

PMMA homopolymeric and copolymeric in sheet and block form

Product data sheet

CHEMICAL COMPOSITION			
PMMA (polymethyl acrylate)	96-100% depending on compound		
Functional monomers and other additives	0-4% depending on compound		
Estimated molecular weight	between 3.8×10^6 and 9.5×10^6		
Residual constituents of free monomers	<1% (typical 0.45%) depending on compound		
CHARACTERISTICS	Value	Unit of measure	Standard
MECHANICAL			
Density	1.19	g/cm ³	ISO 1183
Impact value	1.8	K/m ²	ISO 180/1A
Tensile strength at 20°C	68	Mpa	ISO 527
Elongation at rupture	4	%	ISO 527
Bending properties	103	Mpa	ISO 178
Compressive strength	103	Mpa	ISO 604
Ball impact strength	166	Mpa	ISO 2039-1
Scratch resistance after grinding wheel test	37	%Haze	ISO 9532
ACOUSTIC			
Acoustic velocity at 20°C	2800	m/s	
Estimated sound insulation value Rw for 10mm	32	dB	
OPTICAL			
Transmittance	92.2	%	DIN 5036/3
UV-translucence	no		
Reflection loss	< 4	%	
Total energy transmission factor g	84	%	DIN EN 410
Absorption in visible range	< 0.05	%	
Optical refraction index	1.49		ISO 489
ELECTRICAL			
Earth resistance	$> 10^{14}$		DIN VDE 0303
Surface resistance	$> 10^{14}$		DIN VDE 0303
Dielectric coefficient at 60Hz	3.5		DIN VDE 0303
Dielectric loss factor at 60Hz	0.065		DIN VDE 0303
BEHAVIOUR IN WATER			
Water absorption 24h 20°C sample 65x65x2mm ³ Max. increase in weight after water absorption	42	mg	ISO 62
	2.2	%	ISO 62
THERMAL			
Linear coeff. of expansion between 0 and 55°C	0.07	mm/m°C	DIN 53572-A
Possible expansion through heat and moisture	7	mm/m	
Thermal conductivity	0.19	W/mK	DIN 52612
Coeff. of thermal conductivity sample 10mm	4.45	W/m ² K	DIN 4701
Specific heat	1.47	J/gK	
Recommended forming temperature	140	C	
Maximum surface temperature	190	C	
Maximal recommended continued use temp.	81	C	
Relaxation temperature	> 85	C	
Auto-inflammation temperature	420	c	
Waste gas volume	low		
Toxicity of waste gases	no		
Corrosivity of waste gases	no		
Material class	B2		
Fire protection class	E		
Vicat-softening temperature	112	C	





CE Safety Data Sheet

PMMA (Polymethyl Methacrylate)

1. Identification elements of the substance / product and the production company

CO-POLYMETHYL-METHACRYLATE

Intended use(s)

Structural applications and mechanical processing with machine tools (milling machines, -depends on inlay-other tools)

2. Composition / Information on the ingredients

Acrylic polymers, obtained by polymerisation of monomer methacrylate

3. Notes on hazards

No special hazards exist.

4. First-aid measures

In the case of eye irritations from contact with milling dust of the polymer, wash the eyes thoroughly with sufficient water. If the problem persists, contact a doctor.

5. Fire-prevention measures

Suitable fire-fighting materials: spray with water, dry chemical powder, CO₂

Unsuitable fire-fighting materials: jets of water

Special protective equipment for fire-fighting measures

Use of breathing apparatus with open or closed cycle

No toxic, irritant or hazardous substances are released during combustion.

6. Measures in the event of leaks

Cleaning / Acceptance procedure

Pick up with a shovel and broom, remove according to regulations.

7. Handling and storage

Handling: due to sharp edges, there is a danger of cuts to the hands

Information on safe use

When processing where chips arise, it is necessary to keep a safe distance away from the machines.

Information on fire and explosion prevention

No special measures

Storage

Instructions for storage and containers: no special information

8. Control of individual exposure / individual protection

Personal protective equipment:

Hygiene measures: the normal hygiene measures necessary must be applied

Respiratory protection: machining can give rise to chips that make use of a dust mask necessary

Gloves: according to standard EN 388, danger of cuts

Glasses: machining can give rise to chips that make use of safety glasses necessary

9. Physical and chemical properties

Appearance of the product

Form: plate or block

Colour: as ordered

Odour: odourless

Other safety data:

Softening > 100°C

Boiling temperature: not applicable

Flash point > 220°C (ASTM D1929-68)

Ignition temperature > 370°C (ASTM D1929-68)

Auto ignition: not determinable

Relative density 1.19 g/cm³ at 20°C

Vapour density: not applicable

Water solubility: not soluble

Fat solubility: not determined

pH value: not applicable

Viscosity: not applicable



10. Stability and reactivity

Thermal degradation (depolymerisation): > 220°C

Hazardous reactions: not known

Hazardous decomposition products: none

11. Toxicological information

The product was not tested for toxicity. According to the analysis of existing literature on analogue polymers, it may be assumed that the product is not toxic and not harmful to health.

12. Information on disposal

Product: the wastes and processing residues are not hazardous. They must be disposed of according to legal regulations and with the approval of the local responsible authorities. The wastes may be disposed of with household waste.

CER waste code

07 02 13 Wastes from the manufacture, formulation, supply and use (MFSU) of plastics, synthetic rubber and man-made fibers - waste plastic

13. Information on transport

According to transport laws, the product is not hazardous.

14. Information on regulations

Labelling according to EU Directive 199/45/EU: not applicable

Further information on labelling

Based on the toxicological and eco-toxicological information available to us on comparable products, labelling is dispensed with in terms of the European Directive 199/45/EU.

Sources

Manuals and publications on the subject

Analyses from other research and branches of industry

The information provided here relates solely to the specific material identified. »acrylic couture« holds this information to be true and reliable at the time of issuing this safety data sheet. »acrylic couture«, however, assumes no explicit guarantee that the information in this data sheet is correct, reliable or complete. It is the responsibility of the customers of »acrylic couture« to perform a full evaluation regarding the suitability of the polymer manufactured by »acrylic couture« for the intended purpose; the same applies for the completeness and correctness of the information contained in this document and its use, in which regard »acrylic couture« has no general or specific competency.

FAQ's & special technical information

What is the difference between »acrylic couture« panels and "acrylic panels"?

Our panels are casted starting by only optical-class methyl methacrylate virgin monomer, manufactured in the EU under EU rules and standards. This is the original and the only monomer, that can be used to manufacture polymethylmethacrylate homopolymer (PMMA) since 1933.

Unfortunately the term "acrylic" authorizes a lot of suppliers to use resins done with large amounts of other monomers, styrene (which is cancerogenic) is the main one. Our panels are produced using 99,7% of MMA and the rest of 0,3% are process additives. Let's say our panels are PURE CAST METHACRYLATES.

PMMA is toxic? Cancerogenic? Mutagenic?

No, PMMA is COMPATIBLE WITH the HUMAN BODY: First class methacrylates can be applied in contact with the human body like a prosthesis: PMMA is skull, bone and teeth replacement material since the 50's. Since our plant produces goods for technical markets, our PMMA was certified according to CE 93/42 (number of authorization IT 0068/QPR-DM/053-2011) for medical use like, for example, orthodontic prosthesis: it passed all tests (cancerogenic, mutagenic, residual monomer, cell growth).

PMMA is recyclable?

Yes, 100%; one of the few plastic materials that can be turned again into monomer in a reliable process called "cracking process". Just to go a bit deeper, PMMA is one of the few materials, that comes back into the original liquid form and can be reused for second choice applications like paints, automotive parts and acrylic textiles or recycled acrylic sheets, good for several purposes.

What is the difference between our panels and some other kind of eco/green/ambient friendly-resin?

It is difficult to simplify this question but... »acrylic couture« panels are produced 99,7% with a 100% recyclable nontoxic monomer. We believe THIS IS GREEN! This raw material costs far more than the recycled one, but guarantees a total traceability of the eventual pollutants (manufacturers of monomer give a certificate of analysis batch after batch) and express evidently more stable and uniform properties. Recycled "materials" (no one, in the end, knows from what raw material source they're done!) contains huge proportion of "recycled plastics". Most of them come from far east plants and contain, evidently, a lot of polymers that are very difficult to control. So batch after batch there are different properties, different compositions and, in the end, different pollutants (styrene, PVC like polymers and antimony and heavy metals like pollutants derived by plastic composition that were allowed to be produced years ago). All our factory wastes are sent to recycling plants with a traced register.

What is main difference between our panels and other "acrylic panels" on the market?

As mentioned above, "acrylic" is a generic name that can hide some dirty secrets: »acrylic couture« panels are CAST METHACRYLATES. Some producers use toxic co-monomers to reduce raw material price, some other producers use granulates (like the one used in paint/extrusion) to enhance the suspension ability of the polymer. These granulates contain plasticizers (most of them mutagenic phthalates), thiols (sulfur containing cancerogenic compounds) and other monomers (mainly some toxic acrylic monomers and styrene). Dissolving these granulates into monomer these compounds are distributed in the polymer matrix and finally in the related panels.

Do we use any plasticizer?

No, no plasticizer (phthalates) or other unsafe monomers are present. All chemicals used are selected by the one approved for human use. Polymers obtained were applied in live cells culture and they fully passed any hazard test.

What about UV?

CAST PMMA is the “leader” of plastic for outdoor use: highly opaque to UV is often stabilized with the economic benzophenones compounds (some of these are suspected carcinogenic). We protect our panels with high-cost FOOD GRADE UV stabilizers. Our panels will not become opaque within 30 years. The most of the polyesters and “eco” panels produced worldwide will last one tenth of this time below the sun reporting quickly hazing and yellowing.

What is Molecular Weight? How this value can affect quality?

Average molecular weight is the average number of monomer joined together for one single polymer chain. As long is the chain, as stable and rigid is the polymer (shiny surface). Just to give some examples, granulates used by some other producers and in the extrusion process have a MW of 100.000-200.000; some eco-resins and some polyesters resin 30.000-50.000; A good European-class cast acrylate must target for 1.200.000 like minimum; »acrylic couture« panels were reported an average molecular weight (Mz) of 3.800.000 Dalton. This value, together with residual monomer concentration, is the responsible of a long lasting polymer.

Residual Monomer? What is this?

As mentioned, our panels are manufactured by pure MMA polymerized entirely in our plants and converted in PMMA; typical residual unconverted monomer present in CAST PMMA ranges by 1,2 till 2% (often above...); our panels were tested during the abovementioned certification to contain an unconverted monomer quantity of 0,37%, an excellent value that can be achieved only if working with all care.

Are our panels fireproof like some of the resins on the market?

No, our panels can be burned. We had to decide if it is better to have a very low-burning ratio panels (emitting only water and CO2 like pollutants) or to realize something that doesn't burn but can kill you with the smokes (halogens, bromide, antimony...). We chose the first option.

Can I use »acrylic couture« panels in contact with chlorinated water? Salt water? Food?

Yes, sure.

How should I clean you panels?

Water and soap. Gasoline, Solvents, Alcohols, strong acids and alkali can damage surface of the panels.

