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Guidelines for SINTEF Technical Approval for

wind barriers and roofing underlays

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1. General information about SINTEF Technical Approval

General information about SINTEF Technical Approval procedures is available at http://www.sintefcertification.no/en-us/PortalPage.aspx?pageid=180

2. Properties to be included in the approval and how the properties are determined

SINTEF Technical Approval for wind barriers and combined roofing undelays and wind barriers shall normally include a documentation of the product properties according to Table 1, 2 and 3.

Requirements concerning material and product properties related to impact on the environment is available at; https://www.sintefcertification.no/file/index/1867

3. Description of the manufacturer's factory production control

As a basis for the approval SINTEF must receive a copy of the description of the manufacturer's control plan for the product. This may be the relevant part of the manufacturer's quality control system for the product, or other documentation describing the manufacturer's factory production control. The person responsible for the factory production control shall be identified.

The control plan shall as a minimum describe the controls performed for:

- incoming materials
- the production process
- finished product
- marking and storage

including the control frequency, how the controls are performed and by whom. The factory production control description shall also include what measures are taken when faults are observed in the production or in the product.

4. Supervisory production control

Supervisory production control normally comprises an annual inspection at the plant performed by an independent body. General description of how the supervisory product and production control are performed is available at; http://www.sintefcertification.no/en-us/PortalPage.aspx?pageid=180

However, for windbarriers and roofing underlays in roll form, SINTEF axcept a certified quality system, according to ISO 9001, as an adequate supervisory production control. SINTEF have to receive an annual inspection report in accordance with ISO 9001(alternatively either a summary of the inspection report or a confirmation from the inspection body that the certidicate is still valid).

Supervisory production control includes, in addition to the above mentioned conditions, an annual random testing of the products has to be carried out. Table 4 and 8 show an overview of annual audit testing of windbarriers and roofing underlays together with plasterboards.

5. Application for SINTEF Technical Approval and project management

Information regarding application and project management for SINTEF Technical Approval is available at;https://www.sintefcertification.no/file/index/2980

6. More information

Further information about SINTEF Technical Approval can be found on www.sintefcertification.no

7. Special conditions and recommendations

7.1 Rain tightness for combined roofing underlays and wind barriers

- It is important that the counter battens clamp firmly against the underlay and the underlying rafter independent of roof pitch. Screws with plain shank through counter battens, with maximum thickness of 36 mm, are assessed to ensure satisfactory clamping over time.
  -Plaine round shank nails (for nail guns) are expected to give poor clamping already at assembling and will probably give even poorer clamping after repeatedly shrinkage and swelling.
  - Use of hammer and square nails are assessed to achieve improved clamping both during installation and over time.
  - Screws with plain shank through counter battens, with maximum thickness of 36 mm, are assessed to ensure the most satisfactory clamping over time.
- Use of extra sealing strips between the counter battens and the underlayer leads to better security against leakages.
- When using horizontal taped joints (where the tape is not integrated in the product), it must be described which tape are used, and also how it will be installed.
- Use of combined roofing underlays with durable adhesive joints, and tapes, provide a continuous layer on the roof surface. The possibility for leakage is then reduced to appear only through nail- or screw holes.
- The "installation-friendliness" of products and details must be assessed. Systems that are highly vulnerable should be given special conditions for use or, at worst, not approved.

7.2 Air tightness construction, proposed text for approval documents

When the standardized air flow rate number < 0.50 m³ / m²h50Pa:
The airtightness of the wind barrier system makes it possible to fulfil any requirements regarding airtightness (n_{50}) given in the building regulations and in the Norwegian passive house standards before the vapour barrier is mounted.

When the standardized air flow rate number is between 0.50 m³ / m²h50Pa and 2,50 m³ / m²h50Pa:
The wind barrier system is sufficiently airtight to protect the insulation to avoid cooling from wind, but not to fulfil the requirements regarding airtightness (n_{50}) given in the building regulations and the Norwegian passive house standards before the vapour barrier is mounted.

7.3 Properties related to fire, proposed text for approval documents which covers wind barriers for walls

7.3.1 Wind barriers without reaction to fire classification or with classification lower than D-s3,d0 (pre-accepted performance for wind barrier in fire class 1):

Field of application
The wind barrier can be used in fire class (brannklasse) 1 in buildings, and in residential buildings up to three floors if each dwelling unit has direct access to the ground level (not via stairs or stair cases). For other use, a fire safety analysis has to be performed.

Properties related to fire
The wind barrier has a reaction to fire class _____ according to EN 13501-1 **or** Reaction to fire performance for the product has not been determined.

Special conditions for use and installation
(Her henvises til aktuelle anvisninger i Byggforskserien, for eksempel 520.308 og 520.322.)

Basis for the approval
(Her refereres til klassifiseringsrapporter der de foreligger. Det er ikke nødvendig å henvise til produktstandard eller kommisjonsvedtak dersom egenskapen er basert på den typen dokumentasjon.)

7.3.2 Wind barriers with at least fire classification D-s3, d0

Field of application
The wind barrier can be used in fire class (brannklasse) 1 in buildings, and in residential buildings up to three floors if each dwelling unit has direct access to the ground level (not via stairs or stair cases). For other use, a fire safety analysis has to be performed.

Properties related to fire
The wind barrier has a reaction to fire class _____ according to EN 13501-1.

Special conditions for use and installation
(Her henvises til aktuelle anvisninger i Byggforskserien, for eksempel 520.308 [13] og 520.322 [14].)

Basis for the approval
(Husk å referere til klassifiseringsrapporter der de foreligger. Det er ikke nødvendig å henvise til produktstandard eller kommisjonsvedtak dersom egenskapen er basert på den typen dokumentasjon.)

7.3.3 Wind barriers with at least fire classification B-s3, d0

Field of application

The wind barrier can be used in hazard class 1-6 and fire class 1, 2 and 3 in buildings.

Properties related to fire
The wind barrier has a reaction to fire class _____ according to EN 13501-1.

Special conditions for use and installation
(Her henvises til aktuelle anvisninger i Byggforskserien, for eksempel 520.308 og 520.322.)

Basis for the approval
(Her refereres til klassifiseringsrapporter der de foreligger. Det er ikke nødvendig å henvise til produktstandard eller kommisjonsvedtak dersom egenskapen er basert på den typen dokumentasjon.)

7.4 Properties related to fire, proposed text for approval documents which covers combined roofing underlay and wind barriers on roofs

Field of application
The product can be used as combined roof underlayer and wind barrier on roofs in buildings in hazard class 1-6 and fire class 1, 2 and 3.

Properties related to fire
The product has a reaction to fire class _____ according to EN 13501-1 **or** Reaction to fire performance for the product has not been determined.

Fire resistance (Dersom TG'en omhandler undertak av plateprodukt eller taktro og kunden ønsker å ha med denne egenskapen, kan man ofte finne den i tilgjengelig litteratur)

The wind barrier has a reaction to fire class $K_2$10 according to EN 13501-1 **or** (the section can be deleted)

Field of application
(Her henvises til aktuelle anvisninger i byggforskserien, for eks. *525.106 Skrå tretak med kaldt loft* for bruk på kalde loft og/eller *525.866 Undertak.*)

Basis for the approval
(Her refereres til klassifiseringsrapporter der de foreligger. Det er ikke nødvendig å henvise til produktstandard eller kommisjonsvedtak dersom egenskapen er basert på den typen dokumentasjon.)

7.5 Evaluation of durability

The durability for the material is evaluated based on tests of fresh and artificial aged material in the laboratory. Changes in material properties after ageing are subjected to the following requirements:

- The properties must not change more than 20 % in relation to the tested fresh product.
- If the change is between 20 % and 30 % of the properties for fresh material, the properties must be within 15 % of the requirements for the fresh product.
- If the change is larger than 30 %, the properties must be better than, or as good as, the requirements for fresh product. The durability properties have to be evaluated in each case.
  -For roll products can for example low values for elongation be balanced/compensated with high values for tensile strength and analogous can low values for tensile strength be compensated with high values for elongation.
  -Use of tape in joints are covered by own guidelines for tapes.
  -If the changes from fresh to aged material are large it may be necessary to provide special conditions for use. For example that adhesive joints, or joints with tape, can not be be used crosswise, but along the rafters, and be continuous clamped by counter battens.
- Changes larger than 50 % will basically not be accepted.

Adhesive joints
The durability for integrated adhesive joints is tested only in connection with the type testing (this means that such joints are not tested in connection with annual control). The reason for this is, among other things, that SINTEF has long and good experience with integrated adhesive joints, and the fact that the joints have two adhesive areas that adher to each other.

For products that have only one adhesive area sticking against the product, the need for extra follow up controls has to be evaluated especially.

7.6 Durability for windbarrier system of gypsum- og cement based boards (together with tape/profiles), proposed text for approval documents

The durability for the windbarrier system is assesed based on accelerated artificial ageing in laboratory for two og four weeks.

Durability
On the basis of accelerated artificial ageing in laboratory, the durability of wind barrier system (NN) is assessed to be acceptable. The wind barrier system has been exposed to artificial ageing in climate simulator, according to NT Build 495, for 2/4 weeks. The durability of the tape, adherence to the boards, has been assessed on the basis of artificial ageing, according to NT Build 495, for 2 weeks followed by heat ageing, according to EN 1296, for 12/24 weeks.

With conditions for use, as described in cl. 6, it is assumed that the wind barrier may be exposed to outdoor climate up to 6/12 months before being covered by an external cladding.

In clause 6 in the Approval document, *Special conditions for use and installation,* the following section shall be added:

Installation
It is in general recommended to cover the wind barrier with an external cladding as soon as possible. The wind barrier may be uncovered as long as indicated in cl. 4 provided the building is not subject to unusual large driving rain exposure. It is also a condition that all joints are protected by tape and that all board edges (e.g. along the bottom, sides and top of the wall and around wall penetrations) is protected against rain.

7.7 Accessories

Optional products (such as tape, slleves, etc.) that shall be a part of the Approval have always to be evaluated and maybe tested.

Table 1: Fibreboards, current product standards and SINTEFs minimum required performance

EN 622-1:2003 Fibreboards Specifications Part 1: General requirements
EN 622-2:2004 Fibreboards Specifications Part 2: Requirements for hardboards, minimum type HB.H
EN 622-4:2009 Fibreboards Specifications Part 4: Requirements for softboards, minimum type SB.H
NS-EN 14964:2007 Ridgid underlays for discontinous roofing Definitions and characteristics

Property	Test method	Minimum required perfomance [1]		
		Wind barrier	Combined under-layer roof and wind barrier	Other roof underlays
Watertightness	NS-EN 12467:2012+A12016/ (EN 1928:2000)	Can be determined	Watertight at 20 mm (24 h) / (Watertight at 200 mm (2 h)	Watertight at 20 mm (24 h) / (Watertight at 200 mm (2 h)
Rain tightness construction [2]	NT Build 421	Can be determined	≥ 300 Pa	Can be determined
Water absorption / condensation [3]	NT Build 304 or similar	≥0,4 kg/m² when 0,2 m < sd < 0,5m	≥0,4 kg/m² when 0,2 m < sd < 0,5m	Can be determined
Air tightness - material	EN 12114:2000	Has to be determined to calculate air tightness construction	Has to be determined to calculate air tightness construction	-
Air tightness construction [6] Option 1 [4] Option 2 [5]	EN 12114:2000	≤ 0.50 m³/ m²h 50Pa ≤ 2.50 m³/ m²h 50Pa	≤ 0.50 m³/ m²h 50Pa ≤ 2.50 m³/ m²h 50Pa	-
Water vapour resistance [3] Accredited testing	EN ISO 12572:2016	s_d-value ≤ 0,20 m s_d-value ≤ 0,50 m	s_d-value ≤ 0,20 m s_d-value ≤ 0,50 m	Can be determined
Thermal resistance	EN 12667:2001	To be determined for soft fibreboards	To be determined for soft fibreboards	-
Swelling in thichness 2h/24h	EN 317:1993	Value according to refered standard	Value according to refered standard	Value according to refered standard
Tensile strength perpendicular to the plane of the board	EN 319:1993	Value according to refered standard	Value according to refered standard	Value according to refered standard
Moisture movement 30 –90 % RH	NT-Build 113/ EN 318:2002	To be determined, result is evaluated	To be determined, result is evaluated	To be determined, result is evaluated
"Tread-through" resistance	SP 0487	-	Can be determined	Can be determined
Flexural strength Bending modulus of elasticity	EN 310:1993	Value according to refered standard	Value according to refered standard	Value according to refered standard
Lateral bracing, 2.4 m high wall [7]	NT Build 362	To be determined, result is evaluated		
Resistance to tearing – nail shank accredited testing	EN 12310-1:1999	To be determined, result is evaluated	To be determined, result is evaluated	To be determined, result is evaluated
Weather resistance plus heat aging	Climate simulator: NS 8140:1985 NT Build 495 Heat ageing: EN 1296:2000, Heat+UV+water: EN 1297:2004	Resist 14 days in climate carousel/ alt. UV-radiation plus resist 12 weeks in heat chamber at 70 °C without noticeable changes to properties		
Moisture resistance	EN 321:1999	Change in thickness swelling and lateral tensile yield strength to be determined		

[1] Products with low declared values may be rejected. In such cases appropriate documentation must show that the product is suitable.

[2] Recommended lowest roof pitch is 10 °. The client must describe the performance of all details in the test section and also provide all components which are included in the wind barrier- and roofing underlay system.

[3] For products with water vapour resistance (s_d – value) higher than 0,2 m, the water absorption (condensation) **shall** be tested and the absorption has then to be ≥ 0,4 kg/m² to approve the product. For products with water vapour resistance (s_d – value) lower than 0,2 m, the water absorption **can** be lower than 0,4 kg/m² and testing is not necessary.

[4] Option 1 applies to wind barrier system which makes it possible to fulfil any requirements regarding airtightness (n_{50}) given in the building regulations and in the Norwegian passive house standards before the vapour barrier is mounted.

[5] Option 2 applies to wind barrier system which is sufficiently airtight to protect the insulation to avoid cooling from wind but not to fulfil the requirements regarding airtightness (n_{50}) given in the building regulations and the Norwegian passive house standards before the vapour barrier is mounted.

[6] The client must describe the performance of all details in the test section and also provide all components which are included in the wind barrier- and roofing underlay system. Air tightness of the construction is a standardized air flow number that is calculated for a test section of 10 m x 5 m (width x height) and and includes both material and joint leakages.

[7] Only required if the product has lateral bracing effect. Testing according to EN 594 should be done in a way that the vertical load is high enough to keep the product tight to the sill. The horizontal bracing capacity of the test section can then be determined.

Table 2: Flexible sheets/ roll products, current product standards and SINTEFs minimum required performance

EN 13859-1 Felxible sheets for waterproofing Part 1: Underlays for discontinuous roofing
EN 13859-1 Felxible sheets for waterproofing Part 2: Underlays for walls

Property	Test method	Minimum required perfomance [1]		
		Wind barrier	Combined under-layer roof and wind barrier	Other roof underlaysunderlays
Watertightness - material	EN 1928:2000	Watertight at 200 mm (2 h)	Watertight at 200 mm 2 (h)	Watertight at 200 mm 2 (h)
Rain tightness – construction [2]	NT Build 421	Can be determined	To be determined	Can be determined
Water absorption / condensation [3]	NT Build 304 or similar	≥ 0,4 kg/m² when 0,2 m < s_d < 0,5m	≥ 0,4 kg/m² when 0,2 m < s_d < 0,5m	Can be determined
Air tightness material	EN 12114:2000	Has to be determined to calculate air tightness construction	Has to be determined to calculate air tightness construction	-
Air tightness – construction [6] Alternative 1 [4] Alternative 2 [5]	EN 12114:2000	≤ 0.50 m³/ m²h 50Pa ≤ 2.50 m³/ m²h 50Pa	≤ 0.50 m³/ m²h 50Pa ≤ 2.50 m³/ m²h 50Pa	-
Water vapour resistance [3] Accredited testing	EN ISO 12572:2016	s_d-value ≤ 0,20 m s_d-value ≤ 0,50 m	s_d-value ≤ 0,20 m s_d-value ≤ 0,50 m	Can be determined
Dimensional stability	EN 1107-1:1999 (bituminous) EN 1107-2:2001	≤ 2 %	≤ 2 %	≤ 2 %
"Tread-through" resistance	SP 0487	-	Can be determined	Can be determined
Tensile strength [7]	EN 13859-1:2014 EN 13859-2:2014 EN 12311-1:1999	To be determined	≥ 100 N	≥ 100 N
Fracture elongation [7]	EN 13859-1:2014 EN 13859-2:2014 EN 12311-1:1999	To be determined	≥ 15 %	≥ 15 %
Resistance to tearing – nail shank	EN 13859-1:2014 EN 13859-2:2014 EN 12310-1:1999	≥ 35 N	≥ 35 N	≥ 35 N
Durability material. Weather resistance and heat aging	EN 13859-1:2014 EN 13859-2:2014 EN 1297 (UV without water) EN 1296 (heat)	Resist UV-radiation (without water spraying) for 336 hours (14 days) followed by 12 weeks in heat chamber at 70 °C without noticeable changes in properties Water tightness and tensile strength and fracture elongation are tested after artificial aging.		
Durability adhesive joints also adhesive tape Weather resistance and heat aging	EN 13859-:2014 EN 13859-:2014 Climate carousel: NT Build 495 Heat aging: EN 1296	Resist 14 days in climate carousel followed by 24 weeks in heat chamber at 70 °C without noticeable changes in properties Tests done after artificial aging: T-peel resistance in joints EN 12316-2 Shear resistance in joints EN 12317-2 Resistance to water penetration modified EN 13111, min W2 Tests can also be carried out after 12 weeks of ageing according to SINTEF's guidelines for tape		

1) Products with low declared values may be rejected. In such cases appropriate documentation must show that the product is suitable.

2) Recommended lowest roof pitch is 10 °. The client must describe the performance of all details in the test section and also provide all components which are included in the wind barrier- and roofing underlay system.

3) For products with water vapour resistance (s_d – value) higher than 0,2 m, the water absorption (condensation) **shall** be tested and the absorption has then to be ≥ 0,4 kg/m² to approve the product. For products with water vapour resistance (s_d – value) lower than 0,2 m, the water absorption **can** be lower than 0,4 kg/m² and testing is not necessary.

4) Option 1 applies to wind barrier system which makes it possible to fulfil any requirements regarding airtightness (n_{50}) given in the building regulations and in the Norwegian passive house standards before the vapour barrier is mounted.

5) Option 2 applies to wind barrier system which is sufficiently airtight to protect the insulation to avoid cooling from wind but not to fulfil the requirements regarding airtightness (n_{50}) given in the building regulations and the Norwegian passive house standards before the vapour barrier is mounted.

6) The client must describe the performance of all details in the test section and also provide all components which are included in the wind barrier- and roofing underlay system. Air tightness of the construction is a standardized air flow number that is calculated for a test section of 10 m x 5 m (width x height) and and includes both material and joint leakages.

7) Low values for elongation be balanced/compensated with high values for tensile strength and analogous can low values for tensile strength be compensated with high values for elongation.

Table 3 Gypsum boards, current product standards and SINTEFs minimum required performance

-EN 520 Gypsum plasterboards Definitions, requirements and test methods
NS-EN 15283-1:2008+A1:2009 Gypsum boards with fibrous reinforcement Definitions, requirements and test methods Part 1:Gypsum boards with mat reinforcements
NS-EN 15283-2:2008+A1:2009 Gypsum boards with fibrous reinforcement Definitions, requirements and test methods Part 2:Gypsum fibre boards

Property	Test method	Minimum required perfomance [1]		
		Wind barriers of gypsum board Type E and H according to EN 520	Wind barriers of gypsum board with mat reinforcement Type GM-H according to EN 15283-1	Wind barriers of reinforced gypsum board Type GF-H according to EN 15283-2
Watertightness-material	NS-EN 12467:2002 +A1:2016 / EN 1928:2000	Can be determined	Can be determined	Can be determined
Rain tightness – construction [2]	EN 1027:2016	Can be determined	Can be determined	Can be determined
Air tightness material	EN 12114:2000	Has to be determined to calculate air tightness construction	Has to be determined to calculate air tightness construction	Has to be determined to calculate air tightness construction
Air tightness – construction [3] Alternative 1 [4] Alternative 2 [5]	EN 12114:2000	 ≤ 0,50 m^3/m^2h 50Pa ≤ 2,50 m^3/m^2h 50Pa	 ≤ 0,50 m^3/m^2h 50Pa ≤ 2,50 m^3/m^2h 50Pa	 ≤ 0,50 m^3/m^2h 50Pa ≤ 2,50 m^3/m^2h 50Pa
Water vapour resistance Accredited testing	EN ISO 12572:2016	≤ 0,5 m	≤ 0,5 m	≤ 0,5 m
Lateral bracing, 2,4 m high wall [6]	NT Build 362 EN 594:2011	To be determined. Result has to be evaluated	To be determined. Result has to be evaluated	To be determined. Result has to be evaluated
Bending strength	NS-EN 520:2004+ A1:2009 EN 15283-1/2	Ch. 4.1.2 in the product standard	Ch. 4.1.1 in the product standard	Ch. 4.1.2 in the product standard
Dimensions: length, width, thickness, squareness	NS-EN 520:2004+ A1:2009 EN 15283-1/2	Ch. 4.9.1.1/2/3/4 in the product standard	Ch. 4.9.1.1/2/3/4 in the product standard	Ch. 4.9.1.1/2/3/4 in the product standard
Water absorption	NS-EN 520:2004+ A1:2009 EN 15283-1/2	Ch. 4.10 in the product standard Class H1, H2, H3	Ch. 4.8 in the product standard Class H1, H2	Ch. 4.9 in the product standard Class GF-H
Shear strength	NS-EN 520:2004+ A1:2009 EN 15283-1/2	Ch. 5.13 in the product standard	The product standard refers to EN 520	Ch. 4.1.1 in the product standard
Properties related to fire	NS-EN 13501-1:2007 +A1:2009	To be determined	To be determined	To be determined
Fire classification	EN 13501-2:2016	Can be determined	Can be determined	Can be determined
Weather resistance	Climate simulator: NT-Build 495	Resist 14 days in climate carousel Visual evaluation		

1) Products with low declared values may be rejected. In such cases appropriate documentation must show that the product is suitable.

2) The client must describe the performance of all details in the test section and also provide all components which are included in the wind barrier system.

3) The client must describe the performance of all details in the test section and also provide all components which are included in the wind barrier system. Air tightness of the construction is a standardized air flow number that is calculated for a test section of 10 m x 5 m (width x height) and and includes both material and joint leakages.

4) Option 1 applies to wind barrier system which makes it possible to fulfil any requirements regarding airtightness (n_{50}) given in the building regulations and in the Norwegian passive house standards before the vapour barrier is mounted.

5) Option 2 applies to wind barrier system which is sufficiently airtight to protect the insulation to avoid cooling from wind but not to fulfil the requirements regarding airtightness (n_{50}) given in the building regulations and the Norwegian passive house standards before the vapour barrier is mounted.

6) Only required if the product has lateral bracing effect. Testing according to EN 594 should be done in a way that the vertical load is high enough to keep the product tight to the sill. The horizontal bracing capacity of the test section can then be determined.

Table 4 Audit testing of soft fibreboards used as combined roofing underlay and wind barrier

Property	Test method	Frequency
Thickness	EN 324-1:1993	Examination of the manufacturer's internal control once each year (alternatively control testing once each second year)
Length	EN 324-1:1993	
Width	EN 324-1:1993	
Squareness	EN 324-2:1993	
Edge straightness	EN 324-2:1993	
Flexural strength and bending modulus of elasticity	EN 310:1993	Once each second year
Air tightness material	EN 12114:2000	Once each second year
Thermal resistance	EN 12667:2001	Once each fifth year
Water vapour resistance	EN ISO 12572:2016	Once each second year
Water tightness	NS-EN 12467:2012+A1:2016	Once each fifth year

Table 5 Audit testing of hard fibreboards used as roofing underlay

Property	Test method	Frequency
Thickness	EN 324-1:1993	Examination of the manufacturer's internal control once each year (alternatively control testing once each second year)
Length	EN 324-1:1993	
Width	EN 324-1:1993	
Squareness	EN 324-2:1993	
Edge straightness	EN 324-2:1993	
Flexural strength and bending modulus of elasticity	EN 324-2:1993	
Tensile strength perpendicular to the plane of the board	EN 319:1993	Once each year
Tensile strength perpendicular to the plane of the board after boiling test	EN 319:1993	Once each year
Thickness swelling 24h	EN 317:1993	Once each year
Water tightness	NS-EN 12467:2012+A1:2016	Once each fifth year

Table 6 Audit testing of hard fibreboards used as combined roofing underlay and wind barrier

Property	Test method	Frequency
Thickness	EN 324-1:1993	Examination of the manufacturer's internal control once each year (alternatively control testing once each second year))
Length	EN 324-1:1993	
Width	EN 324-1:1993	
Squareness	EN 324-2:1993	
Edge straightness	EN 324-2:1993	
Flexural strength and bending modulus of elasticity	EN 310:1993	
Tensile strength perpendicular to the plane of the board	EN 319:1993	Once each year
Tensile strength perpendicular to the plane of the board after boiling test	EN 319:1993	Once each year
Thickness swelling 24h	EN 317:1993	Once each year
Water vapour resistance	EN ISO 12572:2016	Once each fifth year
Water tightness	NS-EN 12467:2012+A1:2016	Once each fifth year

Table 7: Audit testing of windbarriers and roof underlays in roll form

Property	Test method	Control limit	Value	Frequency
Water vapour resistance, sd-value *	EN ISO 12572:2016		Sd – value m	Ususally once every year, but can be done once every second year when several annual test results show good consistency
Resistance to air penetration	EN ISO 12114:2000		$m^3/(m^2h50Pa)$	One of these properties once every year
Resistance to water penetration	EN 1928:2000		Tight	
Tensile strength * -Longitudinal -Transversal	EN 13859-1:2014 EN 13859-2:2014 EN 12311-1:1999		N/50 mm	Once every year
Elongation at break * -Longitudinal -Transversal	EN 13859-1:2014 EN 13859-2:2014 EN 12311-1:1999		%	Once every year

*Accredited testing

Table 8: Audit testing of gypsum boards

Property	Test method	Control limit	Value	Frequency
Water vapour resistance *	EN ISO 12572:2016		s_d - verdi m	Once every second year
Resistance to air penetration	EN ISO 12114:2000		m^3/m^2h50Pa	Once every second year
Bending strength	EN 520:2004/ NS-EN 15283-1:2008+A1:2009 NS-EN 15283-2:2008+A1:2009		N/mm^2	Once every second year
Water absorption	EN 520:2004/ NS-EN 15283-1:2008+A1:2009 NS-EN 15283-2:2008+A1:2009		%	Once every year
Shear strength	EN 520:2004/ NS-EN 15283-1:2008+A1:2009 NS-EN 15283-2:2008+A1:2009		N	Once every second year

*Accredited testing