



ANSI/ASHRAE Standard 17-1998 (RA 2003)

# ASHRAE<sup>®</sup> STANDARD

## Method of Testing Capacity of Thermostatic Refrigerant Expansion Valves

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## CONTENTS

### ANSI/ASHRAE 17-1998 (RA 2003), Method of Testing Capacity of Thermostatic Refrigerant Expansion Valves

SECTION	PAGE
Foreword	
1 Purpose .....	2
2 Scope.....	2
3 Definitions .....	2
4 Conditions for Testing Capacity.....	3
5 Data Required for Reporting Capacity.....	3
6 Test Instruments .....	3
7 Test Apparatus .....	3
8 Test Procedure .....	4
9 Capacity Calculation .....	4
10 References .....	5
Appendix A .....	6

(This foreword is not part of this standard but is included for information purposes only.)

## FOREWORD

This standard is a reaffirmation of ANSI/ASHRAE Standard 17-1998, which was revised in 1998 to address the entry of new refrigerants in the market and the introduction of new safety classifications that resulted from the increasing recognition of the CFC issue. Prior to 1998, Standard 17 referred to three refrigerants used in the industry: R-12, R-22, and R-502. The current version of Standard 17 references the broader refrigerant possibilities without specifically naming them.

This standard prescribes a method of testing capacity of thermostatic expansion valves for use in air-conditioning and refrigeration systems. This standard does not specify the test conditions to be used for obtaining the standard rating. That is done in a rating standard developed by the Air-Conditioning and Refrigeration Institute (ARI). The latest edition of ARI Standard 750 is referenced for the test conditions to be used in obtaining standard ratings for thermostatic refrigerant expanding valves.

## 1. PURPOSE

This standard prescribes a method of testing the capacity of thermostatic refrigerant expansion valves for use in vapor-compression refrigeration systems.

## 2. SCOPE

2.1 This standard is applicable to

- (a) thermostatic expansion valves (also referred to in this standard as expansion valves) as defined in Section 3, "Definitions,"
- (b) expansion valves of the direct-acting type but not the pilot-operated type, and
- (c) many currently used refrigerants deemed available and suitable according to ANSI/ASHRAE Standard 15, *Safety Standard for Refrigeration Systems*, and ANSI/ASHRAE Standard 34, *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

- (a) specify tests for production, specification compliance, or field testing of expansion valves, nor
- (b) specify capacity rating conditions for testing expansion valves. These may be found in ARI Standard 750, *Thermostatic Refrigerant Expansion Valves*.

## 3. DEFINITIONS

The following definitions apply only to parts and terms used in this standard.

**capacity of an expansion valve:** the refrigerating effect in kW (Btu/h or tons) of refrigeration, produced by the mass flow of refrigerant that will pass through the valve under the conditions that are cited in Section 5.

**certified standard instrument:** an instrument calibrated by

the manufacturer or other reliable agency and certified as traceable to the National Institute of Standards and Technology (NIST).

**direct-acting valve:** an expansion valve designed so that the valve plug opens the valve port in inverse response to sensed equalizer pressure and in direct response to temperature-sensing element temperature. The valve plug is positioned through direct mechanical linkage to the actuating element (e.g., diaphragm or bellows).

**evaporator:** an evaporatively cooled heat exchanger.

**external equalizer:** in a thermostatic expansion valve, a connection from a selected point in the low-pressure part of the circuit to the system pressure-sensing side of the actuating element such that the selected point pressure is transmitted to the actuating element (e.g., diaphragm or bellows).

**initial valve opening:** a minimal valve opening position not to exceed 0.05 mm (0.002 in.).

**internal equalizer:** in a thermostatic expansion valve an integral internal port or passage whereby the system pressure-sensing side of the actuating element (e.g., diaphragm or bellows) is exposed to valve outlet pressure.

**liquid refrigerant flowmeter:** a device for determining the refrigerant mass flow rate.

**nominal capacity:** the capacity reported by the manufacturer for an expansion valve, citing ARI 750 for the test conditions.

**operating superheat:** the difference between the temperature at the temperature-sensing element and the system refrigerant vapor saturation temperature corresponding to the valve equalizer pressure.

**permanent bleed-type valve:** a valve that has a fixed flow passage incapable of being closed by action of the valve. Such a fixed orifice permits a flow through or in parallel with the main valve port.

**permanent bleed rate:** the capacity of the permanent bleed provision under the conditions cited in Section 5, expressed either as a percentage of the nominal capacity or in kW (Btu/h or tons) of refrigerating effect produced by the evaporation of that amount of refrigerant flow.

**pilot-operated valve:** expansion valve of a type used on large capacity systems (e.g., direct-expansion chillers) where the required capacity per valve is beyond the range of direct-acting valves; this type of valve is under the control of a direct-acting valve.

**refrigerant:** the working fluid in a refrigerating system that absorbs heat by evaporating at a low temperature and pressure and rejects heat on condensing at a higher temperature and pressure.

**shall/shall not:** indicate that the provision is mandatory if compliance with the standard is claimed.

**should/ is recommended:** indicate that the provision is not mandatory but is desirable as good practice.

**static superheat:** the superheat required to position the valve at the initial valve opening.