

AHRI Standard 420 (I-P)

2016 Standard for Performance Rating of Forced-circulation Free-delivery Unit Coolers for Refrigeration



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IMPORTANT

SAFETY DISCLAIMER

AHRI does not set safety standards and does not certify or guarantee the safety of any products, components or systems designed, tested, rated, installed or operated in accordance with this standard/guideline. It is strongly recommended that products be designed, constructed, assembled, installed and operated in accordance with nationally recognized safety standards and code requirements appropriate for products covered by this standard/guideline.

AHRI uses its best efforts to develop standards/guidelines employing state-of-the-art and accepted industry practices. AHRI does not certify or guarantee that any tests conducted under its standards/guidelines will be non-hazardous or free from risk.

Note:

This standard supersedes ANSI/AHRI Standard 420-2009.
For SI ratings, see AHRI Standard 421 (SI)-2016.

AHRI CERTIFICATION PROGRAM PROVISIONS

Scope of the Certification Program

This program applies to production models of Unit Coolers, as defined in Section 3.3, and meet the following criteria:

- Use refrigerant R-404A or R-507A for Direct Expansion (DX) Coils, or R-717 for DX and/or liquid overfeed coils
- Single vertical coil with aluminum fin material
- Horizontal only air flow direction (the air flows to or from the inlet face of the coil from or to the fan inlet, with no change in direction)
- Axial fans only

Certified Ratings

The following certification program ratings are verified by test:

1. Rated Power, W or hp
2. Gross Total Cooling Effect, Btu/h

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PERFORMANCE RATING OF FORCED-CIRCULATION FREE-DELIVERY UNIT COOLERS FOR REFRIGERATION

Section 1. Purpose

1.1 *Purpose.* The purpose of this standard is to establish for Forced-circulation Free-delivery Unit Coolers for Refrigeration: definitions; test requirements; rating requirements; minimum data requirements for Published Ratings; marking and nameplate data; and conformance conditions.

1.1.1 *Intent.* This standard is intended for the guidance of the industry, including manufacturers, engineers, installers, contractors, and users.

1.1.2 *Review and Amendment.* This standard is subject to review and amendment as technology advances.

Section 2. Scope

2.1 *Scope.* This standard applies to factory-made, Forced-circulation, Free-delivery Unit Coolers, as defined in Section 3, operating with a Volatile Refrigerant fed by either direct expansion or liquid overfeed at wet and/or dry conditions.

2.1.1 *Exclusions.* This standard does not apply to:

2.1.1.1 Air-conditioning units used primarily for comfort cooling for which testing methods are given in other standards.

2.1.1.2 Unit Coolers operating at latent load conditions with Refrigerant Saturation Temperature < 32 °F to prevent frost.

2.1.1.3 Unit Coolers installed in or connected to ductwork.

2.1.1.4 Unit Coolers using zeotropic refrigerants with Glides greater than 2.0 °F.

2.1.1.5 Field testing of Unit Coolers.

Section 3. Definitions

All terms in this document follow the standard industry definitions in the current edition of *ASHRAE Terminology* (<https://www.ashrae.org/resources--publications/free-resources/ashrae-terminology>) unless otherwise defined in this section.

3.1 *Dew Point.* Refrigerant vapor saturation temperature at a specified pressure.

3.2 *Enthalpy Difference (HD).* The difference between the enthalpy of the air entering the Unit Cooler and the calculated enthalpy of saturated air at the Refrigerant Saturation Temperature at the Unit Cooler outlet, Btu/lb.

3.3 *Forced-circulation Free-delivery Unit Coolers (Unit Coolers).* A factory-made assembly, including means for forced air circulation and elements by which heat is transferred from air to refrigerant without any element external to the cooler imposing air resistance. These may also be referred to as Air Coolers, Cooling Units, Air Units or Evaporators.

3.3.1 *Direct Expansion Unit Cooler.* A Unit Cooler in which the leaving refrigerant vapor is superheated.

3.3.2 *Liquid Overfeed Unit Cooler.* A Unit Cooler in which the refrigerant liquid is supplied at a Recirculation Rate greater than 1.

3.4 *Glide.* The absolute value of the difference between the starting and ending temperatures of a phase-change process (condensation or evaporation) for a zeotropic refrigerant exclusive of any liquid subcooling or vapor superheating.