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Flexible sheets for waterproofing - Definitions and characteristics of underlays - Part 1: Underlays for discontinuous roofing

Abdichtungsbahnen - Definitionen und Eigenschaften von Unterdeck- und Unterspannbahnen - Teil 1: Unterdeck- und Unterspannbahnen für Dachdeckungen

Feuilles souples d'étanchéité - Définitions et caractéristiques des écrans souples de sous toiture - Partie 1: Ecrans souples de sous toiture pour couverture en petits éléments discontinus

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Flexible sheets for waterproofing - Definitions and characteristics of underlays - Part 1: Underlays for discontinuous roofing

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EN 13859-1:2010 (E)**Foreword**

This document (EN 13859-1:2010) has been prepared by Technical Committee CEN/TC 254 “Flexible sheets for waterproofing”, the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by December 2010, and conflicting national standards shall be withdrawn at the latest by December 2010.

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 13859-1:2005+A1:2008.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland 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 referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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*

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

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

EN 13859-2:2010, *Flexible sheets for waterproofing — Definitions and characteristics of underlays — Part 2: Underlays for walls*

EN ISO 11925-2, *Reaction to fire tests — Ignitability of building products subjected to direct impingement of flame — Part 2: Single-flame source test (ISO 11925-2:2002)*

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 waterproofing

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

3.2 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)

**3.3 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

**3.4 manufacturer's declared value
MDV**

value declared by the manufacturer accompanied by a declared tolerance

3.5 sampling

procedure used to select or constitute a sample

3.6 sample

sheet from which a test piece is taken

3.7 test piece

part of the sample from which test specimens are taken

3.8 test specimen

piece of precise dimensions taken from the test piece

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*.

EN 13859-1:2010 (E)**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.

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.

4.4 Dangerous substances

For products placed on the market within the European Economic Area see ZA.1. Outside the EEA products shall conform to any applicable provisions related to dangerous substances valid in the place of use.

Underlays covered by this document shall not contain asbestos or coal tar constituents. The manufacturer shall disclose on the product wrapper and in the health and safety data sheets the use of any additive or constituent considered hazardous.

NOTE See also [3] and [4].

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, Table 1. When tested according to EN ISO 11925-2, the products shall be tested under conditions of surface flame attack (surface exposure).

NOTE 1 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 (EN 13823:2002) test 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.

NOTE 2 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 *WI*

The resistance to water penetration Class *WI* 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);

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- one layer of laboratory filter paper with a mass per unit area of 80 g/m²;
- test period: 2 h (instead of 24 h);
- three test specimens are used.

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 13859-2:2010, 4.3.4.