 shall not be acceptable. Test shall be acceptable only if capacity and COP meet with zero tolerance, or exceed, the scheduled performance. See Special Conditions section of contract documents for penalties associated with performance deficiencies.
- 1.2. Test the following conditions:
 - 1.2.1. Design conditions indicated.
 - 1.2.2. Reduction in capacity from design to minimum load in steps of 10% with condenser fluid at design conditions.
 - 1.2.3. Reduction in capacity from design to minimum load in steps of 10% with varying entering condenser-fluid temperature from design to minimum conditions in 5°F(3°C) increments.
- 1.3. Prepare test report indicating test procedures, instrumentation, test conditions, and results. Submit copy of results within one week of test date.
- 1.4. If the equipment fails to achieve the minimum capacity listed in the documents, the manufacturer will be allowed to make the necessary revision to the equipment and retest as required prior to shipment of equipment. The manufacturer shall assume all expenses and travel expenses incurred by the owner or his representative to witness the retest. Capacity Test will have a Zero Tolerance from submitted data.
2. AHRI Certification – Certify chiller in accordance to AHRI 550 certification program for IPLV rating.
3. AHRI Rating – Rate chiller performance according to requirements in AHRI 550/590 for IPLV rating.
4. ASHRAE Compliance
 - 4.1. ASHRAE 15 for safety code for mechanical refrigeration.
 - 4.2. ASHRAE 147 for refrigerant leaks, recovery, and handling and storage requirements.
5. ASHRAE/IESNA Compliance – Applicable requirements in ASHRAE/IESNA 90.1-2007
6. ASME Compliance – Fabricate and label chillers to comply with ASME Boiler and Pressure Vessel code: Section VIII, Division I, as applicable to chiller design. For chillers charged with R-134a refrigerant, include an ASME U-Stamp and nameplate certifying compliance
7. Comply with NFPA 70.
8. Comply with requirements of UL for all components of equipment within the scope of UL, and include label by a qualified testing agency showing compliance.
9. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of chillers that fail in materials or workmanship within specified warranty period.
 - 9.1. Extended warranties include, but are not limited to, the following:
 - 9.1.1. Complete compressor and drive assembly including refrigerant and oil charge.
 - 9.1.2. Parts and labor.
 - 9.1.3. Loss of refrigerant charge for any reason.
 - 9.2. Warranty Period: Ten (10) years from date of Substantial Completion for chiller mounted VFDs.
 - 9.3. Warranty Period: Five (5) years from date of Substantial Completion for entire chiller, except for VFDs.