

Technical Data Sheet

Most recent revision date: June 2014

EPIKOTE™ Resin 05475
EPIKURE™ Curing Agent 05443
HELOXY™ Additive 112

Product Description

EPIKOTE™ Resin 05475 is a medium viscosity epoxy resin.

EPIKURE™ Curing Agent 05443 is a low viscosity amine hardener.

HELOXY™ Additive 112 is a silicone- and wax-free internal mold release agent.

Application Areas/Suggested Uses

Low viscous resin system designed for RTM applications with excellent wetting and adhesion characteristics on glass-, carbon- or aramid-fibers. Benefits of this system are a low viscosity during infusion (2 min at 100°C < 150mPas) and a short curing cycle, which allows an early demolding (e.g. 5 min at 120°C).

The EPIKOTE™ Resin 05475 with EPIKURE™ Curing Agent 05443 system is compatible with the internal mold release agent HELOXY™ Additive 112, which can be added in a recommended amount of about 1 - 2 phr.

Typical suggested uses include but are not limited to. the production of structural automotive parts such as parts of the frame or chassis, floor panels, bulkheads monocoque structure, and exterior and visible structural parts such as roof tops, pillars, heads and deck lids.

Benefits

- | Low viscosity during injection
- | Easy to process due to thermolatent behavior
- | Long infusion time (90 sec at 120°C)
- | Fast glass transition temperature (T_g) development
- | Short curing cycle (e.g. 5 min at 120°C)

- | Excellent fibre wetting properties
- | Excellent thermal and mechanical performance
- | Good surface quality for painted parts.

Sales Specifications

EPIKOTE™ Resin 05475

Property	Unit	Value	Test Method
Viscosity at 25°C	mPa·s	8000 - 10000	DIN 53015
Color Gardner		0 - 3	ISO 4630
Refractive index at 25°C		1.569 - 1.575	DIN 51423

EPIKURE™ Curing Agent 05443

Property	Unit	Value	Test Method
Viscosity at 25°C	mPa·s	10 - 20	DIN 53015

HELOXY™ Additive 112

Property	Unit	Value	Test Method
Viscosity at 25°C	mPa·s	1000 ± 500	DIN 53015

Typical Properties

EPIKOTE™ Resin 05475

Property	Unit	Value	Test Method
Delivery form		liquid	
Density at 20°C	kg/l	1.15 - 1.19	ISO 2811

EPIKURE™ Curing Agent 05443

Property	Unit	Value	Test Method
Delivery form		liquid	
Density at 20°C	kg/l	0.97	DIN 16945

HELOXY™ Additive 112

Property	Unit	Value	Test Method
Delivery form		liquid	
Density at 20°C	kg/l	1.03 ± 0.02	DIN 16945
Appearance		yellow/brown	

Processing Details

Mixing ratio

EPIKOTE™ Resin 05475	100 parts by weight
EPIKURE™ Curing Agent 05443	24 parts by weight
HELOXY™ Additive 112	1-2 parts by weight

Mixing tolerance

The maximum allowable mixing tolerance (resin & hardener) is ± 1 pbw, but it is particularly important to preserve the recommended mixing ratio as accurately as possible. Incorrect dosing of the hardener is not an appropriate approach to accelerate or retard the reaction; rather it will lead to an incomplete cure. The reaction speed can be properly adjusted by changing the processing temperature, as indicated below. Resin and hardener must be mixed very thoroughly. Mix until no clouding is visible, pay special attention to the walls and the bottom of the mixing container.

Material preheating

To optimize the process a preheating of the components is recommended.

EPIKOTE™ Resin 05475	60-80 °C
EPIKURE™ Curing Agent 05443	RT-30 °C
HELOXY™ Additive 112	25-30 °C

Processing Temperature and Pot Life

The system exhibits good processing in the temperature range between 80 and 140 °C, and full curing can typically be achieved in 5 minutes cure at 120°C. Higher processing temperatures are possible but will shorten the pot life. A rise in temperature of 10 °C reduces the pot life by approx. 50%. Different temperatures during processing have no significant effect on the mechanical properties of the hardened product.

Do not mix large quantities at elevated processing temperatures as this can lead to an uncontrolled exothermic reaction where the mixture may heat up very quickly to more than 200 °C in the mixing container.

Processing Data		Unit	Value
Viscosity of formulation	at 25°C	mPa·s	1200 ± 100

EPIKOTE™ Resin 05475 and EPIKURE™ Curing Agent 05443 and HELOXY™ Additive 112

	at 80°C	mPa·s	30 ± 5
	at 100°C	mPa·s	13 ± 3
Pot life	at 25°C	min	120 ± 10
Gel time	at 80°C	s	330 ± 30
	at 100°C	s	210 ± 30
	at 120°C	s	150 ± 30
	at 140°C	s	90 ± 30
Viscosity increase after 60s / 120s / 180s	at 80°C	mPa·s	47/63/100
	at 100°C	mPa·s	33/123/1402
	at 120°C	mPa·s	40/865/>100000
	at 140°C	mPa·s	20070/>100000/-

 EP 05475 + EK 05443 + HelAd 112 Figure 1 Viscosity profiles data of formulation

Typical Properties of the cured, non-reinforced system

Cast by hand; curing cycle: 5 min at 120°C

Properties	Unit	Value	Test Method
T _G , DSC			DSC (10K/min)
Onset	°C	118 ± 2	
Midpoint	°C	124 ± 2	
Thermal expansion coefficient	ppm/K	< 75	ISO 11359-2
Tensile test at RT			DIN EN ISO 527-1
Tensile strength	MPa	85 ± 2	
Tensile modulus	MPa	2900 ± 100	
Elongation at break	%	6 - 8	
Bending test at RT			DIN EN ISO 178
Flexural strength	MPa	130 ± 5	
Flexural modulus	MPa	3000 ± 100	
Charpy impact at RT	mJ/mm ²	24 ± 2	ISO 179
Fracture performance at RT			ISO 17281
Fracture toughness K _{1C}	MPa·m ^{-1/2}	0.75 ± 0.05	
Fracture energy G _{1C}	J/m ²	225 ± 5	
Water uptake (7d at 23°C)	%	< 0.4	DIN EN ISO 62
Total shrinkage at RT	Vol. %	< 4	Calculated DIN 16945
Hardness at RT	Shore D	85 - 86	DIN 53505-D
Density at 23°C	kg/l	1.151 - 1.155	DIN 53479 A

Safety, Storage & Handling

Please refer to the MSDS for the most current Safety and Handling information.

EPIKOTE™ Resin 05475 should be stored at room temperature in its carefully sealed original containers. Under these conditions the shelf life is a minimum of three years from date of certification.

EPIKURE™ Curing Agent 05443 should be stored at room temperature in its carefully sealed original containers, so that moisture is excluded. Under these conditions the shelf life is a minimum of two years from date of certification. Care should be taken to avoid storage environments resulting in moisture contamination. Exposure to moisture will cause an increase in viscosity and reactivity, the degree of increase depending on the amount of moisture, which has been absorbed.

HELOXY™ Additive 112 should be stored at room temperature in its carefully sealed original containers, so that moisture is excluded. Under these conditions the shelf life is a minimum of 6 months.

HELOXY™ Additive 112 should not be stored at temperatures above 30°C.

Before use it is necessary to homogenize the material by shaking or stirring.

Occasionally, it is possible that the resin or the hardener crystallize at temperatures below 15°C. The crystallization is visible as a clouding or solidification of the content of the container. Before processing, the crystallization must be removed by warming up. Slow warming up to 50 - 60°C in a water bath or oven and

EPIKOTE™ Resin 05475 and EPIKURE™ Curing Agent 05443 and HELOXY™ Additive 112

stirring or shaking will clarify the contents in the container without any loss of quality. Use only completely clear products. Before warming up, open containers slightly to permit equalization of pressure. Caution during warm up! Do not warm up over open flame! While stirring up use safety equipment (gloves, eyeglasses, respirator equipment).

Contact Information

For further Technical Inquiries on the properties and performance of this matrix system in reinforced composites, please contact us

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