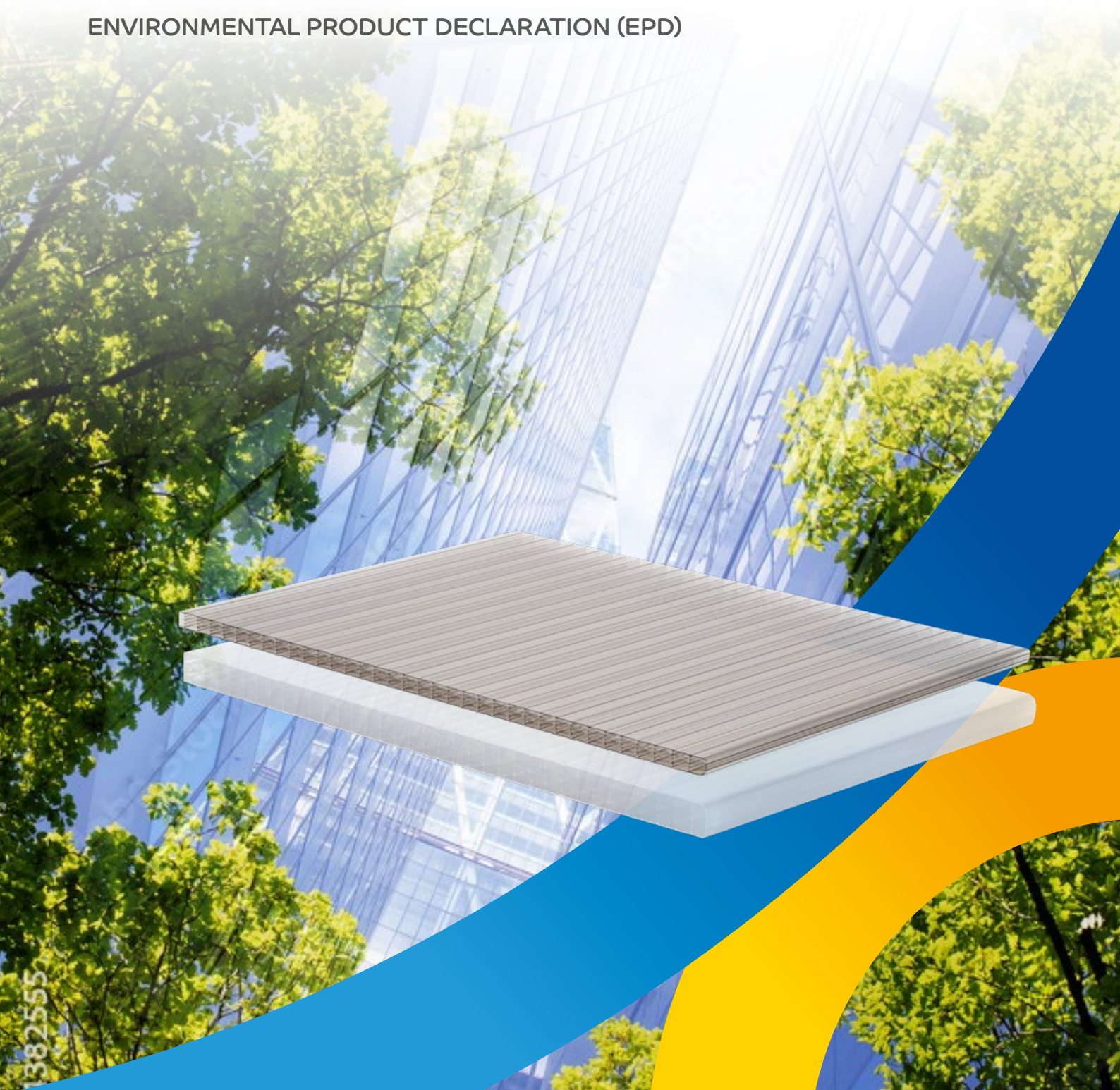
CHEMISTRY THAT MATTERS™

LEXAN™ THERMOCLEAR™ MULTIWALL SHEET

ENVIRONMENTAL PRODUCT DECLARATION (EPD)



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ABOUT THIS EPD

Declared Product:	**LEXAN™ THERMOCLEAR™ Multiwall Sheet**
Issue Date:	July 2022
Validity:	5 years from the date of publication
PCR (Product Category Rule):	EN 15804:2012 + A2:2019
Third Party Verification:	In accordance to EN ISO 14025 and relevant PCR Conforms to EN15804+A2 Verifier: Bernd Brandt, bernd@brandtconsulting.eu

DESCRIPTION

An Environmental Product Declaration (EPD) is a document, which transparently communicates the environmental performance or impact of any product or material over its lifetime.

PRODUCT INFORMATION

PRODUCT DESCRIPTION

LEXAN™ THERMOCLEAR™ Multiwall polycarbonate sheets combine a high level of mechanical, optical and thermal properties, which can be used for a wide range of applications.

PRODUCT COMPOSITION AND CONTENT

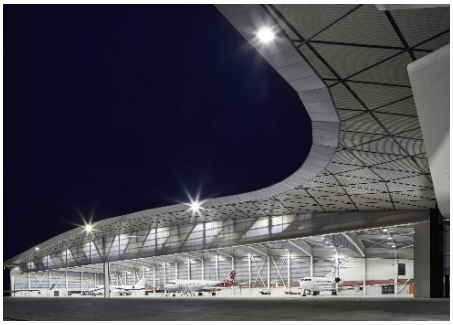
The product does not contain materials listed in the “Candidate list of Substances of Very High Concern for authorization” in a concentration over 0,1% (w/w).

PRODUCTION PROCESS AND TECHNOLOGY

LEXAN™ THERMOCLEAR™ Multiwall Polycarbonate sheets are produced via an extrusion process. Polycarbonate pellets are compounded to a melt, which is transformed to a sheet shape through a calibration process.

Table 1 Composition of the product in percentages

Components	Composition/content/ ingredients	Quantity (range)
Product	Polycarbonate granulates	80 - 90%
	Regrinded polycarbonate granulates	10 - 15%
	UV-additives	1 - 1.5%
	Pigments (white, grey, brown/bronze, blue, violet, red)	0.02 - 1.1%



TECHNICAL DATA / PHYSICAL CHARACTERISTICS

Table 2 Technical properties of the product

Technical property	Standard	Value/unit	Comment
Reaction to fire	EN 13501-1	B-s1, d0	Test according EN 13823 up to 32mm
Dimensional tolerances	EN 16153	Pass/Fail	
Small hard body impact resistance	EN ISO 6603-1	Pass/Fail	
Solar energy transmittance (g)	EN 410	%	Depending on colour and thickness.
Light transmittance "τ_v"	EN 14500	%	Depending on colour and thickness.
Durability (YI and LT)	EN 16153	ΔA clear, ΔD coloured	YI [2 (ΔA) ; 5 (ΔD)] LT[2 % (ΔA and ΔD)]
Thermal transmittance (U value)	EN ISO 6946	0,9 – 3,5 W/m²K	Depending on structure and thickness
Linear thermal expansion	ISO 11359-2	65.10^{-6} K^{-1}	Coefficient

LIFE CYCLE STAGE AND MODULES

Description of the system boundary (X = Included in LCA; MND = Module not declared)																
Product stage			Construction installation stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Construction installation stage	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	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

LCA (LIFE CYCLE ASSESSMENT)

The LCA study was performed by EPSE and ENPERAS/VITO according to the ISO 14040 and ISO 14044 (data inventory) standards (ISO, 2006). The European electricity mix (consumption mix + import) has been used to model electricity use in the life cycle stages. Ecoinvent 3.6 database (June 2019, Wernet et al., 2016) was used for this study.

Declared Functional Unit (FU) is the production of 1 kg of a "Multiwall Polycarbonate sheet". LEXAN™ THERMOCLEAR™ Multiwall sheets are typically available in thicknesses up to 50 mm.

Table 3 Conversion factors of LEXAN™ Multiwall Polycarbonate Sheet

Thickness	Weight (kg/m²)	Conversion factor	Thickness	Weight (kg/m²)	Conversion factor
6	1.3	0.77	25	3	0.33
8	1.5	0.67	30	3.3	0.29
10	1.7	0.59	32	3.5	0.29
16	2	0.5	35	3.8	0.26
20	2.4	0.42	40	4	0.25
22	3	0.33	50	4.5	0.22

GWP TOTAL - POTENTIAL ENVIRONMENTAL IMPACT

*Table 4 Total **G**lobal **W**arming **P**otential (standard unit for measuring carbon footprint)*

Impact category	Units	Total
GWP-Total	kg CO_2 equiv./FU	6.08

Included is:

Product Stage: A1, A2, A3
Installation stage: A4
End of life Stage: C1, C2, C3, C4



INFORMATION ON BIOGENIC CARBON CONTENT

There is no biogenic carbon content in the product. Uptake of biogenic CO_2 within the pallets and the carton is reported in module A3, release in module A5.

	Biogenic carbon content (kg C / FU)
Biogenic carbon content in product (at the gate)	0,00E+00
Biogenic carbon content in accompanying packaging (at the gate)	7,58E-02

This EPD is valid for products sold globally, produced in Europe.

REFERENCES

- Datasheets www.sabic.com/ff
- ISO 14040:2006: Environmental Management-Life Cycle Assessment-Principles and framework.
- ISO 14044:2006: Environmental Management-Life Cycle Assessment-Requirements and guidelines.
- ISO 14025:2006: Environmental labels and Declarations-Type III Environmental Declarations principles.

- EN 15804+A2:2019. CEN TC350. Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products. European standard.
- European Commission, PEFCR Guidance document, - Guidance for the development of Product Environmental Footprint Category Rules (PEFCRs), version 6.3, December 2017.
- Life cycle assessment for solid and multiwall polycarbonate sheets produced by the European Polycarbonate Sheet Extruders (EPSE); December 2021.

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LEXAN™ Polycarbonate Sheet Tough Virtually Unbreakable

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