

Atlac® 580

Tough & impact resistant vinyl ester urethane resin

Components based on Atlac® 580 feature high mechanical strength and exhibit great resistance to chemicals and heat. Atlac® 580 resin very good handling to make strong and durable parts with any fibers made of carbon, aramid, or glass.

Benefits

- No-foaming curing system, even with standard MEKP
- Excellent wet-out with glass, carbon and aramid fibers
- Lower density and low volumetric shrinkage
- Good toughness and impact strength
- Low exotherm, suitable for thick products

Chemical/physical nature

Atlac® 580 is a high-grade bisphenol A vinyl ester urethane resin, which combines exceptional chemical resistance and an outstanding combination of heat resistance and flexibility. Atlac® 580 is especially resistant to alkaline media and hot water. Furthermore Atlac® 580 has very good handling and curing properties.

Major applications

Atlac® 580 can be used in all fabrication methods, and especially adapted to meet the requirements of filament winding, centrifugal casting, pultrusion, hand lay-up and spray-up applications. Extra additional of styrene leads to viscosities which are needed for resin injection moulding techniques. Atlac® 580 may also be formulated for mortars, floor toppings and lining systems based on flake glass or mica. It can be used as gelcoat base resin and laminating resin for use in marine applications.

Principal properties

Atlac® 580 has excellent wet-out and deaeration properties. It produces less foam when standard MEKP are added with less air inhibition, resulting in a tack free cured surface. Atlac® 580 has a low exotherm in curing allowing thick sections to be fabricated. The density of Atlac® 580 resin castings is approximately 10% lower than other resins, also has lower shrinkage after curing.

Due to its urethane incorporation, Atlac® 580 can be thixotropised easily by standard grades of fumed silica and shows an improved compatibility with carbon, glass and aramid fibre reinforcements.

Certifications and Approvals

Cured non-reinforced Atlac® 580 conforms to type 1310 according to DIN 16946/2 and is classified group 5 according to DIN 18820/1 and group 8 according to EN13121/2. Atlac® 580 passed testing at TÜV for use in flue gas cleaning plants.

Liquid resin typical properties

Property	Value	Unit	TM
Density, 23°C	1074	kg/m ³	TM 2160
Flash point	33	°C	TM 2800
Stability, no initiator, dark, 25 °C	6	Month	-

Product Specification

Property	Value	Unit	TM
Appearance	Yellow and hazy	-	TM 2265
Acid Number	5-7	mgKOH/g	TM 2401
Solids content	52.0-58.0	%	TM 2033
Viscosity, 23°C	400-500	mPa.s	TM 2013
Gel time (25 until 35 °C)	33-43	min	TM 2625
Cure time (25°C to peak)	46-61	min	TM 2625
Peak temperature	110-135	°C	TM 2625

Remarks

Reactivity measurement @25°C: 1.0g Butanox® M50(Nouryon) and 1.0g NL63-10P, 2.5 g Accelerator NL 49P (Nouryon) added to 100 g resin.

Properties of cast unfilled resin (typical values)

Property	Value	Unit	TM
Density, 20°C	1110	kg/m ³	ASTM D 792
Tensile strength	83	MPa	ISO 527-2
Tensile E-modulus	3.5	GPa	ISO 527-2
Elongation at break	4.2	%	ISO 527-2
Flexural strength	153	MPa	ISO 178
Flexural E-modulus	3.6	GPa	ISO 178
HDT	115	°C	ISO 75-2
Impact res.-unnotched	15	KJ/m ²	ISO 179-2
Glass transition temp	132	°C	ISO 6721-2
Barcol hardness	40	-	EN 59-2016
Water absorption, 25°C	0.16	%	ISO 62
Water absorption, 100°C	0.22	%	ISO 3117

Curing conditions

Cured with 1.5 g Butanox M50, 0.5 g NL63-10P and 0.5 g Accelerator NL 51P added to 100 g of resin. After 24h at RT followed by post curing for 3 h at 100 °C.

Properties of glass reinforced resin (typical values)

Property	Value	Unit	TM
Laminate Composition	I	II	
Density at 23 °	1,440	-	kg/m ³ ASTM D 792
Glass content	30	44	% ASTM D 2584
Tensile strength	105	162	MPa ISO 527-2
Tensile modulus	7.4	11.9	GPa ISO 527-2
Flexural strength	160	281	MPa ISO 178
Flexural modulus	6.8	10.0	GPa ISO 178
Impact-unnotched	115	-	kJ/m ² ISO 179
Linear thermal expansion	30 × 10 ⁻⁶	-	K ⁻¹ ASTM D 696
Thermal conductivity	0,21	-	W/m.K DIN 52612

Curing conditions and Laminate Composition

Cured with 1.5 g Butanox M50 and 0.5g NL 63-10P + 0.5 g Accelerator NL 51P added to 100 g of resin. After 24h at RT followed by post curing for 3 h at 100 °C. Laminates I were based on 4 layers of CSM (450 g/m²). Laminates II were based on CSM+WR (800g/m²) +CSM+WR+CSM+WR.

Excellent processing performance

Atlac[®] 580 has excellent wet-out and deaeration properties. It produces less foam when standard MEKP are added with less air inhibition, resulting in a tack free cured surface.



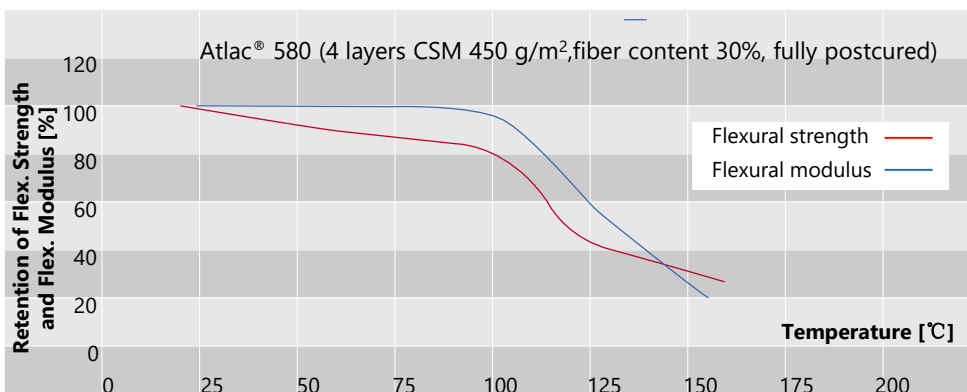
The density of Atlac[®] 580 resin castings is approximately 10% lower than other resins, it also has lower shrinkage after curing.

Density of liquid resin, g/cm ³	Density of fully cured resin, g/cm ³	Volumetric shrinkage
1.074	1.110	3.243%

Excellent wet-out with glass, carbon and aramid fibers more rapidly and completely. Fibre adhesion is better, giving a tougher and more impact resistant composite.

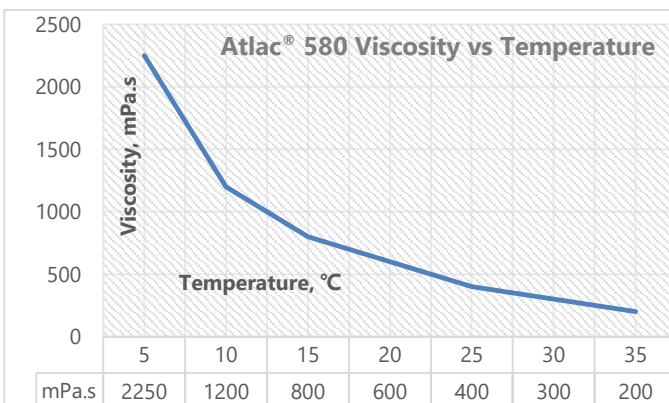


High temperature properties of glass reinforced resin (typical values)



The flexural moduli and strengths of the Atlac[®] 580 resin over a temperature range of 20-180 °C were measured according to ISO-178. The laminates were based on 4 layers of 450 g/m² chopped strand mat with a fibre content of 30% w/w. Standard cure systems have been used and all specimen have been fully postcured.

Atlac[®] 580 Viscosity vs Temperature (typical values)



Atlac[®] 580 Thixotropy

Atlac[®] 580 can be made thixotropic by using the standard (polyester) fumed silica types: Aerosil R 200 or Cab-O-Sil M5 (0.5% - 2%). They should be blended into the resin using a high-shear stirrer (Cowless type). To improve a maximum thixotropic effect, it is recommended to use a wetting agent (e.g. 0.2% w/w Tween 20 – ICI). Thixotropic agents should not be used in laminates intended for service with hypochlorite solutions or fluorine. In this case, sagging can only be reduced to a minimum by very short gel times (20-25 min). In case of Wacker HDK 20 or Aerosil R202, BYK R605 can be used as a wetting agent.

Curing System of Atlac® 580 at room temperature: Peroxide/Cobalt salt

Used curing agents: standard methyl ethyl ketone peroxide (Standard MEKP), Cobalt 6% and dimethylaniline (DMA)

Temperature	10-20 minutes	20-40 minutes	40-60 minutes
15°C	0.5% Cobalt-6	0.5% Cobalt-6	0.5% Cobalt-6
	0.17% DMA	0.10% DMA	0.12% DMA
	1.5% St. MEKP	1.5% St. MEKP	1.0% St. MEKP
20°C	0.3% Cobalt-6	0.3% Cobalt-6	0.3% Cobalt-6
	0.14% DMA	0.08% DMA	0.05% DMA
	1.5% St. MEKP	1.5% St. MEKP	1.5% St. MEKP
25°C	0.3% Cobalt-6	0.3% Cobalt-6	0.3% Cobalt-6
	0.10% DMA	0.05% DMA	0.04% DMA
	1.5% St. MEKP	1.5% St. MEKP	1.5% St. MEKP
30°C	0.2% Cobalt-6	0.2% Cobalt-6	0.2% Cobalt-6
	0.07% DMA	0.02% DMA	0.01% DMA
	1.5% St. MEKP	1.5% St. MEKP	1.5% St. MEKP

Weathering resistance

Atlac® 580 has good weathering resistance. If an ultraviolet (UV) absorber is felt to be necessary, an additional level of 0.2% throughout the laminating resin or 0.2 - 0.5% in the topcoat is effective Recommended UV absorbers are: Tinuvin 320 -Ciba Geigy and Cyanosorb UV 5411 -Cyanamid .

Postcuring

Postcuring is mandatory for food contact applications to reduce residual styrene to the range of 0.01-0.2%, and for some of the chemical mediums in AOC Chemical Resistance Guide to obtain the optimum chemical resistance and the longest service life of the Atlac® 580. Post curing is required to achieve complete cure with BPO/DMA within one week of lamination . Recommended postcure conditions are 3 to 6 hours at 90 to 100 °C – longer times and adjusted postcure schedules being required for thicker laminates and/or more complex shapes. Lower temperatures are ineffective; higher temperatures can lead to embrittlement.

Top Coats

Topcoats applied as final layer in linings for the outside surface of floor topping, pipes and vessels, must contain paraffin wax to obtain full cure. Atlac® 580 requires only 0.2% addition of wax (1/3 of the amount needed for conventional resins). The wax should have a melting point of 54-57°C and is best added into the resin as a 10% solution in styrene. Topcoats must be cured quickly for the wax to be effective. Use a MEKP or AAP cure system to obtain a gel time of 15 mins or less. Properly cured topcoats will not become tacky when rubbed with acetone.

Storage Guidelines

The resin should be stored in a dark and dry place at temperatures between 5 °C and 30 °C. Shelf life is reduced when resin is stored at higher temperatures and the properties of the resin might change during storage. The shelf life of styrene containing Vinyl ester will be significantly reduced when exposed to light. Therefore, store in dark and in 100% light tight containers only. Exposure to direct sunlight should be avoided.

Material Safety

A Material Safety Data Sheet of this product is available on request.

Test Methods

Test methods (TM) referred to in the table(s) are available on request.

ISO 9001:2015 Certified

The Quality Management Systems at every AOC manufacturing facility have been certified as meeting ISO 9001:2015 standards. This certification recognizes that each AOC facility has an internationally accepted model in place for managing and assuring quality. We follow the practices set forth in this model to add value to the resins we make for our customers.

About AOC

AOC is the leading global supplier of resins and specialty materials which enable customers to create robust, durable and versatile products and components. With strong capabilities around the world in manufacturing and science, the company works closely with customers to deliver unrivaled quality, service and reliability for today, and create innovative solutions for tomorrow. Partner with AOC and we will work together to find the right solutions for your business.

AOC. Trusted Solutions

Brochures

You can find additional information through the Atlac® Product Guide. For detailed information on the chemical resistance of Atlac® resins, please consult our Chemical Resistance Guide. Both brochures are available for download from the AOC web site: aocresins.com

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