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Radiators and convectors - Part 1: Technical specifications and requirements

Heizkörper und Konvektoren - Teil 1: Technische Spezifikationen und Anforderungen

Radiateurs et convecteurs - Partie 1: Spécifications et exigences techniques

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Foreword

This document (prEN 442-1:2010) 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 document is currently submitted to the CEN Enquiry.

This document will supersede EN 442- 1:1995, EN 442-1:1995/A1:2003.

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 Directive(s).

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

Introduction

This European Standard of radiators and convectors consists of the following Parts:

- Part 1: *Technical specifications and requirements;*

- Part 2: *Testing and rating methods;*

- Part 3: *Evaluation of conformity.*

1 Scope

This European Standard defines the technical specifications and requirements of radiators and convectors to be installed in central heating systems in residential buildings.

Radiators and convectors are components for installation in a permanent manner in construction works.

This European Standard covers radiators and convectors fed with water or steam at temperatures below 120 °C, supplied by a remote heat source.

This European Standard does not apply to independent heating appliances.

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

2 Normative references

The following referenced documents are indispensable for the application 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.

prEN 442-2: 2010	Radiators and convectors - Part 2: Testing and rating methods
prEN 442-3:2010	Radiators and convectors – Part 3: Evaluation of conformity.
EN 573-3	Wrought aluminium and aluminium alloys - Chemical composition and forms of products - Part 3: Chemical composition
EN 10130	Cold rolled low carbon steel flat products for cold forming; Technical delivery conditions
EN 10131	Cold rolled unwanted low carbon and high yield strength steel flat products for cold forming on dimensions shape
ISO 31-4: 1978	Quantities and units - Part 4: Heat
ISO 185: 1988	Grey cast iron - Classification
ISO 2409: 1992	Paints and varnishes - Cross-cut test
ISO EN 17025	General criteria for the operation of testing laboratories
EN 13501-1	Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests

3 Definitions, symbols and units of measurement

See EN 442-2:

4 Pretreatment and paint

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 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 Annex L.

- for paint only, be resistant to minor impact damage according to ISO 2409. The test result shall be within the first three steps (0-1-2) of table 1 of ISO 2409: 2007

The surface treatments shall not contain any chemical substances the use of which is not allowed in building products[1]

The compliance with the relevant Directive shall be stated by the manufacturer of the radiator/convector.

5 Dimensional tolerances and pressure tightness

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 table 3 of EN 442-2:

5.1 Material specification and wall thickness of wet heating surface

The following values for material thickness for steel radiators, tubular radiators and finned tube convectors shall be measured before pressing or fabrication. Wall thickness of cast-iron, cast aluminium or extruded aluminium radiators refers to the nominal drawing dimensions minus all admissible tolerances.

5.1.1 *Steel radiators* (radiators manufactured from steel sheet or coil)

The wet heating surface materials of steel radiators shall be low carbon steel sheet, which is free from scale or rust and which complies with EN 10130 grade DC 01 and with EN 10131.

The thickness of the steel used for wet surfaces shall not be less than 1,11 mm.

The compliance with this requirement shall be verified by measurement.

5.1.2 Cast-iron radiators

Cast-iron radiators shall be manufactured from grey cast-iron complying with ISO 185.

The wet wall thickness shall not be less than 2,5 mm.

The minimum wall thickness shall be ensured by periodical controls of the casting equipment and daily random production checks.

Compliance with this requirement shall be verified by measurement.

5.1.3 Cast aluminium radiators

Cast aluminium alloy radiators shall be manufactured from alloy EN AB 46000 and EN AB46100 [2)]:

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

The wet wall thickness shall not be less than 1,5 mm.

The minimum wall thickness shall be ensured by periodical controls of the casting equipment and daily random production checks.

Compliance with this requirement shall be verified by measurement.

5.1.4 Extruded aluminium radiators

Extruded aluminium alloy radiators shall be manufactured from wrought aluminium alloy EN AW-6060 of the EN 573-3 corresponding to the alloy AlMgSi.

The wet wall thickness shall not be less than 1,1 mm.

The minimum wall thickness shall be ensured by periodical controls of the extruder and daily random production checks.

Compliance with this requirement shall be verified by measurement.

5.1.5 Tubular radiators

The material specification and gauge of tubes used in manufacture will be dependent on the tube size and profile and on the process of assembly.

They shall nevertheless be sufficient to satisfy the general minimum requirements of **5.2** and **5.3** and the wall thickness of the tube used shall not be less than 0,8 mm.

Compliance with this requirement shall be verified by measurement.

5.1.6 Finned tube convectors

The wall thickness of the tube shall not be less than 0,8 mm.

Compliance with this requirement shall be verified by measurement.

5.1.7 Reaction to fire

The materials from which radiators and convectors are made (steel, cast iron and aluminium) are considered to be reaction to fire Class A1 without the need for testing, provided that any organic part of the paint or coating is less than 1 % by mass or volume.
If any organic part of the paint or coating exceeds 1 % by mass or volume (whichever is the more onerous), the material shall be tested and classified according to EN 13501-1 and the resulting class stated.
The percentage of organic part of the paint or coating is referred to the actual operating conditions of the radiator and convector (i.e. to the mass of the metal and the mass of the water and to the volume obtained by the product of the overall width, height and length of the radiator).
Only one model is to be tested to assess the reaction to fire of a type.

5.1.8 Other materials

Materials (grade and thickness) other than those specified in **5.1.1** to **5.1.6** may be used provided that they have been demonstrated by appropriate tests and/or data to:

- meet the requirements of **5.2** and **5.3**;
- 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.

5.2 Leak testing

All heating appliances before leaving the manufacturer's works 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.

5.3 Strength pressure testing

Sample heating appliances shall be subjected to a burst test at a pressure 1,3 times the leak testing pressure, as specified in **5.2**.

- The sample under test may deform but shall not rupture.
- The sample radiators shall not be less than 500 mm long. They shall not be sold after testing.

5.4 Surface defects

The heating appliance shall be free from burrs likely to cause personal injury.

6 Thermal output

6.1 Test method and laboratory

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

6.2 Aim of the test programme

The aim of the test programme is to determine:

- the standard thermal outputs for comparison of different products;
- the thermal output in different operating conditions to provide standardized technical data for the design of heating systems.

6.3 Test data

The test programme shall determine:

- the standard characteristic equation of the model or of each model of a type;
- the standard characteristic equation of the type;
- the standard thermal outputs of all the models of the type;
- the mass and water content of all the models of the type.

6.4 Test report

The test report shall be issued according to clause **7** of EN 442-2.

6.5 Dimensional control by the manufacturer

The manufacturer shall implement a quality control system to ensure that products comply with the tolerances given in table 3 of EN 442-2

7 Catalogue data

7.1 General

This clause of this European Standard specifies the minimum data that the manufacturer or sales agent shall give in his catalogues (printed, electronic support, e-catalogue …) [2)] for the evaluation, installation and identification of the relevant heating appliance.

7.2 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 8).

7.3 Thermal output

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

- Standard low temperature thermal output at 30 K excess temperature
- Standard rated thermal output at 50 K excess temperature

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

The two standard thermal outputs, the exponent **n** and the name and the number of the testing Notified Body, shall also be indicated in the catalogue data.

In the case of tests made before the publication of the present Standard the test laboratory shall issue an addendum to the report, stating the Standard low temperature thermal output on the basis of previous test data without requiring new testing.

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

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 (see clause **7.2** of EN 442-2).

If, besides standard conditions, the outputs have been obtained in other conditions, the standard thermal output shall be referred to the standard conditions only.

7.4 Dimensions

7.4.1 Radiators

The following nominal dimensions shall be given:

- depth,

[2)] Even in case of e-trading a catalogue shall be available