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Methods of Testing Capacity of Refrigerant Solenoid Valves

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Preview

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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(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 158.1 provides a standard method of test for the capacity of refrigerant solenoid valves. ANSI/AHRI Standard 760 (I-P), Performance Rating of Solenoid Valves for Use With Volatile Refrigerants*, and ANSI/AHRI Standard 761 (SI)* Performance Rating of Solenoid Valves for Use With Volatile Refrigerants, *require this standard be used as a method of test for capacity. It is further anticipated that AHRI will continue to maintain Standard 760/761 as it relates to standard methods of rating refrigerant service solenoid valves. AHRI Standard 760/761 may also include information concerning other solenoid valve performance characteristics.*

The basis for the method of test and the calculation of capacity for flow through solenoid valves is AHRI-sponsored research project PRF 5233, performed at Ray W. Herrick Laboratories, Purdue University, West Lafayette, Indiana. This research followed a study performed at Herrick Laboratories, under the auspice of AHRI, by R.T. McKenzie, J.B. Chaddock, and W.E. Fontaine between September 1963 and September 1966.

This standard provides a means of accurately measuring the refrigerant mass flow capacity of solenoid valves. The flow capacity may be expressed in terms of refrigerating effect with various refrigerants by performing simple thermodynamic computations. Examples of the computations necessary to express valve capacity in kilowatts (tons) or other appropriate units are included in Informative Appendix B of this standard.

ANSI/ASHRAE Standard 15, Safety Standard for Refrigeration Systems*, and ANSI/ASHRAE Standard 34,* Designation and Safety Classification of Refrigerants*, list the various refrigerants to which this standard is applicable.*

The 2024 edition of Standard 158.1 includes updated references. This standard was prepared under the auspices of ASHRAE. It may be used, in whole or in part, by an association or government agency with due credit to ASHRAE. Adherence is strictly on a voluntary basis and merely in the interests of obtaining uniform standards throughout the industry.

1. PURPOSE

This standard prescribes a method of testing the capacity of refrigerant solenoid valves for use in refrigerating systems.

2. SCOPE

2.1 This standard is applicable to refrigerant solenoid valves in the following circumstances:

a. As defined in Section 3, “Definitions”
b. For either liquid or vapor refrigerant applications
c. For use with refrigerants deemed available and suitable according to ANSI/ASHRAE Standard 15, *Safety Standard for Refrigeration Systems* [1], and ANSI/ASHRAE Standard 34 [2], *Designation and Safety Classification of Refrigerants*

2.2 This standard specifies procedures, apparatus, and instrumentation that will produce accurate capacity data.

2.3 This standard does not do the following:

a. Specify rating conditions or electrical or mechanical design requirements (Rating conditions may be found in ANSI/AHRI Standard 760, *Performance Rating of Solenoid Valves for Use with Volatile Refrigerants* [3], for I-P units, or ANSI/AHRI Standard 761, *Performance Rating of Solenoid Valves for Use with Volatile Refrigerants* [4], for SI units.)
b. Make recommendations for safety
c. Specify tests for production, specification compliance, or field testing of solenoid valves

3. DEFINITIONS

capacity: the mass flow rate of a selected refrigerant that will pass through the valve under test at specified conditions.

certified standard instrument: an instrument that is calibrated by the manufacturer or other reliable agency and is certified traceable to the National Institute for Standards and Technology (NIST).