

# 1999 STANDARD for

# POSITIVE DISPLACEMENT REFRIGERANT COMPRESSORS AND COMPRESSOR UNITS



**ANSI/ARI  
Standard 540-1999**

**IMPORTANT**

***SAFETY RECOMMENDATIONS***

It is strongly recommended that the product be designed, constructed, assembled and installed in accordance with nationally recognized safety requirements appropriate for products covered by this standard.

ARI, as a manufacturers' trade association, uses its best efforts to develop standards employing state-of-the-art and accepted industry practices. However, ARI does not certify or guarantee safety of any products, components or systems designed, tested, rated, installed or operated in accordance with these standards or that any tests conducted under its standards will be non-hazardous or free from risk.

Note:

This standard supersedes ARI Standard 540-99.

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# POSITIVE DISPLACEMENT REFRIGERANT COMPRESSORS AND COMPRESSOR UNITS

## Section 1. Purpose

**1.1 Purpose.** The purpose of this standard is to establish, for positive displacement refrigerant compressors and compressor units for refrigeration applications: definitions; requirements for testing, rating and operating; 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 electric motor driven, single capacity positive displacement refrigerant compressors and compressor units. This standard also applies to the presentation of performance data for positive displacement refrigerant compressors and compressor units.

### 2.2 Exclusions.

**2.2.1** This standard does not apply to compressors and compressor units employing ammonia, as covered in ARI Standard 510.

**2.2.2** This standard does not apply to compressors and compressor units intended for use in:

- a. Household refrigerators and freezers
- b. Automotive air-conditioners
- c. Dehumidifiers

## Section 3. Definitions

**3.1 Definitions.** All terms in this document will follow the standard industry definitions in the current edition of ASHRAE *Terminology of Heating, Ventilation, Air Conditioning and Refrigeration* unless otherwise defined in this section.

### 3.2 Compressor or Compressor Unit Efficiency.

$$\eta = 100 mC (h_{2s} - h_1) / P$$

where:  $m$  = mass flow of volatile refrigerant, lb/hr [kg/s]

$h_1$  = specific enthalpy of refrigerant vapor entering the compressor or compressor unit, Btu/lb [kJ/kg]

$h_{2s}$  = specific enthalpy of refrigerant vapor - at discharge pressure, Btu/lb [kJ/kg] and  $s$  is the specific entropy of refrigerant vapor entering the compressor or compressor unit, Btu/lb · °F [kJ/kg · °C]

$C$  = 0.2931 W/Btu/h, 1.0 [kW/kJ/s]

$P$  = measured motor input power, W [kW]

$\eta$  = compressor or compressor unit efficiency, in percent

**3.3 External-Drive Refrigerant Compressor.** A compressor with a shaft or other moving part extending through a casing to be driven by an electric motor.

**3.4 Positive Displacement Refrigerant Compressor Unit.** A positive displacement compressor mounted on a structural base with accessories, such as strainers, service valves, check valves, suction filters, oil separators, receivers, etc., as provided by the manufacturer.