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ANSI/ASHRAE Standard 225-2020
Method for Performance Testing Centrifugal Refrigerant Compressors and Condensing Units

NOTE

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

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

ANSI/ASHRAE Standard 225 prescribes methods for obtaining performance data relating to centrifugal compressors or compressor units. The intent of this standard is to provide uniform test methods to measure the performance of this equipment by addressing the test and instrumentation requirements, test procedures, data to be recorded, and calculations to generate and confirm valid test results.

The standard has been developed using as a basis ANSI/ASHRAE Standard 23.1-2019, Methods for Performance Testing Positive Displacement Refrigerant Compressors and Condensing Units that Operate at Subcritical Pressures of the Refrigerant*, and ANSI/ASHRAE Standard 23.2-2019,* Methods of Test for Rating the Performance of Positive Displacement Compressors that Operate at Supercritical Pressures of the Refrigerants*, with the following differences:*

a. Defines centrifugal compressor*,* Mach number*,* measured property*,* static property*, and* total property
b. Allows mass flow measurement using a flowmeter without a simultaneous and independent confirming test of mass flow
c. Includes calculations for head factor and flow factor
d. Includes requirements to use total enthalpy for head factor and isentropic efficiency calculations
e. Excludes volumetric efficiency because it does not apply to centrifugal compressors and condensing units
f. Shows calculations for total properties and Mach number (Normative Appendix A)
g. Shows calculations for compressor efficiency using total enthalpy (Informative Appendix C)

1. PURPOSE

This standard provides methods of testing for the performance rating of centrifugal refrigerant compressors and condensing units.

2. SCOPE

This standard applies to centrifugal refrigerant compressors and condensing units using any refrigerants. This standard applies to single and multistage compressors with or without means of intermediate cooling.

3. DEFINITIONS

The following definitions apply to the terms used in this standard.

***accuracy*:** the degree of conformity of an indicated value to the corresponding true value.

bubble-point temperature: a liquid-vapor equilibrium point for a pure liquid or for a multicomponent mixture of miscible, pure component liquids, in the absence of noncondensables, where the temperature of the mixture at a defined pressure is the minimum temperature required for a vapor bubble to form in the liquid.

calorimeter: a thermally insulated apparatus containing a heat exchanger that is used to determine the mass flow rate of a refrigerant by measuring the heat input/output that will result in a corresponding enthalpy change for the refrigerant.

capacity: the rate of heat removal by the refrigerant used in the compressor or condensing unit in a refrigerating system. This rate equals the product of the refrigerant mass flow rate and the difference in the specific enthalpies of the refrigerant vapor at its thermodynamic state entering the compressor or condensing unit and refrigerant liquid at the thermodynamic state entering the expansion device.

centrifugal refrigerant compressor: a machine that increases the pressure of a refrigerant vapor by imparting kinetic energy to a continuous flow of fluid.