

# MAKROTECH®



MAKROTECH® is a range of coloured opaque polycarbonate sheet. It is based on Arla Plast AB's long experience of producing PC sheet in mono, co- and even tri-extrusion. Extremely high impact strength and high temperature resistance are the main advantages of PC compared to other thermoplastic materials.

#### Qualities:

- High temperature resistance
- Light weight compared to glass
- Excellent impact strength
- Good fire behaviour classification
- Usable over a wide temperature range
- Can easily be formed into gentle curves
- Excellent thermoforming properties

MAKROTECH® is available in following variants:

#### MAKROTECH® UV

MAKROTECH® UV is a fully UV-protected coloured polycarbonate sheet that provides new opportunities for the outdoor use of PC.

#### MAKROTECH® FR

MAKROTECH® FR is a flame retardant coloured polycarbonate sheet based on 100% Lexan 950 resin. This material contains the latest halogen free\* flame retardant additives. A yellow card on the base material is available on the UL website, (\*according to DIN VDE 472 part 815).

#### MAKROTECH® FA

MAKROTECH® FA is an extruded polycarbonate sheet made from a special resin complying with food contact regulations governed by the U.S. Food and Drug Administration and EC Directives.

#### Application areas:

MAKROTECH®, is especially suitable for thermoforming applications where impact strength within a wide temperature range is of great importance.

#### Available in:

Standard colours and colour matched versions with smooth or textured surface.

**Standard colours:** (min 1 ton\*\*) White, Offwhite, Beige, Grey (4), Green, Yellow, Blue (2), Brown, Red, Black.

**Special colours:** (min 1 ton\*\*) Matched Colours\*\*\*

#### Cases above:

Industrial door  
Windshield wiper panel

#### ARLA PLAST AB

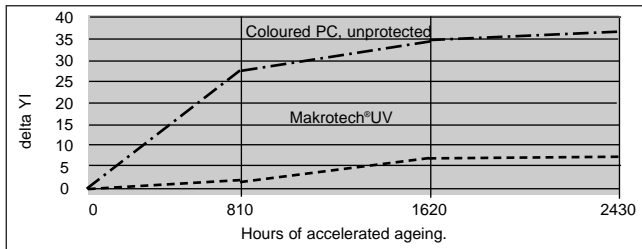
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\*\* The minimum quantities are to start production, if there are existing orders of the specific colour it is possible to ask for less quantities.

\*\*\*Colour Matching Service (min. 3 weeks to production).

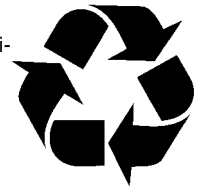
# Makrotech® UV - Outdoor Properties

For outdoor applications, Makrotech UV is recommended. The diagram shows the colour stability of Makrotech® UV compared to normal unprotected polycarbonate.



# Recycling

Recycling is a very important part of Arla sheet business and in general we can offer all possibilities in this field. Our total recycling concept, covering all types of Makrotech® will help you minimise the material costs. Off-cuts from Makrotech, sheet can be re-used in new sheet and together with co.-extrusion of virgin material, all quality requirements can be fulfilled. Please contact Arla for more details.



**Yellowing of white Makrotech during accelerated ageing.** Cycles of 8h QUVA light at 60°C and 4h of condensation at 50°C. Yellowing measured as delta yellowness, delta YI, according to ASTM E 313.

Property a)	Value			Unit			Standard		
	MT	FA	FR	MT	FA	FR	MT	FA	FR
<b>Mechanical Properties</b>									
Tensile Strength at Yield (at Break)	60	63 (70)	63	MPa	Mpa	MPa	ISO 527	ISO 527	ISO 527
Tensile Elongation at Yield (Break)	6	6 (110)	6(110)	%	%	%	ISO 527	ISO 527	ISO 527
Tensile Elongation at break	>50			%			ISO 527		
Elastic Modulus	2300	2300	2350	MPa	Mpa	MPa	ISO 527	ISO 527	ISO 527
Flexural Strength	90			MPa			ISO 178		
Flexural Modulus	2300	2300	2300	Mpa	Mpa	MPa	ISO 178	ISO 178	ISO 178
Izod Impact, notched +23 °C	60	65	15	kJ/m2	kJ/m2	kJ/m2	ISO 180	ISO 180/1A	ISO 180/1A
Izod Impact, unnotched -30 °C	10	10	NB	kJ/m2	kJ/m2	kJ/m2	ISO180	ISO 180/1A	ISO180/1U
Rockwell hardness		M70						ISO 2039-2	
<b>Thermal Properties</b>									
Linear coefficient of thermal expansion (23 - 80°C)		0,70			10 <sup>-4</sup> x K <sup>-1</sup>				
Vicat softening temp. B120	149		145	°C		°C	ISO 306		ISO306
Heat deflection temp. (HDT A 1,80N/mm 2)	132		127	°C		°C	ISO 75		ISO 75
<b>Physical Properties</b>									
Density	1,20	1,20	1,20	g/cm3	g/cm3	g/cm3	ISO 1183	ISO 1183	ISO 1183
<b>Fire Properties <sup>*)</sup></b>									
Flammability 1,14 mm		HB			Class			UL 94	
Flammability 1,5 mm			V0			Class			UL94/IEC60707
Flammability 1,6 mm	HB			Class			UL 94		
Flammability 3,05 mm			5VA			Class			UL 94/IEC60707
<b>Food contact regulations (resin)c)</b>									
USA (FDA) Code of Federal Regulations, Title 21 PAR.177.1580.		Complies							
European Union EC Directive 90/128/EEC of 23.02.1990 as amendedd)		Complies							

## Delivery Programme

	MAKROTECH®	MAKROTECH® FA	MAKROTECH® FR
Standard size	1250x2050 mm	1250x2050 mm	1250x2050 mm
Max. Width	1450 mm	1450 mm	1450 mm
Tolerance, Length & Width	+5 -0 mm	+5 -0 mm	+5 -0 mm
Min. thickness	1.1 mm	1.3 mm	2 mm
Max thickness	8 mm	8 mm	6 mm
Tolerance, thickness	+ 0,0/-0,2 mm	+0,0/-0,2 mm	+0,0/-0,2 mm
Embossings	35, 40, 75 + smooth	35, 40, 75 + smooth	35, 40, 75 + smooth
Colours	Special + 14 standard		All

## Embossings



The above information is based upon experience and given in good faith. Due to many factors which are outside our knowledge and control, no warranty is given or is to be implied with respect to such information.

Arla sheets are produced from resins that are certified according to UL 94. Furthermore, several products have been tested according DIN 4102 (class B1 and B2), DIN 5510 (class S3, SR1 and SR 2, ST1 and ST2), BS 476 part 7 (class 1Y), NF P 92-501 (M2), CSE/75/A (class 1), CSE/RF/3/77 (class 1), UNE 23.727-90 (class M.4). A list of products that have been tested and their respective classification is presented on [www.arla-plast.se](http://www.arla-plast.se). If information regarding classifications according to other standards is needed, it is often possible to retrieve information from our raw material suppliers. Please contact our technical support.