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

EESTI STANDARDIKESKUS
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NATIONAL FOREWORD

See Eesti standard EVS-EN 13487:2019 sisaldab Euroopa standardi EN 13487:2019 ingliskeelset teksti.	This Estonian standard EVS-EN 13487:2019 consists of the English text of the European standard EN 13487:2019.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 07.08.2019.	Date of Availability of the European standard is 07.08.2019.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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EUROPEAN STANDARD

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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 European Standard was approved by CEN on 17 June 2019.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

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European foreword

This document (EN 13487:2019) has been prepared by Technical Committee CEN/TC 110 “Heat exchangers”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2020 and conflicting national standards shall be withdrawn at the latest by February 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13487:2003.

The main changes compared to the previous edition are:

a) the Scope was completely revised;

b) the Normative references were updated;

c) Terms and Definitions were updated and new terms were introduced;

d) the whole document, including Annexes, was completely revised and rearranged.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document is one of a series dedicated to heat exchangers.

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

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

1 Scope

1.1 General

This document is one of a series 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 document provides information for assessing and presenting the acoustic emission characteristics of heat exchangers under stationary operating conditions.

This document 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, EN ISO 9614-2 and EN ISO 9614-3 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 document 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 document 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/A1:2017, *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 - Amendment 1 (ISO 3745:2012/Amd 1:2017)*

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)*

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)*