

AHRI Standard 530-2011

2011 Standard for Rating of Sound and Vibration for Refrigerant Compressors



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IMPORTANT

SAFETY DISCLAIMER

AHRI 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.

AHRI uses its best efforts to develop standards/guidelines employing state-of-the-art and accepted industry practices. AHRI 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 AHRI Standard 530-2005.

Note:

This version of the standard differs from that of 2005 in the following ways:

1. Reverberation Room requirements including instrumentation and qualification shall be in accordance with AHRI Standard 220.
2. Reverberation Room testing shall be done per AHRI Standard 220.
3. Sound Power Levels shall be computed per AHRI Standard 220 for testing done in a reverberation room.
4. Anechoic/Hemi-Anechoic Test Room requirements including instrumentation and qualification shall be in accordance with ANSI S12.55/ISO 3745.
5. Anechoic/Hemi-Anechoic Test Room testing shall be done per ANSI S12.55/ISO 3745.
6. Sound Power Levels are to be computed per ANSI S12.55/ISO 3745 for testing done in an Anechoic/Hemi-Anechoic Test Room.

Note: The AHRI Technical Committee on Sound will investigate alternative measurement methods for possible inclusion in future revisions of this standard.

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RATING OF SOUND AND VIBRATION FOR REFRIGERANT COMPRESSORS

Section 1. Purpose

1.1 Purpose. The purpose of this standard is to establish for the rating of sound and vibration for Refrigerant Compressors: definitions; test requirements; rating requirements; minimum data requirements for published ratings; 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 External-drive, Hermetic, and Semi-Hermetic Positive Displacement Refrigerant Compressors. In the case of External-drive Refrigerant Compressors, the driving mechanism shall be excluded from the sound and vibration measurements. However, for Semi-Hermetic Refrigerant Compressors where the driving mechanism is an integral part of the compressor assembly as defined in Section 3, it shall be included in the measurements.

2.1.1 Exclusion. An External-drive Refrigerant Compressor, coupling and motor assembly mounted on a common base is excluded from this standard, since the vibration measurement method specified in the standard does not apply to this type of product.

Section 3. Definitions

All terms in this document shall 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 Amplitude Root Mean Square (rms). Refer to definition 3.16.

3.2 Anechoic Test Room. A test room whose surfaces absorb essentially all of the incident sound energy over the frequency range of interest, thereby affording free-field conditions over the measurement surface.

3.3 Bandwidth. The difference between the upper and lower frequencies in a contiguous set of frequencies. It is typically measured in Hz.

3.4 Flat Top Window. A weighting function applied during fast fourier transform analysis to obtain the true amplitudes of periodic components of a time signal. It is designed specifically to minimize the amplitude error. It facilitates calibration by using a calibration tone which may lie anywhere between two lines of the analyzer. Maximum amplitude error is less than 0.01 dB.

3.5 Fundamental Frequency. The speed of the compressor drive/shaft expressed in Hz.

3.5.1 Fundamental Pulsation Frequency. The dominant frequency observed in the pressure pulse. For reciprocating compressors, where all events are equally spaced in time, this is usually the number of cylinders times the Fundamental Frequency.

3.6 Harmonics. Sinusoidal quantity that has a frequency which is an integral multiple of the frequency of the periodic quantity to which it is related.