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BSI Standards Publication

Fan assisted radiators, convectors and trench convectors

Part 1: Technical specifications and requirements

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee RHE/6, Air or space heaters or coolers without combustion.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Fan assisted radiators, convectors and trench convectors - Part 1: Technical specifications and requirements

Radiateurs assistés par ventilateur, convecteurs et convecteurs de caniveaux - Partie 1 : Spécifications techniques et exigences

Gebläseunterstützte Heizkörper, Konvektoren und Unterflurkonvektoren - Teil 1: Technische Spezifikationen und Anforderungen

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Foreword

This document (EN 16430-1:2014) 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of an identical text or by endorsement, at the latest by June 2015 and conflicting national standards shall be withdrawn at the latest by June 2015.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

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1 Scope

This European Standard defines the technical specifications and requirements of fan assisted radiators, convectors and trench convectors for permanent installation in central heating systems which are factory assembled or kits.

This European Standard covers fan assisted radiators and convectors fed with water at temperatures below 120 °C, supplied by a remote heating source.

This European Standard also applies for radiators and convectors according to EN 442-1 to determine their dry cooling capacity.

This European Standard does not apply to discrete heating appliances.

This European Standard also defines the additional common data that the manufacturer is to provide to the trade in order to ensure the correct application of the products.

This European Standard applies to the testing for the determination of thermal output and dry cooling capacity of

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

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

— ventilation radiators and convectors (only heating);

— not fan assisted radiators and convectors (only cooling).

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 442-1, *Radiators and convectors — Part 1: Technical specifications and requirements*

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

EN 16430-2, *Fan assisted radiators, convectors and trench convectors — Part 2: Test method and rating for thermal output*

EN 16430-3, *Fan assisted radiators, convectors and trench convectors — Part 3: Test method and rating for cooling capacity*

EN 60335-2-80, *Household and similar electrical appliances — Safety — Part 2-80: Particular requirements for fans*

EN ISO 2409:2013, *Paints and varnishes — Cross-cut test (ISO 2409:2013)*

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

EN ISO 3743-1, *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)*

EN ISO 3744, *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)*

EN ISO 3745, *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)*

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

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

EN ISO 12499, *Industrial fans — Mechanical safety of fans — Guarding (ISO 12499)*

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

IEC 62301, *Household electrical appliances — Measurement of standby power*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 442-2, EN 16430-2 and EN 16430-3 apply.

4 Pretreatment and coating

The pretreatment, paint processes and other surface finishing (chrome, polish etc.) used, shall provide a protective coating to all external surfaces in contact with the air which shall as a minimum requirement:

— give protection against corrosion in normal storage and installation conditions, as demonstrated by absence of surface corrosion after 100 h humidity test according to EN 442-2;

— for paint only, be resistant to minor impact damage according to EN ISO 2409. The test result shall be within the first three steps (0-1-2) of EN ISO 2409:2013, Table 1.

The surface treatments shall not contain any chemical substances whose use is prohibited in building products[1]. The compliance shall be declared by the manufacturer of the radiator/convector.

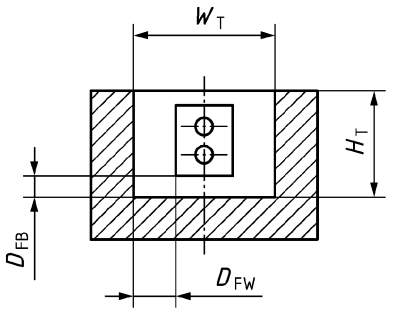
5 Dimensional tolerances and pressure tightness

5.1 General

The dimensional tolerances shall not be greater than those in the manufacturer's drawings. In any case they shall not be greater than those given in EN 442-2. For trench convectors the dimensional tolerances of finned tube convectors apply. The dimensional tolerance of the trench shall not be greater than those given in Table 1.

[1] Also in relation to Regulation (EC) No 1907/2006 (REACH)

Table 1 — Additional dimensional tolerances of the trench convectors

Dimensional tolerances dimensions in millimetres		
trench (width W_T and height H_T)	± 5	
distances convector to trench (fins to wall D_{FW} and fins to bottom D_{FB})	± 5	

For fan assisted radiators and convectors the location of the fans shall be to the specifications of the manufacturers technical drawings within a tolerance of ±10 mm.

The manufacturer shall implement a quality control system to ensure that products comply with the tolerances.

5.2 Material specification and wall thickness of wet heating surfaces

5.2.1 General

The requirements of EN 442-1 for material and wall thickness for steel, cast-iron, cast aluminium or extruded aluminium radiators shall be fulfilled.

Compliance with this requirement shall be verified by measurement.

5.2.2 Finned tube convectors

The wall thickness for the steel tubes in the finished product shall not be less than 0,8 mm. The wall thickness for copper tubes in the finished product shall not be less than 0,25 mm. For other materials 5.2.3 applies.

Compliance with this requirement shall be verified by measurement.

5.2.3 Other materials

Materials (grade and thickness) other than those specified in EN 442-1 may be used provided that they have been demonstrated by appropriate tests and/or data to:

— meet the requirements of 5.3 and 5.4;

— ensure at least equivalent performance in terms of reaction to fire, strength and stability of the product.

Compliance with this requirement shall be verified by measurement.

5.3 Leak testing

Before leaving the manufacturer's all heating appliances shall be tested for leaks to a test pressure equal to at least 1,3 times the quoted maximum operating pressure. The test pressure shall not be less than 520 kPa.

5.4 Pressure strength testing

Sample heating appliances shall be subjected to a burst test at a pressure 1,3 times the leak testing pressure, as specified in 5.3.

— The sample under test may deform but shall not rupture;

— The sample radiators/convectors shall not be less than 500 mm long. They shall not be sold after testing.

5.5 Surface defects

The heating appliance shall be free from burrs likely to cause handling injuries.

6 Electrical and mechanical safety for fan assisted radiators

The electrical components and the fan shall meet the requirements for electrical and mechanical safety.

Electrical components of the fan assisted radiators shall comply with EN 60335-2-80. The fan shall comply with EN ISO 12499 for mechanical safety.

7 Noise emission

The noise emission (sound power) shall be measured according to one of the following standards:

— EN ISO 3741;

— EN ISO 3745;

— EN ISO 3743-1;

— EN ISO 3744;

— EN ISO 9614-1;

— EN ISO 9614-2.

A measurement according to class 2 is sufficient.

The sound power shall be measured for the fixed rotation speed of the fan respectively for the highest, the lowest and the nominal speed in case of continuous or multi stage variable fan speeds.

In addition to the sound power level, the manufacturer may specify the sound pressure level with a room absorption of 8 dB (A). This corresponds to a distance of 2 m from the sample, a room volume of 100 m³ and a reverberation time of 0,5 s.

8 Thermal outputs and cooling capacity

8.1 Test method and laboratory

8.1.1 Thermal outputs

The thermal outputs shall be determined with the method and test programme specified by EN 16430-2 in a laboratory, also taking into account the laboratory specific requirements and harmonization methods as specified by EN 442-2.

8.1.2 Cooling capacity

The cooling capacity shall be determined with the method and test programme specified by EN 16430-3 in a laboratory, also taking into account the laboratory specific requirements as specified by EN 442-2.

8.2 Aim of the test programme

The aim of the test programme is to determine:

— the standard thermal outputs and/or standard cooling capacity for comparison of different products under manufacturer defined nominal conditions (e.g. primary air flow rate, acoustical power, fan speed);

— the thermal output and/or cooling capacity under variable operating conditions (e.g. water temperatures, fan speed, primary air flow rate, acoustical power etc.) to provide standardized technical data for the design of heating systems with or without a cooling function.

8.3 Test data

The test programme shall determine:

In case of trench convectors without fan assistance:

— the standard characteristic equation of the model or of each model of a type for heating and/or cooling;

— the standard characteristic equation of the type for heating and/or cooling;

— the standard thermal outputs and/or cooling capacity of all the models of the type;

— the mass and water content of all the models of the type.

In case of fan assisted radiators, convectors and trench convectors:

— the characteristic equations of the type for heating and/or cooling at different fan speeds;

— the standard thermal outputs and/or cooling capacity of all the models of the types at mean speed;

— the mass and water content of all the models of the type.

In case of ventilation radiators and convectors:

— the characteristic equation of the type for heating and/or cooling at different primary air flow rates;

— the standard thermal outputs and/or cooling capacity of all the models of the type (at the standard reference point).

In case of non fan assisted radiators and convectors for cooling

— the characteristic equation for cooling;

— the standard cooling capacity of all the models of the type.

8.4 Test report

The test report shall be issued according to EN 16430-2 for heating and and/or EN 16430-3 for cooling. The test report shall comply with EN ISO/IEC 17025.

9 Catalogue data

9.1 General

This clause of this European Standard specifies the minimum data that the manufacturer or sales agent shall provide in his catalogues (printed, electronic support, e-catalogue …) for the evaluation, installation and identification of the relevant heating appliance.

9.2 Identification code of the heating appliance

The data shall refer to the identification code of the model or of the type of heating appliance. This identification code shall be the same as that used for marking the packaging of the heating appliance (see Clause 10).

9.3 Thermal output

The following standard thermal outputs and the exponent n of the excess temperature shall be indicated in the test report and catalogue data:

— standard low temperature thermal output at 30 K excess temperature;

— standard rated thermal output at 50 K excess temperature.

In case of fan assisted radiators and convectors the standard thermal outputs and exponents shall be determined for at least nominal fan stage or speed and non-operating fans (switched off). The nominal fan stage or speed shall be clearly indicated.

In case of ventilation radiators or convectors the standard thermal outputs and exponents shall be determined for at least nominal primary air flow rate. The nominal primary air flow rate shall be clearly indicated.

The two standard outputs are design outputs to be used according to the heating system characteristics.

The thermal output at other excess temperatures, calculated from the type´s regression equation, may be indicated additionally.

If the outputs have been obtained in the standard installation conditions, this shall be indicated.

If the outputs have been obtained in non-standard installation conditions, the relevant conditions shall be indicated in the test report and in the catalogue data.

If additional outputs have been obtained in other than standard conditions, the standard thermal output shall refer to standard conditions only.

9.4 Cooling capacity

This clause applies if the cooling capacity is measured and is included in the catalogue data.

The standard cooling capacity and the exponent n shall be indicated in the test report and catalogue data.

In case of fan assisted radiators and convectors the standard cooling capacity and exponent shall be determined for at least nominal fan stage or speed and non-operating fans (switched off). The nominal fan stage or speed shall be clearly indicated.

In case of fan assisted trench convectors the standard cooling capacity and exponent shall be determined for at least nominal fan stage or speed. The nominal fan stage or speed shall be clearly indicated.

In case of ventilation radiators or convectors the standard cooling capacity and exponents shall be determined for at least nominal primary air flow rate. The nominal primary air flow rate shall be clearly indicated.

The cooling capacity at other under temperatures, calculated from the type´s regression equation, may be indicated additionally.

If the cooling capacity has been obtained in the standard installation conditions, this shall be indicated.

If the outputs have been obtained in non-standard installation conditions, the relevant conditions shall be indicated in the test report and catalogue data.

If additional outputs have been obtained in other than standard conditions, the standard cooling capacity shall refer to standard conditions only.

9.5 Noise emission

The sound power level in dB(A) for fan assisted radiators / convectors in the catalogue data shall be given at least for the highest, nominal and lowest fan speed (at least three). In addition the sound pressure level can be indicated.

9.6 Dimensions

9.6.1 Radiators

The following nominal dimensions shall be given:

— depth;

— height;

— length;

— size, type and position of connections;

— dry mass;

— water content.

For sectional radiators the dimensions shall define the section.

For modular radiators the dimensions shall define the module.

9.6.2 Convectors

The following nominal dimensions shall be given:

— length of the finned section;

— size, type and position of connections;

— height of the convective duct;

— dry mass;

— water content.

For trench convectors the following nominal dimensions shall additionally be given:

— height of the trench;

— width of the trench;

— dimension of the covering (size of the bars/elements, spacing).

9.6.3 Fan assisted radiators and convectors

The following nominal dimensions shall be given in addition to the dimensions in 9.6.1 and 9.6.2:

— number of fans;

— positions of fans.

9.6.4 Ventilation radiators and convectors

The following nominal dimensions shall be given in addition to the dimensions in 9.6.1 and 9.6.2:

— length of the primary air unit;

— height of the primary air unit;

— depth of the primary air unit;

— size and location of air inlet and outlet.

9.7 Maximum operating pressure

The manufacturer shall state the maximum operating pressure to which the heating appliance may be subjected (see 5.2).

9.8 Maximum operating temperature

The manufacturer shall state the maximum water temperature at which the heating appliance may be operated.

9.9 Electrical connections

For fan assisted radiators and convectors the manufacturer shall state:

— power supply (supply voltage, form (alternating, direct), frequency etc.);

— power consumption;

— standby power consumption see IEC 62301;

— protection class;

— rating and location of safety elements (e.g. fuses);

— connection diagram.

9.10 Catalogue reference data

All catalogues and any other literature relevant to the heating appliance shall contain the following reference data:

— number or other identification code;

— date of issue or equivalent code.

The two standard thermal outputs, the exponent **n** and the name and number of the notified body performing the tests, shall also be indicated in the catalogue data

In case of fan assisted radiators and convectors the standard thermal outputs and exponents shall only be indicated in conjunction with the nominal fan stage or speed.

In case of radiators or convectors with supply air the standard thermal outputs and exponents shall only be indicated in conjunction with the nominal supply air flow rate.

10 Marking and labelling

The heating appliance shall be marked with:

1. the name of the manufacturer or his authorised representative or their identifying marks;

2. the model number of the heating appliance if the model cannot be identified by means of the manufacturer's catalogue.

The associated packaging shall allow identification of the product.

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