ANSI/AHRI Standard 540
(formerly ARI Standard 540)

2004

Standard For Performance Rating Of Positive Displacement Refrigerant Compressors And Compressor Units

Approved American National Standard

ANSI

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IMPORTANT

SAFETY RECOMMENDATIONS

ARI does not set safety standards and does not certify or guarantee the safety of any products, components or systems designed, tested, rated, installed or operated in accordance with this standard/guideline. It is strongly recommended that products be designed, constructed, assembled, installed and operated in accordance with nationally recognized safety standards and code requirements appropriate for products covered by this standard/guideline.

ARI uses its best efforts to develop standards/guidelines employing state-of-the-art and accepted industry practices. ARI does not certify or guarantee that any tests conducted under its standards/guidelines will be non-hazardous or free from risk.

Note:

This standard supersedes ARI Standard 540-99.

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PERFORMANCE RATING OF POSITIVE DISPLACEMENT REFRIGERANT COMPRESSORS AND COMPRESSOR UNITS

Section 1. Purpose

1.1 Purpose. The purpose of this standard is to establish, for single and variable capacity positive displacement refrigerant compressors and compressor units: definitions; test requirements; rating requirements; minimum data requirements for Published Ratings; operating requirements; 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 and variable 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 for air-cooled, evaporatively-cooled or water-cooled air-conditioning, heat pump and refrigeration applications.

2.1.1 *Refrigerant*. The rating points in this standard are based on commonly used refrigerants.

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

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.

3.1 *Compressor or Compressor Unit Efficiency*. The efficiency is defined by the following equation:

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

where: $\dot{m}$ = mass flow of volatile refrigerant, lb/h [kg/s]
h_1 = specific enthalpy of the refrigerant vapor entering the compressor or compressor unit, Btu/lb [kJ/kg]
h_{2s} = specific enthalpy of the refrigerant vapor at the discharge pressure and the specific entropy of the refrigerant vapor entering the compressor or compressor unit, Btu/lb [kJ/kg]
C = 0.2931 W/Btu/h [1.0 kW/kJ/s]

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