

SVENSK STANDARD

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Flexibla tätskikt – Bestämning av motstånd mot vindlast för mekaniskt fastsatta tätskikt

Flexible sheets for waterproofing – Determination of the resistance to wind load of mechanically fastened flexible sheets for roof waterproofing

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Denna standard ersätter SS-EN 16002:2010, utgåva 1.

The European Standard EN 16002:2018 has the status of a Swedish Standard. This document contains the official version of EN 16002:2018.

This standard supersedes the SS-EN 16002:2010, edition 1.

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Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about Swedish and foreign standards.

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EUROPEAN STANDARD

EN 16002

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2018

ICS 91.100.50

Supersedes EN 16002:2010

English Version

Flexible sheets for waterproofing - Determination of the resistance to wind load of mechanically fastened flexible sheets for roof waterproofing

Feuilles souples d'étanchéité - Détermination de la résistance à l'arrachement au vent des feuilles souples d'étanchéité de toiture fixées mécaniquement

Abdichtungsbahnen - Bestimmung des Widerstandes gegen Windlast von mechanisch befestigten bahnenförmigen Stoffen für die Dachabdichtung

This European Standard was approved by CEN on 9 November 2018.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 16002:2018) 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 June 2019 and conflicting national standards shall be withdrawn at the latest by June 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 16002:2010.

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SS-EN 16002:2018 (E)

Introduction

The test is performed on a standard test configuration, i.e. a structural deck, a layer of insulation material and the mechanically fastened membrane(s).

For the determination of the performance of the mechanical fastening system (screw and washer), with or without possible substrates, ETAG 006:2012, Annex D may be used. The suppliers of these mechanical fastening systems should provide the required information.

For the calculation of the performance of wind load resistance of the whole roof, see the relevant national and/or international standards.

The result of this standard is the resistance to wind load of the flexible sheet expressed as the characteristic load per fastener. Safety factors may be defined by national regulation and/or within European or national application documents.

In principle, the test apparatus may also be used to assess (partially) bonded flexible sheets, but some modifications and additional guidance are needed. This is the reason to limit the scope of this standard to mechanically fastened sheets only.

1 Scope

This document specifies a test method to determine the resistance to wind load of mechanically fastened flexible sheets for roof waterproofing.

The assessment is limited to the performance of the mechanically fastened flexible sheets only. The test method does not include the determination of the performance of the mechanical fastener and/or the combination of the mechanical fastener and the substrate.

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 10346, *Continuously hot-dip coated steel flat products for cold forming — Technical delivery conditions*

EN 13162, *Thermal insulation products for buildings — Factory made mineral wool (MW) products — Specification*

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

EN 13707, *Flexible sheets for waterproofing — Reinforced bitumen sheets for roof waterproofing — Definitions and characteristics*

EN 13956, *Flexible sheets for waterproofing — Plastic and rubber sheets for roof waterproofing — Definitions and characteristics*

ETAG 006:2012, *Guideline for European Technical Approval systems of systems mechanically fastened flexible roof waterproofing membranes*

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13707 and EN 13956 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

fastener

object to fasten the flexible sheet to a structural deck

Note 1 to entry: A fastener may be made of a metal washer or metal washer with a plastic sleeve and a screw, or a plastic washer with an integrated sleeve and a screw, or a metal bar/continuous strip and a screw.

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3.2 fastening system

assembly of components intended to secure a waterproofing system to the structural deck by means of mechanically fixed fasteners

Note 1 to entry: Whilst primarily intended to secure the covering against wind uplift forces, the system may contribute to securing intermediate layers such as thermal insulation, vapour control layers, etc.

3.3 jointing technique

technique of material-specific seam and butt joint of waterproofing sheets

3.4 joining technique

process for joining flexible sheets for waterproofing to one another

Note 1 to entry: This may be achieved by bonding (torch, adhesive) and/or welding (hot air, chemicals).

3.5 test specimen

representative part of the roof, consisting of one or more layers of flexible sheet for roof waterproofing, an insulation layer and a structural deck

3.6 structural deck

roofing panel which has to transfer both permanent and variable loads to the other construction parts of the roof or building

3.7 vapour control layer

sheet used to limit the transportation of water vapour into any part of the roof

4 Symbols and abbreviations

For the purposes of this document, the following symbols apply.

		Unit
A_i	area of influence of the fastener	mm ²
a	maximum spacing between rows of fasteners	mm
b	maximum spacing between individual fasteners in a row	mm
C_a	geometric correction factor	-
C_d	statistical correction factor	-
g	number of gusts, specified for each “proportional” peak load in a cycle	-
i	proportional part of $P_{100\%,n}$	%
l	length of the test area inside the pressure chamber	mm
m	width of the test area inside the pressure chamber	mm
n_f	number of cycles before failure	-

P_a	applied pressure during the gust	kPa
P_i	peak pressure during the gust	kPa
P_{test}	peak pressure of the cycle preceding the cycle of failure	kPa
$P_{100\%,n}$	peak pressure in the pressure chamber during cycle (n)	kPa
t	time	s
ΔW_a	applied load per fastener	N
ΔW_{char}	characteristic load for the resistance to wind uplift per mechanical fastener	N
ΔW_{adm}	admissible (design) load for the resistance to wind uplift per mechanical fastener	N
ΔW_i	peak load per fastener	N
$\Delta W_{100\%,n}$	peak load per fastener of cycle (n) with $n = 1, 2, 3, \dots, n_f$	N
α	number of spaces between rows of fasteners	-
β	number of spaces between fasteners	-
γ_M	material partial factor	-

5 Sampling

The flexible sheets for roof waterproofing shall be sampled according to EN 13416.

All additional materials to construct the test specimen such as fasteners, insulation, substrate, shall be according to the sampling requirements of the relevant European harmonized technical specifications. If these specifications are not available, then sampling shall be done according to the instructions of the applicant.

6 Test conditions

The test specimen and the apparatus shall be conditioned for at least 16 h in an environment of $(23 \pm 5)^\circ\text{C}$ prior to the test and used under the same conditions.

7 Apparatus and additional devices

7.1 Pressure (vacuum) chamber

The internal length and width of the pressure chamber shall be according to 8.2. The height of the pressure chamber shall be such that the applied pressure is equally distributed and not affected by deformations of the test specimen. The pressure chamber shall be provided with one or more windows in such a way that the test specimen can be observed during testing.

The pressure chamber shall be capable of resisting a suction pressure of at least 10 kPa. It shall be possible to create an airtight seal between the test specimen and the pressure chamber.

7.2 Fan including control and recording system

7.2.1 Fan and controlling equipment

The combination of the fan and the controlling equipment (e.g. valve) shall be capable of producing the dynamic load cycles, as defined in 9.4.