

ENVIRONMENTAL PRODUCT DECLARATION




as per ISO 14025 and EN 15804

Owner of the Declaration	Isola AS
Programme operator	Institut Bauen und Umwelt e.V. (IBU)
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Valid to	07.06.2021

Isola Soft Xtra
Isola AS



1. General Information

Isola AS Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	Isola Soft Xtra Owner of the Declaration Isola AS Prestermoen 9 N3946 Porsgrunn N-orway
Declaration number EPD-ISO-20150315-IBE1-EN	Declared product / Declared unit 1 m ² Isola Soft Xtra
This Declaration is based on the Product Category Rules: False ceiling and underlay sheeting, 07.2014 (PCR tested and approved by the SVR)	Scope: This document applies to Isola Soft Xtra high density polyethylene (HDPE) membranes (Tyvek®) manufactured by DuPont in L-2984 Contern, with a declared unit weight of 69 g/m ² . The LCA data were compiled using production data from the year 2013 by DuPont Luxembourg s.à r.l. The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.
Issue date 08/06/2016	Verification The CEN Norm /EN 15804/ serves as the core PCR Independent verification of the declaration according to /ISO 14025/ <input type="checkbox"/> internally <input checked="" type="checkbox"/> externally
Valid to 07/06/2021 	
Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)	Christina Bocher (Independent verifier appointed by SVR)
	
Dr. Burkhard Lehmann (Managing Director IBU)	

2. Product

2.1 Product description / Product definition

DuPont™ Tyvek® is a nonwoven material made of HDPE, which is diffusion open but watertight. It is used as a roof and wall underlay.

For the placing on the market in the EU/EFTA (with exception of Switzerland) the regulation (EU) No 305/2011 applies. The products need a declaration of performance taking into consideration /EN 13859-1:2010/: Flexible sheets for waterproofing and /EN 13859-2:2010/: Flexible sheets for waterproofing and the CE-marking.

2.2 Application

Tyvek® underlays are used in roofs and walls. They constitute the second water shedding layer and at the same time protect the insulation from trapped moisture, wind penetration, dust and insects. Insulation installed below Tyvek® is kept dry and performs as designed.

2.3 Technical Data

The following chapter comprises technical data for the characteristics listed in the Declaration of Performance according to the harmonized technical specifications /EN 13859-1:2010/ and /EN 13859-2:2010/.

Constructional data

Name	Value	Unit
Length * acc. to EN 1848-2	50m standard	m
Width * acc. to EN 1848-2	1.3m standard 2.8m standard 3.0m standard	m
Grammage * acc. to EN 1849-2	0.069	kg/m ²
Resistance to water penetration acc. to EN 1928 (class)	W1	-
Water vapor diffusion equivalent air layer thickness acc. to EN ISO 12572	0.021	m
Maximum tensile force acc. to EN 12311-1	205 - 170	N/50mm
Elongation acc. to EN 12311-1	9 - 13	%
Tear Resistance (nail) acc. to EN 12310-1	80 - 80	N/mm
Resistance to water penetration after ageing acc. to EN 1297, EN 1928 (class)	W1	-

* Not listed in the declaration of performance

For the application and use the respective national provisions apply. (NO: SINTEF - Stiftelsen for

industriell og teknisk forskning; GB: BBA - British Board of Agrément; FR: CSTB - Centre scientifique et technique du bâtiment, etc.).

2.4 Delivery status

The single selling unit is a roll of up to 3m width and a length of up to 100m. Usually several rolls are strapped and piled on a wooden pallet. The order unit is square meter [m²].

2.5 Base materials / Ancillary materials

Isola Soft Xtra single layer membranes are made of
- high density polyethylene (HDPE) >99%
- hindered amine light stabilizers (HALS, added for UV stabilization) <1%.

2.6 Manufacture

Isola Soft Xtra underlay is produced on semi-continuously operating production facilities in different countries. Process steps include:

1. Spinning of thin HDPE filaments.
2. Bonding of filament sheet.
3. Printing, slitting and packaging of the finished roll goods.

2.7 Environment and health during manufacturing

Some of the manufacturing facilities employed in the production of Isola Soft Xtra are /ISO 14001:2004/ certified. All facilities comply with local regulations.

2.8 Product processing/Installation

Isola Soft Xtra membranes for walls and roofs can be either installed on the construction site or in manufacturing facilities in case of pre-fabricated buildings. In both instances the material is usually installed by manually unwinding the sheet from the roll and placing it onto the designated surface. Tools required are usually a knife or scissors to cut the sheet as well as a stapler to fix it to the construction. Refer to Tyvek® installation guidelines for more information.

2.9 Packaging

Isola Soft Xtra is wound onto carton cores. Each roll comes with a paper insert sheet. Rolls are individually wrapped in foil (LDPE: low density PE) and stacked on wooden pallets which are also wrapped in LDPE stretch film. Vertical sides of the pallets are protected with a carton profile. All packaging materials can be reused (e.g. pallets), recycled or valorised through energy recovery.

2.10 Condition of use

Materials are not expected to change or react during the period of use. Isola Soft Xtra is intended to be

installed on the cold side of the insulation and is designed to withstand substantial temperature changes during service life.

2.11 Environment and health during use

Tyvek® membranes are usually concealed below roof decking or facade cladding. They do not require maintenance and will not produce emissions. There are no environmental or health concerns to be expected from the use of the material.

2.12 Reference service life

The documentation of the RSL is not required for this EPD since not the entire life cycle is declared (without modules B1-B7). Nevertheless, the product is assumed to have a reference service life of 30 years, corresponding to the average roof lifetime (BNB *Nutzungsdauerliste*). But this assumption could not be verified because the Tyvek® envelopes have only been sold for 20 years. Influences on ageing when applied in accordance with the rules of technology

2.13 Extraordinary effects

Fire

Fire protection

Name	Value
Building material class acc. to /EN13501-1/	E

Water

Isola Soft Xtra membranes are inherently waterproof. No part of the product will dissolve in water nor will the product release any toxic substances to water.

Mechanical destruction

No possible impacts on the environment following unforeseeable mechanical destruction are known.

2.14 Re-use phase

The material is not intended to be re-used or recycled. Energy recovery is possible.

2.15 Disposal

Incineration is the preferred way of disposal. The /European Waste Code:2000/ for HDPE is 02 01 04, for random construction materials it is 17 09 04. Both may apply.

2.16 Further information

Additional information about product properties and use can be found at www.isola.com.

3. LCA: Calculation rules

3.1 Declared Unit

This declaration applies to 1 m² of Isola Soft Xtra membrane, with a declared unit weight of 69 g/m².

Declared unit

Name	Value	Unit
Declared unit	1	m ²
Grammage	0.069	kg/m ²
Conversion factor to 1 kg	13.89	-

3.2 System boundary

Type of EPD: Cradle-to-gate (with options)
The system boundaries of the EPD follow the modular construction system as described by /EN 15804:2012/. The LCA takes into account the following modules:

- A1-A3: Manufacturing of pre-products, packaging, ancillary materials, transport to the factory, production including energy supply and waste handling
- A4: Transport to the construction site

- A5: Installation into the building (disposal of packaging)
- C4: Waste disposal (incineration)
- D: Potential for reuse, recovery and/or recycling (benefits for incineration and recovery of packaging materials from module A5 and envelopes incineration from module C3).

3.3 Estimates and assumptions

The color paste used in the finishing process was valued with a general composition of water-based color paste (conservative approach).

3.4 Cut-off criteria

All data were taken into consideration (recipe constituents, process water, electricity used). In case of missing data, a cut-off criteria of 1% of the total input mass was applied for unit processes and 5% for the entire modules (as recommended by /EN 15804:2012/, section 6.3.5) and therefore some inputs were excluded: tape and spiking agent for monolayer production (sum < 0.04% of total input mass for monolayer production), paper ink, hotmelt, paper, tape and detergent for finishing process (sum < 0.2% of total input mass for finishing process). Transports were considered for all inputs and outputs. Manufacturing of the production machines and systems and associated infrastructure were not taken into account in the life cycle assessment (LCA). Regarding possible off-cuts during installation, the amount is lower than 5% and therefore also neglected.

3.5 Background data

All background data for the LCA model were taken from the database of the /GaBi software version 6.106:2015/.

3.6 Data quality

To simulate the product stage, data recorded by DuPont Luxembourg s.à r.l. and the converting plant in Germany from the production year 2013 were used. Eurostat data for the year 2012 were used to model the modules A4 (freight transport modal split) and A5 (packaging disposal routes). Regarding background processes, the Luxembourg and German electricity grid mix were applied to the production plants in these countries (A1-A3). Other background data were specific to Germany or the European average, and were not older than 3 years. The representativeness can be classified as very good.

3.7 Period under review

The period of study encompasses the year 2013.

3.8 Allocation

Mass allocation was applied for production. At the DuPont site in Luxembourg, Tyvek® waste materials are recycled internally or sold and transformed externally. The avoided production of HDPE granulates is considered in the modules A1-A3 for the valuable pellets sold with specification. The low quality plastic pellets without specification and some packaging materials sent for recycling are transformed externally to obtain a valuable material. In this case, the materials for recycling are considered as waste material and a system cut-off is applied to the Life Cycle Inventory (LCI). The packaging and Tyvek® production waste sent to incineration are modelled through the combustion process of the specific material and the avoided conventional energy production is credited in module D.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

4. LCA: Scenarios and additional technical information

The following technical information serves as a basis for the declared modules or can be used for the development of specific scenarios in the context of a building assessment.

Transport to the building site (A4)

Name	Value	Unit
Transport distance	2667	km
Transport (train)	2.17E-02	tkm
Transport (road)	8.95E-02	tkm
Transport (water)	9.70E-02	tkm

Installation into the building (A5)

Name	Value	Unit
Wood waste to landfill	1.36E-03	kg
Wood waste to incineration	1.25E-03	kg
Cardboard waste to landfill	4.02E-04	kg
Cardboard waste to incineration	3.46E-04	kg
Plastic waste to landfill	9.32E-05	kg
Plastic waste to incineration	7.02E-05	kg

Reference service life

Name	Value	Unit
Reference service life	30	a

End of life (C1-C4)

Name	Value	Unit
Collected separately Tyvek® waste	0.069	kg
Energy recovery	100	%
R1 value	< 0.6	

5. LCA: Results

The results displayed below apply to Isola Soft Xtra.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m² Isola Soft Xtra

Parameter	Unit	A1-A3	A4	A5	C4	D
Global warming potential	[kg CO ₂ -Eq.]	3.35E-1	7.05E-3	5.47E-3	2.25E-1	-1.32E-1
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	5.33E-11	2.72E-13	1.68E-14	4.98E-13	-4.10E-11
Acidification potential of land and water	[kg SO ₂ -Eq.]	1.43E-3	7.75E-5	1.02E-6	1.63E-5	-3.23E-4
Eutrophication potential	[kg (PO ₄) ³ -Eq.]	8.70E-5	1.30E-5	4.83E-7	3.09E-6	-2.28E-5
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	1.48E-4	-1.14E-5	7.14E-7	1.93E-6	-2.79E-5
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	6.70E-8	3.04E-10	5.38E-11	1.10E-9	-1.26E-8
Abiotic depletion potential for fossil resources	[MJ]	7.86E+0	9.42E-2	2.49E-3	2.36E-2	-1.87E+0

RESULTS OF THE LCA - RESOURCE USE: 1 m² Isola Soft Xtra

Parameter	Unit	A1-A3	A4	A5	C4	D
Renewable primary energy as energy carrier	[MJ]	4.66E-1	5.93E-3	1.78E-4	2.77E-3	-2.09E-1
Renewable primary energy resources as material utilization	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	4.66E-1	5.93E-3	1.78E-4	2.77E-3	-2.09E-1
Non-renewable primary energy as energy carrier	[MJ]	8.99E+0	1.04E-1	2.91E-3	3.04E-2	-2.43E+0
Non-renewable primary energy as material utilization	[MJ]	9.13E-7	1.54E-13	1.81E-14	3.22E-13	-2.29E-11
Total use of non-renewable primary energy resources	[MJ]	8.99E+0	1.80E-104	2.91E-3	3.04E-2	-2.43E+0
Use of secondary material	[kg]	6.06E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	6.28E-5	6.73E-7	1.42E-6	3.96E-7	-2.40E-5
Use of non-renewable secondary fuels	[MJ]	6.65E-4	7.05E-6	3.05E-6	3.56E-6	-2.52E-4
Use of net fresh water	[m ³]	1.99E-1	1.48E-3	1.26E-4	2.76E-3	-1.79E-1

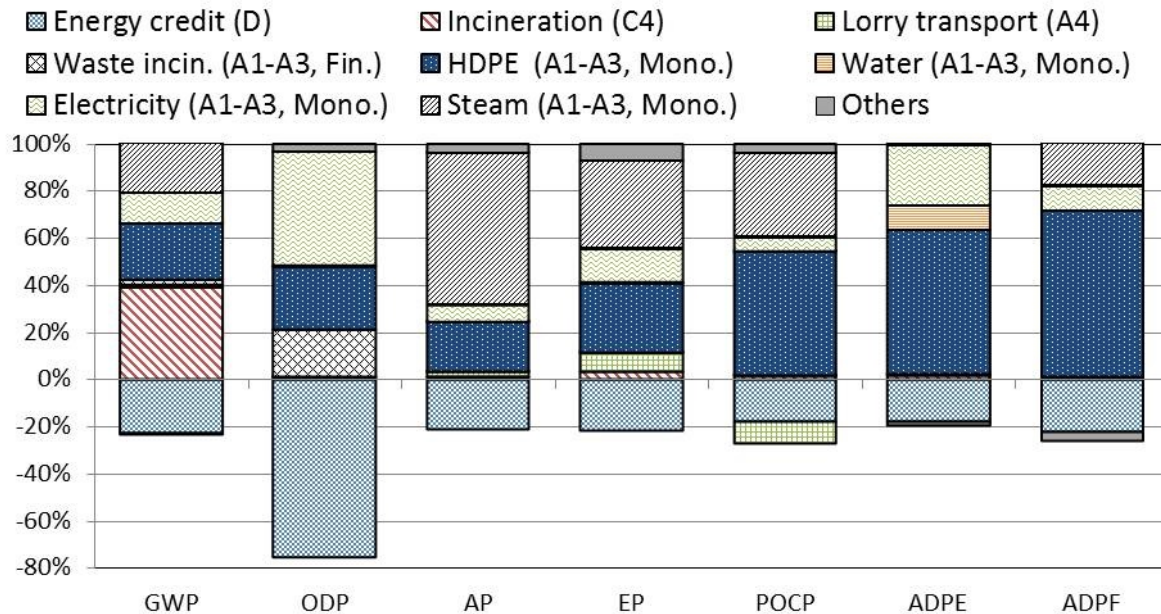
RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES:

Parameter	Unit	A1-A3	A4	A5	C4	D
Hazardous waste disposed	[kg]	-4.28E-7	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Non-hazardous waste disposed	[kg]	-2.19E-4	0.00E+0	1.86E-3	0.00E+0	0.00E+0
Radioactive waste disposed	[kg]	1.77E-4	1.00E-6	7.53E-8	1.87E-6	-1.47E-4
Components for re-use	[kg]	IND	IND	IND	IND	IND
Materials for recycling	[kg]	IND	IND	IND	IND	IND
Materials for energy recovery	[kg]	IND	IND	IND	IND	IND
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	2.24E-2	4.25E-1	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	7.22E-2	9.65E-1	0.00E+0

6. LCA: Interpretation

The following chart shows the relative contributions of the different modules to the various LCA categories

and to primary energy use in a dominance analysis.



For most of the impact categories, more than 70% of the impacts are dominated by the Tyvek® production (A1-A3) and in particular by the supply of HDPE granulates, steam and electricity. This result makes sense since the production step is requiring the main efforts in terms of materials and energy input.

The avoided energy production due to waste incineration (D) leads to significant benefits, between 17% and 75% of the impact results. Emissions of carbon dioxide during monolayer incineration (C4) generate 38% of the **GWP** (global warming potential) results but this process shows negligible impacts on other categories.

Tyvek® waste incineration during the finishing step (included in A1-A3) contributes to 21% of **ODP** (depletion potential of the stratospheric ozone layer) score due to halogens emissions to air in the incineration module. The emissions of nitrogen monoxide from lorry transport (A4) generate significant impacts on **EP** (eutrophication potential) and negative

results on **POCP** (formation potential of tropospheric ozone photochemical oxidants) (it decreases tropospheric ozone production). Impacts linked to packaging production as well as packaging disposal are negligible.

Glossary:

ADPE: Abiotic depletion potential for non-fossil resources

ADPF: Abiotic depletion potential for fossil resources

EP: Eutrophication potential

Fin.: Finishing process

GWP: Global Warming Potential

HDPE: High-Density Polyethylene

LCA: Life Cycle Assessment

Mono: Monolayer production

ODP: Depletion potential of the stratospheric ozone layer

POCP: Formation potential of tropospheric ozone photochemical oxidants

7. Requisite evidence

No requisite evidence is required for Isola Soft Xtra monolayer membranes.

8. References

European Waste Code:2000

European List of Waste (Commission Decision 2000/532/EC) and Annex III to Directive 2008/98/EC

GaBi 6.106:2015

Life Cycle Engineering software and database. LBP, University of Stuttgart and thinkstep, 2015.

PCR 2014, Part B

PCR Guidance-Texts for Building-Related Products and Services: Requirements on the EPD for False ceiling and underlay sheeting (version 1.6, 2014)

EN 12310-1:1999

Flexible sheets for waterproofing - Part 1: Bitumen sheets for roof waterproofing; determination of resistance to tearing (nail shank)

EN 12311-1:1999

Flexible sheets for waterproofing - Part 1: Bitumen sheets for roof waterproofing; Determination of tensile properties

EN 1297:2004

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 13501-1:2007+A1:2010

Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

EN 13859-1:2010

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

EN 13859-2:2010

Flexible sheets for waterproofing - Definitions and characteristics of underlays - Part 2: Underlays for walls

EN ISO 14001:2004

Environmental management systems - Requirements with guidance for use (ISO 14001:2004 + Cor. 1:2009)

EN ISO 12572:2001

Hygrothermal performance of building materials and products -- Determination of water vapour transmission properties

EN 1849-2:2009

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

Institut Bauen und Umwelt

Institut Bauen und Umwelt e.V., Berlin(pub.):
Generation of Environmental Product Declarations (EPDs);

General Principles

for the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2013/04
www.ibu-epd.de

/ISO 14025/

DIN EN /ISO 14025:2011-10/, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

/EN 15804/

/EN 15804:2012-04+A1 2013/, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

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**Publisher**

Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Tel +49 (0)30 3087748- 0
Fax +49 (0)30 3087748- 29
Mail info@ibu-epd.com
Web www.ibu-epd.com

**Programme holder**

Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Tel +49 (0)30 - 3087748- 0
Fax +49 (0)30 - 3087748 - 29
Mail info@ibu-epd.com
Web www.ibu-epd.com

**Author of the Life Cycle Assessment**

Luxembourg Institute of Science and Technology (LIST)
Avenue des Hauts-Fourneaux 5
L-4362 Esch-sur-Alzette
Luxembourg

Tel +352 275 888 1
Fax +352 275 885 555
Mail info@list.lu
Web <http://www.list.lu/>

**Owner of the Declaration**

Isola AS
Prestermoen 9
N-3946 Porsgrunn
Norway

Tel +47 35 57 57 00
Fax +47 35 55 48 44
Mail isola@isola.no
Web www.isola.com



ANNEX 1

ANNEX 1: Self declaration from EPD owner

Specific Norwegian requirements

1 Applied electricity data set used in the manufacturing phase

The electricity mix for the electricity used in manufacturing (A3) is the electricity grid mix

1500 g CO₂ eqv/MJ (477 g CO₂-ekv./kWh (enova))

<http://www.enova.no/getpage.aspx?menu=587>

2 Content of dangerous substances

X The product contains no substances given by the REACH Candidate list or the Norwegian priority list.

- ☐ The product contains substances that are less than 0.1% by weight given by the REACH Candidate or the Norwegian priority list.
- ☐ The product contains dangerous substances more than 0.1% by weight given in the REACH candidate list or the [Norwegian Priority List](#), concentrations is given in the EPD:

Dangerous substances from the REACH candidate list or the Norwegian Priority List	CAS No.	Quantity (concentration, wt%/FU(DU)).
Substance 1		
Substance n		

3 Transport from the place of manufacture to a central warehouse

Transport distance, and CO₂-eqv./DU from transport of the product from factory gate to central warehouse in Oslo shall be given. The following table shall be included in the EPD:

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy use	Unit	Value (l/t)	CO2-equiv./DU
Boat							
Truck	50	Truck 16 tonn	1000	0,019914	l/tkm	19,91	
Railway							
Rail							
Air							
Total							

4 Impact on the indoor environment

- ☐ Indoor air emission testing has been performed; specify test method and reference; M1, _____
- ☐ No test has being performed
- ☒ Not relevant; specify Not used indoor _____