



NSAI
Standards

Irish Standard
I.S. EN 12102-1:2017

Air conditioners, liquid chilling packages, heat pumps, process chillers and dehumidifiers with electrically driven compressors - Determination of the sound power level - Part 1: Air conditioners, liquid chilling packages, heat pumps for space heating and cooling, dehumidifiers and process chillers

I.S. EN 12102-1:2017

Incorporating amendments/corrigenda/National Annexes issued since publication:

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This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN 12102-1:2017

Published:

2017-11-29

This document was published under the authority of the NSAI and comes into effect on:

2017-12-17

ICS number:

17.140.20

27.080

91.140.30

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National Foreword

I.S. EN 12102-1:2017 is the adopted Irish version of the European Document EN 12102-1:2017, Air conditioners, liquid chilling packages, heat pumps, process chillers and dehumidifiers with electrically driven compressors - Determination of the sound power level - Part 1: Air conditioners, liquid chilling packages, heat pumps for space heating and cooling, dehumidifiers and process chillers

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EUROPEAN STANDARD

EN 12102-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2017

ICS 17.140.20; 27.080; 91.140.30

Supersedes EN 12102:2013

English Version

**Air conditioners, liquid chilling packages, heat pumps,
process chillers and dehumidifiers with electrically driven
compressors - Determination of the sound power level -
Part 1: Air conditioners, liquid chilling packages, heat
pumps for space heating and cooling, dehumidifiers and
process chillers**

Climatiseurs, groupes refroidisseurs de liquide, pompes à chaleur, refroidisseurs industriels et déshumidificateurs avec compresseur entraîné par moteur électrique - Détermination du niveau de puissance acoustique - Partie 1 : Climatiseurs, groupes refroidisseurs de liquide, pompes à chaleur pour le chauffage et la réfrigération, déshumidificateurs et refroidisseurs industriels

Luftkonditionierer, Flüssigkeitskühlsätze, Wärmepumpen, Prozesskühler und Entfeuchter mit elektrisch angetriebenen Verdichtern - Bestimmung des Schalleistungspegels - Teil 1: Luftkonditionierer, Flüssigkeitskühlsätze, Wärmepumpen zur Raumbeheizung und -kühlung, Entfeuchter und Prozesskühler

This European Standard was approved by CEN on 1 October 2017.

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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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EN 12102-1:2017 (E)**European foreword**

This document (EN 12102-1:2017) has been prepared by Technical Committee CEN/TC 113 “Heat pumps and air conditioning units”, the secretariat of which is held by UNE.

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 May 2018, and conflicting national standards shall be withdrawn at the latest by May 2018.

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 12102:2013.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directives.

For relationship with EU Directives, see informative Annexes ZA, ZB, ZC or ZD, which are integral parts of this document.

The main changes with respect to the previous edition are listed below:

- a) addition of Annex ZB relating to the Commission Regulation EU n°626/2012;
- b) addition of Annex ZC relating to the Commission Regulation EU n°813/2013;
- c) addition of Annex ZD relating to the Commission Regulation EU n°811/2013.

EN 12102 comprises the following parts under the general title *Air conditioners, liquid chilling packages, heat pumps, process chillers and dehumidifiers with electrically driven compressors – Determination of the sound power level*:

- *Part 1: Air conditioners, liquid chilling packages, heat pumps for space heating and cooling, dehumidifiers and process chillers*
- *Part 2: Heat pump water heaters*

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard offers ways to determine the sound power level of air conditioners, liquid chilling packages, heat pumps, and dehumidifiers with electrically driven compressors. Some of them are specifically adapted to provide results with low uncertainties, by using laboratory class acoustic methods and highly controlled operating conditions. Those measurements are suitable for certification, labelling and marking purposes.

In some cases, the target and/or the environment of the measurements do not allow such precision-class methods. This European Standard also offers ways to assess sound power levels with acceptable accuracy even though acoustic methods and/or operating conditions are not laboratory-type, e.g. *in situ* or quality control measurements.

This European Standard gives two classes of measurements and results, according to the test environment:

- Class A measurements correspond to controlled operating conditions (standard or application rating conditions). It is defined by the respect to the tolerances of Table 2 and will be used for the conformity to requirements of:
 - The Commission Regulation (EU) No 206/2012 of 6 March 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for air conditioners;
 - Commission Delegated Regulation (EU) No 811/2013 of 18 February 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of space heaters, combination heaters, packages of space heater, temperature control and solar device and packages of combination heater, temperature control and solar device;
 - The Commission Regulation (EU) No 813/2013 of 2 August 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for space heaters and combination heaters;
 - The Commission Delegated Regulation (EU) No 626/2011 of 4 May 2011 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of air conditioners.
- Class B measurements correspond to the case where the range defined by the tolerances of Table 2 cannot be fulfilled.

In both classes, precision or engineering class acoustic methods need to be applied. The choice of the acoustic measurement method is done in accordance with EN ISO 3740 and the EN ISO 9614 series depending on the type of surrounding acoustic fields (diffuse or free field, enclosed or open space), and the available instrumentation. The reference of acoustic standard needs to be reported with explicit mention of its accuracy class, whatever the current operating conditions.

The use of EN ISO 3746 and EN ISO 3747 as survey grade methods are not recommended due to the high level of uncertainties. Their use is only allowed for non-controlled environments when they fulfil the engineering grade requirement.

Three methods for determining the sound power levels are specified in order to avoid unduly restricting existing facilities and experience:

- the first methodology is based on reverberation room measurement (see EN ISO 3741 and the EN ISO 3743 series);

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- the second method is based on measurements in an essentially free field over a reflecting plane (see EN ISO 3744 and EN ISO 3745);
- the third method is based on sound intensity measurement (see the EN ISO 9614 series) preferably in a free field environment.

The necessity to maintain the test conditions obviously leads to recommend test methods implemented in acoustically designed (enclosed) spaces, such as EN ISO 3741, the EN ISO 3743 series, EN ISO 3745 and also the EN ISO 9614 series when implemented in an enclosed space.

The open spaces will be used only in specific cases, e.g. when the size or the capacity of the unit under test cannot be managed by standard test rooms. Suitable test methods are EN ISO 3744 and the EN ISO 9614 series.

NOTE Intensity measurement methods are quite robust and are well suited for tests to be done in environments without or with a light acoustic treatment (the better the acoustic treatment, the easier the implementation).

1 Scope

This European Standard establishes requirements for determining, in accordance with a standardized procedure, the sound power level emitted into the surrounding air by air conditioners, heat pumps, liquid chilling packages with electrically driven compressors when used for space heating and/or cooling, and/or for process, as described in the EN 14511 series and dehumidifiers as described in EN 810.

This European Standard also covers the measurement of the sound power level of evaporatively cooled condenser air conditioners, as defined in EN 15218. However, the measurement will be done without external water feeding and these units will thus be considered as the other air conditioners covered by the EN 14511 series.

It is emphasized that this measurement standard only refers to airborne noise.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 810:1997, *Dehumidifiers with electrically driven compressors - Rating tests, marking, operational requirements and technical data sheet*

EN 14511-1:2013, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 1: Terms, definitions and classification*

EN 14511-2:2013, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 2: Test conditions*

EN 14511-3:2013, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 3: Test methods*

EN 14511-4:2013, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 4: Operating requirements, marking and instructions*

EN 14825:2016, *Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling - Testing and rating at part load conditions and calculation of seasonal performance*

EN 15218:2013, *Air conditioners and liquid chilling packages with evaporatively cooled condenser and with electrically driven compressors for space cooling - Terms, definitions, test conditions, test methods and requirements*

EN ISO 3740:2000, *Acoustics - Determination of sound power levels of noise sources - Guidelines for the use of basic standards (ISO 3740:2000)*

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 (all parts), *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 (ISO 3743, all parts)*

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