# HVAC - Chiller Life-Cycle Procurement (Pre-Purchase)

Section 236414-2

Typically, for all Capital Construction Projects employing large screw-compressor or centrifugal-compressor chillers, the Division of Engineering and Contract Administration will pre-purchase the chiller equipment on a life-cycle cost basis. The Division of Engineering and Contracting Administration has successfully used this process since 1998.

- **See Section 236414-1 HVAC Equipment Pre-Purchase,**
- **See Section 236414-3 Sample Chiller Pre-Purchase Guide Specification**
- **See Section 236414-4 Sample Special Conditions Chiller Pre-purchase Guide Specifications.**

The Architect-Engineer **shall not prepare chiller specifications** unless directed by the Associate Director, Mechanical & Electrical Services.

This procurement method allows the most cost-effective, energy-efficient chiller equipment to be obtained for capital construction projects.

**Overview:**

- The Architect-Engineer shall design the chiller layout and associated chiller piping and appurtenances, and shall identify the exact make/model of chiller used as the basis of design.
- The Architect-Engineer shall forward information on the basis of design, with appropriate design parameters, to the Associate Director, Mechanical & Electrical Services.
- The Associate Director, Mechanical & Electrical Services will prepare specifications for the pre-purchase of the chiller(s) in consultation with the Architect-Engineer.
- The Associate Director, Mechanical & Electrical Services and the Contracting Officer will handle the bidding and contract award for the chiller equipment.
- The chiller(s) will be tested at the factory on an ARI-certified test stand for compliance with the values listed in the Form of Proposal. A representative of the Division of Engineering and Contract Administration will witness the test(s).
- Typically, the chiller(s) will be delivered F.O.B. truck bed at the job site. The Architect-Engineer shall specify for the Installing Contractor to unload the chiller(s) and otherwise install them, just as if the contractor had supplied the chillers.
- Warranty issues with the pre-purchased chiller equipment will be administered directly between the Division of Engineering and Contract Administration and the chiller manufacturer. The Installing Contractor shall only handle warranty issues that are directly related to his work.

**Unitary Equipment:** Small chillers using reciprocating, scroll or screw compressors that are of standard configuration, and are rated as such by ARI (i.e. tested by random sampling from the manufacturer's production) will not be purchased in this manner. Only large screw chillers (custom-configured) and all centrifugal chillers will be pre-purchased on a life-cycle basis.

**Basis of Design:** The Architect-Engineer should be aware that, due to zero-tolerance acceptance testing, the pre-purchased chiller equipment may be somewhat larger than a model that might have been selected as a normal basis of design.

For example, ARI standards call for 5% tolerance on full-load capacity. Since the pre-purchase contract will call for zero-tolerance for full-load capacity, the manufacturer may have to use a bigger heat exchanger, compressor or other components to ensure that the predicted performance has no chance of performing at a value less than called for under the contract.

Accordingly, when working with manufacturer representatives, the Architect-Engineer should make sure that the sales representative understands this issue.

Where feasible, allow extra "footprint" room for an oversize chiller (perhaps one nominal frame size larger, for example).

The Architect-Engineer shall investigate the physical layout of chillers from the four available chiller manufacturers (Carrier, McQuay, Trane and York). None shall be excluded unless there is a valid physical constraint that cannot be resolved.

**Size/Weight Constraints:** Where applicable, the Architect-Engineer shall determine the maximum allowable dimensions and weights for each chiller. The designer shall also supply information on restricted dimensions related to moving the chiller into the chiller room (doorways, etc.). This information shall be coordinated with the Associate Director, Mechanical & Electrical Services.

**Chiller Room Floor Structure:** For new construction, the chiller room floor shall be able to accommodate the estimated weight of a chiller (plus 10%) while being "skated" or rigged into place from the building exterior to the final location, without the need for shoring or bracing of the floor.

**Chiller Room External Access:** For new construction, the chiller room shall have an overhead door of sufficient size to allow the new installation and subsequent replacement of each chiller without major disassembly of the chiller.

**Piping Configuration:** Unless there is a specific reason to restrict the number of tube passes for a chiller (e.g. tight space limits in the chiller room), this parameter will be left to the chiller vendor. This will allow the vendor more flexibility in selection and ultimately a better chiller for the money.

If the Architect-Engineer feels that the number of tube passes should be fixed (even or odd), the information should be conveyed to the Associate Director, Mechanical & Electrical Services.

If the installation drawings show a piping configuration that is later determined to be incompatible with the actual pre-purchased chiller, the configuration will be corrected by negotiating a Change Order with the Installing Contractor. The piping changes are generally minor in nature, and are not considered detrimental to the project by the Commonwealth.

**Allowable Refrigerants**: Acceptable refrigerants for centrifugal chillers are R-123 and R-134a.

**Refrigerant Monitor/Alarm System**: The Architect-Engineer shall coordinate refrigerant monitor/alarm system requirements with the Associate Director, Mechanical & Electrical Services. Typically, the alarm system will be purchased directly by the Division of Engineering and Contract Administration, but separately from the chiller.

**Operating Parameters:** The Architect-Engineer shall specify and supply the following operating parameters to the Associate Director, Mechanical & Electrical Services:

- Condenser water flow
- Condenser entering water temperature
- Condenser leaving water temperature
- Condenser water pressure drop
- Evaporator water flow
- Evaporator entering water temperature
- Evaporator leaving water temperature
- Evaporator water pressure drop
- Electrical characteristics (voltage/phase/circuit capacity)