BS EN 13859-1:2014

BSI Standards Publication

Flexible sheets for waterproofing — Definitions and characteristics of underlays

Part 1: Underlays for discontinuous roofing

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee B/546, Flexible sheets for waterproofing and water vapour control.

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

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Foreword

This document (EN 13859-1:2014) has been prepared by Technical Committee CEN/TC 254 “Flexible sheets for waterproofing”, the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by October 2014 and conflicting national standards shall be withdrawn at the latest by October 2014.

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 13859-1:2010.

The main technical changes that have been made in this new edition are as follows:

a) the application-related characteristic 'emissivity' has been added;

b) the wording and the Annex ZA have been adapted to the CPR.

EN 13859, *Flexible sheets for waterproofing — Definitions and characteristics of underlays*, is composed of the following parts:

— *Part 1: Underlays for discontinuous roofing* (the present document);

— *Part 2: Underlays for walls*.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of Regulation (EU) No. 305/2011.

For relationship with Regulation (EU) No. 305/2011, see informative Annex ZA, which is an integral part of this document.

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.

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1 Scope

This European standard specifies the characteristics of flexible sheets for underlays which are to be used under roof covering of discontinuous roofs. It specifies the requirements and test methods and provides for the evaluation of conformity of the products with the requirements of this document.

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 1107-1, *Flexible sheets for waterproofing - Part 1: Bitumen sheets for roof waterproofing - Determination of dimensional stability*

EN 1107-2, *Flexible sheets for waterproofing - Determination of dimensional stability - Part 2: Plastic and rubber sheets for roof waterproofing*

EN 1109, *Flexible sheets for waterproofing - Bitumen sheets for roof waterproofing - Determination of flexibility at low temperature*

EN 1296, *Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roofing - Method of artificial ageing by long term exposure to elevated temperature*

EN 1297, *Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Method of artificial ageing by long term exposure to the combination of UV radiation, elevated temperature and water*

EN 1848-1, *Flexible sheets for waterproofing - Determination of length, width and straightness - Part 1: Bitumen sheets for roof waterproofing*

EN 1848-2, *Flexible sheets for waterproofing - Determination of length, width, straightness and flatness - Part 2: Plastic and rubber sheets for roof waterproofing*

EN 1849-1, *Flexible sheets for waterproofing - Determination of thickness and mass per unit area - Part 1: Bitumen sheets for roof waterproofing*

EN 1849-2, *Flexible sheets for waterproofing - Determination of thickness and mass per unit area - Part 2: Plastic and rubber sheets*

EN 1928:2000, *Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of watertightness*

EN 1931, *Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of water vapour transmission properties*

EN 12310-1:1999, *Flexible sheets for waterproofing - Part 1: Bitumen sheets for waterproofing - Determination of resistance to tearing (nail shank)*

EN 12311-1, *Flexible sheets for waterproofing - Part 1: Bitumen sheets for roof waterproofing - Determination of tensile properties*

EN 13111, *Flexible sheets for waterproofing - Underlays for discontinuous roofing and walls - Determination of resistance to water penetration*

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EN 13416:2001, *Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Rules for sampling*

EN 13501-1:2007+A1:2009, *Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests*

EN 13859-2:2014, *Flexible sheets for waterproofing — Definitions and characteristics of underlays — Part 2: Underlays for walls*

EN 15976, *Flexible sheets for waterproofing - Determination of emissivity*

EN ISO 11925-2, *Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test (ISO 11925-2:2010)*

EN ISO 12572, *Hygrothermal performance of building materials and products - Determination of water vapour transmission properties (ISO 12572:2001)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13416:2001 and the following apply.

3.1
manufacturer's declared value
MDV
value declared by the manufacturer accompanied by a declared tolerance

3.2
manufacturer's limiting value
MLV
value stated by the manufacturer to be met during testing, that can be a minimum or a maximum value according to statements made under product characteristics of this document

3.3
sample
sheet from which a test piece is taken

3.4
sampling
procedure used to select or constitute a sample

3.5
test piece
part of the sample from which test specimens are taken

3.6
test specimen
piece of precise dimensions taken from the test piece

3.7
underlays for discontinuous roofing
factory-made flexible sheets of plastics, bitumen, rubber or other suitable materials, which are used as underlay to coverings of sloping roofs (e.g. tiles, slates)

3.8
waterproofing
action to prevent the passage of water from one plane to another

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4 Product characteristics

4.1 General

The arithmetic mean value calculated from a number of test results shall lie within the tolerance declared for the characteristic. 95 % of the individual results shall lie within the declared tolerance unless otherwise specified in this document.

When tested for purposes other than initial type testing or factory production control, the tests to determine product characteristics indicated in this document shall be started within 1 month of delivery from the manufacturer.

4.2 Dimensions, straightness and mass per unit area

The dimensions, straightness and mass per unit area shall comply with the values declared by the manufacturer (see Annex D) in accordance with 5.2.1. The tolerances are indicated in Table 1.

Table 1 — Tolerances on length, width, straightness and mass per unit area

Characteristic	Tolerance
Length	− 0 %
Width	− 0,5 % to + 1,5 %
Straightness	Maximum deviation from straightness: 30 mm per 10 m length or in proportion for other lengths (e.g. 15 mm per 5 m length)
Mass per unit area	Shall lie within the declared tolerance of the MDV

4.3 Application related characteristics

4.3.1 Reaction to fire

Where required, the reaction to fire shall be determined in accordance with 5.2.2.

4.3.2 Resistance to water penetration

4.3.2.1 Class *W1*

The product shall be classified as resistant to water penetration Class *W1* if it passes the resistance to water penetration test in accordance with 5.2.3. If the product fails the test of resistance to water penetration indicated in 5.2.3, it shall be tested in accordance with 4.3.2.2.

4.3.2.2 Class *W2*

A product failing to pass the test indicated in 5.2.3 shall be tested in accordance with 5.2.4. If the measured mean volume of water passing through the specimens tested is less than 100 ml, the product shall be classified as resistant to water penetration Class *W2*.

4.3.2.3 Class *W3*

If the product fails the test indicated in 4.3.2.2, e.g. the measured mean volume passing the specimens exceeds 100 ml, it shall be classified as resistant to water penetration Class *W3*.

Untested products shall also be classified as resistant to water penetration Class *W3*.

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4.3.3 Water vapour transmission properties

The product shall be tested in accordance with 5.2.5 and the results shall lie within the declared tolerance of the manufacturer's declared value. Other measuring methods shall also be allowed if the correlation with 5.2.5 is proved and recorded. If the water vapour diffusion-equivalent air layer thickness s_d is above or equal to 0,2 m the product shall be tested in accordance with 5.2.5.1. If the s_d value is below 0,2 m the product shall be tested in accordance with 5.2.5.2. If the s_d value is below 0,1 m the standard deviation s shall also be recorded in the test report.

4.3.4 Tensile properties

The product shall be tested in accordance with 5.2.6 and the results shall lie within the declared tolerance of the manufacturer's declared value for tensile strength and the maximum and/or minimum values for elongation for both longitudinal and transverse directions.

4.3.5 Resistance to tearing

The resistance to tearing of underlays shall be tested in accordance with 5.2.7 and the results shall lie within the declared tolerance of the manufacturer's declared value in both (longitudinal and transverse) directions.

4.3.6 Dimensional stability

The dimensional stability shall be determined in accordance with 5.2.8.

The shrinkage or lengthening shall be equal to or less than the manufacturer's limiting value.

4.3.7 Flexibility at low temperature (pliability)

Where appropriate, the flexibility at low temperature (pliability) determined in accordance with 5.2.9 shall be equal to or less than the manufacturer's limiting value.

4.3.8 Artificial ageing behaviour

The product shall be tested in accordance with 5.2.10. The mean values of tensile strength and elongation of the test specimens before and after artificial ageing shall be declared on the product data sheet by the manufacturer. The resistance to water penetration of artificially aged materials shall pass the same class declared by the manufacturer as defined in 4.3.2.

4.3.9 Resistance to penetration of air

If the resistance to penetration of air is required, it shall be determined in accordance with 5.2.11.

4.3.10 Watertightness of seams

If a determination of the watertightness of seams is required, it has to be carried out in accordance with Annex F.

4.3.11 Emissivity

If required, the emissivity shall be determined in accordance with 5.2.13.

4.4 Dangerous substances

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

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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 web site on EUROPA accessed through: http://ec.europa.eu/enterprise/construction/cpd-ds/.

5 Testing

5.1 Sampling

Samples shall be taken in accordance with EN 13416.

5.2 Test methods

5.2.1 Determination of dimensions, straightness and mass per unit area

The length, width, straightness and mass per unit area of underlays shall be determined in accordance with EN 1848-1 and EN 1849-1 for bitumen sheets and in accordance with EN 1848-2 and EN 1849-2 for all other sheets.

5.2.2 Determination of reaction to fire

Where required, the product shall be tested and classified in accordance with EN 13501-1:2007+A1:2009, Table 1. When tested according to EN ISO 11925-2, the products shall be tested under conditions of surface flame attack (surface exposure).

NOTE It is currently considered that the Euroclasses Classification system at Classes D and above requires investigation to determine its appropriateness to the products covered by this document (the SBI test (EN 13823) may be inappropriate for products covered by the document). Pending results of such an investigation and discussions in the Fire Regulators Group, products covered by this document are tested to EN ISO 11925-2.

If and when a new fire test scenario and test method are developed for the products, this document will be amended to refer to them.

The underlays, where no limitation in the application is requested, shall be tested free hanging (without substrate) only. The classification obtained shall be applied to all unsupported and supported end use applications.

If the intended use of the underlay is solely limited to being supported on a specific substrate, e. g. wood, mineral wool, polyurethane, it should be tested in the end use application in accordance with EN 13238.

5.2.3 Determination of resistance to water penetration Class W1

The resistance to water penetration Class *W1* shall be determined in accordance with EN 1928:2000, Method A, with the modifications that:

— water column shall be 200 mm;

— using water dyed with 0,05 % eosin (instead of a moisture indicating mixture of sugar and methylene blue);

— one layer of laboratory filter paper with a mass per unit area of 80 g/m^2;

— test period: 2 h (instead of 24 h);

— three test specimens are used.

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5.2.4 Determination of resistance to water penetration Class *W2*

The resistance to water penetration Class *W2* shall be determined in accordance with EN 13111 using three test specimens.

5.2.5 Determination of water vapour transmission properties

5.2.5.1 Determination of water vapour transmission properties using EN 1931

The water vapour transmission properties shall be determined in accordance with EN 1931 using five test specimens.

5.2.5.2 Determination of water vapour transmissions properties using EN ISO 12572

The water vapour transmission properties shall be determined in accordance with EN ISO 12572 using the set of conditions C and using five test specimens.

5.2.6 Determination of tensile properties

The tensile properties of foldable products shall be tested in accordance with EN 12311-1 and the modifications indicated in Annex A. Unfoldable products shall be tested in accordance with EN 12311-1 without these modifications.

5.2.7 Determination of resistance to tearing (nail shank)

The resistance to tearing of foldable products shall be tested in accordance with EN 12310-1 and the modifications indicated in Annex B. Unfoldable products shall be tested in accordance with EN 12310-1 without these modifications.

5.2.8 Determination of dimensional stability

The dimensional stability shall be tested in accordance with EN 1107-1 for bitumen sheets and in accordance with EN 1107-2 for all other materials.

5.2.9 Determination of flexibility at low temperature (pliability)

The flexibility at low temperature shall be tested in accordance with EN 1109.

5.2.10 Determination of resistance to artificial ageing

The product shall be tested in accordance with Annex C.

5.2.11 Determination of resistance to penetration of air

The product shall be tested in accordance with EN 13859-2:2014, 4.3.4.

5.2.12 Watertightness of seams

If required, the watertightness of seams shall be determined according to EN 1928:2000, Method A, taking into account the modifications and considerations in Annex F.

5.2.13 Determination of emissivity

The product shall be tested in accordance with EN 15976.

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6 Assessment and verification of the constancy of performance – AVCP

6.1 General

The compliance of flexible sheets for waterproofing as underlays for discontinuous roofing with the requirements of this standard and with the declared values (including classes) 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 product.

NOTE The assignment of tasks to the notified bodies and the manufacturer is shown in Annex ZA, Tables ZA.3.1, ZA.3.2 and ZA.3.3.

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, 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 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, under the responsibility of a notified product certification body.

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 those 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 (see Table D.1):

— at the beginning of the production of a new or modified underlays for discontinuous roofing (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 characteristic(s), whenever a change occurs in the underlays for discontinuous roofing 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.

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Where components are used 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.

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 underlays for discontinuous roofing manufacturer to ensure that the underlays for discontinuous roofing as a whole is correctly manufactured and its component products have the declared performance values.

6.2.2 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 underlays for discontinuous roofing to which they relate.

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 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 production control system documentation shall ensure a common understanding of conformity evaluation and enable the achievement of the required product characteristics 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 this European standard.

6.3.2 Requirements

6.3.2.1 General

The manufacturer is responsible for organizing the effective implementation of the FPC system. 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 conformity, shall be defined. This applies in particular to personnel that needs to initiate actions preventing product non-conformities from occurring, actions in case of non-conformities and to identify and register product conformity problems. Personnel performing work affecting product conformity 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 conformity of the product at appropriate stages;

— identify and record any instance of non-conformity;

— identify procedures to correct instances of non-conformity.

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