Gammacril s.r.l.
Via Ticino, 76
I - 20014 Nerviano (MI)
Tel. +39 0331 415425
Fax +39 0331 586751
www.gammacril.com

TECHNICAL DATA SHEET

All the data listed below are typical values obtained in standard conditions, at 20 °C room temperature and 50% relative humidity, and should not be used for specifications purposes.

Chemical properties of P.M.M.A., either cast or extruded

In general terms it can be said that our acrylic products are resistant at room temperature to most inorganic chemicals, aliphatic hydrocarbons, cycloaliphatic compounds, fat and oils, and at temperatures up to 60°C they are also resistant to dilute acids as well as dilute and concentrated solutions of most alkalis. Our products can be damaged from the action of chlorinated aliphatic hydrocarbons, ketones, alcohols, ethers, esters and aromatics. However their resistance to the weather conditions is excellent: as proven in a great number of successful outdoor applications, they resist very well to atmospheric agents, such as long term exposure to the sunlight or UV rays, wind and rain or sea water.

Physical properties of cast P.M.M.A.

Mechanical properties	Value	Unit	Standard
Density	1,19	g/cm^3	DIN 53479
Impact strength (standard small test specimen)	12	kJ/m^2	DIN 53453
Notched impact strength (standard small test specimen)	2	kJ/m^2	DIN 53453
Tensile strength (1/1 test specimen 3; V= 5 mm./min)	80	N/mm^2	DIN 53455
Elongation at break (1/1 test specimen 3; V= 5 mm./min)	5,5	%	DIN 53455
Flexure strength (test specimen 80x10x4 mm.)	115	N/mm^2	DIN 53452
Compressive yeald stress	110	N/mm^2	DIN 53454
Modulus of elasticity	3300	N/mm^2	DIN 53457
Dynamic shear modulus at c. 10 Hz	1700	N/mm^2	DIN 53445
Indentation hardness brinell $H_{961/30}$	200	N/mm^2	DIN 53456
Optical properties	**Value**	**Unit**	**Standard**
Transmittance of 3 mm. thick material in the visible range	~ 92	%	DIN 5036
Refractive index n^{20}_D	1,491		DIN 53491
Thermal properties	**Value**	**Unit**	**Standard**
Coefficient of linear thermal expansion (0…50 °C)	$70 - 10^{-6}$	1/°C	VDE 0304/1
Thermal conductivity	0,19	W/m°C	DIN 52612
U-Value at thickness of 3 mm. at thickness of 5 mm. at thickness of 10 mm.	5,6 5,3 4,4	W/m°C	DIN 4701
Forming temperature (oven temperature)	~ 160	°C	
Demoulding temperature	> 80	°C	

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Maximum continuos service temperature	78	°C	
Vicat softening temperature method B	115	°C	DIN 53460
Heat distortion temperature ISO 75, deflection 1,80 N/mm^2	105	°C	DIN 53461
Dimensional stability under heat acc. to Martens method	95	°C	DIN 53458
Electrical properties	**Value**	**Unit**	**Standard**
Volume resistivity	> 10^{15}	Ohm-cm	DIN 53482
Surface resistance	5 –10^{13}	Ohm	DIN 53482
Dielectric strength (test specimen thick 1 mm.)	~ 30	kV/mm	DIN 53481
Dielectric constant at 50 Hz at 0,1 MHz	3,6 2,7		DIN 53483
Dissipation factor at 50 Hz at 0,1 MHz	0,06 0,02		DIN 53483
Tracking resistance	KC>600		DIN 53480
Behaviour towards water	**Value**	**Unit**	**Standard**
Water absorption in weight gain after 24 hrs immersion	0,3	%	DIN 53495

Physical properties of extruded P.M.M.A.

Mechanical properties	**Value**	**Unit**	**Standard**
Density	1,18	g/cm^3	DIN 53479
Impact strength (standard small test specimen)	12	kJ/m^2	DIN 53453
Notched impact strength (standard small test specimen)	2	kJ/m^2	DIN 53453
Tensile strength (1/1 test specimen 3; V= 5 mm./min)	72	N/mm^2	DIN 53455
Elongation at break (1/1 test specimen 3; V= 5 mm./min)	4,5	%	DIN 53455
Flexure strength (test specimen 80x10x4 mm.)	105	N/mm^2	DIN 53452
Compressive yeald stress	103	N/mm^2	DIN 53454
Modulus of elasticity	3300	N/mm^2	DIN 53457
Dynamic shear modulus at c. 10 Hz	1700	N/mm^2	DIN 53445
Indentation hardness brinell $H_{961/30}$	190	N/mm^2	DIN 53456
Optical properties	**Value**	**Unit**	**Standard**
Transmittance of 3 mm. thick material in the visible range	~ 92	%	DIN 5036
Refractive index n^{20}_D	1,491		DIN 53491
Thermal properties	**Value**	**Unit**	**Standard**
Coefficient of linear thermal expansion (0…50 °C)	70 – 10^{-6}	1/°C	VDE 0304/1
Thermal conductivity	0,19	W/m°C	DIN 52612
U-Value at thickness of 3 mm. at thickness of 5 mm. at thickness of 10 mm.	5,6 5,3 4,4	W/m°C	DIN 4701

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Forming temperature (oven temperature)	~ 150	°C	
Demoulding temperature	> 80	°C	
Maximum continuos service temperature	70	°C	
Vicat softening temperature method B	102	°C	DIN 53460
Heat distortion temperature ISO 75, deflection 1,80 N/mm^2	90	°C	DIN 53461
Dimensional stability under heat acc. to Martens method	85	°C	DIN 53458
Electrical properties	**Value**	**Unit**	**Standard**
Volume resistivity	> 10^{15}	Ohm-cm	DIN 53482
Surface resistance	5 –10^{13}	Ohm	DIN 53482
Dielectric strength (test specimen thick 1 mm.)	~ 30	kV/mm	DIN 53481
Dielectric constant at 50 Hz at 0,1 MHz	3,6 2,7		DIN 53483
Dissipation factor at 50 Hz at 0,1 MHz	0,06 0,02		DIN 53483
Tracking resistance	KC>600		DIN 53480
Behaviour towards water	**Value**	**Unit**	**Standard**
Water absorption in weight gain after 24 hrs immersion	0,3	%	DIN 53495

Chemical properties of Polycarbonate

Water is the chemical to which the products are exposed most frequently. High temperature water can cause hydrolytic degradation by attacking the carbonate linkages, breaking the polycarbonate polymer chain, and lowering impact and tensile strength. At standard room temperatures, there is no noticeable loss of properties after many years of contact with water. Contact with water at 60 °C and intermittent contact at temperatures up to 100 °C may have little effect on properties. Severe conditions, such as those in steam autoclaves, however, may alter the clarity and toughness of the polymer faster. Polycarbonate is resistant to dilute mineral and organic acids, animal and vegetable oils and fats and alcohols. Dilute alkaline solutions of sodium carbonate and bicarbonate produce no effect, but ammonium hydroxide and amines degrade the polymer. Exposure to chlorinated, aromatic and aliphatic hydrocarbons, as well as esters and ketones, should be avoided as these are excellent solvents for polycarbonate.

Physical properties of Polycarbonate

Mechanical properties	Value	Unit	Standard
Density	1,20	g/cm^3	DIN 53479
Impact strength (standard small test specimen)	No break	kJ/m^2	DIN 53453
Notched impact strength (standard small test specimen)	20	kJ/m^2	DIN 53453
Tensile strength (1/1 test specimen 3; V= 5 mm./min)	60	N/mm^2	DIN 53455
Elongation at break (1/1 test specimen 3; V= 5 mm./min)	6	%	DIN 53455

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Flexure strength (test specimen 80x10x4 mm.)	95	N/mm^2	DIN 53452
Compressive yeald stress	70	N/mm^2	DIN 53454
Modulus of elasticity	2300	N/mm^2	DIN 53457
Indentation hardness brinell $H_{961/30}$	100	N/mm^2	DIN 53456
Optical properties	**Value**	**Unit**	**Standard**
Transmittance of 3 mm. thick material in the visible range	~ 88	%	DIN 5036
Refractive index n^{20}_{D}	1,586		DIN 53491
Thermal properties	**Value**	**Unit**	**Standard**
Coefficient of linear thermal expansion (0…50 °C)	$68 – 10^{-6}$	1/°C	VDE 0304/1
Thermal conductivity	0,20	W/m°C	DIN 52612
Forming temperature (oven temperature)	~ 195	°C	
Demoulding temperature	> 120	°C	
Maximum continuos service temperature	110	°C	
Vicat softening temperature method B	150	°C	DIN 53460
Heat distortion temperature ISO 75, deflection 1,80 N/mm^2	135	°C	DIN 53461
Dimensional stability under heat acc. to Martens method	125	°C	DIN 53458
Electrical properties	**Value**	**Unit**	**Standard**
Volume resistivity	$> 10^{16}$	Ohm-cm	DIN 53482
Surface resistance	$> 10^{15}$	Ohm	DIN 53482
Dielectric strength (test specimen thick 2 mm.)	> 70	kV/mm	DIN 53481
Dielectric constant at 50 Hz at 1 MHz	2,7 2,7		DIN 53483
Dissipation factor at 50 Hz at 1 MHz	0,001 0,01		DIN 53483
Behaviour towards water	**Value**	**Unit**	**Standard**
Water absorption in weight gain after 24 hrs immersion	0,3	%	DIN 53495