SLOVENSKI STANDARD
oSIST prEN 13487:2017

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Prenosniki toplote - Zračno hlajeni kondenzatorji in suhi hladilniki s prisilno konvekcijo - Merjenje hrupa

Heat exchangers - Forced convection air cooled refrigerant condensers and dry coolers - Sound measurement

Wärmeübertrager - Ventilatorbelüftete Kältemittelverflüssiger und Trockenkühltürme - Schallmessung

Echangeurs thermiques - Aérocondenseur à convection forcée et batterie froide - Mesurage du bruit

Ta slovenski standard je istoveten z: prEN 13487

ICS:

17.140.20	Emisija hrupa naprav in opreme	Noise emitted by machines and equipment
27.060.30	Grelniki vode in prenosniki toplote	Boilers and heat exchangers

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

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ICS 17.140.20; 27.060.30

Will supersede EN 13487:2003

English Version

Heat exchanger - Forced convection air cooled refrigerant condensers and dry coolers - Sound measurement

Echangeurs thermiques - Aérocondenseur à convection forcée et batterie froide - Mesurage du bruit

Wärmeübertrager - Ventilatorbelüftete Kältemittelverflüssiger und Trockenkühltürme - Schallmessung

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 110.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Page

European foreword

This document (prEN 13487:2017) has been prepared by Technical Committee CEN/TC 110 “Heat exchangers”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13487:2003.

Introduction

This European Standard is one of a series of European Standards dedicated to heat exchangers.

This standard provides information for assessing and presenting the acoustic characteristics of heat exchangers in fan operation.

This standard also provides information necessary for specifying and selecting the product which best suits the needs of the purchaser.

1 Scope

1.1 General

This European Standard is one of a series of European Standards dedicated to air-cooled heat exchangers.

— forced convection air cooled refrigerant condensers as specified in EN 327;

— forced convection unit air coolers for refrigeration as specified in EN 328;

— air cooled liquid coolers "dry coolers" as specified in EN 1048.

This standard provides information for assessing and presenting the acoustic emission characteristics of heat exchangers under stationary operating conditions.

This European Standard is applicable to selfstanding forced convection air cooled refrigerant condensers and air cooled liquid coolers "dry coolers" and air coolers.

1.2 Size of source

The method specified in EN ISO 3744, EN ISO 3745, EN ISO 3746, EN ISO 9614-1 and EN ISO 9614-2 is applicable to noise sources of any size. Limitations for the size of the source are given in 1.3 of EN ISO 3741:2010, EN ISO 3743-1:2010 and EN ISO 3743-2:2009.

1.3 Object

This European Standard offers ways to determine the sound power level of units. Some of them are specifically adapted to provide results with low uncertainties, by using laboratory class or engineering class acoustic methods under highly controlled working conditions. Those results are suitable for certification, labeling and marking purposes.

This standard is concerned with objective methods for determining sound power levels L_W, expressed in decibels (dB) with reference to a sound power of one picowatt (1 pW), of airborne acoustical noise within the specified frequency range of interest and for prescribed operating conditions of the appliance to be measured:

— A-weighted sound power level, L_{WA};

— spectral sound power levels;

— emission sound pressure level at workplace, L_{pA}.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 3741:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Precision methods for reverberation test rooms (ISO 3741:2010)*

EN ISO 3743-1:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for small movable sources in reverberant fields — Part 1: Comparison method for a hard-walled test room (ISO 3743-1:2010)*

EN ISO 3743-2:2009, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering methods for small, movable sources in reverberant fields — Part 2: Methods for special reverberation test rooms (ISO 3743-2:1994)*

EN ISO 3744:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane (ISO 3744:2010)*

EN ISO 3745:2012, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Precision methods for anechoic rooms and hemi-anechoic rooms (ISO 3745:2012)*

EN ISO 3746:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746:2010)*

EN ISO 4871, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 9614-1:2009, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 1: Measurement at discrete points (ISO 9614-1:1993)*

EN ISO 9614-2:1996, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning (ISO 9614-2:1996)*

EN ISO 9614-3:2009, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 3: Precision method for measurement by scanning (ISO 9614-3:2002)*

EN ISO 11203:2009, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level (ISO 11203:1995)*

ISO 7574-4, *Acoustics — Statistical methods for determining and verifying stated noise emission values of machinery and equipment — Part 4: Methods for stated values for batches of machines*

EN 60038, *CENELEC standard voltages (IEC 60038)*

3 Terms and definitions

For the purposes of this document, the terms and definitions pertinent to the determination of sound power levels given in EN ISO 3741, EN ISO 3743-1, EN ISO 3743-2, EN ISO 3744, EN ISO 3746, EN ISO 9614-1 and EN ISO 9614-2 and the following apply.

3.1
forced convection air cooled refrigerant condenser
refrigeration system component that condenses refrigerant vapour by rejecting heat to air, which is mechanically circulated over its dry heat transfer surface by integral fans and fan drives. The heat transfer coil includes distributing and collecting headers. [See EN 327]

Note 1 to entry: In the following "forced convection air cooled refrigerant condenser" is referred to as "apparatus".

3.2
forced convection air cooled liquid cooler; dry cooler
self contained system that cools a single phase liquid by rejecting sensible heat via a heat exchanger, to air that is mechanically circulated by integral fans.[See EN 1048]

Note 1 to entry: In the following "forced convection air cooled liquid cooler; dry cooler" is referred to as "apparatus".

3.3
forced convection unit air cooler
refrigeration system component transferring heat from air to a refrigerant or liquid. The air is mechanically circulated over the heat transfer surface by integral fan(s) and fan drive(s)

Note 1 to entry: The heat transfer coil includes refrigerant distributing and collecting headers.

Note 2 to entry: In the following “forced convection unit air cooler” is referred to as “apparatus”.

3.4
emission sound pressure level
L_p
ten times the logarithm to the base 10 of the ratio of the square of the emission sound pressure, p, to the square of the reference value, p_0, measured with a particular time weighting and a particular frequency weighting, selected from those defined in EN 61672-1 expressed in decibels

$$L_p = 10lg\frac{p^2}{p_0^2}dB$$

where the reference value, p_0, is 20 µPa. The emission sound pressure level shall be determined at a specified position in accordance with either a test code for a specific family of machines or, if no test code exists, a method that complies with the EN ISO 11200- series.

[SOURCE: EN ISO 11203:2009, 3.3]

3.5
sound power level
L_W
ten times the logarithm to the base 10 of the ratio of the sound power of a source, P, to a reference value, P_0, expressed in decibels

$$L_W = 10lg\frac{P}{P_0}dB$$

where the reference value, P_0, is 1 pW

Note 1 to entry: If a specific frequency weighting as specified in IEC 61672-1 and/or specific frequency bands are applied, this is indicated by appropriate subscripts; e.g. L_{WA} denotes the A-weighted sound power level.

Note 2 to entry: This definition is technically in accordance with ISO 80000-8:2007[2], 8-23.

[SOURCE: ISO/TR 25417:2007, 2.9 and EN ISO 3744:2010, 3.21]