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Solar collectors — General requirements

*Kollektoren — Allgemeine Anforderungen*

*Capteurs solaires — Exigences générales*

ICS:

Descriptors:

European foreword

This document (TC 312 WI 0312039) has been prepared by Technical Committee CEN/TC 312 “Thermal solar systems and components”, the secretariat of which is held by ELOT.

This document is a working document.

This document will supersede EN 12975-1:2006.

This document has been prepared under mandates given to CEN by the European Commission and the European Free Trade Association, and supports the essential requirements related with solar collectors of the Regulation (EU) No 305/2011 of the European Parliament and of the council of 9 March 2011 (Construction Products Regulation, CPR), of the Commission Delegated Regulations (EU) No 811/2013 and (EU) No 812/2013 of 18 February 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 (Energy Labelling Directive), of the Commission Regulations (EU) No 813/2013 and (EU) No 814/2013 of 2 August 2013 implementing Directive 2009/125/EC of 21 October 2009 (Ecodesign Directive), and under the general mandate the Directive 2014/68/EU of the European Parliament and of the council of 15 May 2014 (Pressure Equipment Directive, PED)

For relationship with these EU Directives and Regulations, see the informative Z-Annexes, which are an integral part of this document.

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# Scope

This international standard is applicable to all types of fluid heating solar collectors. This international standard specifies performance requirements for fluid heating solar collectors with respect to durability, reliability, safety and thermal performance. This European Standard includes provisions for the assessment and verification of constancy of performance to these requirements.

This document deals with the collector module and not with assemblies. This document is not applicable to those devices in which a thermal storage unit is an integral part to such an extent that the collection process cannot be separated from the storage process for making the collector thermal performance measurements.

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

EN 13501-5, *Fire classification of construction products and building elements — Part 5: Classification using test data from external fire exposure to roof tests*

ISO 3741-2, *Acoustics -- Determination of sound power levels and sound energy levels of noise sources using sound pressure -- Precision methods for reverberation test rooms*

EN ISO 3743-2, *Acoustics - Determination of sound power levels of noise sources using sound pressure - Engineering methods for small, movable sources in reverberant fields - Part 2: Methods for special reverberation test rooms*

EN ISO 3747-2, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering/survey methods for use in situ in a reverberant environment*

EN ISO 9488, *Solar energy – Vocabulary*

EN ISO 9806:2017, *Solar energy – Solar Thermal collectors – Test methods*

# Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 9488, EN ISO 9806:2017 and the following apply.

# Symbols and abbreviations

For the purposes of this European Standard, the symbols, abbreviations and units given in EN ISO 9488 and EN ISO 9806:2017 apply.

# Requirements

## General

Collectors shall be tested according to clause 5.2. For the declaration of the performance of a solar collector as required in the Z-Annexes, additional tests (clause 5.3) or conversions of test results of clause 5.1 into other formats may be required (clause 5.4).

## Required tests

Collectors shall be tested according to Table 1 of EN ISO 9806:2017 considering the provision of clause 5 of EN ISO 9806:2017. The measurement of the pressure drop (Clause 27 of EN ISO 9806:2017) is recommended but not mandatory. The results shall be reported as required in the corresponding clauses and in Annex A of EN ISO 9806:2017.

None of the findings of the performed tests shall be rated as major failure according to clause 17 of EN ISO 9806:2017.

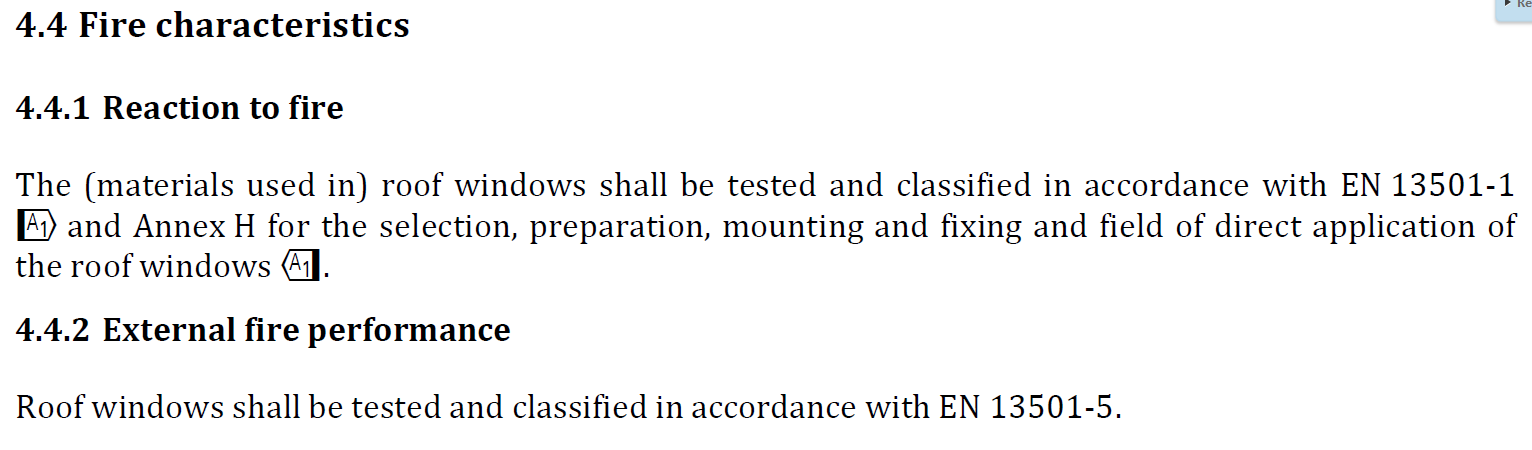
## Additional tests for the purpose of the Z-annexes

### Fire safety

Reaction to fire: Collectors which cannot be classified without testing shall be tested according to EN 13501-1 applying the standards therein, as applicable and Annex XXX for the selection, preparation mounting and fixing and field of application of the collector.

External fire performance: If required, collectors embedded in the roof shall be tested and classified in accordance with EN 13501-5.

**REMARK from Convenor:**The proposed text for fire safety is very much an imitation of EN14351-1 (Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets) which sems to be a similar product. The Annex B is therefore also a "copy" of the here mentioned Annex H



### Release of dangerous substances

National regulations on dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this European 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 https://ec.europa.eu/growth/tools-databases/cp-ds\_en

### Electrical safety

If required, collectors co-generating or using electricity shall comply with the specific requirements of the applicable standards and regulations for such products.

### Sound level

If applicable, the sound level shall be tested and the results shall be reported according to either ISO 3741-2:2010, EN ISO 3743-2:2009 or EN ISO 3747-2:2010.

## Conversion of test results for the purpose of DoP's as required in the Z-annexes

### Mechanical resistance to climate loads

The performance of the collector with respect to resistance to climate load is defined as the *maximum test load without damage* reported in A.12.1.2 of EN ISO 9806:2017 for snow load, and as the *maximum negative load without damage* reported in A.12.2.2 of EN ISO 9806:2017 for wind load.

### Weather tightness

The performance of the collector with respect to weather tightness is defined as "Pass", if the collector is tested according to clause 13 of EN ISO 9806:2017 and none of the reported findings (Annex A.10.2 of EN ISO 9806:2017) is rated as major failure according to clause 17 of EN ISO 9806:2017.

### Collector aperture area *ASol*

For the specific use in Annex ZB, Annex ZC, and Annex ZD, the collector aperture area is designated as *ASol* where *ASol* = *AApt* (see EN ISO 9806:2017 Annex A.1.4).

### Collector efficiency *ηCol*

For the specific use in Annex ZB, the collector efficiency *ηCol* is defined as the efficiency of the solar collector under standard reporting conditions (SRC) for Blue Sky (Table 7 of EN ISO 9806:2017) at a mean temperature of the heat transfer fluid of *ϑm* = 60°C, expressed in %, under the assumptions that the collector efficiency is related to *ASol* (see Annex G of EN ISO 9806:2017)

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### Collector zero loss efficiency *η0*

For the specific use in Annex ZC, the collector zero loss efficiency *η0* is defined as the efficiency of the solar collector under standard reporting conditions (SRC) for Blue Sky (Table 7 of EN ISO 9806:2017) at a mean temperature of the heat transfer fluid equal to the ambient air temperature *ϑm* = *ϑa*, under the assumptions that the collector efficiency is related to *ASol* (see Annex G of EN ISO 9806:2017)

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### Collector first order coefficient

For the specific use in Annex ZC the collector first order coefficient *a1* shall be approximated by Formula (3), under standard reporting conditions (SRC, Table 7 of EN ISO 9806:2017) at *ϑm* - *ϑa* = 100°C. On the right side of the definition (3), the parameters *a1*, *a3* and *a8* as given in Table A.6 of Annex A of the EN ISO 9806:2017 shall be used.

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### Collector incidence angle modifier *IAM*

For the specific use in Annex ZC and Annex ZD, the incidence angle modifier (*IAM*) is defined as the incidence angle modifier at an incidence angle of 50°.

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### Thermal Output

For the specific use in Annex ZA the thermal output is defined as the Peak Power indicated in Annex A.15.4.2 of EN ISO 9806:2017.

### Maximum allowable pressure *PS*

Only for the specific use in Annex ZE the maximum allowable pressure *PS* is defined as the maximum operation pressure given in Annex A.1.3 of the EN ISO 9806:2017, converted into units of bars.

### Maximum allowable temperature *TS*

Only for the specific use in Annex ZE the maximum allowable temperature *TS* of a collector is defined as the maximum operating temperature indicated in Annex A.1.3 of the EN ISO 9806:2017.

### Nominal size DN

Only for the specific use in Annex *ZE* the nominal size DN of a collector is defined as the maximum of the inner diameters of the hydraulic system given in Annex A.1.7 of the EN ISO 9806:2017.

### Volume V

Only for the specific use in Annex ZE the Volume V of a collector is defined as the fluid content indicated in Annex A.1.4 of the EN ISO 9806:2017.

### Fluids

Only for the specific use in Annex ZE the fluids include all recommended heat transfer fluids listed in Annex A.1.3 of the EN ISO 9806:2017.

## Classification of collectors with respect to their hydraulic system

Collectors shall be classified with respect to their intended use and their intended fluids as defined in the Directive 2014/68/EU of the European Parliament and of the Council, Article 13 §1, into one or several collector classes defined in Table 1.

Table 1 — Collector classes with respect to the hydraulic system

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| **Collector class** | **Definition** |
| Class 0 | Low pressure collectors (PS < 0,5 bar over atmosphere) and all collectors that are not classified in another class listed in this table. |
| Class A1(F1) | Collectors made of one pipe (e.g. meander) which are not intended for generation of steam or super-heated water in the primary circuit using Group 1 fluids and DN ≤ 25 mm |
| Class Ax1(F1) | Collectors made of one pipe (e.g. meander) which are not intended for generation of steam or super-heated water in the primary circuit using Group 1 fluids and DN > 25 mm |
| Class A1(F2) | Collectors made of one pipe (e.g. meander) which are not intended for generation of steam or super-heated water in the primary circuit using Group 2 fluids and DN ≤32 mm |
| Class Ax1 (F2) | Collectors made of one pipe (e.g. meander) which are not intended for generation of steam or super-heated water in the primary circuit using Group 2 fluids and DN > 32 mm |
| Class A2(F1) | Collectors made of several pipes (e.g. harp) which are not intended for generation of steam or super-heated water in the primary circuit using Group 1 fluids and PS·V ≤ 25 bar·litres |
| Class Ax2(F1) | Collectors made of several pipes (e.g. harp) which are not intended for generation of steam or super-heated water in the primary circuit using Group 1 fluids and PS·V > 25 bar·litres |
| Class A2(F2) | Collectors made of several pipes (e.g. harp) which are not intended for generation of steam or super-heated water in the primary circuit using Group 2 fluids and PS·V ≤ 50 bar·litres |
| Class Ax2(F2) | Collectors made of several pipes (e.g. harp) which are not intended for generation of steam or super-heated water in the primary circuit using Group 2 fluids and PS·V > 50 bar·litres |
| Class B | Collectors intended for generation of steam or super-heated water in the primary circuit with V > 2 litres |

## Classification of collectors with respect to their intended place of installation

Collectors shall be classified with respect to their intended place of installation as defined in Table 2. Classification in one or several classes is possible.

Table 2 — Collector classes with respect to the hydraulic system

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| **Collector class** | **Definition** |
| In Building | Collectors intended to be integrated in the building as part of the outer building shell (For example collectors integrated into the roof or the façade fulfilling building shell functions such as preventing from ingress of rain) |
| On Building | Collectors intended to be attached to the building, which are not part of the outer building shell (For example on-roof collectors which having no additional function related with the building). |
| Off Building | Collectors not intended to be used with a building, such as greenfield process-heat collectors or collectors for power plants. |

# Assessment and verification of constancy of performance - AVCP

## General

The compliance of solar collectors 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
* 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.

## Type testing

### 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.

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 similar 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.

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.

NOTE Products may be grouped in different families for different characteristics.

NOTE 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 solar collector (unless a member of the same product range), 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 characteristics, whenever a change occurs in the solar collector 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.

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

Products bearing regulatory marking in accordance with appropriate harmonized European specifications may be presumed to have the performances declared in the DoP, although this does not replace the responsibility on the solar collector manufacturer to ensure that the solar collector as a whole is correctly manufactured and its component products have the declared performance values.

### Test samples, testing and compliance criteria

The number of samples of solar collectors to be tested/assessed shall be in accordance with Table 1 — Number of samples to be tested and compliance criteria.

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Characteristic** | **Requirement** | **Assessment method** | **No. of samples** | **Compliance criteria** |
| Mechanical resistance to climate loads | Clause 5.4.1 | Clause 5.2 | 1 | Clause 5.4.1 |
| Fire safety | Clause 5.3.1 | Clause 5.3 | 1 | DoP |
| Weather tightnessa | Clause 5.4.2 | Clause 5.2 | 1 | Clause 5.4.2 |
| Release of dangerous substances | Clause 5.3.2 | Clause 5.3.2 | 1 | - |
| Electrical safetyb | Clause 5.3.3 | Clause 5.3.3 | 1 | DoP |
| Maximum operating pressure | Clause 5.2 | Clause 5.2 | 1 | DoP |
| Sound level | Clause 5.3.4 | Clause 5.3.4 | 1 | DoP |
| Thermal output | Clause 5.2 | Clause 5.2 | 1 | DoP |
| a only for "In Building" solar collectors  b only for solar collectors co-generating or using electricity for normal operation | | | | |

### Test reports

The results of the determination of the product type shall be documented in test reports. All test reports shall be retained by the manufacturer for at least 10 years after the last date of production of the solar collector to which they relate.

### 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:

* the results are known to be valid for products with the same essential characteristics relevant for the product performance;
* 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]](#footnote-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;
* the manufacturer using other party results accepts to remain responsible for the product having the declared performances and he also:
* 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
* 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.

### Cascading determination of the product type results

For some construction products, there are companies (sometimes called “system houses”) which supply or ensure the supply of, based on an agreement[[2]](#footnote-2)) some or all of the components (e.g. in case of windows: profiles, gaskets, weather strips)[[3]](#footnote-3)) to an assembler who then manufactures the finished product (referred to below as the “assembler”) in his factory.

If the activities for which such a system house is legally established include manufacturing/assembling of products as the assembled one, the system house may take the responsibility for the determination of the product type regarding one or several essential characteristics of a product, which is subsequently manufactured and/or assembled by other firms in their own factory.

When doing so, the system house shall submit an “assembled product” using components manufactured by it or by others, to the determination of the product type and then make the determination of the product type report available to the assemblers, i.e. the actual manufacturer of the product placed on the market.

To take into account such a situation, the concept of cascading determination of the product type might be taken into consideration in the technical specification, provided that this concerns characteristics for which either a notified product certification body or a notified test laboratory intervene, as presented below.

The determination of the product type report that the system house has obtained with regard to tests carried out by a notified body, and which is supplied to the assemblers, may be used for the regulatory marking purposes without the assembler having to involve again a notified body to undertake the determination of the product type of the essential characteristics that were already tested, provided that:

* the assembler manufactures a product which uses the same combination of components (components with the same characteristics), and in the same way, as that for which the system house has obtained the determination of the product type report. If this report is based on a combination of components not representing the final product as to be placed on the market, and/or is not assembled in accordance with the system house’s instruction for assembling the components, the assembler needs to submit his finished product to the determination of the product type;
* the system house has notified to the manufacturer the instructions for manufacturing/assembling the product and installation guidance;
* the assembler (manufacturer) assumes the responsibility for the correct assembly of the product in accordance with the instructions for manufacturing/assembling the product and installation guidance notified to him by the system house;
* the instructions for manufacturing/assembling the product and installation guidance notified to the assembler (manufacturer) by the system house are an integral part of the assembler’s Factory Production Control system and are referred to in the determination of the product type report;
* the assembler is able to provide documented evidence that the combination of components he is using, and his way of manufacturing, correspond to the one for which the system house has obtained the determination of the product type report (he needs to keep a copy of the system house’s determination of the product type report);
* regardless the possibility of referring, on the basis of the agreement signed with the system house, to the latter’s responsibility and liability under private law, the assembler remains responsible for the product being in compliance with the declared performances, including both the design and the manufacture of the product, which is given when he affixes the regulatory marking on his product

## Factory production control (FPC)

### 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 FPC 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 or cascading product type results, the FPC shall also include the appropriate documentation as foreseen in clause 6.2.4 and 6.2.5.

### Requirements

#### 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 because 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:

1. 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;
2. the effective implementation of these procedures and instructions;
3. the recording of these operations and their results;
4. 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 fulfill his responsibilities according to this European standard.

If the manufacturer has part of the product designed, manufactured, assembled, packed, processed and/or labeled 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 standard and which addresses the provisions of the present European standard are considered as satisfying the FPC requirements of the Regulation (EU) No 305/2011.

#### Equipment

##### Testing

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

##### 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.

#### 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.

#### Traceability and marking [This clause may not be relevant for all standards]

Individual solar collectors shall be identifiable and traceable with regard to their production origin. The manufacturer shall have written procedures ensuring that processes related to affixing traceability codes and/or markings are inspected regularly.

#### Controls during manufacturing process

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

#### Product testing and evaluation

The manufacturer shall establish procedures to ensure that the stated values of the characteristics he declares are maintained. The characteristics listed in Table 1 — Number of samples to be tested and compliance criteria shall be subject to the relevant tests as referred to in Table 1 — Number of samples to be tested and compliance criteria and as defined in clause 6.1.

#### Non-complying products

The manufacturer shall have written procedures specifying 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.

#### Corrective action

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

#### Handling, storage and packaging

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

### 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.:

1. 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

1. 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.

### 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.

### One-off products, pre-production products and products produced in very low quantity

The solar collector produced as a one-off, prototypes assessed before full production is established, and products produced in very low quantities (< 50 pieces 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:

1. that all resources necessary for the achievement of the product characteristics included in this European standard will be available, and
2. that the FPC-procedures in accordance with the FPC-documentation will be implemented and followed in practice, and
3. 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 clause 6.3 shall apply.

# Marking, labelling and packaging

## Drawings and data sheet

The collector submitted for test shall be accompanied by a set of drawings describing the collector's dimensions, a list of materials used in the solar collector and their important properties and the solar collector description as in Annex A.1 of EN ISO 9806:2017. Drawings shall have a number, date of issue and possible revision date. These documents shall be filed by the test institute for at least the period of time that the solar collector type is traded by the manufacturer.

## Marking, labelling and packaging

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

Solar collectors shall carry a visible and durable label with at least the following data:

* Name of manufacturer;
* Model;
* Serial number;
* Year of production (Could be indicated by the serial number);
* Gross area of the solar collector;
* Peak power : Power output of the solar collector module for G = 1000 W/m² and *ϑm-ϑa* = 0 K;
* Maximum operation pressure;
* Standard stagnation temperature at 1000 W/m2 and *ϑa* = 30°C;
* Volume of heat transfer fluid (liquid heating solar collectors only);
* Solar collector maximum operating temperature, *ϑmax,op*;
* Maximum start temperature (air heating solar collectors only);
* Weight of empty solar collector;

## Installer instruction manual

Collectors shall be accompanied by an installer instruction manual containing at least the following information:

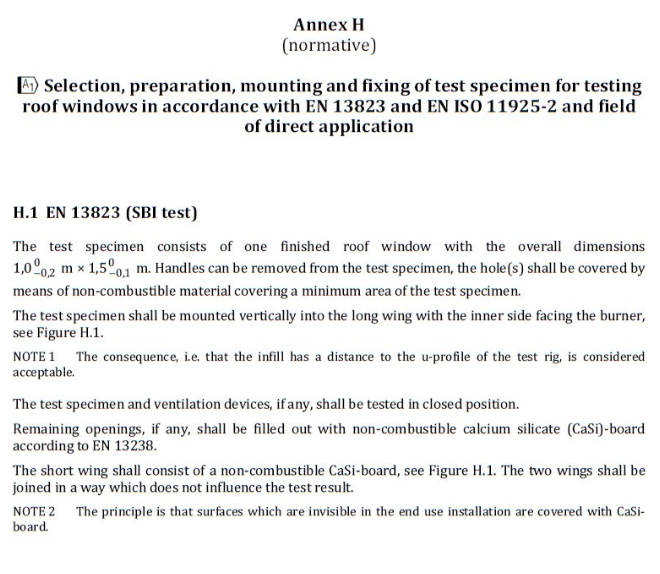
* dimensions of the solar collector;
* weight of the solar collector;
* instructions about the transport and handling of the solar collector;
* standard stagnation temperature of the solar collector;
* description of the mounting procedure;
* recommendations about lightning protection;
* instructions about the coupling of the solar collectors to one another (if applicable) and the connection of the solar collector field to the heat transfer circuit, including dimensions of pipe connections for solar collector arrays up to 20 m²;
* recommendations about the heat transfer media which may be used and precautions to be taken during filling, operation and service;
* maximum operation pressure;
* pressure drop;
* the maximum and minimum tilt angle;
* permissible positive and negative mechanical load;
* maintenance requirements.
* If the collector is not intended for use with the hazardous group 1 fluids, manufacturer shall state in the product manual: Not for use with Group 1 fluids as listed in [1].
* For Class 0 collectors it shall be stated in the product manual that the maximum operating pressure, PS is 0.5 bar (above atmospheric pressure).
* For all Class A collectors it shall be stated in the product manual that the collector is not intended for generation of steam or super-heated water at temperature > 110 °C”.
* For Class B collectors it shall be stated in the product manual that the collector is intended for generation of steam or super-heated water at temperature > 110 °C”.
* If the collector is not intended for use with the hazardous group 1 fluids, manufacturer shall state in the product manual: Not for use with Group 1 fluids as listed in Directive 2014/68/EU of the European Parliament and of the Council, Article 13 §1.

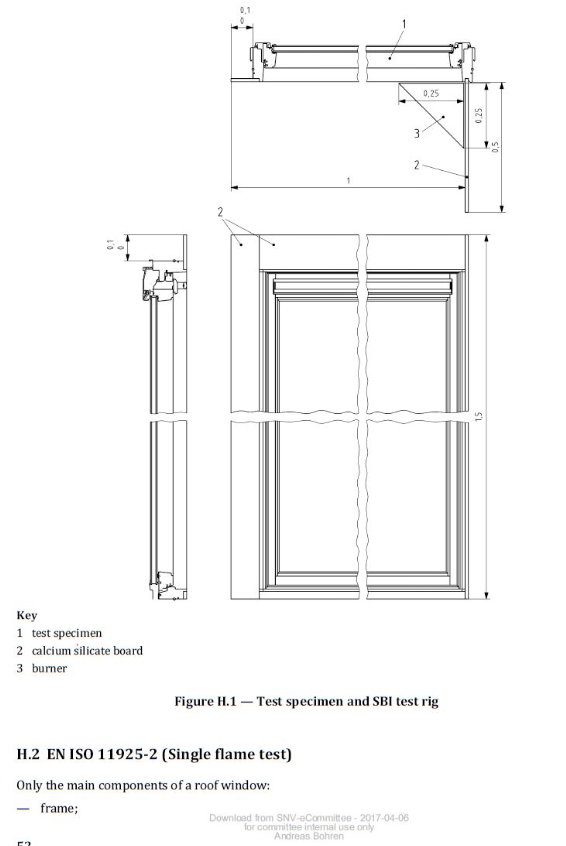
1. Key for using test results of previous test standards EN ISO 9806:2013 and EN 12975-2

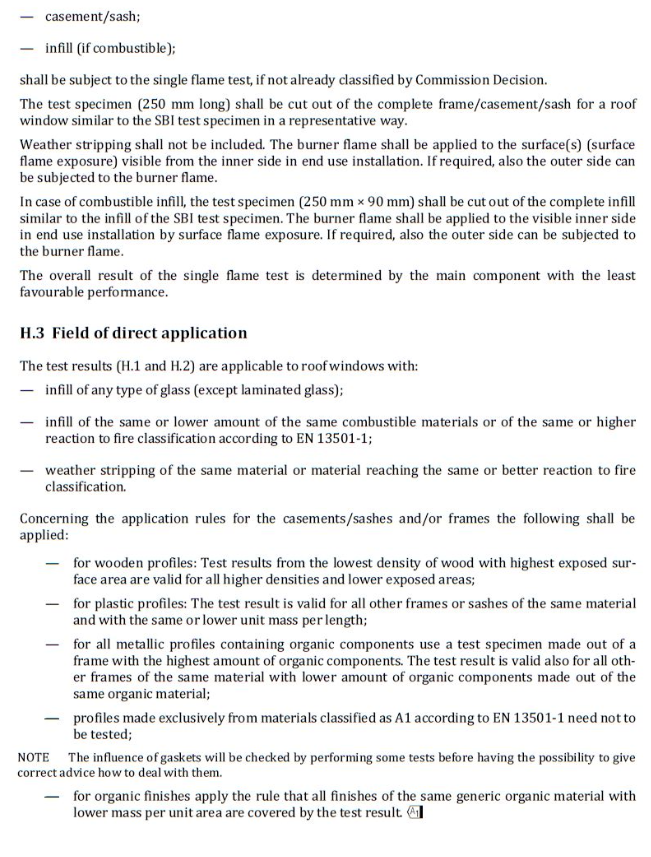
If the collector was tested in accordance with one of the previous versions of the test standard EN ISO 9806:2017 the following table applies:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **ISO9806:2017** | **ISO9806:2013** | **EN12975-2:2006** |
| Internal pressure tests for fluid channels | Clause 6 | Clause 6 | Clause 5.2 |
| Air leakage rate test (air heating collectors only) | Clause 7 | Clause 7 | -- |
| Rupture or collapse test (air heating collectors only) | Clause 8 | Clause 8 | -- |
| Standard Stagnation Temperature | Clause 9 | Clause 10a | Annex Ca |
| Exposure and half-exposure test | Clause 10 | Clause 11b | Clause 5.4c |
| External thermal shock | Clause 11 | Clause 12b | Clause 5.5c |
| Internal thermal shock test | Clause 12 | Clause 13b | Clause 5.6c |
| Rain penetration test | Clause 13 | Clause 14 | Clause 5.7 |
| Freeze resistance test | Clause 14 | Clause 15d | Clause 5.8d |
| Mechanical load test with positive or negative pressure | Clause 15 | Clause 16 | Clause 5.9 |
| Impact resistance test | Clause 16 | Clause 17 | Clause 5.10 |
| Thermal Performance Incidence angle modifier  Heat capacity cp | Clause 19-26 | Clause 20-27e | Clause 6e |
| Pressure drop | Clause 27 | Clause 28 | Clause 6.2.8 |
| Final inspection | Clause 17 | Clause 18 | Clause 5.11 |
| a Round Result to the next higher multiple of 10°  b Tests according to Class A, B, C are considered as Class A, B, C in EN ISO 9806:2017. Class A+ is not possible.  c Tests are considered as Class B in EN ISO 9806:2017  d Tests of heat pipe collectors according to EN ISO 9806:2013 and EN 12975-2:2013 cannot be transferred  e Formula 12, Annex B and Annex G of EN ISO 9806:2017 shall be used to convert the thermal performance parameters into the format required in Table A.6 of the ISO 9806:2017. | | | |

1. Selection, preparation, monting and fixing of test specimen for testing collectors in accordance with EN 13823 and EN ISO 11925-2

**CONVENOR REMARK**: In the following (red frames) a copy of annex H of EN14351-1 is given as inspiration. Probably we can do the same for collectors?





1. (informative)  
     
   Relationship of this European Standard with the Construction Product Regulation CPR, (EU) No.305/2011
   1. Scope and relevant characteristics

This European Standard has been prepared under standardization request M/129 amended by M/369 given to CEN by the European Commission (EC) and the European Free Trade Association (EFTA).

When this European Standard is cited in the Official Journal of the European Union (OJEU), under Regulation (EU) No 305/2011, it shall be possible to use it as a basis for the establishment of the Declaration of Performance (DoP) and the CE marking, from the date of the beginning of the co-existence period as specified in the OJEU.

Regulation (EU) No 305/2011, as amended, contains provisions for the DoP and the CE marking.

This annex deals with the CE marking of the collectors intended for the uses indicated in Table(s) ZA.1.1 and shows the relevant clauses applicable. It is not applicable to free-standing solar collectors which are not considered as part of a building.

This annex has the same scope as in Clause 1 of this European Standard related to the aspects covered by the mandate and is defined by Tables and ZA.1.2.

Table ZA.1 — Correspondence between this European Standard and Annex I of Regulation (EU) No 305/2011 and the Mandate M/369 amendment to M/129.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Product:** | Solar Collector | | | |
| **Intended use:** | In Buildings | | | |
| **Essential Characteristics** | | **Clauses of this European Standard related to essential characteristics** | **Classes and/or threshold levels** | **Notes** |
| Mechanical resistance to climatic loads | | 5.4.1 | -- | Pa |
| Reaction to fire External fire performance | | 5.3.1 | A1 to F Broof (t1) to (t2) | -- |
| Weather tightness | | 5.4.2 | Pass | Pass |
| Release of dangerous substances | | 5.3.2 |  | -- |
| Electrical safety | | 5.3.3 |  | If applicable |
| Maximum operating pressure | | 5.2 |  | Pa |
| Sound level | | 5.3.4 |  | If applicable |
| Thermal output | | 5.4.8 |  | W |

Table ZA.2 — Correspondence between this European Standard and Annex I of Regulation (EU) No 305/2011 and the Mandate M/369 amendment to M/129.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Product:** | Solar Collector | | | |
| **Intended use:** | On Buildings | | | |
| **Essential Characteristics** | | **Clauses of this European Standard related to essential characteristics** | **Classes and/or threshold levels** | **Notes** |
| Mechanical resistance to climatic loads | | 5.4.1 |  | Pa |
| Reaction to fire External fire performance | | 5.3.1 | A1 to F Broof (t1) to (t2) | -- |
| Release of dangerous substances | | 5.3.2 |  | -- |
| Electrical safety | | 5.3.3 |  | If applicable |
| Maximum operating pressure | | 5.2 |  | Pa |
| Sound level | | 5.3.4 |  | If applicable |
| Thermal output | | 5.4.8 |  | W |

**WARNING 1 —** Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

**WARNING 2 —** Other Union legislation may be applicable to the products falling within the scope of this standard.

* 1. System of Assessment and Verification of Constancy of Performance (AVCP)

The AVCP system of solar collectors indicated in Table ZA.2, can be found in the EC legal act(s) adopted by the EC: M 369 Amendment to the mandate to CEN/CENELEC concerning the execution of standardisation work M 129 "Space heating appliance and energy capturing appliances".

Table ZA.3 — System of AVCP

|  |  |  |  |
| --- | --- | --- | --- |
| **Product(s)** | **Intended use(s)** | **Level or class of performance** | **AVCP system(s)** |
| energy capturing appliances | in buildings | - | 3 |
| System 3: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.4 | | | |

Micro-enterprises are allowed to treat products under AVCP system 3 covered by this standard in accordance with AVCP system 4, applying this simplified procedure with its conditions, as foreseen in Article 37 of Regulation (EU) No.305/2011.

* + 1. Assignment of AVCP tasks

The AVCP system of solar collectors as provided in Table ZA.3 is defined in Table ZA.1.3 to ZA.3.n resulting from application of the clauses of this or other European Standards indicated therein. The content of the tasks assigned to the notified body shall be limited to those essential characteristics, if any, as provided for in Annex III of the relevant standardization request and to those that the manufacturer intends to declare.

Taking into account the AVCP systems defined for the products and the intended uses the following tasks are to be undertaken by the manufacturer and the notified body respectively for the assessment and verification of the constancy of performance of the product.

Table ZA.4 — Assignment of AVCP tasks for solar collectors under system 3

|  |  |  |  |
| --- | --- | --- | --- |
| **Tasks** | | **Content of the task** | **AVCP clauses to apply** |
| Tasks for the manufacturer | Factory production control (FPC) | Parameters related to the characteristics of Table ZA.1 relevant for the intended use | 6.3 |
| Tasks for a notified laboratory | Initial type testing | Parameters related to the characteristics of Table ZA.1 relevant for the intended use | 6.2 |

* + 1. Declaration of performance (DoP)
       1. General

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

* the factory production control carried out by the manufacturer; and
* the 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, carried out by the notified testing laboratory.
  + - 1. 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:

1. the intended use or uses for the construction product, in accordance with the applicable harmonised technical specification;
2. the list of essential characteristics, as determined in the harmonized technical specification for the declared intended use or uses;
3. the performance of at least one of the essential characteristics of the construction product, relevant for the declared intended use or uses;
4. 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.
5. 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;
6. 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.

* + - 1. Example of DoP

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

**DECLARATION OF PERFORMANCE: No. 001CPR2013-05-12**

1. Unique identification code of the product-type: ***Solar collector XYF-A***

2 Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4) of Regulation (EU) No 305/2011 of the European parliament and of the council: ***Solar collector XYF-A***

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

4. Name, registered trade name or registered trademark and contact address of the manufacturer as required under Article 11(5) of Regulation (EU) No 305/2011 of the European parliament and of the council:

**AnyCo SA, PO Box 21**

**B-1050 Brussels, Belgium**

**Email:** [**anyco.sa@provider.be**](mailto:anyco.sa@provider.be)

5. Where applicable, name and contact address of the authoised representative whose mandate covers the tasks specified in Article 12(2) of Regulation (EU) No 305/2011 of the European parliament and of the council:

**Anyone Ltd, Flower Str. 24**

**West Hamfordshire, UK-589645 United Kingdom**

**e-mail:** [**anyone.ltd@provider.uk**](mailto:anyone.ltd@provider.uk)

6. System or systems of assessment and verification of constancy of performance of the construction product as set out in Regulation (EU) No 305/2011 of the European parliament and of the council, Annex V: **System 3**

7. The initial type testing of the product under system 3 was carried out by the notified body   
**Anyone, Everywhere, in Nowhere (**Identification No CXD-239948)

8 Declared performanceº

|  |  |  |
| --- | --- | --- |
| **Essential characteristics** | **Performance** | **Harmonised technical specification** |
| Mechanical resistance to climatic loads  - Positive loads (Snow load) - Negative loads (Wind load)  - Reaction to fire - External fire performance  - Weather tightness  - Release of dangerous substances  - Electrical safety  - Maximum operating pressure  - Sound level  - Thermal output | **3000 Pa 2400 Pa**  **A1 Broof (t2)**  **No water ingress**  **None**  **Safety class II**  **1 MPa**  **N/A**  **12700 W** | **EN 12975:2017 EN 12975:2017**  **EN xxx:2017 EN yyy:2017**  **EN 12975:2017**  **--**  **EN 789:2017**  **EN 12975:2017**  **--**  **EN 12975:2017** |

10. The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 8.

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 designed 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 solar collector or to a label attached to it. Where this is not possible or cannot be warranted because of the nature of the product, it shall be affixed to the packaging or to the enclosed 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,
* the unique identification code of the product-type
* the reference number of the declaration of performance [see example of DoP]
* the level or class of the performance declared
* the dated reference to the harmonised technical specification applied
* the identification number of the notified body,
* the intended use as laid down in the harmonised 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.

Figure ZA.1 gives an example of the information related to products subject to AVCP under system 3 to be given on the solar collector as specified in clause ZA.3.

|  |  |  |
| --- | --- | --- |
| **cemark** |  | *CE marking, consisting of the “CE”-symbol* |
| 4567 | *Identification number of the notified test 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* |
| 00001-CPR-2013/05/12 |  | *Reference number of the DoP* |
| **EN 12975:2017** |  | *No. of European standard applied, as referenced in OJEU (see note 14)* |
| Solar Collector XYF-A |  | *Unique identification code of the product-type* |
| for use in buildings |  | *Intended use of the product as laid down in the European standard applied* |
| Mechanical resistance to climatic loads: - Positive load: 5400 Pa - Negative load: 2400 Pa  Fire safety, in terms of  - Reaction to fire: Class A1 - External fire performance: Broof (t2)  - Weather tightness: No water ingress  - Release of dangerous substances: None  - Electrical safety: Safety class II  - Max. operating pressure: 1 MPa  - Sound level: NPD  - Thermal output: Ppeak = 2700 W |  | *Levels or classes of the performance declared* |

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

1. (informative)  
     
   Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EC) No 811/2013 aimed to be covered

This European standard has been prepared under a Commission’s standardisation request with regard to energy labelling of water heaters, hot water storage tanks and packages of water heater and solar device M/535/C(2015) 2626 final, to provide one voluntary mean of conforming to the energy labelling requirements of the Commission Delegated Regulation (EC) No 811/2013 of 18 February 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of space heaters, combination heaters, packages of space heaters, temperature control and solar device and packages of combination heater, temperature control and solar device.

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding energy labelling requirements of that Regulation and associated EFTA Regulations.

Table ZB.1 — Correspondence between this European Standard and Commission Delegated Regulation (EC) No 811/2013 of 18 February 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of space heaters, combination heaters, packages of space heaters, temperature control and solar device and packages of combination heater, temperature control and solar device and the Commission’s standardisation request Full reference to the request M/535/C(2015) 2626 final’

|  |  |  |
| --- | --- | --- |
| **Energy labelling requirements of Regulation (EC) No 811/2013** | **Clauses and sub-clauses of this European Standard** | **Remarks & Notes** |
| **Solar devices** | | |
| Annex I, (70) Annex IV, 4.1 (c) | 5.4.3 | Collector aperture area |
| Annex I, (71) Annex IV, 4.1 (d) | 5.4.4 | Collector efficiency |

**WARNING 1 —** Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

**WARNING 2 —** Other Union legislation may be applicable to the products falling within the scope of this standard.

1. (informative)  
     
   Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EC) No 812/2013

This European standard has been prepared under a Commission’s standardisation request with regard to energy labelling of water heaters, hot water storage tanks and packages of water heater and solar device M/535/C(2015) 2626 final’ to provide one voluntary means of conforming to the energy labelling requirements of Commission Delegated Regulation (EC) No 812/2013 of 18 February 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of water heaters, hot water storage tanks and packages of water heater and solar device.

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZC.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding energy labelling requirements of that Regulation and associated EFTA Regulations.

Table ZC.1 — Correspondence between this European Standard and Commission Delegated Regulation (EC) No 812/2013 of 18 February 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of water heaters, hot water storage tanks and packages of water heater and solar device and Commission’s standardisation request Full reference to the request M/534/C(2015) 2625 final’

|  |  |  |
| --- | --- | --- |
| **Energy labelling requirements of Regulation (EC) No 812/2013** | **Clauses and sub-clauses of this European Standard** | **Remarks & Notes** |
| **Solar devices** | | |
| Annex I, (33) Annex VII, 7(i), Annex VII, 9(a) | 5.4.3 | Collector aperture area |
| Annex I, (34) Annex VII, 7(j), Annex VII, 9(b) | 5.4.5 | Zero loss efficiency |
| Annex I, (35) Annex VII, 7(k), Annex VII, 9(c) | 5.4.6 | First order coefficient |
| Annex I, (36) Annex VII, 7(l), Annex VII, 9(d) | a2 of Table A.6 of EN ISO 9806:2017 | Second order coefficient |
| Annex I, (37) Annex VII, 7(m), Annex VII, 9(e) | 5.4.7 | Incidence angle modifier |

**WARNING 1 —** Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

**WARNING 2 —** Other Union legislation may be applicable to the products falling within the scope of this standard.

1. (informative)  
     
   Relationship between this European Standard and the Ecodesign requirements of Commission Regulation (EC) No 814/2013 aimed to be covered

This European standard has been prepared under a Commission’s standardisation request to Ecodesign requirements for water heaters and hot water storage tanks ‘M/534’ / ‘C(2015) 2625 final’ to provide one voluntary means of conforming to the Ecodesign requirements of Commission Regulation (EC) No 814/2013 of 2 August 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to Ecodesign requirements for water heaters and hot water storage tanks.

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZD.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Ecodesign requirements of that Regulation and associated EFTA Regulations.

Table ZD.1 — Correspondence between this European Standard and Commission Regulation (EU/EC) No 814/2013 of 2 August 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to Ecodesign requirements for water heaters and hot water storage tanks and Commission’s standardisation request Full reference to the request M/534/C(2015) 2625 final’

|  |  |  |
| --- | --- | --- |
| **Energy labelling requirements of Regulation (EC) No 814/2013** | **Clauses and sub-clauses of this European Standard** | **Remarks & Notes** |
| **Solar devices** | | |
| Annex I, (30) Annex III, 6, (l) | 5.4.3 | Collector aperture area |
| Annex I, (31) Annex III, 6, (m) | 5.4.5 | Zero loss efficiency |
| Annex I, (32) Annex III, 6, (n) | 5.4.6 | First order coefficient |
| Annex I, (33) Annex III, 6, (o) | a2 of Table A.6 of EN ISO 9806:2017 | Second order coefficient |
| Annex I, (34) Annex III, 6, (p) | 5.4.7 | Incidence angle modifier |

**WARNING 1 —** Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

**WARNING 2 —** Other Union legislation may be applicable to the products falling within the scope of this standard.

1. (informative)  
     
   Relationship between this European Standard and the essential safety requirements (ESR) of Directive 2014/68/EU of the European parliament and of the council (Pressure equipment directive PED) aimed to be covered

This European Standard has been prepared under a Commission’s standardization request under the general mandate M/071 to provide one voluntary means of conforming to essential safety requirements of Directive 2014/68/EU of the European parliament and of the council (Pressure equipment directive PED).

Once this standard is cited in the Official Journal of the European Union under that [Directive] / [Regulation] / [Decision] / […], compliance with the normative clauses of this standard given in Table […] confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding [essential] / [interoperability] / […] requirements of that [Directive] / [Regulation] / [Decision] / […], and associated EFTA regulations.

This Annex ZE is only applicable to solar collectors of Class Ax1(F1), Ax1(F2), Ax2(F1), Ax2(F2) and B. It is not applicable to solar collectors of Class 0, A1(F1), A1(F2), A2(F1), A2(F2).

Table ZE.1 — Correspondence between this European Standard and [Annex … of] / [Article(s) … of] [Directive] / [Regulation] / [Decision] [Reference numbers of the legal Act]]

|  |  |  |
| --- | --- | --- |
| **[Essential]/ [interoperability]/[…] Requirements of [Directive]/[Regulation]/[Decision] [ …]** | **Clause(s)/sub-clause(s) of this EN** | **Remarks/Notes** |
|  |  |  |

[NOTE to the drafter, to be removed before publication:

This table can be used to accommodate all possible cases and independently how detailed correspondence is established or is possible to give:

* to declare the correspondence with a general statement ‘all requirements are covered’ by complying ‘all (or indicated) clauses’ (then the table would contain only one row);
* to declare more detailed correspondence (then the table would contain as many rows as needed).]

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**WARNING 2 —** Other Union legislation may be applicable to the products falling within the scope of this standard.

1. ) The formulation of such an agreement can be done by licence, contract, or any other type of written consent. [↑](#footnote-ref-1)
2. ) This can be, for instance, a contract, license or whatever kind of written agreement, which should also contain clear provisions with regard to responsibility and liability of the component producer (system house, on the one hand, and the assembler of the finished product, on the other hand. [↑](#footnote-ref-2)
3. ) These companies may produce components but they are not required to do so. [↑](#footnote-ref-3)