Warranty, April 2005

Makrolon® multi UV
Multiwall polycarbonate sheet

10 years warranty against weathering and hail

This warranty covers the all configurations and standard weights of sheets with thickness ≥ 6mm. It applies to Makrolon® multi UV sheets with or without a no drop coating.

Warranty statements

1. Makrolon® multi UV retains its light transmission
This means that the sheets suffer a maximum loss of light transmission of 4 per cent points within 10 years of delivery. The transmittance is measured on clean, unscratched specimens according to DIN 5036.

2. Makrolon® multi UV retains its rigidity
This means that sheets will have a modulus of elasticity of ≥ 2100 MPa after 10 years. This elastic modulus is measured in the tensile test according to ISO 527 at 23°C, as the average value established for 5 specimens with parallel faces which have been conditioned to the equilibrium state in the standard climate of 23°C and 50% RH.

3. Makrolon® multi UV does not turn brittle and retains its strength
This means that the sheets have a tensile strength of σy ≥ 50 MPa after 10 years. This strength is determined in the tensile test according to ISO 527, at 23°C, as the average value established for 5 unscratched specimens with parallel faces which have been conditioned to the equilibrium state in the standard climate of 23°C and 50% RH.

4. Makrolon® multi UV will not be broken by hail during the warranty period
Breakage by hail within the meaning of this warranty is defined as at least 5 holes at different points in the surface of the multiwall sheets, produced by 10 shots during the hail simulation test described below.

Hail simulation test
Pellets of 6.6 polyamide with a diameter of 20 mm (weight approx. 4.5 g) are shot against the weathered surface at a speed of 21 m/s, corresponding to a kinetic energy of 1 joule, at room temperature.

Note
According to an expertise, a natural hailstone of 23 mm in diameter has an average impact velocity of 17 m/s and a kinetic energy of 1 joule. Furthermore, a hailstone study has established that the average frequency of hailstones of more than 10 mm in diameter, e.g. in the Stuttgart area (Germany), is only approx. 2.9%. Hailstones of a greater diameter are even less frequent.

Conditions of warranty

Makrolon® multi UV multiwall sheets

- have to be stored, transported, fabricated and installed (or used) in a manner that suits the material,
- must not be (adversely) affected by connecting, fastening and sealing elements,
- have to be protected against aggressive chemicals,
- must not be thermoformed,

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- may only be exposed to the weather on the UV side, not on both sides (e.g. vertical glazing),
- must not be scratched or abraded.

This warranty applies throughout Europe.

Note
For reasons of testing technique it is impossible to establish characteristic material values on complicated profiles with sufficient accuracy. Therefore, specimens with parallel faces are cut out of the skins in the direction of the webs to measure the transmittance, modulus of elasticity and tensile stress at yield. Specimen surfaces obtained by mechanical treatment must be polished.

Applicability

A complaint under this warranty will be considered,

a) if caused within the warranty period despite demonstrable observance of the conditions of warranty,
b) if made without delay during the warranty period, and
c) if an invoice issued by the salesperson is presented, showing the name and address of the buyer, the purchase date, complete product description and number of sheets purchased.

If the complaint is justified, we will replace the material free of charge ex works as stipulated below.

If, for some reason, replacement material cannot be supplied, the customer will be refunded with the original purchase price according to the same pattern. Further claims are ruled out.

Replacement of faulty material

Period after purchase date	Percentage replaced in	
	case of weathering damage	case of damage by hail
up to 5 years	100 %	100 %
within 6th year	75 %	50 %
within 7th year	60 %	40 %
within 8th year	45 %	30 %
within 9th year	30 %	20 %
within 10th year	15 %	10 %

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