



STANDARD

ANSI/ASHRAE Standard 30-2019
(Supersedes ASHRAE Standard 30-2017)

Method of Testing Liquid Chillers

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NOTE

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE website at www.ashrae.org/technology.

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FOREWORD

ASHRAE Standard 30 prescribes methods for obtaining performance test data of liquid-chilling or liquid-heating equipment using the vapor compression thermodynamic cycle and any type of compressor. The intent of this standard is to provide uniform test methods to measure the performance of this equipment by specifying the test and instrumentation requirements, test procedures, data to be recorded, and calculations to generate and confirm valid test results. Changes since the 2017 edition include the following:

- Clarification of operating condition tolerance and stability criteria when redundant measurements are required
- Reference to ANSI/ASHRAE Standard 41.8 for liquid mass flow rate measurements
- Clarification that test instrument measurement resolution includes all parts of the measurement system, such as analog to digital conversion
- Updates to Section 9 test report requirements to align with AHRI Standards 550/590 and 551/591

1. PURPOSE

1.1 The purpose of this standard is to prescribe methods of testing to measure the thermal capacity, energy efficiency, and water pressure drop of packaged liquid-chiller equipment using a refrigerant vapor compression cycle.

1.2 This standard does not specify methods of establishing published ratings or performance tolerances.

2. SCOPE

2.1 This standard applies to liquid-chilling or liquid-heating packaged equipment using any type of compressor and using the following methods of heat rejection during the cooling cycle:

- a. Air cooled
- b. Evaporatively cooled
- c. Water cooled

2.2 This standard includes packaged equipment provided in more than one assembly if the separated or remote assemblies are designed to be used together and are connected together during the test.

2.3 This standard does not include the following types of equipment:

- a. Self-contained, mechanically refrigerated drinking-water coolers within the scope of ASHRAE Standard 18
- b. Unitary water-to-air heat-pump equipment within the scope of ASHRAE Standard 37

c. Absorption water-chilling packages within the scope of ASHRAE Standard 182

2.4 This standard does not include testing of chillers in field installations.

2.5 This standard does not specify the test operating conditions.

2.6 This standard does not specify methods of performance ratings certification.

3. DEFINITIONS, ABBREVIATIONS, AND ACRONYMS

air-sampling tree: an air-sampling tube assembly that draws air through sampling tubes in a manner to provide a uniform sampling of air entering the air-cooled condenser coil. See Section 6.3.1.4.2.1 for design details.

aspirating psychrometer: a piece of equipment with a monitored airflow section that draws a uniform airflow velocity through the measurement section and has probes for measurement of air temperature and humidity. See Section 6.3.1.4.2.2 for design details.

auxiliary power: see *power*.

capacity: a measurable physical quantity, the rate that heat (energy) is added to or removed from the liquid side of a refrigerating system. Capacity is defined as the mass flow rate of the liquid multiplied by the difference in enthalpy of liquid entering and leaving the heat exchanger. For the purposes of this standard, the enthalpy change is approximated as the sensible heat transfer using specific heat and temperature difference and, in some calculations, also the energy associated with liquid-side pressure losses.

gross cooling capacity: the capacity of the evaporator as measured by the total heat transferred from the liquid to the refrigerant in the evaporator. This value includes both the sensible heat transfer and the friction heat losses from pressure drop effects of the liquid flow through the evaporator. This value is used to calculate the energy balance of a test.

gross heating capacity: the capacity of the water-cooled condenser as measured by the total heat transferred from the refrigerant to the liquid in the condenser. This value includes both the sensible heat transfer and the friction heat losses from pressure drop effects of the liquid flow through the condenser. This value is used to calculate the energy balance of a test.

net cooling capacity: the capacity of the evaporator available for useful cooling of the thermal load, external to the liquid-chilling system, calculated using only the sensible heat transfer.

net heating capacity: the capacity of the condenser available for useful heating of the thermal load, external to the liquid-chilling system, calculated using only the sensible heat transfer.

compressor saturated discharge temperature: for single-component and azeotrope refrigerants, it is the saturated temperature corresponding to the refrigerant pressure at the compressor