SLOVENSKI STANDARD
SIST EN 16430-2:2015

01-marec-2015

Končni prenosniki toplote z ventilatorjem, konvektorji in talni konvektorji - 2. del: Preskusne metode in vrednotenje toplotnega oddajanja

Fan assisted radiators, convectors and trench convectors - Part 2: Test method and rating for thermal output

Gebläseunterstützte Heizkörper, Konvektoren und Unterflurkonvektoren - Teil 2: Prüfverfahren und Bewertung der Wärmeleistung

Radiateurs assistés par ventilateur, convecteurs et convecteurs de caniveaux - Partie 2: Méthode d'essais et d'évaluation de la puissance thermique

Ta slovenski standard je istoveten z: **EN 16430-2:2014**

ICS:

91.140.10	Sistemi centralnega ogrevanja	Central heating systems

SIST EN 16430-2:2015 **en,fr,de**

EUROPEAN STANDARD

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English Version

Fan assisted radiators, convectors and trench convectors - Part 2: Test method and rating for thermal output

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This European Standard was approved by CEN on 9 November 2014.

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

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Foreword

This document (EN 16430-2:2014) has been prepared by Technical Committee CEN/TC 130 “Space heating appliances without integral heat sources”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by June 2015 and conflicting national standards shall be withdrawn at the latest by June 2015.

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

The European Standard "Fan assisted radiators, convectors and trench convectors" consists of the following parts:

- Part 1: Technical specifications and requirements

- Part 2: Test method and rating for thermal output

- Part 3: Test method and rating for cooling capacity

According to the CEN-CENELEC Internal Regulations, the national standards organizations 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard applies to the thermal output testing of fan assisted radiators, convectors and trench convectors which are factory assembled or kits, i.e.

— fan assisted radiators and convectors, provided the heater has a dedicated fan or fans;

— trench convectors with and without fan(s), provided the heater and the fan(s) are dedicated;

— ventilation radiators and convectors.

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 442-2, *Radiators and convectors - Part 2: Test methods and rating*

EN 636, *Plywood - Specifications*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025)*

3 Terms and definitions

For the purposes of this document the terms and definitions given in EN 442-2 and the following apply.

3.1
trench convectors
convectors installed in a trench in the floor mostly in front of glass facades, including the covering of the trench

3.2
fan assisted radiators and convectors
radiators and convectors according to EN 442-2 and trench convectors according to 3.1 equipped with fans to increase the convective thermal output/ cooling capacity of the radiator, convector or trench convector

3.3
ventilation radiators and convectors
radiators or convectors, which, apart from heating rooms normally, also heat the incoming air (outside air)

Note 1 to entry: In this context, the air is led directly to the radiator and, once heated by the radiator, fed to the room. The controlled air feed is performed mechanically, either using a fan in the primary air system or through an exhaust air system.

3.4
primary air unit
unit connected to the radiator, convector or trench convector which supplies primary air to the room, preheated or pre-cooled by the radiator, convector or trench convector

3.5
basic units
regularly repeated sections of the radiator/convector equipped with fans

3.6
extension units
parts of the fan assisted radiator/convector in addition to the basic units which are not equipped with a fan

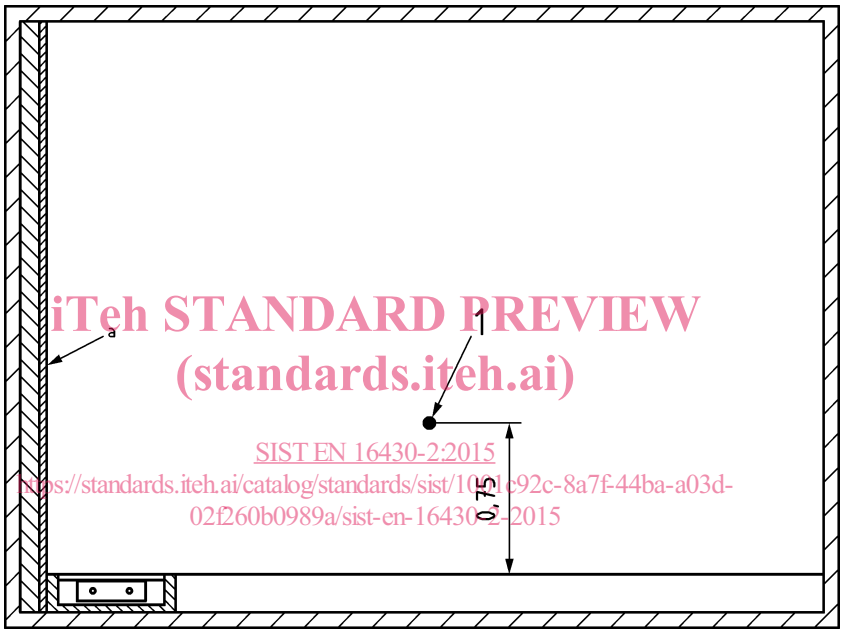
4 Radiators and convectors with fan(s) and trench convectors with and without fan(s)

4.1 Preparation of the closed test room

4.1.1 Trench convectors

The back wall of the test room shall be cooled to a surface temperature of 16 °C ± 0,5 K during the test (see Figure 1). This can be done either by the back wall itself or by a flat cooling surface (emission coefficient has to be at least 0,9) covering the whole width and height of the room placed in front of the back wall of the closed test room in accordance with EN 442-2. The space between the cooling plate and the booth back wall shall be closed off to prevent air from flowing through.

Dimensions in metres



Key

a cooling surface, temperature 16 °C ± 0,5 K

1 reference air temperature t_r

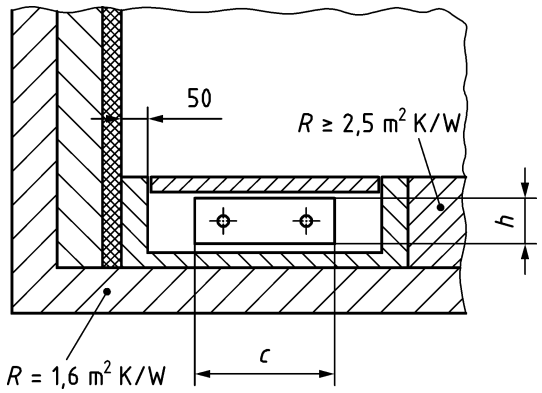
Figure 1 — Positioning of the cooling surface in the test room

The trench convector with its associated trench and the intended covering is installed in the booth floor in front of this cooling surface, flush with the finished floor level, in accordance with the manufacturer's instructions. Unless other dimensions have been given by the manufacturer, the distance between the trench and the cooled back wall shall be 0,05 m (see Figure 2). For the purposes of the test, the trench in itself is covered with a thermal insulation shown in Figure 2 which has a thermal resistance of at least R =1,0 m^2K/W.

If the floor of the test booth is cooled then the floor has to have a thermal resistance of at least R =2,5 m^2K/W.

If the floor of the test booth is not cooled then there is no requirement for such a thermal resistance.

Dimensions in millimetres

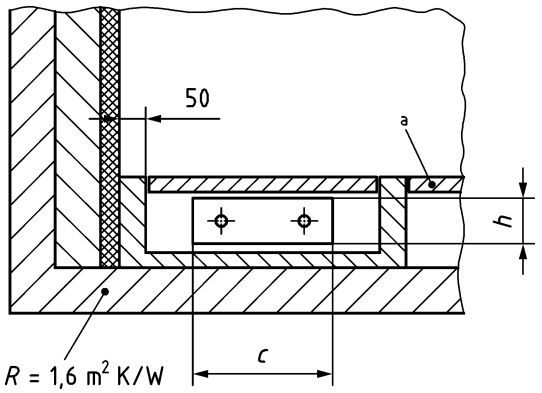


Key

h height

c depth

Figure 2a — Positioning of the trench convector, cooled floor



Key

h height

c depth

a without requirement

Figure 2b — Positioning of the trench convector, without requirement

If it is possible to allocate the models to a certain type with a characteristic size (e. g. height of the convector and/or height of the casing) whose changes point to the fact that a continuous dependence of the thermal output can be expected, the smallest and the largest sizes each and so many intermediate sizes shall be tested that a ratio of 1:2 is not exceeded.

In the case of trench convectors without fan(s) the convector length to be tested (finned length) should be 2 m; if that length is not available, the next available length > 2 m shall be tested. The length of the sample under test shall be adapted if the requirements for either the minimum or maximum thermal output according to 4.2.1 are not fulfilled.

In the case of finned tube convectors, a finned length of 1 m is assumed as the module. In the case of trench convectors with fan(s) the convector length to be tested (finned length) should be at least 1 m, if that length is not available, the next available length > 1 m shall be tested. The length of the sample under test shall be adapted if the requirements for either the minimum or maximum thermal output according to 4.2.1 are not fulfilled.

The convector as such is installed in the trench, applying the manufacturer's fixing material, spacers, covering, etc. and following the manufacturer's instructions. The testing application shall be accompanied by drawings showing the dimensions of the trench and the convector as well as the convector's positioning in the trench and the design of the covering.

4.1.2 Fan assisted radiators and wall mounted convectors

Radiators and wall mounted convectors shall be installed according to EN 442-2. Unless other dimensions have been given by the manufacturer, the distance between the radiator / convector and the back wall of the test room shall be 0,05 m, the distance between the radiator / convector and the floor of the test room shall be 0,11 m.

If it is possible to allocate the models to a certain type with a characteristic size (e. g. height) whose changes point to the fact that a continuous dependence of the thermal output can be expected, the smallest and the largest sizes each and so many intermediate sizes shall be tested that a ratio of 1:2 is not exceeded.

In the case of radiators / convectors the length of the sample to be tested (in case of convectors: finned length) should be 1 m, if that length is not available, the next available length > 1 m shall be tested. The length

of the sample under test shall be adapted if the requirements for either the minimum or maximum thermal output according to 4.2.1 are not fulfilled.

The radiator / convector as such is installed in the test room, applying the manufacturer's fixing material, spacers, covering, etc., and following the manufacturer's instructions. The testing application shall be accompanied by drawings showing the dimensions of the trench and the convector as well as the radiator's / convector's positioning in the test room and the design of the covering.

4.2 Test procedure

4.2.1 Scope of testing

The selection of the samples and the scope of testing shall be to specifications analogous to EN 442-2.

The standard heating output is to be determined at different water flow rates with the following limitations:

Thermal output: min. 200 W; max. 3 500 W (according at standard conditions).

4.2.2 Determination of the thermal output

4.2.2.1 General

The procedure of the test and the determination of the thermal output are performed in accordance with EN 442-2. EN 442-2, applies analogously with regard to the requirements for measuring instruments.

Here, a characteristic formula:

$$\Phi = K_m \cdot \Delta T^n \quad (1)$$

Where:

- Φ is the thermal output
- K_m is the constant of the model
- ΔT is the excess temperature
- n is the exponent

shall be determined on the basis of at least three measuring points, at a constant water flow rate and excess temperatures of

ΔT = (60 ± 2,5) K;

ΔT = (50 ± 2,5) K;

ΔT = (30 ± 2,5) K.

The standard rated thermal output results at ΔT = 50 K.

Inlet water temperature t_1: 75 °C;

Outlet water temperature t_2: 65 °C;

Reference air temperature t_r: 20 °C.

The standard low thermal output results at ΔT = 30 K.

4.2.2.2 Influence of mass flow on the characteristic curve

In case of an influence of the mass flow on the thermal output, it shall be estimated by performing all of the subsequent tests at standard mass flow and – additionally – at 50% and 200% of the standard mass flow.

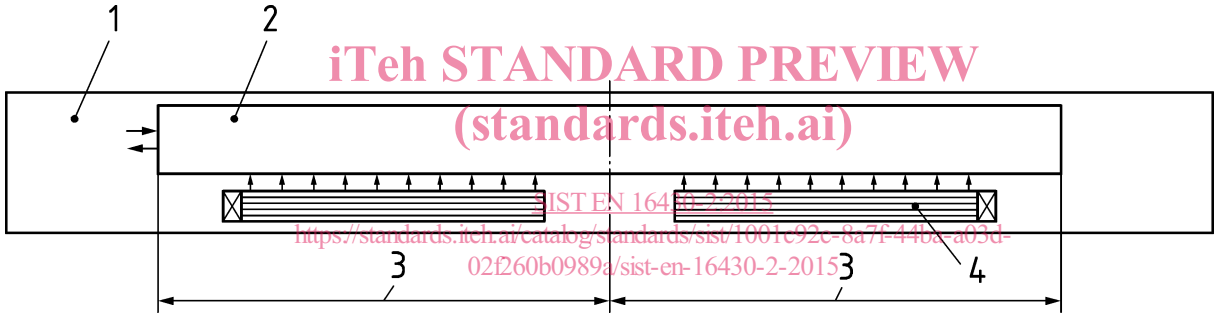
4.2.2.3 Fan assisted radiators and convectors

If the fans do not cover the entire radiator / convector, the performance of the radiator / convector is the sum of the performance of the basic units plus those of extension units. The basic unit is considered as the smallest combination of a regularly repeating radiator / convector section with fan(s). This basic section shall be indicated by the manufacturer. Examined is a combination of basic units of a length of at least 1 m (see 4.1). The performance of a basic unit is determined from this calculation.

If the total length of all basic units is less than the total length of the radiator / convector, the standard heat output of the remaining length (difference) shall be determined with a fan speed of 0. (see Figure 6 and Figure 7).

If a fan acts upon different lengths of a radiator / convector (e. g, a fan at the end of the radiator / convector), at least 3 lengths (small, medium, longest) shall be measured. Hence a linear characteristic is determined (see Figure 8).

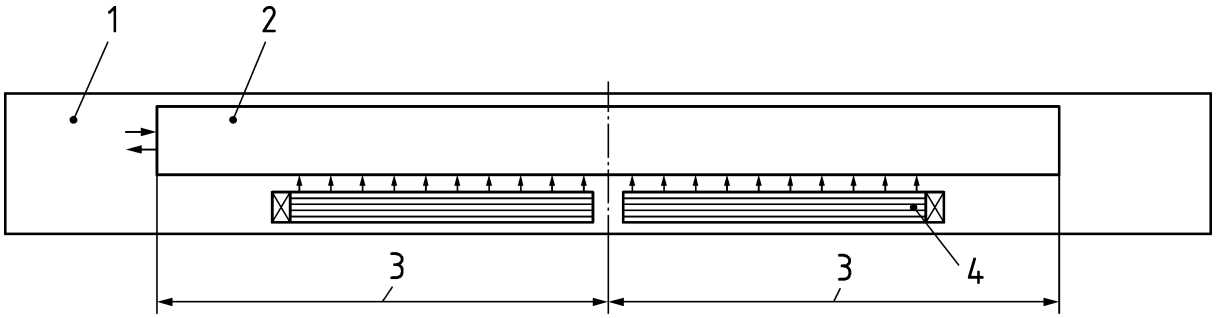
See the following examples (Figure 3 – Figure 9):



Key

1 trench convector - trench
2 convector / radiator
3 basic unit
4 fan

Figure 3 — Example for two basic units, symmetrical fan positioning



Key

1 trench convector - trench
2 convector / radiator
3 basic unit
4 fan

Figure 4 — Example for two basic units, asymmetrical fan positioning

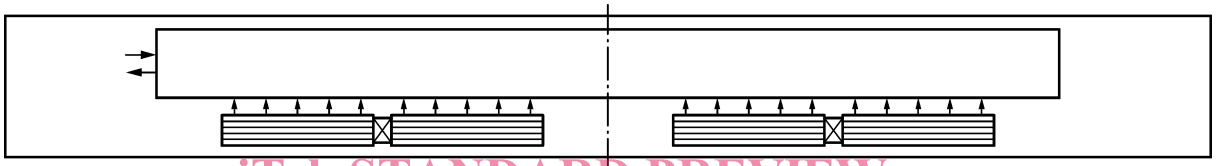
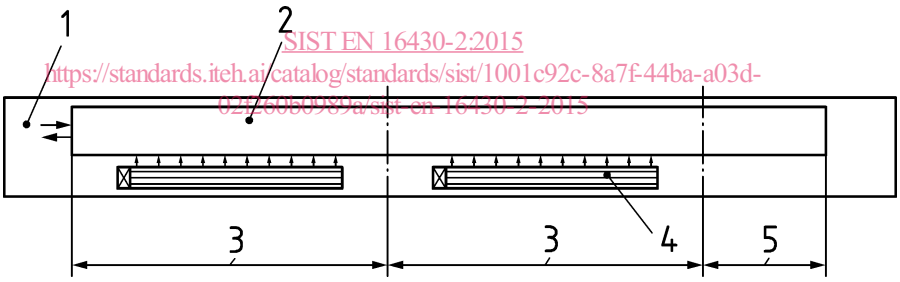


Figure 5 — Example for two basic units with two fans each, symmetrical fan positioning



Key

1 trench convector - trench
2 convector / radiator
3 basic unit
4 fan
5 extension unit

Figure 6 — Example for two basic units, one extension unit