

SINTEF Building and Infrastructure confirms that

OLDROYD® Xv and OLDROYD® Xv20

has been found to be fit for use in Norway and to meet the provisions regarding product documentation given in the regulation relating to the marketing of products for construction works (DOK) and regulations on technical requirements for building works (TEK), with the properties, fields of application and conditions for use as stated in this document

1. Holder of the approval

Oldroyd AS
 Industriveien 1
 3766 Sannidal
 Norway
www.oldroyd.com

2. Product description

OLDROYD® Xv and OLDROYD® Xv20 (furthermore stated as OLDROYD® Xv-products) are combined moisture barriers and protection sheets for use on external walls against the ground, on concrete floors, and for the protection of bituminous roofing membranes in turf roofs.

OLDROYD® Xv-products are delivered as roll and are produced of polypropylene (PP) with a density of 910 kg/m³ and a nominal thickness of 0.5 mm. OLDROYD® Xv-products are made with studs and a pattern of intersecting channels forming a 7 mm air gap between the sheet and the underlying surface for OLDROYD® Xv, see fig. 1, and 20 mm air gap for OLDROYD® Xv20. The sheets have flat jointing flanges on each side. Measures and tolerances are shown in table 1.

Product specifications for additional accessories to fix OLDROYD® Xv-products are given in table 3.

Table 1
 Measure and tolerances for OLDROYD® Xv-products

Property	Oldroyd® Xv		Oldroyd® Xv20	
	Measure ¹⁾	Tolerance	Measure ¹⁾	Tolerance
Thickness mm	0,5	± 0,05	0,8	± 0,08
Spec.weight kg/m ²	0,5	± 10 %	0,8	± 10 %
Total height mm	7	± 5 %	20	± 5 %
Stand. roll width m	2,08	± 0,01	2,0	± 0,01
Stand. roll length m	20	± 0,05	15	± 0,05

¹⁾ Measured according EN 1848-2 and EN 1849-2

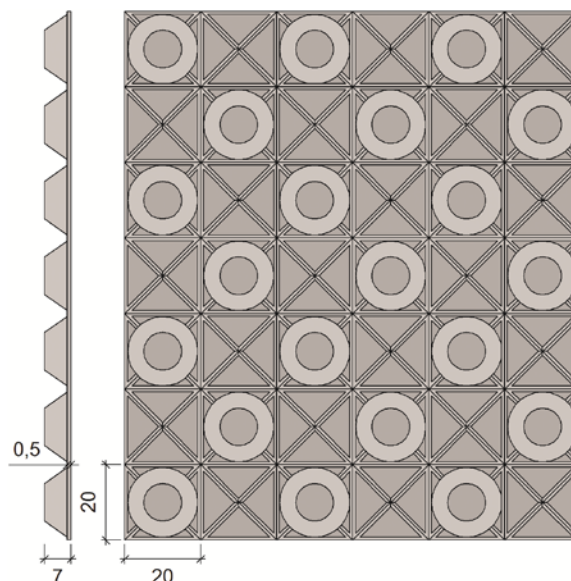


Fig. 1
 OLDROYD® Xv sheet, pattern of channels and studs. Plan and section drawing. Measurements in mm.

3. Fields of application

Protection of external walls against moisture in the ground

OLDROYD® Xv-products are used as water repellent and capillary breaking layer on the outside of insulated or uninsulated walls against the ground, see fig. 2 and fig. 3.

Moisture barrier in concrete floors

OLDROYD® Xv-products are designed to be used as diffusion resistant moisture barrier under floating floors on concrete underlays. Floating floors may consist of boards, parquet, floor laminates, levelling compounds or screeds. An example is shown in fig. 4. OLDROYD® Xv-products can be used in new construction or in refurbishment work.

These moisture-proof sheets may be used in floor constructions for load category A and B according to EN 1991-1-1:2002, with an imposed maximum uniformly distributed load of 3.0 kN/m² and 2.0 kN concentrated load.

Table 2
Product characteristics of fresh material of OLDROYD® Xv-products

Property	Test method EN	OLDROYD® Xv		OLDROYD® Xv20		Unit
		DoP ¹⁾	Control limit ²⁾	DoP ¹⁾	Control limit ²⁾	
Water tightness	1928 (A)	Tight	Tight	Tight	Tight	-
Water vapour resistance	1931	-	1x10 ¹² 200	-	1x10 ¹² 200	m ² sPa/kg m (equiv. air layer thickness, s _d)
Resistance to tearing L: (nail shank) T:	12310 -1:	> 300 > 300	> 300 > 300	> 700 > 700	> 700 > 700	N
Tensile strength L: T:	12311-2 (A)	> 300 > 300	> 300 > 300	> 350 > 350	> 350 > 350	N/50 mm
Elongation L: T:	12311-2 (A)	- -	> 30 > 30	- -	> 30 > 30	%
Shear resistance in joint	12317-2	-	> 5	-	> 5	N
Puncturing - impact at/+23 °C - static load	12691 (A) 12730 (B)	> 400 > 20	> 400 >20	> 500 > 20	> 500 >20	mm kg
Deformation under load measured after 60 hours	13967, Annex B	-	≤ 1,4 75	-	≤ 2 40	mm deformation kN/m ² load

¹⁾ The manufacturers declaration of performance, DoP

²⁾ Control limit shows values the product has to satisfy during internal factory production control and audit testing.

Table 3
Product specifications for additional accessories to fix OLDROYD® Xv-products

Component	Material type	Description	Dimensions
OLDROYD® Butyl jointing tape	Butyl rubber	Taping of overlap joints for dimple sheets	Width/thickness: 50 mm / 1,5 mm Length: 10 m
OLDROYD® Butyl jointing Flextape	Butyl rubber	Flexible tape for joints to other material	Width/thickness: 100 mm / 0,8 mm Length: 10 m
OLDROYD® Butyl fugemasse	Butyl sealing	Sealing of joints or other materials	310ml cartridge
Nails with fastening plugs	Hardened, el. galvanised steel nails / PEL (Low density polythene)	Fastener adapted to stud pattern for use on external walls or turf roofs with sheathing made of wood	Diameter: 3,0 mm Length: 30 mm to concrete/underroof of boards Length: 60 mm to light weight concrete
Fastening plug for bolt gun	Polypropylene PP or Polyethylene HDPE	Fastening plug	Dimension: 7mm Length: 50mm
Topplist	PVC HDPE	Edge profile for closing top edge at external walls against ground level. Fastened with steel nails.	Width/thickness: ca. 50 x 1,7 mm Width/thickness: ca. 50/115/40 x 1,7 mm Width/thickness: ca. 50/80/40 x 1,7 mm Standard length: 2 m

Where the problem with smell or gases from the ground occurs, special solutions, for example mechanical ventilation of the air gap below the sheet shall be evaluated. OLDROYD® Xv-products cannot be used as waterproof sheets in bathrooms etc.

Protection of bitumen roofing membranes on turf roofs

OLDROYD® Xv-products can be used in turf roof constructions to protect the membrane from the turf. The sheet's studs ensure ventilation and drainage above the roofing felt and at the same time protect it from root growth. In addition shall the roughness of the sheet avoid that turf material is sliding down over time.

4. Properties

Mechanical material properties

OLDROYD® Xv-products characteristics are given in Table 2.

Load-carrying capacity

Strength and stiffness properties of 14 mm laminated parquet laid as a floating floor on OLDROYD® Xv-products have been tested according to NT Build 384. The measurements shows that the sheet has sufficient stiffness for the construction to satisfy the resistance to deformation specified in all the load classes given in the test method.

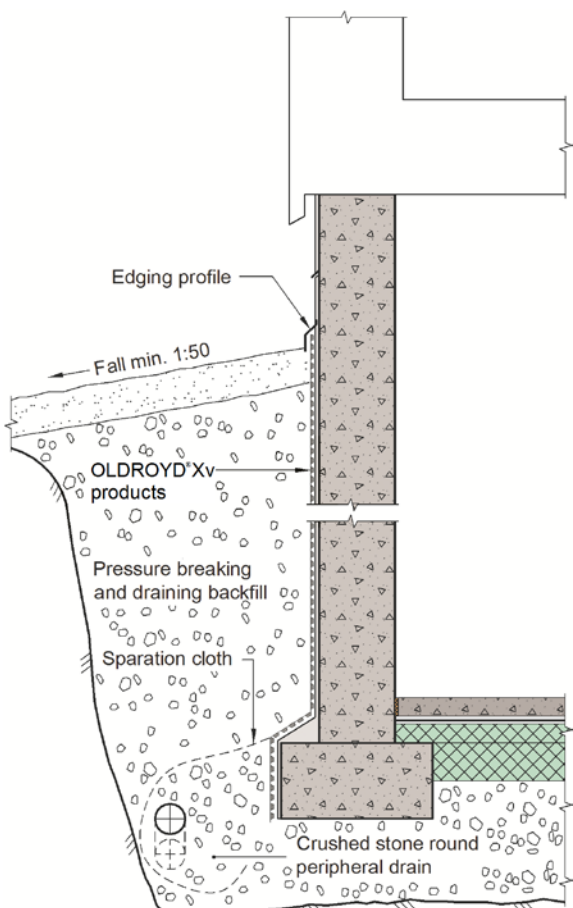


Fig.2
Example of the use of OLDROYD® Xv-products on exterior wall of unheated cellar.

Safety in case of fire

Reaction to fire has not been determined for OLDROYD® Xv-products according to EN 13501-1. Product must be separated if it is used in different fire cells.

Sound insulation

Weighted reduction in impact sound pressure $\Delta L_{n,w}$ according to ISO 717/2 is 17dB for floating floors with 14 mm parquet on OLDROYD® Xv-products. Such flooring on concrete decks with minimum thickness 180 mm satisfy Class C in NS 8175, except for residential housing.

Durability

OLDROYD® Xv-products has been tested and assessed to have acceptable durability for the intended use, shown in this approval.

5. Environmental aspects

Substances hazardous to health and environment

The product contains no hazardous substances with priority in quantities that pose any increased risk for human health and environment. Chemicals with priority include CMR, PBT or vPvB substances.

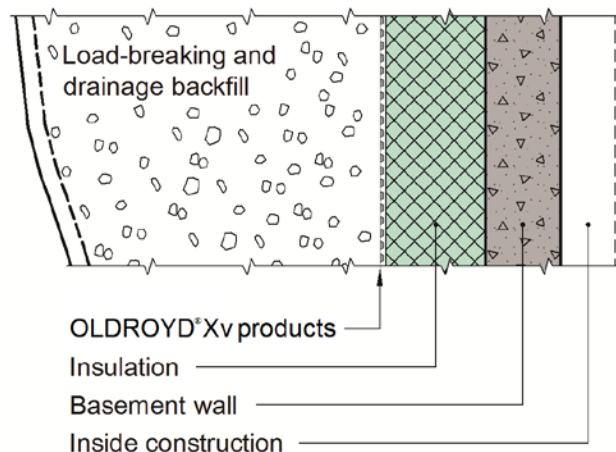


Fig. 3
OLDROYD® Xv-products used on insulated basement wall. For quicker dry out of the basement wall it is recommended to place the sheet outside the vapour open insulation as e.g. EPS, see also SINTEF Building Research Design Guide 523.111 Yttervegger mot terreng. Varmeisolering og tetting.

Effect on indoor environment

The product is not regarded as emitting any particles, gases or radiation that have a perceptible impact on the indoor climate, or to have any significant impact on health.

Effect on soil, surface water and ground water

The leaching properties to soil and water have not been tested.

Waste treatment/recycling

The product shall be sorted as residual waste. The product shall be delivered to an authorized waste treatment plant for energy and material recovery.

Unused sealant is defined as hazardous waste (according to the Norwegian Waste Regulation (Avfallsforskriften)). The product must be sorted as hazardous waste on the building site, and be delivered to an authorized treatment plant for hazardous waste. The dried product is not hazardous waste.

Environmental declaration

An environmental declaration (EPD) has not been worked out according to EN 15804 for the products.

6. Special conditions for use and installation

6.1. Exterior walls against ground.

The sheet should be applied with the studs against the wall and rolled out along the length of the wall. Installation shall start at the bottom of the wall, and horizontal joints should have an overlap of 120 mm and vertical joints of 500 mm.

The sheet is fastened with nails and plugs or plugs for bolt gun every 250 mm along the top edge after where the topolist shall be applied.

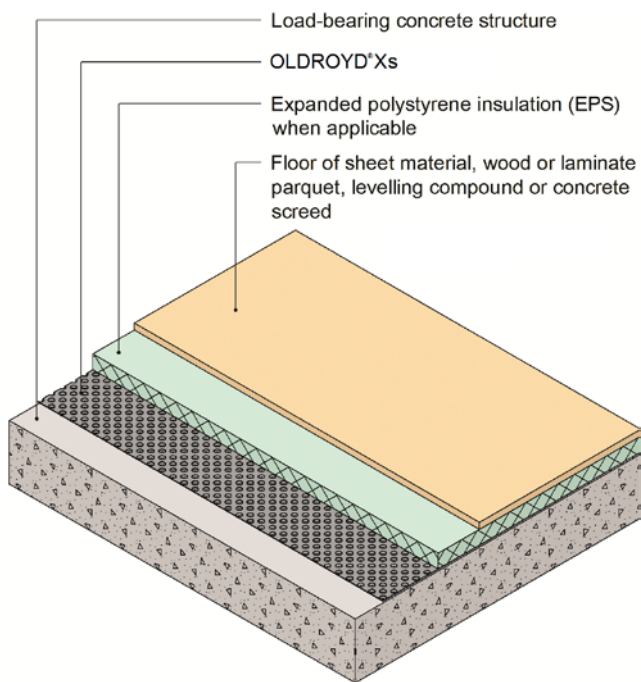


Fig. 4
Principle design of floating floor construction with OLDROYD® Xv-products

The sheet should cover both the foundations and the wall, and installed 30 – 50 mm above ground level. The back fill on the outside must be of self-draining and pressure breaking quality.

Approval is conditional upon OLDROYD® Xv-products being applied according to the recommendations contained in the following SINTEF Building Research Design Guides:

514.221 Fuktsikring av bygninger

520.706 Sikring mot radon ved nybygning

523.111 Yttervegger mot terreng. Varmeisolering / tetting

6.2. Moisture-proof barrier on concrete floors.

6.2.1. Design considerations

Non load-bearing walls and non-fire resistant walls can be erected on top of the moisture barrier.

6.2.2. Thermal insulation and air tightness

Floors may be insulated with polystyrene sheets between the moisture-barrier and the floating floor. See fig. 4. When parquet flooring or board materials are installed over insulation it is required to use XPS (extruded polystyrene) or EPS (expanded polystyrene) sheets with a resistance to compression of at least 200 kN/m² (CS(10)200). A thin sliding material like a fibre cloth or equivalent should be laid between the insulation and flooring to avoid squeaking.

It is assumed that the use of XPS or EPS is in accordance with the recommendations contained in the SINTEF Building Research Design Guides: 520.339 *Bruk av brennbar isolasjon i bygninger.*

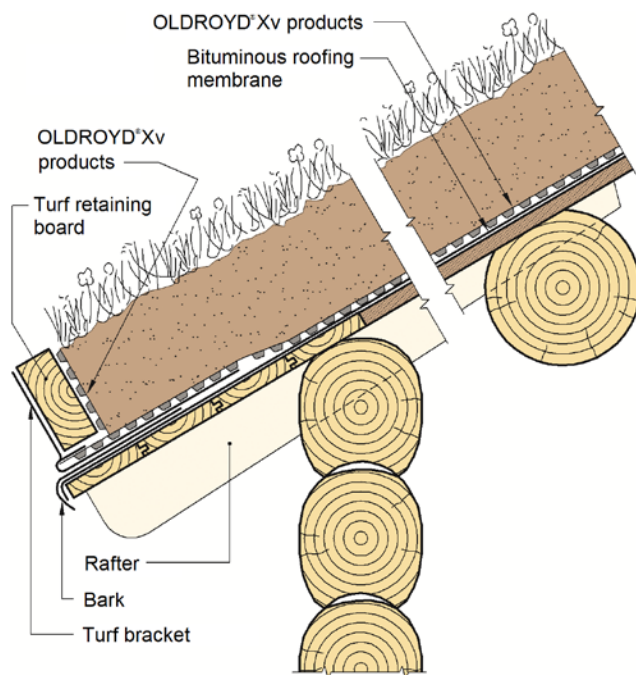


Fig. 5
Example of OLDROYD® Xv-products used as protection of bituminous roofing membrane in turf roof over unheated building.

6.2.3. Moisture conditions

The building is assumed to have a normal indoor climate as long as no special measures are taken. OLDROYD® Xv-products can be installed independently of the moisture content of the underlying concrete construction. The product cannot be used in cases where free flowing water on the underlying concrete floor may occur.

To avoid increased moisture content of the lower parts of existing walls standing on concrete floors sheet shall be folded upwards back skirting to form an air gap between the skirting and the wall. This air gap must allow connection of the air below the barrier and the air in the room.

6.2.4. Installation

OLDROYD® Xv-products shall be jointed by OLDROYD® Butyl skjøtebånd. Lengthwise joints shall be performed with tape between the overlapping flanges. Transverse joints are made as butt joints with the tape across the top of the joint.

Pipes or the equivalent passing through the barrier should be sealed with two rings of OLDROYD® Flexbånd against the concrete floor which must be primed beforehand to bind any dust.

6.3 Turf roofs

OLDROYD® Xv-products are rolled out transversely to the direction of the roof slope, with the studs facing down. Installation should start at the eaves of the roof. The sheets are fastened along the top edge with plugs and nails. Maximum distance between nails should be ca. 100mm for 2,0m / 2,08m wide moisture barrier

At a roof pitch angle $\geq 25^\circ$ the joints along the length should have a minimum overlap of 250 mm, and minimum 300 mm at lower pitch. Overlaps at transverse joints should be at least 400 mm.

It is assumed that the use of OLDROYD® Xv-products for protection of bituminous roofing membrane on turf roofs follows the principles shown in SINTEF Building Research Design Guides: 544.803 *Torvtak*.

6.4. Transport and storage

The rolls shall be stored and transported standing vertically on pallets, protected from sunlight. Pallets may be stacked in two levels, providing the stacks are staggered. Caution must be shown when stacking pallets.

7. Factory production control

The product is produced by Oldroyd AS, Industriveien 1, 3766 Sannidal, Norway.

The holder of the approval is responsible for the factory production control in order to ensure that the product is produced in accordance with the preconditions applying to this approval.

The manufacturing of the product is subject to continuous surveillance of the factory production control in accordance with the contract regarding SINTEF Technical Approval.

Oldroyd AS; Sannidal has a quality system, certified of KIWA Teknologisk Institut Sertifiserings AS according to EN ISO 9001:2008. Certificate no. 213.

8. Basis for the approval

The approval is primarily based on the verification of properties documented in the following reports:

- SP Sveriges Tekniska Forskningsinstitut, Report 97M22008, dated 12.08.1997, type testing of product characteristics
- Nemko Trondheim, Report 974404532, dated 04.97, sound characteristics
- Norges byggforskningsinstitutt, Report O 9403, dated 11.01.1999, testing of floating laminated parquet flooring on OLDROYD®Xv according to test method NT Build 384
- SP Sveriges Tekniska Forskningsinstitut, Report F 602258, dated 22.02.2006, Complementary tests for P-marking
- Sintef Byggforsk, Report 3D0971, dated 01.09.2010

9. Marking

OLDROYD® Xv-products shall be marked at least with name of producer, product name og production date or batch-number. The product is CE marked in accordance with EN 13967. The approval mark for SINTEF Technical Approval No. 20067 may also be used.



Approval mark

10. Liability

The holder/manufacturer has sole product responsibility according to existing law. Claims resulting from the use of the product cannot be brought against SINTEF beyond the provisions of Norwegian Standard NS 8402

for SINTEF Building and Infrastructure

A handwritten signature in blue ink that reads 'Hans Boye Skogstad'.

Hans Boye Skogstad
Approval Manager