SLOVENSKI STANDARD
SIST ENV 12102:2001

01-junij-2001

Air conditioners, heat pumps and dehumidifiers with electrically driven compressors - Measurement of airborne noise - Determination of the sound power level

Air conditioners, heat pumps and dehumidifiers with electrically driven compressors - Measurement of airborne noise - Determination of the sound power level

Luftkonditionierer, Wärmepumpen und Entfeuchter mit elektrisch angetriebenen Verdichtern - Messung der Luftschallemissionen - Bestimmung des Schalleistungspegels

Climatiseurs, pompes a chaleur et déhumidificateurs avec compresseur entraîné par moteur électrique - Mesure de bruit aérien émis - Détermination du niveau de puissance acoustique

Ta slovenski standard je istoveten z: **ENV 12102:1996**

ICS:

17.140.20	Emisija hrupa naprav in opreme	Noise emitted by machines and equipment
23.120	Zračniki. Vetrniki. Klimatske naprave	Ventilators. Fans. Air-conditioners
27.080	Toplotne črpalke	Heat pumps
91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning

SIST ENV 12102:2001 **en**

EUROPEAN PRESTANDARD

PRÉNORME EUROPÉENNE

EUROPÄISCHE VORNORM

ENV 12102

March 1996

ICS 91.140.30

Descriptors: buildings, air conditioning, ventilation, aeraulic pipes, components, form specifications, dimensions, installation, cleaning, maintenance

English version

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This European Prestandard (ENV) was approved by CEN on 1996-01-26 as a prospective standard for provisional application. The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into an European Standard (EN).

CEN members are required to announce the existance of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Ref. No. ENV 12102:1996 E

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FOREWORD

This European Prestandard has been prepared by Technical Committee CEN/TC 113 "Heat Pumps and Air Conditioning Units", the secretariat of which is held by AENOR.

Following the results of CEN enquiry on prEN 255-7 "Heat pumps -Heat pumps units with electrically driven compressors. Part 7: Heat pump units and heat pumps for heating sanitary hot water - Measurement of airbonne noise - Determination of sound power level", CEN/BTS 5 decided to issue document as ENV for the following reasons:

- enlargement of the scope to air conditioners and dehumidifiers

- measurement procedure for the ducted sound component of a device to be developed

- all possible installations configurations of indoor units to be taken into account (e.g. installation in double ceiling).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this European Prestandard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 SCOPE

This European Prestandard establishes requirements for determining, in accordance with a standardized procedure, the noise (parameter: sound power level) emitted into the surrounding air by air conditioners, heat pumps or dehumidifiers with electrically-driven compressors.

The frequency range used in this pre standard is from 125 Hz to 4000 Hz. Three methods for determining the sound power levels are specified in order to avoid unduly restricting existing facilities and experience. The first method is based on reverberant room measurement (see EN 23741, EN 23742 and EN 23743-2); the second is based on measurements in an essentially free field over a reflecting plane (see EN 23744 and ISO 3745); and the third method is based on sound intensity measurement (see EN 29614-1).

It is emphasized that this measurement standard only refers to airborne noise. This standard is applicable to air conditioners and/or heat pumps defined in accordance with EN 255 and EN 814, and for dehumidifiers in accordance with EN 810.

2 NORMATIVE REFERENCES

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any or these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 255	Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors - Heating mode.
EN 814	Air conditioners and heat pumps with electrically driven compressors - Cooling mode.
EN 810	Dehumidifiers with electrically driven compressors. Rating tests, marking, requirements and technical data.
EN 23741	Acoustics - Determination of sound power levels of noise sources - Precision methods for broad-band sources in reverberation rooms (Identical with ISO 3741:1988)
EN 23742	Acoustics - Determination of sound power levels of noise sources - Precision methods for discrete-frequency and narrow band sources in reverberation rooms (Identical with ISO 3742:1988)

EN 23743-2	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 23744	Acoustics - Determination of sound power levels of noise sources using sound pressure - Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994)
EN 29614-1	Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 1: Measurement at discreet points (ISO 9614-1:1993)
ISO 3745	Acoustics - Determination of sound power levels of noise sources - Precision methods for anechoic and semi-anechoic rooms

TABLE 1 - International and European Standards for determining the sound power level of machines and accessories

European Standards	Internat. Standard No.	Classif. of method	Test environment	Volume of source	Character of noise	Sound power levels obtainable	Optional information available
EN 23741	ISO 3741	Precision	Reverberation room meeting specified requirements	Preferably less than 1% of test room volume	Steady, broad-band	In one-third octave or octave bands	A weighted sound power level
EN 23742	ISO 3742				Steady, discrete-frequency or narrow-band		
EN 23743-2	ISO 3743	Engineering	Special reverberation room	Greatest dimension less than 15 m	Steady, broad band, narrow band or discrete-frequency	A weighted and in octave band	Other weithted sound power levels
EN 23744	ISO 3744	Engineering	Outdoors or in large room	No restrictions: limited only by available test environment	Any	A weighted and in one-third octave or octave bands	Directivity information and sound pressure levels as a function of time: other weighted sound power levels
	ISO 3745	Precision	Anechoic or semi-anechoic room	Preferably less than 0.5% of test room volume	Any		
EN 29614-1	ISO 9614-1	Precission or Engineering	Any if the principle of sound intensity measurement is correct	Any	Steady	In one-third octave or octave bands	A weighted sound power level

3 DESIGNATION

The designation of sound power measurement for air conditioners, heat pumps and dehumidifiers in accordance with this standard is: Sound Power Measurement ENV 12102.

4 DEFINITIONS AND SYMBOLS

Definitions and symbols of EN 255-1, EN 814-1 and EN 810 apply.

L_W: Sound power level, in dB, for the housing of the compact units with or without ducts.

L_{Wd}: Sound power level, in dB for the proportion of sound radiating by the openings of the ducts for the compact units with ducts.

L_{Wi}: Sound power level in dB, for the housing of the indoor component of split units with or without ducts.

L_{Wo}: Sound power level in dB, for the housing of the outdoor component of split units with or without ducts.

L_{Wdi}: Sound power level, in dB for the proportion of sound radiated by the openings of the ducts of the indoor component of split units with ducts.

L_{Wdo}: Sound power level, in dB for the proportion of sound radiated by the openings of the ducts of the outdoor component of split units with ducts.

5 MEASURING INSTRUMENTS

The instruments used for measuring and evaluation, shall comply with the requirements of the standards appropriate to the test method used. These are listed in table 1.

Suitable windshields are to be fitted on microphones if they could otherwise be affected (especially at low frequencies) by currents of air (above about 2m/s) which may be produced by the appliance to be tested. Adjustment shall be made to the measured sound pressure levels to compensate for any alteration in the sensitivity of microphones so shielded.

6 OBJECT TO BE MEASURED

The object to be measured is the air conditioner, heat pump or dehumidifier, which may be contained in either one housing (compact unit) or several housings (split unit). A distinction shall be made between the following types of design:

water/water	unit
water/air	unit
brine/water	unit
brine/air	unit
air/water	unit
air/air	unit

In the case of air/water, water/air, brine/air and air/air air conditioners heat pumps or dehumidifier used for heating or cooling purposes or for heating sanitary water, a distinction is to be made between:

compact unit without duct
compact unit with duct
the condenser part of the split unit without duct
the condenser part of the split unit with duct
the evaporator part of the split unit without duct
the evaporator part of the split unit with duct

7 OPERATION OF THE UNIT

7.1 Operating temperature conditions

As a general rule, the sound power level is dependent on the operating conditions of the unit.

Sound measurements are to be carried out at one of the following operating points.

The definitions and conditions for the operating points shall be in accordance with the relevant part of EN 255, EN 814 or EN 810.

For heating, cooling and dehumidifying purposes, the operating points are to be kept constant.

It is allowed to set the wet bulb temperature as near as possible from the value indicated in table 2 to 5. The humidity during the test will be indicated in the test report.

Table 2 - Stipulated operating points for heating

DESIGNATION	OPERATION POINT
Outside air/water heat pump	A7 (6)/W50
Exhaust air/water heat pump	A20(12)/W50
Water/water heat pump	W10/W50
Brine/water heat pump	B0/W50
Outside air/recycled air heat pump	A7 (6)/A20(12)
Exhaust air/recycled air heat pump	A20(12)/A20(12)
Water/recycled air heat pump	W10/A20(12)
Brine/recycled air heat pump	B0/A20(12)
Exhaust air/fresh air heat pump	A20(12)/A7(6)
Intern.closed water loop/recycled air heat pump	W20/A20 (12)

Table 3 - Stipulated operating point for cooling

DESIGNATION	OPERATION POINT
Air cooled comfort air conditioner or heat pump	A35 (24)/A27 (19)
Air cooled Spot air conditioner	A35 (24)/A35 (24)
Air cooled single-duct air conditioner	A27 (19)/A27 (19)
Air cooled control cabinet air conditioner	A35(24)/A35 (24)
Air cooled close control air conditioner	A35 (24)/A24 (17)
Water cooled comfort air conditioner or heat pump	W30/A27 (19)
Water cooled control cabinet air conditioner	W15/A35 (24)
Water cooled close control air conditioner	W30/A24 (17)

Table 4 - Stipulated operating point for dehumidifying

DESIGNATION	OPERATION POINT
Comfort	A27 (21)/A27 (21)
Process	A12 (9)/A12 (9)
Heat recovery (air cooled)	A27 (21)/A27 (21)
Heat recovery (water cooled)	A27 (21)/W24