
Hidroizolacijski trakovi - Ojačeni bitumenski trakovi za tesnjenje betonskih premostitvenih objektov in drugih betonskih povoznih površin - Definicije in lastnosti

Flexible sheets for waterproofing - Reinforced bitumen sheets for waterproofing of concrete bridge decks and other trafficked areas of concrete - Definitions and characteristics

Abdichtungsbahnen - Bitumenbahnen mit Trägereinlage für die Abdichtung von Betonbrücken und anderen Verkehrsflächen aus Beton - Definitionen und Eigenschaften

Feuilles souples d'étanchéité - Feuilles bitumineuses armées pour l'étanchéité des tabliers de ponts en béton et autres surfaces en béton circulables par les véhicules - Définitions et caractéristiques

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 254.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 14695:2017) has been prepared by Technical Committee CEN/TC 254 “Flexible sheets of waterproofing”, the secretariat of which is held by NEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 14695:2010.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association,

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

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1 Scope

This European Standard specifies characteristics and performance of reinforced bitumen sheets for waterproofing of concrete bridge decks and other trafficked areas of concrete where the waterproofing system is fully bonded to the concrete deck and fully bonded to the asphalt overlay.

This standard does not cover concrete surfaces trafficable by vehicles where the waterproofing is not fully bonded to the concrete and/or not fully bonded to an overlay.

This European Standard also specifies the test methods used for verifying the characteristics and gives rules for the assessment and verification of constancy of performance of the product.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1109, *Flexible sheets for waterproofing — Bitumen sheets for roof waterproofing — Determination of flexibility at low temperature*

EN 1110, *Flexible sheets for waterproofing — Bitumen sheets for roof waterproofing — Determination of flow resistance at elevated 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 1848-1, *Flexible sheets for waterproofing — Determination of length, width and straightness — Part 1: Bitumen 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 1850-1, *Flexible sheets for waterproofing — Determination of visible defects — Part 1: Bitumen sheets for roof waterproofing*

EN 12039:2016, *Flexible sheets for waterproofing — Bitumen sheets for roof waterproofing — Determination of adhesion of granules*

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

EN 13375, *Flexible sheets for waterproofing — Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles — Specimen preparation*

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

EN 13596, *Flexible sheets for waterproofing — Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles — Determination of bond strength*

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EN 13653, *Flexible sheets for waterproofing — Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles — Determination of shear strength*

EN 14223, *Flexible sheets for waterproofing — Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles — Determination of water absorption*

EN 14224, *Flexible sheets for waterproofing — Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles — Determination of crack bridging ability*

EN 14691, *Flexible sheets for waterproofing — Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles — Compatibility by heat conditioning*

EN 14692, *Flexible sheets for waterproofing — Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles — Determination of the resistance to compaction of an asphalt layer*

EN 14693, *Flexible sheets for waterproofing — Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles — Determination of the behaviour of waterproofing sheets during application of mastic asphalt*

EN 14694, *Flexible sheets for waterproofing — Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles — Determination of resistance to dynamic water pressure after damage by pre-treatment*

3 Terms and definitions

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For the purposes of this document, the terms and definitions given in EN 13375, EN 13416 and the following apply.

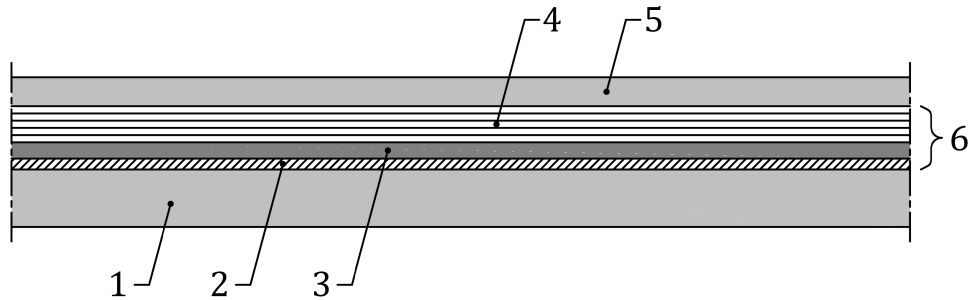
ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 waterproofing
action to protect the structure and the construction against the ingress and the passage of water and or moisture

3.2 waterproofing system
assembly of layers between a concrete bridge deck (or other trafficked areas of concrete) and an overlay

Note 1 to entry: Generally comprises a primer, the reinforced bitumen sheet (or the assembly of several reinforced bitumen sheets) and the protection layer if specified by the manufacturer, see Figure 1.

**Key**

- 1 concrete deck
- 2 primer
- 3 reinforced bitumen sheet(s)
- 4 protection layer
- 5 overlay (asphalt)
- 6 bridge waterproofing system (2 + 3 and 4 if specified)

Figure 1 — Example of schematic section of a waterproofing system for bridges and other trafficked areas of concrete

3.3**carrier**

material incorporated into or onto a factory-made reinforced bitumen sheet to ensure its stability and/or mechanical resistance

3.4**backing**

material incorporated onto a factory-made reinforced bitumen sheet without a permanent mechanical function

3.5**surfacing**

material applied on one or both sides of reinforced bitumen sheets, either as a permanent light surface protection on the upper surface or as an anti-sticking substance of the reinforced bitumen sheets

3.6**batch**

amount of product manufactured to the same specification without interruption and within a maximum period of 24 h

3.7**manufacturer's limiting value****MLV**

value stated by the manufacturer to be met during testing

Note 1 to entry: The MLV can be a minimum or a maximum value according to statements made under product characteristics of this European Standard.

prEN 14695:2017 (E)**3.8
manufacturer's declared value
MDV**

value declared by the manufacturer accompanied by a declared tolerance

**3.9
primer**

first layer of the system applied directly to the prepared concrete deck to achieve adhesion to the concrete surface; the primer can be made by one or more layers of bituminous products or resin based products

**3.10
reinforced bitumen sheet**

factory made flexible layer of bitumen with internal or external incorporation of one or more carriers, supplied in roll form ready to use

**3.11
protection layer**

layer above the reinforced bitumen sheet, the aim of which being to protect the sheet from mechanical damage

Note 1 to entry: Depending on the waterproofing system, this layer can have an additional waterproofing function.

**3.12
overlay**

asphalt layer immediately above the waterproofing system

Note 1 to entry: Typically, the overlay can be made up of asphalt concrete, sand asphalt or coarse aggregate mastic asphalt.

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4 Product characteristics**4.1 General**

Where a tolerance is defined by this European Standard it does not have to be declared by the manufacturer.

When tested for purposes other than type testing or factory production control (see 5.1), that are for example market surveillance, the tests to determine product characteristics indicated in this European Standard shall be started within one month of delivery from the manufacturer.

4.2 Sheet characteristics**4.2.1 Visible defects**

The product shall be free of visible defects, as determined in accordance with EN 1850-1.

4.2.2 Dimensions, tolerances and mass per unit area

The length, width and straightness shall be determined in accordance with EN 1848-1. The length and width shall not be shorter than the manufacturer's limiting value. The maximum deviation from straightness shall not exceed 20 mm per 10 m length, or in proportion for other lengths (e.g. 10 mm per 5 m length).

Where a product is specified by mass per unit area, it shall be measured in accordance with EN 1849-1, and the results shall lie within the declared tolerance of the manufacturer's declared value.

Where a product is specified by thickness, it shall be measured in accordance with EN 1849-1 and the results shall lie within the declared tolerance of the manufacturer's declared value.

Where sheets with incorporated mineral protection are specified by thickness, the measurement of thickness may additionally be carried out on the granule-free selvedge. This shall be declared in the report.

4.2.3 Initial amount of mineral surface protection

The initial amount of mineral surface protection shall be determined in accordance with EN 12039:2016, Annex B, except that a 125 µm sieve shall be used. If a distinction is to be made between the different sides of the sheet the initial amount of mineral surface protection shall be determined in accordance with Annex C. The results for the test used shall lie within the declared tolerance of the manufacturer's declared value.

4.2.4 Tensile properties

The tensile properties shall be determined in accordance with EN 12311-1 and the results (for the longitudinal and transverse directions) shall lie within the declared tolerance of the manufacturer's declared value.

4.2.5 Water absorption

The content of water absorbed shall be determined in accordance with EN 14223. The water absorption shall be less than or equal to the manufacturer's limiting value.

4.2.6 Flexibility at low temperature

The flexibility at low temperature shall be determined in accordance with EN 1109 and shall be less than or equal to the manufacturer's limiting value.

This test does not give results directly corresponding to the application conditions in practice. Results should only be used to compare products of similar thickness and construction.

In the case of sheets with the same bituminous compound on both sides and where the reinforcement is placed in the cross section visually closer to the upper surface, the test shall be performed on the bottom face only.

If the upper surface is covered with a non-woven (e.g. tissue, fleece, etc.) or metal facing the test shall be performed on the bottom side only.

If the sheet on the upper surface is covered with permanent light surface protection and where the reinforcement is placed in the cross section visually closer to the upper surface the test shall be performed on the bottom side only.

4.2.7 Flow resistance at elevated temperature

The flow resistance at elevated temperature shall be determined in accordance with EN 1110. The result shall be greater than or equal to the manufacturer's limiting value.

4.2.8 Dimensional stability at elevated temperatures

The dimensional stability at elevated temperature shall be determined in accordance with EN 1107-1 (24 h at 80 °C). The result shall be less than or equal to the manufacturer's limiting value.

For reinforced bitumen sheets to be used with a layer of coarse aggregate mastic asphalt directly on the reinforced bitumen sheet, the dimensional stability at elevated temperatures (1 h at 160 °C) shall be

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evaluated in accordance with Annex A. The test result shall be less than or equal to the manufacturer's limiting value.

NOTE The test at 80 °C is intended to determine the dimensional changes as a result of production-induced internal stresses under the effect of heat. When combined with a coarse aggregate mastic asphalt layer, the effect of heat is much larger and can cause severe shrinkage to the reinforced bitumen sheet. This effect is therefore declared as well for sheets intended for use in combination with a coarse aggregate mastic asphalt layer.

4.2.9 Artificial ageing behaviour

In order to verify the artificial ageing behaviour of the product, characteristics shall be determined before and after exposure in accordance with EN 1296 for a period of 12 weeks at 70 °C. The relevant characteristics are the flexibility at low temperature and the flow resistance at elevated temperature. The flexibility at low temperature shall be determined in accordance with EN 1109 (see 4.2.6) and the results shall lie within the declared tolerance of the manufacturer's declared value. The flow resistance at elevated temperature shall be determined in accordance with EN 1110 (see 4.2.7) and the results shall lie within the declared tolerance of the manufacturer's declared value.

The purpose of testing in accordance with EN 1296 is to characterize the long-term stability of elastomeric or plastomeric bitumen sheets. The test does not give results corresponding to the service conditions in practice. Results should only be used to compare products of similar thickness, construction and composition, and they cannot be used for general durability classification. The chosen exposure duration for artificial ageing in accordance to EN 1296 has no relevance to a real product lifetime.

4.3 Performance related characteristics

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4.3.1 General

Test specimens for performance-related testing shall be prepared in accordance with EN 13375. Where a sheet can be used in different waterproofing systems, some of the following tests shall require repeating.

4.3.2 Bond strength

The bond strength shall be determined in accordance with EN 13596, and shall be greater than or equal to the manufacturer's limiting value.

4.3.3 Shear strength

The shear strength shall be determined in accordance with EN 13653, and shall be greater than or equal to the manufacturer's limiting value.

4.3.4 Crack bridging ability

Where required the crack bridging ability of fully bonded reinforced bitumen sheets shall be determined in accordance with EN 14224 and the temperature shall be lower than or equal to the manufacturer's limiting value. Testing on type 3 specimens covers also type 1 specimens.

4.3.5 Compatibility by heat conditioning

The compatibility by heat conditioning shall be determined in accordance with EN 14691. The test result shall be greater than or equal to the manufacturer's limiting value.

4.3.6 Resistance to compaction of an asphalt layer

For reinforced bitumen sheets to be used with a compacted asphalt layer directly on the reinforced bitumen sheet, the resistance of the reinforced bitumen sheet to compaction of an asphalt layer shall be