BS EN 442-1:2014

BSI Standards Publication

Radiators and convectors

Part 1: Technical specifications and requirements

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National foreword

This British Standard is the UK implementation of EN 442-1:2014. It supersedes BS EN 442-1:1996 and BS EN 442-3:2003 which are withdrawn

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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Radiators and convectors - Part 1: Technical specifications and requirements

Radiateurs et convecteurs - Partie 1 : Spécifications et exigences techniques

Radiatoren und Konvektoren - Teil 1: Technische Spezifikationen und Anforderungen

This European Standard was approved by CEN on 11 October 2014.

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Foreword

This document (EN 442-1:2014) 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of an identical text or by endorsement, at the latest by June 2015, and conflicting national standards shall be withdrawn at the latest by September 2016.

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.

This document supersedes EN 442-1:1995 and EN 442-3:2003.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports basic works requirements of EU Regulation No 305/2011, of the European Parliament and the Council of 8 March 2011.

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

This European Standard, *Radiators and convectors*, consists of the following parts:

— *Part 1: Technical specifications and requirements* [the present document];

— *Part 2: Test methods and rating*.

The most significant changes that have been made in this new edition of EN 442-1 are the following ones:

— the standard has been revised to be in line with EU Regulation N° 305/2011;

— tubular radiators, finned tube convectors and skirting convectors have been included;

— the declaration of the standard low temperature thermal output at ΔT 30 K has been added.

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 defines the technical specifications and requirements of radiators and convectors to be installed in heating systems in buildings including assessment and verification of constancy of performance.

This European Standard deals with radiators and convectors installed in a permanent manner in construction works, fed with water or steam at temperatures below 120 °C, supplied by a remote energy 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 with the product in order to ensure the correct application of the products.

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 442-2:2014, *Radiators and convectors — Part 2: Test methods and rating*

EN 573-3, *Aluminium and aluminium alloys — Chemical composition and form of wrought products — Part 3: Chemical composition and form of products*

EN 10130, *Cold rolled low carbon steel flat products for cold forming — Technical delivery conditions*

EN 10131, *Cold rolled uncoated and zinc or zinc-nickel electrolytically coated low carbon and high yield strength steel flat products for cold forming — Tolerances on dimensions and shape*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

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

ISO 185, *Grey cast irons — Classification*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE For symbols and units refer to EN 442–2.

3.1
heating appliance
device which has the purpose of transferring heat in order to provide specific temperature conditions inside buildings

3.2
independent heating appliance
self-contained heating appliance which does not need to be connected to a remote energy source (e.g. a boiler) as it contains its own energy source (e.g. gas fired appliances, electric appliances, air to air heat pump appliances)

3.3
radiator
heating appliance, produced with different materials (e.g. steel, aluminium, cast-iron) and with different designs (e.g. plate type, column type, tube type, finned tube type), which emits heat by free convection and radiation

3.4
sectional heating appliances (mainly applied to radiators)
heating appliance manufactured in sections of identical design and traded in this form which can be joined together into modular assemblies so that the desired output can be obtained

3.5
free convection heating appliance
heating appliance which does not contain a fan or similar device to activate the air flow over heat emitter

3.6
convector
heating appliance which emits heat almost entirely by free convection

Note 1 to entry: A convector comprising at least a heat emitter and a casing which provides an unheated convective chimney of defined height.

3.7
skirting convector
convector of limited height running along the base of an interior wall

3.8
height of the unheated convective chimney
vertical distance between the lowest edge of the convector and the bottom of the air outlet section

Note 1 to entry: It applies to convectors only, being a main factor influencing their thermal output.

3.9
wet heating surface; primary heating surface
portion of the heat emitting surface which is always in contact with the primary fluid (water or steam)

3.10
dry heating surface; secondary heating surface
portion of the heat emitting surface which is in contact with air only (e.g. fins projecting from the wet surface)

3.11
family of heating appliances
group of heating appliances of similar design and construction and of identical material, positions of primary fluid connections and other related variables that particularly affect the conditions of flow of the primary fluid within the heating appliance

3.12
type of radiators/convectors
group of heating appliances of similar design whose cross-section remains unchanged while the height or length varies or which have a systematic variation of only one characteristic dimension of the dry heating surfaces providing that this does not affect the water side (e.g. the height of convector fins on panel radiator)

Note 1 to entry: For the calculation in conformity to EN 442–2:2014, Annex D, at least three models are required.

3.13
model
heating appliance of defined height, length and depth within a type

3.14
range of heights
difference between the maximum and minimum height of the models in a type

3.15
module of heating appliances
reference length of the useful portion of a heating appliance

Note 1 to entry: The module coincides with:

— the section, in the case of sectional heating appliances - a length of 1 m, in the case of non-sectional heating appliances;

— a finned length of 1 m, in the case of finned tube convectors.

3.16
sample
representative heating appliance used for the determination of one or more of the performance characteristics

3.17
inlet water temperature
bulk temperature of the water entering the heating appliance

3.18
outlet water temperature
bulk temperature of the water leaving the heating appliance

3.19
temperature drop
difference between inlet and outlet water temperature

3.20
mean water temperature
arithmetical mean of inlet and outlet water temperature

3.21
reference air temperature
air temperature measured on the vertical line at the centre of the test booth, 0,75 m above the floor level

3.22
excess temperature
difference between mean water temperature and reference air temperature

3.23
standard excess temperature
excess temperature of 50 K as determined in the standard conditions

Note 1 to entry: Inlet water temperature of 75 °C, outlet water temperature of 65 °C and reference air temperature of 20 °C.

3.24
standard excess low temperature
excess temperature of 30 K at standard flow rate

3.25
air pressure
air pressure measured at the test place

3.26
standard air pressure
101,325 kPa (1,013 25 bar)

3.27
water flow rate
amount of water flowing through the heating appliance per unit of time

3.28
standard water flow rate
water flow rate relating to standard test conditions

3.29
standard rated thermal output
thermal output of a heating appliance defined at 50 K excess temperature

3.30
standard low temperature thermal output
thermal output of a heating appliance defined at 30 K excess temperature

3.31
characteristic equation
power function with a specific characteristic exponent that gives the thermal output as a function of the excess temperature at constant water flow rate

3.32
standard characteristic equation
characteristic equation which is valid for standard water flow rate and from which the standard thermal output can be found for the standard excess temperature of 50 K

3.33
regression equation of a type
equation which gives the standard thermal outputs and the characteristic exponent of all the models within a type as a function of one characteristic dimension

Note 1 to entry: The regression equation for the determination of thermal outputs is a power function, in which the characteristic exponent is a linear function of the characteristic dimension.

3.34
standard thermal output of the module
standard thermal output of a model divided either by the number of sections or by the length in metres

3.35
test pressure
relative pressure to which the heating appliance is submitted during the manufacturing process (i.e. factory test pressure)

3.36
maximum operating pressure
MOP
maximum relative pressure of the system to which the heating appliance may be submitted as chosen by manufacturer

Note 1 to entry: The maximum operating pressure is expressed in [kPa].

3.37
maximum operating temperature
maximum inlet water temperature allowed by the manufacturer

3.38
test installation
combination of:

— test booth and other related parts, and

— measuring instruments and related equipment

3.39
test system
combination of:

— test installation, and

— master radiators

3.40
test systems circuit
group of test systems convened to comply with the specifications and procedures of this European Standard and to a periodical comparison of test results

3.41
repeatability of a test installation
capability of one test installation to provide test results on one given set of master radiator within the tolerance specified by this European Standard

Note 1 to entry: See EN 442-2:2014, 5.2.4.

3.42
reproducibility of a test installation
capability of different test installations to provide test results on one given set of master radiators within the tolerance specified by this European Standard

Note 1 to entry: See EN 442-2:2014, 5.2.4.

3.43
pressure drop
difference of pressure between water inlet and water outlet of the heating appliance

3.44
standard pressure drop
drop in pressure between inlet and outlet of the appliance heat emitter on the primary fluid side, when the appliance is fed at the standard water flow rate

3.45
supplementary test
test for the purpose of establishing the effect of minor technical modifications on the thermal output of radiators that have already been tested

3.46
radiated heat output factor
Sk
assumed ratio between the radiation heat output and the overall heat output of the radiator, which is only valid for air pressure correction purposes

3.47
exponent np
exponent for the air pressure correction of the measured heat output of the radiator

3.48
emissivity
ratio of energy radiated by a particular material to energy radiated by a black body at the same temperature

3.49
master radiator
sample used for the calibration of test installations

Note 1 to entry: Master radiators are used to determine repeatability and reproducibility of the results of the test installations (see EN 442–2:2014, 5.2.3).

4 Material and product characteristics

4.1 Dimensional deviations

The dimensional deviations shall not be greater than the tolerances in the manufacturer's drawings. In any case they shall not be greater than those given in EN 442-2:2014, Table 3.

The manufacturer shall implement a quality control system to ensure that products comply with the tolerances given in the drawings sent to the laboratory for the type testing.

Wall thickness of cast-iron, cast aluminium or extruded aluminium radiators refers to the nominal drawing dimensions minus the tolerance given in EN 442-2:2014, Table 3.

4.2 Material specification and wall thickness of wet heating surface

4.2.1 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 sheet used for wet surfaces should not be less than 1,11 mm.

4.2.2 Cast-iron radiators

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

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

4.2.3 Die cast aluminium radiators

Die cast aluminium alloy radiators shall be manufactured from alloy EN AB 46000 or EN AB 46100.

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

4.2.4 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 should not be less than 1,1 mm.

4.2.5 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.

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

4.2.6 Finned tube convectors

The wall thickness of the tube should not be less than:

— 0,8 mm for steel tubes;

— 0,3 mm for copper tubes;

— for stainless steel see 4.2.7.

4.2.7 Other materials of different grade and thickness

Materials of grade and/or thickness other than those specified in 4.2.1 to 4.2.6 may be used provided that the relevant performances are tested and declared as specified in 4.3 to 4.11.

4.3 Reaction to fire

When required radiators and convectors covered by this standard shall be tested for reaction to fire according to 5.2 and the result declared as classes of reaction to fire.

4.4 Release of dangerous substances

The surface treatments shall not contain any chemical substances the use of which is not allowed in building products[1)]. The release of dangerous substances should comply with the relevant EC directives.

National regulations on dangerous substances may require, verification and declaration on release, and sometimes content, of dangerous substances, when construction products covered by this standard are placed on those markets.

In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

NOTE An informative database covering European and national provisions on dangerous substances is available at the Construction website on EUROPA accessed through: http://ec.europa.eu/enterprise/construction/cpd-ds/.

4.5 Pressure tightness

When required radiators and convectors covered by this standard shall be tested for pressure tightness according to 5.4 and declared as no leakage at 1,3 × maximum operating pressure [kPa].

4.6 Surface temperature

The maximum surface temperature is assumed equal to the system design inlet water temperature[2)].

4.7 Resistance to pressure

When required radiators and convectors covered by this standard shall be tested for resistance to pressure according to 5.6 and declared as no breakage at 1,69 x MOP and maximum operating pressure [kPa].

4.8 Surface defects

The heating appliance shall be free from burrs likely to cause personal injury, according to 5.7.

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

2) Radiators and convectors are heat emitters without internal energy source. The maximum water temperature is decided by the system designer and controlled by safety devices in the heating system.

4.9 Rated thermal outputs

When required radiators and convectors covered by this standard shall be tested for thermal outputs according to 5.8 and declared as thermal outputs values [W].

4.10 Thermal output in different operating conditions

When required the thermal output in different operating conditions of the radiators and convectors covered by this standard shall be determined according to EN 442-2:2014, Annex C and Annex D, and declared as characteristic equation and relevant exponent n.

4.11 Durability

Durability of the performances is ensured as long as the maintenance and the operating conditions of the heating system are provided.

The durability of the mandated characteristics is very strictly correlated to the absence of corrosion.

The testing of durability shall be in accordance to 5.9.

5 Testing and assessment methods

5.1 Verification of dimensions

Compliance with the requirement in 4.1 shall be verified by measurements.

5.2 Reaction to fire

Metallic radiators and convectors are considered to be reaction to fire Class A1 without testing[3)], provided that:

— the metallic radiators and convectors are not coated and, if coated, the coating does not exceeds 1,0 mm of thickness and 1,0 kg/m^2 of mass per unit area[4)].

If the coating exceeds 1,0 mm of thickness or 1,0 kg/m^2 of mass per unit area, or for radiators and convectors made of others materials not covered by the Decision cited in Footnote [4)], the appliances shall be tested and classified according to EN 13501-1 and the standards referred therein, and the resulting class declared.

Only one model is to be tested to assess the reaction to fire of a type.

5.3 Dangerous substances

The manufacturers of the radiators and convectors shall refer to the declaration of the supplier of the coating materials.

5.4 Pressure tightness

All radiators and convectors covered by this standard before leaving the manufacturer's factory shall be tested for tightness with a test pressure equal to at least 1,3 times the declared maximum operating pressure. The test pressure shall not be less than 520 kPa.

The test may be carried out using as pressurizing fluid water or air.

3) See Decision 1996/603/EC as amended by Decision 2000/605/EC (OJEU 19-10-1996 N. 267).

4) See Decision 2000/147/EC for non-substantial components. (OJEU 23-02-2000 N. 50).

Test using water as pressurizing fluid shall be realized by means of an appropriated hydraulic circuit and a water pump. The heating appliance shall be water filled and the internal air shall be purged. The pressurizing shall be progressive, without blows and the test pressure maintained for 10 s.

Test using air as pressurizing fluid shall be realized by means of the following equipment:

— one water tank filled and its accessories,

— a pneumatic circuit that provides the pressurized air.

The testing appliance, dipped safely in the water bath shall be progressively pressurized without blows by means of the air and the test pressure maintained for 3 s.

In each of the two cases, the pressure inside the pressurizing circuit shall be measured by means of a pressure gauge having uncertainty not greater than 5 %.

5.5 Surface temperature

No test or assessment is required for the maximum surface temperature.

5.6 Resistance to pressure

Sample heating appliances shall be subjected to a burst test at a pressure 1,69 times the maximum operating pressure.

The test may be carried out using as pressurizing fluid water or air as described in 5.4 and the heating appliances shall demonstrate no breakage.

The testing appliance, dipped safely in the water bath shall be progressively pressurized without blows by means of the air and the test pressure maintained for 2 min.

In each of the two cases, the pressure inside the pressurizing circuit shall be measured by means of a pressure gauge having uncertainty not greater than 5 %.

The sample under test may deform but shall not rupture.

The length of the sample to be tested shall not be less than 500 mm.

5.7 Surface defects

The heating appliance shall be free from burrs likely to cause personal injury. The assessment shall be done by visual inspection.

5.8 Rated thermal outputs

5.8.1 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.

5.8.2 Aim of the test programme

The aim of the test programme is to determine:

— the standard low temperature thermal output (Φ_{30});

— the standard rated thermal output (Φ_{50}) for comparison of different products;

— the thermal output in different operating conditions to provide standardized technical data for the design of heating systems.

5.8.3 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 (ΔT 30 K and ΔT 50 K) of all the models of the type;

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

5.8.4 Test report

The test report shall be issued according to EN 442-2:2014, Clause 6.

5.9 Durability

The protection against corrosion in normal storage and installation conditions shall be demonstrated by absence of surface corrosion after 100 h humidity test according to EN 442-2:2014, Annex K.

Additionally, for painted radiators and convectors only, the resistance to minor impact damage shall be tested according to EN ISO 2409. The test result shall be within the first three class (0-1-2) of EN ISO 2409:2013, Table 1.

6 Assessment and verification of constancy of performance - AVCP

6.1 General

The compliance of radiators and convectors with the requirements of this standard and with the performances declared by the manufacturer in the DoP shall be demonstrated by:

— determination of the product type on the basis of type testing;

— factory production control by the manufacturer, including product assessment.

The manufacturer shall always retain the overall control and shall have the necessary means to take responsibility for the conformity of the product with its declared performances.

6.2 Type testing

6.2.1 General

All performances related to characteristics included in this standard shall be determined when the manufacturer intends to declare the respective performances unless the standard gives provisions for declaring them without performing tests. (e.g. use of previously existing data, classification without further testing –CWFT- and conventionally accepted performance).

Assessment previously performed in accordance with the provisions of this standard, may be taken into account provided that they were made to the same or a more rigorous test method, under the same AVCP system on the same product or products of identical design, construction and functionality, such that the results are applicable to the product in question.

NOTE Same AVCP system means testing by an independent third party, under the responsibility of a notified product certification body, when relevant.

For the purposes of assessment, the manufacturer's products may be grouped into families, where it is considered that the results for one or more characteristics from any one product within the family are representative for that same characteristics for all products within that same family.

Products may be grouped in different families for different characteristics.

Reference to the assessment method standards should be made to allow the selection of a suitable representative sample.

In addition, the determination of the product type shall be performed for all characteristics included in the standard for which the manufacturer declares the performance:

— at the beginning of the production of a new or modified radiator and convector (unless it is a member of the same type of radiator or convector), or

— at the beginning of a new or modified method of production (where this may affect the stated properties); or

— they shall be repeated for the appropriate characteristic(s), whenever a change occurs in the radiator and convector design, in the raw material or in the supplier of the components, or in the method of production (subject to the definition of a family), which would affect significantly one or more of the characteristics. In particular the thermal output shall not be decreased by more than 4 % with reference to the result of the original (initial) type-test.

Where components are used (for example coating) whose characteristics have already been determined, by the component manufacturer, on the basis of assessment methods of other product standards, these characteristics need not be re-assessed. The specifications of these components shall be documented.

It is recommended that the manufacturers of radiators and convectors request the documented specifications from suppliers of raw materials and components (i.e. coating paints, steel, aluminium, etc.).

Products bearing regulatory marking in accordance with appropriate harmonized European specifications may be presumed to have the performances declared in the Declaration of Performance (DoP), although this does not replace the responsibility on the radiators and convectors manufacturer to ensure that the radiators and convectors as a whole are correctly manufactured and their component products have the declared performance values.

6.2.2 Test samples, testing and compliance criteria

The number of samples of radiators and convectors to be tested/assessed shall be in accordance with Table 1.

Table 1 — Number of samples to be tested and compliance criteria

Characteristic	Requirement clause(s)	Assessment method	No. of samples	Compliance criteria
Reaction to fire	4.3	5.2	1 per type	Meet the intended declared class
Release of dangerous substances	4.4	5.3	In accordance with National regulation in place of use.	Not to include banned substances or above the regulated limits
Pressure tightness	4.5	5.4	Each model	No leakage
Surface temperature	4.6	5.5	Not applicable	According to the design of the heating system and never higher than 120 °C[a]
Resistance to pressure	4.7	5.6	According to EN 442–2:2014, Clause 4	No breakage
Rated thermal output	4.9	5.8	According to EN 442–2:2014, Clause 4	Declare the value in W at ΔT 30 K and 50 K
Thermal output in different operating conditions *(characteristic curve)*	4.10	5.8.2	According to EN 442–2:2014, Clause 4	Declare the exponent n and the coefficient K of the characteristic curve
Durability as:				
Resistance against corrosion	4.11	5.9	1 per family according to EN 442–2:2014, Annex K	absence of surface corrosion after 100 h humidity
Resistance against minor impact[b]	4.11	5.9	1 per family	within the first three class (0–1–2) of EN ISO 2409:2013, Table 1

[a] Radiators and convectors are heat emitters without internal energy source. The maximum water temperature is decided by the system designer and controlled by safety devices in the heating system.

[b] Only for painted radiators and convectors.

6.2.3 Test reports

The results of the determination of the product type shall be documented in test reports according to EN 442-2:2014, Clause 6. All test reports shall be retained by the manufacturer for at least 10 years after the last date of production of the radiators and convectors to which they relate.

6.2.4 Shared other party results

A manufacturer may use the results of the product type determination obtained by someone else (e.g. by another manufacturer, as a common service to manufacturers, or by a product developer), to justify his own declaration of performance regarding a product that is manufactured according to the same design (e.g. dimensions) and with raw materials, constituents and manufacturing methods of the same kind, provided that:

a) the results are known to be valid for products with the same essential characteristics relevant for the product performance;

b) in addition to any information essential for confirming that the product has such same performances related to specific essential characteristics, the other party who has carried out the determination of the product type concerned or has had it carried out, has expressly accepted[1] to transmit to the manufacturer the results and the test report to be used for the latter's product type determination, as well as information regarding production facilities and the production control process that can be taken into account for FPC;

c) the manufacturer using other party results accepts to remain responsible for the product having the declared performances and he also:

   1) ensures that the product has the same characteristics relevant for performance as the one that has been subjected to the determination of the product type, and that there are no significant differences with regard to production facilities and the production control process compared to that used for the product that was subjected to the determination of the product type; and

   2) keeps available a copy of the determination of the product type report that also contains the information needed for verifying that the product is manufactured according to the same design and with raw materials, constituents and manufacturing methods of the same kind.

6.3 Factory production control (FPC)

6.3.1 General

The manufacturer shall establish, document and maintain an FPC system to ensure that the products placed on the market comply with the declared performance of the essential characteristics.

The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials or components, equipment, the production process and the product.

All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures.

This factory production control system documentation shall ensure a common understanding of the evaluation of the constancy of performance and enable the achievement of the required product performances and the effective operation of the production control system to be checked. Factory production control therefore brings together operational techniques and all measures allowing maintenance and control of the compliance of the product with the declared performances of the essential characteristics.

In case the manufacturer has used shared product type results, the FPC shall also include the appropriate documentation as foreseen in 6.2.4.

6.3.2 Requirements

6.3.2.1 General

The manufacturer is responsible for organizing the effective implementation of the FPC system in line with the content of this product standard. Tasks and responsibilities in the production control organization shall be documented and this documentation shall be kept up-to-date.

The responsibility, authority and the relationship between personnel that manages, performs or verifies work affecting product constancy, shall be defined. This applies in particular to personnel that need to initiate actions preventing product non-constancies from occurring, actions in case of non-constancies and to identify and register product constancy problems.

Personnel performing work affecting the constancy of performance of the product shall be competent on the basis of appropriate education, training, skills and experience for which records shall be maintained.

In each factory the manufacturer may delegate the action to a person having the necessary authority to:

— identify procedures to demonstrate constancy of performance of the product at appropriate stages;

— identify and record any instance of non-constancy;

— identify procedures to correct instances of non-constancy.

The manufacturer shall draw up and keep up-to-date documents defining the factory production control. The manufacturer's documentation and procedures should be appropriate to the product and manufacturing process. The FPC system should achieve an appropriate level of confidence in the constancy of performance of the product. This involves:

a) the preparation of documented procedures and instructions relating to factory production control operations, in accordance with the requirements of the technical specification to which reference is made;

b) the effective implementation of these procedures and instructions;

c) the recording of these operations and their results;

d) the use of these results to correct any deviations, repair the effects of such deviations, treat any resulting instances of non-conformity and, if necessary, revise the FPC to rectify the cause of non-constancy of performance.

Where subcontracting takes place, the manufacturer shall retain the overall control of the product and ensure that he receives all the information that is necessary to fulfil his responsibilities according to this European standard.

If the manufacturer has part of the product designed, manufactured, assembled, packed, processed and/or labelled by subcontracting, the FPC of the subcontractor may be taken into account, where appropriate for the product in question.

The manufacturer who subcontracts all of his activities may in no circumstances pass the above responsibilities on to a subcontractor.

NOTE Manufacturers having an FPC system, which complies with EN ISO 9001 and which addresses the provisions of the present European standard are considered as satisfying the FPC requirements of the Regulation (EU) No 305/2011.

6.3.2.2 Equipment

6.3.2.2.1 Testing

All weighing, measuring and testing equipment shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

6.3.2.2.2 Manufacturing

All equipment used in the manufacturing process shall be regularly inspected and maintained to ensure use, wear or failure does not cause inconsistency in the manufacturing process. Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer's written procedures and the records retained for the period defined in the manufacturer's FPC procedures.

6.3.2.3 Raw materials and components

The specifications of all incoming raw materials and components shall be documented, as shall the inspection scheme for ensuring their compliance. In case supplied kit components are used, the constancy of performance system of the component shall be that given in the appropriate harmonized technical specification for that component.

6.3.2.4 Controls during manufacturing process

The manufacturer shall plan and carry out production under controlled conditions.

6.3.2.5 Product testing and evaluation

6.3.2.5.1 General

The manufacturer shall establish procedures to ensure that the stated values of the characteristics he declares are maintained.

6.3.2.5.2 Material specification and wall thickness of wet heating surface

The material thickness for steel radiators, tubular radiators finned tube convectors and skirting board convectors shall be measured before pressing or fabrication.

For cast-iron radiators and cast-aluminium radiators the minimum wall thickness shall be ensured by periodical controls of the casting equipment and daily random production checks.

For extruded aluminium radiators the minimum wall thickness shall be ensured by periodical controls of the extruder and daily random production checks.

The characteristics and the means of control are indicated in Table 2.

Table 2 — Verification method and frequency

Characteristic	Requirement	Verification method	No. of samples (minimum number)	Minimum Frequency	Compliance criteria
Reaction to fire	4.3	Measurement of the thickness and the mass per unit area of the coating	1	once a day	Coating thickness < 1 mm and mass per unit area < 1 kg/m^2
Release of dangerous substances	4.4	Not applicable		-	Declaration of suppliers.
Pressure tightness	4.5	5.4	Entire production	-	No leakage
Surface temperature	4.6	Not applicable	-	-	According to the design of the heating system and never higher than 120 °C[a]
Resistance to pressure	4.7	5.6	1	At the beginning of each production batch and when some changes arises in the production process or if the changes have influence to the product quality.	No breakage
Rated thermal output	4.9	dimensional tolerances verification according to the drawing of manufacturer provided that they are within the tolerances of EN 442–2:2014, Table 3	1	At least at the beginning of each production batch or if changes arises to the product.	Verifications of the dimensions
Thermal output in different operating conditions *(characteristic curve)*	4.9	dimensional tolerances verification according to the drawing of manufacturer provided that they are within the tolerances of EN 442–2:2014, Table 3	1	At least at the beginning of each production batch or if changes arises to the product.	Verifications of the dimensions

[a] Radiators and convectors are heat emitters without internal energy source. The maximum water temperature is decided by the system designer and controlled by safety devices in the heating system.

6.3.2.6 Non-complying products

The manufacturer shall have written procedures which specify how non-complying products shall be dealt with. Any such events shall be recorded as they occur and these records shall be kept for the period defined in the manufacturer's written procedures.

Where the product fails to satisfy the acceptance criteria, the provisions for non-complying products shall apply, the necessary corrective action(s) shall immediately be taken and the products or batches not complying shall be isolated and properly identified.

Once the fault has been corrected, the test or verification in question shall be repeated.

The results of controls and tests shall be properly recorded. The product description, date of manufacture, test method adopted, test results and acceptance criteria shall be entered in the records under the signature of the person responsible for the control/test.

With regard to any control result not meeting the requirements of this European standard, the corrective measures taken to rectify the situation (e.g. a further test carried out, modification of manufacturing process, throwing away or putting right of product) shall be indicated in the records.

6.3.2.7 Corrective action

The manufacturer shall have documented procedures that instigate action to eliminate the cause of non-conformities in order to prevent recurrence.

6.3.2.8 Handling, storage and packaging

The manufacturer shall have procedures providing methods of product handling and shall provide suitable storage areas preventing damage or deterioration.

6.3.3 Product specific requirements

The FPC system shall address this European Standard and ensure that the products placed on the market comply with the declaration of performance.

The FPC system shall include a product specific FPC, which identifies procedures to demonstrate compliance of the product at appropriate stages, i.e.:

a) the controls and tests to be carried out prior to and/or during manufacture according to a frequency laid down in the FPC test plan,

and/or

b) the verifications and tests to be carried out on finished products according to a frequency laid down in the FPC test plan.

If the manufacturer uses only finished products, the operations under b) shall lead to an equivalent level of compliance of the product as if FPC had been carried out during the production.

If the manufacturer carries out parts of the production himself, the operations under b) may be reduced and partly replaced by operations under a). Generally, the more parts of the production that are carried out by the manufacturer, the more operations under b) may be replaced by operations under a).

In any case the operation shall lead to an equivalent level of compliance of the product as if FPC had been carried out during the production.

NOTE Depending on the specific case, it can be necessary to carry out the operations referred to under a) and b), only the operations under a) or only those under b).

The operations under a) refer to the intermediate states of the product as on manufacturing machines and their adjustment, and measuring equipment, etc. These controls and tests and their frequency shall be chosen based on product type and composition, the manufacturing process and its complexity, the sensitivity of product features to variations in manufacturing parameters, etc.

The manufacturer shall establish and maintain records that provide evidence that the production has been sampled and tested. These records shall show clearly whether the production has satisfied the defined acceptance criteria and shall be available for at least three years.

6.3.4 Initial inspection of factory and of FPC

This clause is applicable only for radiators and convectors under AVCP 1 due to the reaction to fire class assessed by testing.

Initial inspection of factory and of FPC shall be carried out when the production process has been finalized and in operation. The factory and FPC documentation shall be assessed to verify that the requirements of 6.3.2 and 6.3.3 are fulfilled.

During the inspection it shall be verified:

a) that all resources necessary for the achievement of the product characteristics included in this European standard are in place and correctly implemented,

and

b) that the FPC-procedures in accordance with the FPC documentation are followed in practice,

and

c) that the product complies with the product type samples, for which compliance of the product performance to the DoP has been verified.

All locations where final assembly or at least final testing of the relevant product is performed, shall be assessed to verify that the above conditions a) to c) are in place and implemented. If the FPC system covers more than one product, production line or production process, and it is verified that the general requirements are fulfilled when assessing one product, production line or production process, then the assessment of the general requirements does not need to be repeated when assessing the FPC for another product, production line or production process.

All assessments and their results shall be documented in the initial inspection report.

6.3.5 Continuous surveillance of FPC

This clause is applicable only for radiators and convectors under AVCP 1 due to the reaction to fire class assessed by testing.

Surveillance of the FPC shall be undertaken at least once per year. The surveillance of the FPC shall include a review of the FPC test plan(s) and production processes(s) for each product to determine if any changes have been made since the last assessment or surveillance. The significance of any changes shall be assessed.

Checks shall be made to ensure that the test plans are still correctly implemented and that the production equipment is still correctly maintained and calibrated at appropriate time intervals.

The records of tests and measurement made during the production process and to finished products shall be reviewed to ensure that the values obtained still correspond with those values for the samples submitted to the determination of the product type and that the correct actions have been taken for non-compliant products.

6.3.6 Procedure for modifications

If modifications are made to the product, production process or FPC system that could affect any of the product characteristics declared according to this standard, then all the characteristics for which the manufacturer declares performance, which may be affected by the modification, shall be subject to the determination of the product type, as described in 6.2.1.

Where relevant, a re-assessment of the factory and of the FPC system shall be performed for those aspects, which may be affected by the modification.

All assessments and their results shall be documented in a report.

6.3.7 One-off products, pre-production products (e.g. prototypes) and products produced in very low quantity

The radiators and convectors produced as a one-off, prototypes assessed before full production is established, and products produced in very low quantities (less than 1 000 per year) shall be assessed as follows.

For type assessment, the provisions of 6.2.1, 3rd paragraph apply, together with the following additional provisions:

— in case of prototypes, the test samples shall be representative of the intended future production and shall be selected by the manufacturer;

— on request of the manufacturer, the results of the assessment of prototype samples may be included in a certificate or in test reports issued by the involved third party.

The FPC system of one-off products and products produced in very low quantities shall ensure that raw materials and/or components are sufficient for production of the product. The provisions on raw materials and/or components shall apply only where appropriate. The manufacturer shall maintain records allowing traceability of the product.

For prototypes, where the intention is to move to series production, the initial inspection of the factory and FPC shall be carried out before the production is already running and/or before the FPC is already in practice. The following shall be assessed:

— the FPC-documentation; and

— the factory.

In the initial assessment of the factory and FPC it shall be verified:

a) that all resources necessary for the achievement of the product characteristics included in this European standard will be available, and

b) that the FPC-procedures in accordance with the FPC-documentation will be implemented and followed in practice, and

c) that procedures are in place to demonstrate that the factory production processes can produce a product complying with the requirements of this European Standard and that the product will be the same as the samples used for the determination of the product type, for which compliance with this European Standard has been verified.

Once series production is fully established, the provisions of 6.3 shall apply.

7 Instruction and safety information

Safety, storing and handling as well as assembling instructions shall be available in the manufacturer's publications or on the website.

Instructions and safety information should be accompanying the product and in the language determined by the Member State of the market of destination of the product.

8 Product identification

The product identification shall be done according to Annex A.

Annex A
(normative)

Product identification

A.1 General

This clause specifies the product identification data and the minimum reference data that shall be made available in product catalogues (e.g. printed or electronic) for the evaluation, installation and identification of the relevant heating appliance.

Where regulatory marking provisions require information on some or all items listed in this annex, the provisions of this annex, concerning those common items, are deemed to be met and the information shall not be repeated for the purpose of this annex.

A.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.

A.3 Catalogue reference data

A.3.1 General

When catalogues and any other literature relevant to the heating appliance are made available they shall contain the following reference data:

— number or other identification code of the catalogue;

— date of issue or equivalent code of the catalogue;

— the two standard thermal outputs;

— the exponent n of the excess temperature;

— dimensions;

— maximum operating pressure;

— maximum operating temperature.

A.3.2 Standard thermal outputs and the exponent n

The following standard thermal outputs and the exponent n of the excess temperature shall be indicated as 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.

In the case of tests made before the publication of this European Standard the test laboratory can, on request of the manufacturer, 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 EN 442-2:2014, 6.2).

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

A.3.3 Dimensions

A.3.3.1 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.

A.3.3.2 Convectors

The following nominal dimensions shall be given:

— height of the convector;

— depth of the convector;

— total length of the convector;

— length of the finned section;

— size, type and position of connections;

— height of the convective chimney;

— dry mass;

— water content.

A.3.3.3 Skirting convectors

The following nominal dimensions shall be given:

— height of the skirting convector;

— depth of the skirting convector;

— total length of the skirting convector;

— length of the finned section;

— size, type and position of connections;

— dry mass;

— water content.

A.3.4 Maximum operating pressure

The manufacturer shall state the maximum operating pressure, as result of resistance to pressure, to which the heating appliance may be subjected (see 4.7).

A.3.5 Maximum operating temperature

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

Annex ZA
(informative)

Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under Mandate M/129 “Space heating appliances” given to CEN by the European Commission and the European Free Trade Association.

If this European standard is cited in Official Journal of the European Union (OJEU), the clauses of this standard shown in this annex are considered to meet the provisions of the relevant mandate under the Regulation (EU) No. 305/2011.

This annex deals with the CE marking of the radiators and convectors intended for the uses indicated in Table ZA.1 and shows the relevant clauses applicable.

This annex has the same scope as in Clause 1 of this standard related to the aspects covered by the mandate and is defined by Table ZA.1.

Table ZA.1 — Relevant clauses for radiators and convectors intended to be used in buildings

Product: Radiators and convectors **Intended use:** in heating systems in buildings			
Essential Characteristics	**Clauses in this and other European Standard(s) related to essential characteristics**	**Regulatory classes**	**Notes**
Reaction to fire	4.3	A1 to F	A1 without testing or tested in accordance with 5.2 and the class declared
Release of dangerous substances	4.4	-	Tested and declared in accordance with 5.3
Pressure tightness	4.5	-	Tested and declared in accordance with 5.4 as no leakage at 1,3 × maximum operating pressure [kPa]
Surface temperature	4.6	-	The maximum surface temperature is assumed equal to the system design inlet water temperature.
Resistance to pressure	4.7	-	Tested in accordance with 5.6 Declaration as no breakage at 1,69 × maximum operating pressure and maximum operating pressure [kPa]
Rated thermal output	4.9	-	Tested in accordance with 5.8 and declared in W
Thermal output in different operating conditions *(characteristic curve)*	4.10	-	Determined according to EN 442–2 and the characteristic equation $\Phi = K \cdot \Delta T^n$ [in W], including parameters K and n, given.
Durability as:			
Resistance against corrosion	4.11	-	Tested according to 5.9 and declared as absence of surface corrosion after 100 h humidity
Resistance against minor impact[a]	4.11	-	Tested according to 5.9 and declared within the first three class (0–1–2) of EN ISO 2409:2013, Table 1
[a] Only for painted appliances.			

The declaration of the product performance related to certain essential characteristics is not required in those Member States (MS) where there are no regulatory requirements on these essential characteristics for the intended use of the product.

In this case, manufacturers placing their products on the market of these MS are not obliged to determine nor declare the performance of their products with regard to these essential characteristics and the option “No performance determined” (NPD) in the information accompanying the CE marking and in the declaration of performance (see ZA.3) may be used for those essential characteristics.

ZA.2 Procedure for AVCP of radiators and convectors

ZA.2.1 System(s) of AVCP

The AVCP system(s) of radiators and convectors indicated in Table ZA.1, established by EC Decision of the Commission 1999/471/EC of 29 June 1999 (OJEC L184 of 17.7.1999) as amended by the Decision 2001/596/EC of 8 January 2001 (OJEC L209 of 2.8.2001) as shown in Table ZA.2 for the indicated intended use(s) and relevant level(s) or class(es) of performance.

Table ZA.2 — System(s) of AVCP

Product(s)	Intended use(s)	Level(s) or class(es)of performance	AVCP system(s)
Space heating appliances without internal energy source	In buildings	-	3
	For uses subject to reaction to fire regulations	(A1, A2, B, C)[a] ——— (A1, A2, B, C)[b], D, E ——— (A1 to E)[c], F	1 ——— 3 ——— 4
System 1: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.2 System 3: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.4 System 4: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.5			
[a] Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material). [b] Products/materials not covered by Footnote [a]. [c] Products/materials that do not require to be tested for reaction to fire (e.g. products/materials of Class A1 according to the Decision 96/603/EC, as amended).			

Radiators and convectors are included in Mandate M/129 as products belonging to the sub-family space heating appliances without internal energy source.

The AVCP of the radiators and convectors in Table ZA.1 shall be according to the AVCP procedures indicated in Table ZA.3.1, Table ZA.3.2 and Table ZA.3.3 resulting from application of the clauses of this or other European Standard indicated therein. The content of tasks of the notified bodies shall be limited to those essential characteristics as provided for, if any, in Annex III of the relevant mandate and to those that the manufacturer intends to declare.

Table ZA.3.1 — Assignment of AVCP tasks for radiators and convectors under systems 1 and 3

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared	6.3
	Further testing of samples taken at factory according to the prescribed test plan	Reaction to fire	6.3
Tasks for the notified testing laboratory	Determination of the product-type on the basis of type testing (based on sampling carried out by the manufacturer), type calculation, tabulated values or descriptive documentation of the product	Essential characteristics of Table ZA.1 relevant for the intended use except reaction to fire	6.2
Tasks for the notified product certification body	Determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product	Reaction to fire	6.2
	Initial inspection of manufacturing plant and of FPC	Parameters related to essential characteristics of Table ZA.1, relevant for the intended use which are declared, namely reaction to fire Documentation of the FPC.	6.3
	Continuous surveillance, assessment and evaluation of FPC	Parameters related to essential characteristics of Table ZA.1, relevant for the intended use which are declared, namely reaction to fire Documentation of FPC	6.3

Table ZA.3.2 — Assignment of AVCP tasks for radiators and convectors under system 3

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared	6.3
Tasks for the notified testing laboratory	Determination of the product-type on the basis of type testing (based on sampling carried out by the manufacturer), type calculation, tabulated values or descriptive documentation of the product	Essential characteristics of Table ZA.1 relevant for the intended use	6.2

Table ZA.3.3 — Assignment of AVCP tasks for radiators and convectors under system 4 and 3

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use	See Clause 6
	Determination of the product-type on the basis of type testing, type calculation, tabulated values or descriptive documentation of the product	Reaction to fire	6.3
Tasks for the notified testing laboratory	Determination of the product-type on the basis of type testing (based on sampling carried out by the manufacturer), type calculation, tabulated values or descriptive documentation of the product	Essential characteristics of Table ZA.1 relevant for the intended use which are declared, except reaction to fire	6.2

ZA.2.2 Declaration of performance (DoP)

ZA.2.2.1 General

The manufacturer draws up the DoP and affixes the CE marking on the basis of the different AVPC systems set out in Annex V of the Regulation (EU) No 305/2011:

In case of products under system 1

— the factory production control and further testing of samples taken at the factory according to the prescribed test plan, carried out by the manufacturer; and

— the certificate of constancy of performance issued by the notified product certification body on the basis of determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product; initial inspection of the manufacturing plant and of factory production control and continuous surveillance, assessment and evaluation of factory production control.

In case of products under system 3

— the factory production control carried out by the manufacturer; and

— the determination of the product-type on the basis of type testing carried out by the notified testing laboratory (based on sampling carried out by the manufacturer), type calculation, tabulated values or descriptive documentation of the product.

In case of products under system 4

— the factory production control carried out by the manufacturer;

— the determination by the manufacturer of the product-type on the basis of type testing, type calculation, tabulated values or descriptive documentation of the product.

ZA.2.2.2 Content

The model of the DoP is provided in Annex III of the Regulation (EU) No 305/2011.

According to this Regulation, the DoP shall contain, in particular, the following information:

— the reference of the product-type for which the declaration of performance has been drawn up;

— the AVCP system or systems of the construction product, as set out in Annex V of the CPR;

— the reference number and date of issue of the harmonized standard which has been used for the assessment of each essential characteristic;

— where applicable, the reference number of the Specific Technical Documentation used and the requirements with which the manufacturer claims the product complies.

The DoP shall in addition contain:

(a) the intended use or uses for the construction product, in accordance with the applicable harmonized technical specification;

(b) the list of essential characteristics, as determined in the harmonized technical specification for the declared intended use or uses;

(c) the performance of at least one of the essential characteristics of the construction product, relevant for the declared intended use or uses;

(d) where applicable, the performance of the construction product, by levels or classes, or in a description, if necessary based on a calculation in relation to its essential characteristics determined in accordance with the Commission determination regarding those essential characteristics for which the manufacturer shall declare the performance of the product when it is placed on the market or the Commission determination regarding threshold levels for the performance in relation to the essential characteristics to be declared.

(e) the performance of those essential characteristics of the construction product which are related to the intended use or uses, taking into consideration the provisions in relation to the intended use or uses where the manufacturer intends the product to be made available on the market;

(f) for the listed essential characteristics for which no performance is declared, the letters “NPD” (No Performance Determined).

Regarding the supply of the DoP, Article 7 of the Regulation (EU) No 305/2011 applies.

The information referred to in Article 31 or, as the case may be, in Article 33 of Regulation (EC) No 1907/2006 (REACH), shall be provided together with the DoP.

ZA.2.3 Example of DoP

The following gives an example of a filled-in DoP for radiators

Declaration of performance

No. 001-2013-07-30

1. Unique identification code of the product-type:

1000/5 El.06 Finned tube radiators

2. Type, batch or serial number or any other element allowing identification of the construction product as required under Article 11(4):

1000/5 El.06 Finned tube radiators

3. Intended use or uses of the construction product, in accordance with the applicable harmonized technical specification, as foreseen by the manufacturer:

In heating systems in buildings

4. Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant Article 11(5):

AnyCo SA,

PO Box 21

B-1050 Brussels, Belgium

Tel. +32987654321

Fax: +32123456789

Email: anyco.sa@provider.be

5. Where applicable, name and contact address of the authorized representative whose mandate covers the tasks specified in Article 12(2):

Anyone Ltd

Flower Str. 24

West Hamfordshire

UK-589645 United Kingdom

Tel. +44987654321

Fax: +44123456789

e-mail: anyone.ltd@provider.uk

6. System or systems of assessment and verification of constancy of performance of the construction product as set out in Annex V:

System 3

7. In case of the declaration of performance concerning a construction product covered by a harmonized standard:

Notified laboratory No. 4123 performed the determination of the product-type on the basis of type testing and issued a test report.

8. Not applicable

9. Declared performance

Essential characteristics	Performance	Harmonized technical specification
Reaction to fire	A1	EN 442–1:2014
Release of dangerous substances	None	
Pressure tightness	no leakage at 1,3 × maximum operating pressure [kPa]	
Surface temperature	Maximum 120 °C	
Resistance to pressure	no breakage at 1,69 × maximum operating pressure [kPa] Maximum operating pressure: 400 [kPa]	
Rated thermal outputs	ϕ_{30} = 700 W ϕ_{50} = 1 350 W	
Thermal output in different operating conditions *(characteristic curve)*	ϕ = 8,70 x $\Delta T^{1,29}$	
Durability as:		
Resistance against corrosion:	No corrosion after 100 h humidity	
Resistance against minor impact:	Class 0	

10. The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 9.

    This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.

    Signed for and on behalf of the manufacturer by:

    ……

    (name and function)

    ……..…… ……

    (place and date of issue) (signature)

ZA.3 CE marking and labelling

The CE marking symbol shall be in accordance with the general principles set out in Article 30 of Regulation (EC) No 765/2008 and shall be affixed visibly, legibly and indelibly:

— to the radiators and convectors

or

— to a label attached to it.

Where this is not possible or not warranted on account of the nature of the product, it shall be affixed:

— to the packaging

or

— to the accompanying documents.

The CE marking shall be followed by:

— the last two digits of the year in which it was first affixed;

— the name and the registered address of the manufacturer, or the identifying mark allowing identification of the name and address of the manufacturer easily and without any ambiguity, or the representative in the EU;

— the unique identification code of the product-type;

— the reference number of the declaration of performance;

— the level or class of the performance declared;

— the dated reference to the harmonized technical specification applied;

— the identification number of the notified body;

— the intended use as laid down in the harmonized technical specification applied.

The CE marking shall be affixed before the construction product is placed on the market. It may be followed by a pictogram or any other mark notably indicating a special risk or use.

Figures ZA.1 gives an example of the information related to products subject to AVCP under each of the different systems to be given on the radiators and convectors.

CE	*CE marking, consisting of the "CE"-symbol*
4123	*Identification number of the notified testing laboratory*
AnyCo Ltd, PO Box 21, B-1050, Brussels, Belgium	*name and the registered address of the manufacturer, or identifying mark*
14	*Last two digits of the year in which the marking was first affixed*
001–2013–07–30	*reference number of the DoP*
EN 442–1:2014	*No. of European standard applied, as referenced in OJEU*
1000/5 El.06 Finned tube radiators	*Unique identification code of the product-type*
In heating systems in buildings	*Intended use of the product as laid down in the European standard applied*
Reaction to fire: A1 **Release of dangerous substances:** None **Pressure tightness** no leakage at 1,3 x MOP **Resistance to pressure:** no breakage at 1,69 x MOP **-** Maximum operating pressure (MOP): 400 kPa **Surface temperature:** Maximum 120 °C **Rated thermal outputs:** ϕ_{30} = 700 W ϕ_{50} = 1350 W **Thermal output in different operating conditions *(characteristic curve)*:** $\phi = 8{,}70 \times \Delta T^{1{,}29}$ **Durability as:** **Resistance against corrosion:** no corrosion after 100 h humidity **Resistance against minor impact:** Class 0	*Level or class of the performance declared*

Figure ZA.1 — Example CE marking information of products under AVCP system 3

Bibliography

[1] EN ISO 9001, *Quality management systems — Requirements (ISO 9001)*

[2] ISO 31-4, *Quantities and units — Part 4: Heat*

[3] Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 march 2011 laying down harmonised conditions for the marketing of construction products and repealing council directive 89/106/EEC

[4] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

[5] Decision 96/603/EC establishing the list of products belonging to Classes A 'No contribution to fire' provided for in Decision 94/611/EC implementing Article 20 of Council Directive 89/106/EEC on construction products, as amended by Commission Decision 2000/605/EC

[6] Decision 2000/147/EC for non-substantial components of 8 February 2000 implementing Council Directive 89/106/EEC as regards the classification of the reaction to fire performance of construction products (notified under document number C(2000) 133)

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