

Product data sheet, July 2013

Makrolon® multi UV 5X/16-25 ES

Multiwall polycarbonate sheet



Your benefits:

- high stiffness
- good heat insulation
- excellent load bearing

Makrolon® multi UV 5X/16-25 ES (extra strong) is a 5-wall polycarbonate sheet of 16 mm thickness, with an X-structure for enhanced stiffness. It combines high light transmission, good load bearing properties, good thermal insulation and excellent weather resistance. The sheet is lightweight, impact resistant and easy to install.

Makrolon® multi UV 5X/16-25 ES is ideal for flat glazing applications. It can also be installed as cold curved barrel vault.

- industrial glazing
- sports halls
- roofing

The sheets are produced with a coextruded UV-protective layer, which is homogeneously fused with the sheet material. This UV-protected side must be installed facing upwards/outwards. It provides **Makrolon® multi UV** with a highly effective protection against weathering, guaranteed for 10 years.

On request:

IQ-Relax

Makrolon® multi IQ-Relax are opal white sheets, which dramatically reduce the heat of the sunlight, allowing the visible light to pass through. More light, less heat!

ClimateControl CC

Makrolon® multi UV 5X/16-25 CC are transparent coloured sheets. The sheets substantially reduce high temperatures caused by sunlight as they block out selectively the majority of infrared light.

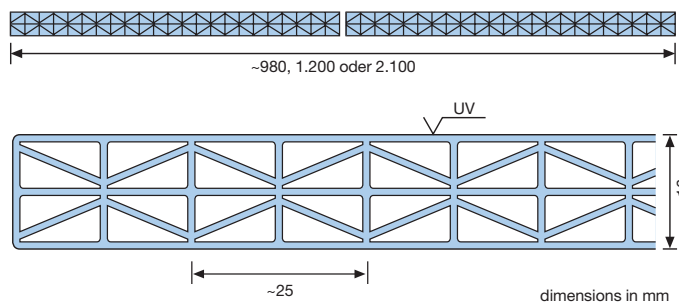
Two side UV-protection

TECHNICAL DATA (TYPICAL VALUES)		
Area weight	2.7 kg/m ²	
Sheet width	980, 1,200 and 2,100 mm	
Possible delivery lengths	2,000 to 15,000 mm	
Minimum permissible cold-bending radius ⁽¹⁾	2,400 mm	
Light transmittance τ_{D65} (UV-absorbing)	clear 1099: white 1146: IQ-Relax: bronze 1845:	ca. 70 % ca. 55 % ca. 47 % ca. 26 %
Total energy transmission g	clear 1099: white 1146: IQ-Relax: bronze 1845:	ca. 62 % ca. 54 % ca. 44 % ca. 45 %
Heat transfer coefficient U _g ⁽²⁾	2.0 W/m ² K (vertical application) 2.1 W/m ² K (horizontal application)	
Coefficient of thermal expansion α	0.065 mm/m °C	
Possible expansion due to heat and moisture	3 mm/m	
Max. service temperature without load	120°C	
Weighted sound reduction index	18 dB	
Fire rating ⁽²⁾		
• Europe	clear 1099, white 1146 bronze 1845	} B-s1, d0 (EN 13501-1)
• France	clear 1099 IQ-Relax, white 1146	
		M1 M2

⁽¹⁾ The cold-bending must be parallel to the ribs of the sheets, never crosswise (risk of buckling). The sheets can be cold bent at a min. radius of 150 times of the sheet thickness. There may appear an optical distortion of the internal layers. This has no negative influence on the mechanical properties of the product providing our guidelines and installation tips are followed correctly.

⁽²⁾ Fire certificates are limited in time and scope, always check if the mentioned certificate is valid for the purchased Polycarbonate sheet type at the date of delivery. Polycarbonate sheets may change their fire behavior due to ageing and weathering. The indicated fire rating was tested on new / unweathered Product in accordance with the indicated fire classification standards, except for Product rated "B1" in accordance with DIN 4102.

⁽³⁾ Heat transfer coefficient U_g according to EN ISO 10077-2 ⁽³⁾



Product Liability Clause: This information and our technical advice – whether verbal, in writing or by way of trials – are given in good faith but without warranty, and this also applies where proprietary rights of third parties are involved. Our advice does not release you from the obligation to verify the information currently provided – especially that contained in our safety data and technical information sheets – and to test products as to their suitability for the intended processes and uses. The application, use and processing of our products and the products manufactured by you on the basis of our technical advice are beyond our control and, therefore, entirely your own responsibility. Our products are sold in accordance with the current version of our General Conditions of Sale and Delivery.

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Bayer MaterialScience S-Line, the standard product line, represents a range of certified quality products which offer the reliable solution for most applications.

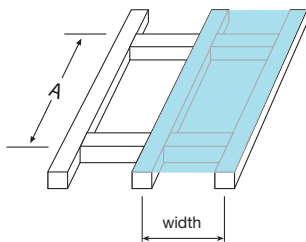
If **Makrolon® multi UV 5X/16-25 ES** is used in applications of roofing or walling, the forces applied by wind and snow loads must be absorbed by a suitable sub-structure. We recommend taking the support distance for each load from the diagram.

The diagram shows the load bearing capacity for **Makrolon® multi UV 5X/16-25 ES** (supported on all sides, rebate depth ≥ 20 mm). If the rebate depth is smaller, the support distances should be reduced suitably for the given load. For pure wind loads the loads may be increased by a factor of 1.1.

If sufficiently stable profiles are used, the load increases by a factor of 1.2. 1,050 mm width is measured in a two-field arrangement of a 2,100 mm wide sheet. You can find further sheet widths and statements on barrel vaults in the Technical Manual.

Load bearing characteristics (determination):

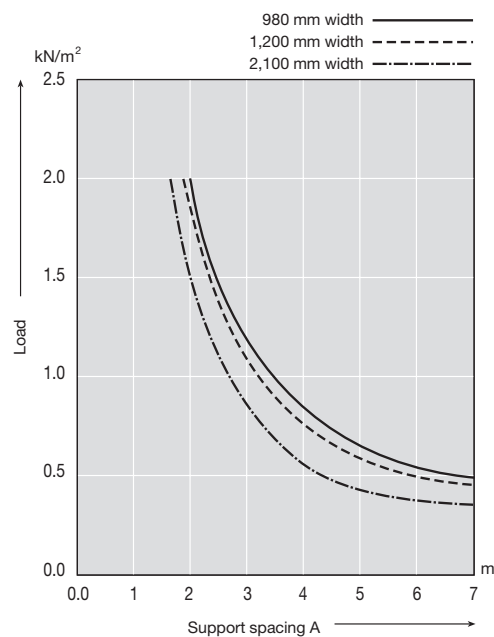
The system resistance (boundary state of load bearing capacity) of **Makrolon® multi UV 5X/16-25 ES** was determined in accordance with European guideline ETAG 10 (European Technical Approval on "self-supporting light-transmitting roofing systems", which came into force in September 2002) in real tests. The characteristic values of system resistance were determined in an unfavorable system, i.e. the sheets were not fixed, but laid loosely. The loads are applied as uniformly distributed linear loads, i.e. load components acting vertically on the sheet, e.g. snow.



These values are guide values, which were determined in extensive tests on real systems carried out by the KPF in Erkelenz/Germany (testing, monitoring and certification centre recognized by the building inspectorate). Adequate safety values, which should be assessed on a case-by-case basis, are to be observed with regard to these values.

In general, experience has shown that a safety factor of 1.3 is adequate with regard to the measured resistance values. This safety factor is included in the load table and the diagram.

These statements do not replace the specified national certificates, e.g. building inspectorate approval (Bauaufsichtliche Zulassung Germany), Avis Techniques (France), etc.



Load	kN/m²	0,75	1,0	1,25	1,5	2,0	Width in mm
Length or support spacing A	m	4,4	3,4	2,9	3,1	2,0	980
	m	4,0	3,3	2,8	2,4	1,9	1.200
	m	3,2	2,7	2,3	2,0	1,8	2.100

Bayer MaterialScience also produces solid sheets in polycarbonate (Makrolon® GP) and in polyester (Vivak® and Axpert®). For more information, take a look at www.bayersheeteurope.com.



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