SUSTAINABILITY CONTRIBUTION DECLARATION

BREEAM® - Building Research Establishment Environmental Assessment Method, NEW CONSTRUCTION 2014

NOWOFOL® Kunststoffprodukte GmbH & Co. KG

Nowoflon®-ET film

NOWOFLON® ET film is a flexible and strong film, made of a fluorinated copolymer. NOWOFLON® ET films are characterized by a number of positive properties, e.g.:

- Excellent mechanical strength, particularly tear strength and tensile strength,
- Excellent weather resistance,
- High transparency to both visible and UV light,
- Due to its anti-adhesive surface the film has got anti-graffiti and self-cleaning properties,
- The film can be coloured or tinted in different shades to meet each customer's specifications,
- Film can be printed with different designs,
- Available as a heat absorbing film (IRcut),
- Flame resistant and self-extinguishing.

This allows them to be used for applications for which only a highly -capable hardwearing and durable material can be used.

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Management

Man 02: Life cycle cost and service life planning
→ To deliver whole life value from investment and promote economic sustainability by recognising and encouraging the use and sharing of life cycle costing and service life planning.

Product information

Specific information	Evidence (quality)
Construction process stage	-
Use stage	**Reference service life** (RSL): 30 years
End of life stage	-

Health and Wellbeing

HEA 01: Visual comfort
→ To ensure daylighting, artificial lighting and occupant controls are considered at the design stage to ensure best practice in visual performance and comfort for building occupants.

Product information

Specific information	Evidence (quality)
Daylighting	Thanks to the transparency of the film, relevant building areas can meet good practice daylight factors and good practice average and minimum point daylight illuminance criteria.
View out	Thanks to the possibility of large-area application, a good view out can be realised in a building.

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HEA 02: Indoor air quality
→ To recognise and encourage a healthy internal environment through the specification and installation of appropriate ventilation, equipment and finishes.

Product information

Minimising sources of air pollution

Item	Value
Test institute / organization	Environmental Institute „*Bremer Umweltinstitut – Gesellschaft für Schadstoffanalysen und Begutachtung mbH*“ (commissioned by Vector Foiltec GmbH)
Test method applied	At 23 °C and a surface specific air throughput rate of 0.5 $m^3/(m^2h)$ and load of 2 m^2/m^3.
SVOC (C16 – C22)	< 5 µg/m^3
TVOC (C6 – C16, 28 days)	27 µg/m^3 (no formaldehyde, as the film doesn't contain any; CAS nr. is 74499-71-1)
Criteria	Committee for Health-related evaluation of Building Products (AgBB) 2010

Energy

Not relevant for this product (only for products that use energy).
- Variant IRcut film absorbs heat into the film whilst providing high transparency, so that heat gain in the interior is reduced. Therefore considerable savings in air-conditioning are possible
- Similar savings in air-conditioning are possible due to pigmentation or printing.

Water

Not relevant for this product (only for products that use water).

Materials

Mat 01: Life cycle impacts
→ To recognise and encourage the use of construction materials with a low environmental impact (including embodied carbon) over the full life cycle of the building.

Product information

Description	Value
EPD Program Operator	-
Author of the LCA	thinkstep AG, Hauptstraße 111-113, 70771 Leinfelden-Echterdingen, Germany
System boundaries	Cradle-to-gate (A1-A3)
Declared unit	1 m^2 (90 µm; 0.157 kg/m^2)*
Green guide rating	No generic Green guide rating available.

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Declared modules (EN 15804)	A1 - A3 (Product stage)
Results of the LCA – ENVIRONMENTAL IMPACTS	
GWP [kg CO_2-eq.]	1.88E+00
ODP [kg CFC11-eq.]	2.90E-07
AP [kg SO2- eq.]	6.14E-03
EP [kg PO43- eq.]	4.83E-04
POCP [kg Ethen eq.]	4.57E-04
ADPE [kg Sb- eq.]	5.66E-06
ADPF [MJ]	3.28E+01
Results of the LCA – RESOURCE USE	
PERE [MJ]	3.12E+00
PERM [MJ]	0
PERT [MJ]	3.12E+00
PENRE [MJ]	1.87E+01
PENRM [MJ]	1.44E+01
PENRT [MJ]	3.31E+01
SM [MJ]	0
RSF [MJ]	0
NRSF [MJ]	0
FW [MJ]	1.25E-02
Results of the LCA – OUTPUT FLOWS AND WASTE CATEGORIES	
HWD [kg]	6.01E-03
NHWD [kg]	3.19E-02
RWD [kg]	1.66E-03
CRU [kg]	0
MFR [kg]	0
MER [kg]	0
EEE [MJ]	0
EET [MJ]	0

Note: *Detailed names of the given abbreviations can be found in the Glossary.*
**The LCA results can be scaled as an approximation on a linear basis according to the thickness or surface weight (e.g. for results for the thickness of 100 µm all results have to be multiplied by 1.11 (=100/90)).*

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Mat 05: Designing for durability and resilience
→ To recognise and encourage adequate protection of exposed elements of the building and landscape, therefore minimising the frequency of replacement and maximising materials.

Product information

Item	Description
Durability improvement	Maintenance is recommended in order to guarantee the longevity of the material; it is a very durable product. It is self-cleaning if rain falls on it; otherwise maintenance instructions are provided upon request. Reference service life: 30 years.

Mat 06: Material efficiency
→ To recognise and encourage measures to optimise material efficiency in order to minimise environmental impact of material use and waste-optimisation.

Product information

Specific information	Evidence (quality)
Adoption of alternative means of design/construction that result in lower materials usage and lower wastage levels including off-site:	Thanks to the extremely lightweight film, less supporting substructure is requiredrelative to normal glazing. This leads to a higher material efficiency for the whole building.

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Waste

Wst 01: Construction waste management
→ To promote resource efficiency via the effective management and reduction of construction waste.

Product information

Specific information	Evidence (quality)
Reduction of construction waste	Construction waste is reduced to nearly zero as the film is cut exactly into the required sizes at the factory.

Wst 06: Functional adaptability
→ To recognise and encourage measures taken to accommodate future changes of use of the building over its lifespan.

Product information

Specific information	Evidence (quality)
Functional adaptability	The film can easily be reused if e.g. the façade shall be remodelled; the same films can be put again on different frames or structures.

Pollution

Not relevant for this product, because the film does not emit any substances.

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General Information

Company name:	NOWOFOL® Kunststoffprodukte GmbH & Co. KG
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Date:	0902.2016

Technical data

Following technical data at delivery state are relevant for the declared product:

Name	Thickness [µm]	Surface weight [kg/m²]
Nowoflon®-ET film	12-400*	21-700*
Composition	100 % ETFE	(CAS number 74499-71-1)

**The LCA results can be scaled on a linear basis according to the thickness or surface weight.*

Structural data for an exemplary thickness of 200 microns and a base weight of 350 g/m²:

Name	Value	Unit
Melting range (ASTM D 4591-07)	265±10	°C
Tensile strength (DIN EN ISO 527-1)	> 40	N/mm²
Strain at 10 % elongation (DIN EN ISO 527-1)	> 18	N/mm²
Elongation at rupture (DIN EN ISO 527-1)	> 300	%
Tear growth resistance (DIN 53363)	> 300	N/mm
Weld seam strength (DIN 527-1)	≥ 33	N/mm²
Weatherability (ISO 4892-1)	No change of mechanical values.	

Glossary

GWP	Global warming potential
ODP	Depletion potential of the stratospheric ozone layer
AP	Acidification potential of land and water
EP	Eutrophication potential
POCP	Formation potential of tropospheric ozone photochemical oxidants
ADPE	Abiotic depletion potential for non-fossil resources
ADPF	Abiotic depletion potential for fossil resources
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials
PERM	Use of renewable primary energy resources used as raw materials
PERT	Total use of renewable primary energy resources
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials
PENRM	Use of non-renewable primary energy resources used as raw materials
PENRT	Total use of non-renewable primary energy resources
SM	Use of secondary material
RSF	Use of renewable secondary fuels
NRSF	Use of non-renewable secondary fuels
FW	Use of net fresh water
HWD	Hazardous waste disposed
NHWD	Non-hazardous waste disposed
RWD	Radioactive waste disposed
CRU	Components for re-use
MFR	Materials for recycling
MER	Materials for energy recovery
EEE	Exported energy per energy carrier (electric)
EET	Exported energy per energy carrier (thermal)