

# GR230

## FAST CURING LIQUID COMPRESSION MOLDING EPOXY

**GR230 is a rapid curing epoxy system designed for use in compression molding applications where flexible working times are required for preforming followed by fast cure times.**

The system has been formulated for longer manual or semi-automated preforming processes the working times required can be significantly longer, up to 60 minutes but still enabling a fast cure of 15 minutes at 130°C and a Tg in excess of 120°C. The increased latency also prevents regular mix head flushing requirements and therefore minimises process waste.

The system has excellent wetting properties to enable the preform to wet-out readily at room temperature without the need for vacuum or other pressured infusion methods.

The system is designed to develop a high Tg of 130°C to meet common performance requirements but also to enable Hot-in Hot-out (HiHo) processing. HiHo processing is critical to optimise press utilization by enabling fast part release and removal from the tool without a cooling cycle. For more complex components a higher press temperature than the developed Tg can be used to accelerate cure time as the parts can still be easily demolded.

In addition to the excellent processing characteristics the system also has very good mechanical performance and hot wet thermal stability. The tolerance to moisture is a key property to minimize post manufacturing distortion and cosmetic appearance.

For further advice please contact Gurit Technical Support.

- Thermally stable up to 130°C (266°F)
- Rapid Cure speed under 15 minutes
- Excellent preforming wetting properties at ambient temperature
- Preform working time up to 60 minutes
- Excellent mechanical properties
- Mix ratio by weight 100:25.6

## INSTRUCTIONS FOR USE

### APPLICATION

The product is optimized for use between 18 - 25°C. At lower temperatures the product thickens and may become unworkable. At higher temperatures working times will be significantly reduced. Maximum relative humidity for use is 70%.

### MIXING AND HANDLING

Accurate measurement and thorough mixing are essential when using this system, and any deviation from the prescribed mix ratios will seriously degrade the physical properties of the cured system.

The resin and hardener must be stirred together well for two minutes or more, with particular attention being paid to the sides and bottom of the container. As soon as the material is mixed the reaction begins. This reaction however slow with this system produces heat (exothermic), which can in turn accelerate the reaction. If this mixed material is left in a confined mixing vessel the heat cannot disperse and the reaction can become uncontrollable.

Gurit produces a separate full Safety Data Sheet for each component of this system. Please ensure that you have the correct SDS to hand for the materials you are using before commencing work. Any accidental spillage should be soaked up with sand, sawdust, cotton waste or any other absorbent material. The area should then be washed clean (see appropriate Safety Data Sheet).

### APPLICATION

GR230 resin is used with its specific hardener and is intended for use in closed mold processing where heat and pressure can be applied together. The information provided in the tables in this datasheet should allow the user to achieve a successful result with this system. However, if further information is required please contact Gurit Technical Support.

### CURE SCHEDULE

GR230 is designed to be use in a heat curing process particularly a Hot in / Hot out (HIHO) closed mold process. Optimal curing will be achieved between 130-140°C for durations between 5 and 20 minutes.

The mixed system will remain pourable for 30 mins at room temperature and any assembled preform for a total of up to 60 minutes from mixing.

### TRANSPORT & STORAGE

The resin and hardener should be kept in securely closed containers during transport and storage. Any accidental spillage should be soaked up with sand, sawdust, cotton waste or any other absorbent material. The area should then be washed clean (see appropriate Safety Data Sheet). Adequate long term storage conditions will result in a shelf life, as per table, from the date of manufacture for both the resin and hardeners, see product container label for expiry date.

COMPONENT	UNITS	10 – 25°C
GR230 Resin	Months	24
GR230 Hardener	Months	24

Storage should be in a warm dry place out of direct sunlight and protected from frost. The storage temperature should be kept constant between 10°C and 25°C, cyclic fluctuations in temperature can cause crystallization. Containers should be firmly closed. Hardener, in particular, will suffer serious degradation if left exposed to air. Hardeners may darken over time, however the physical properties are not affected. Be aware of a possible mixed system color change if very old and new hardeners are used on the same project.

## GR230 RESIN & GR230 HARDENER

This product summary is intended for use in conjunction with further advice provided under the Instructions for Use section. All data has been generated from typical production material and does not constitute a product specification.

PROPERTY	UNITS	GR230 RESIN	GR230 HARDENER	MIXED SYSTEM	TEST METHOD
Mix ratio by volume	Parts by weight	100	25.6	-	-
Mix ratio by weight	Parts by volume	100	32.3	-	-
Density at 21°C	g/cm <sup>3</sup>	1.169	0.926	1.11	ISO 1183-1B

## COMPONENT & MIXED SYSTEM PROPERTIES

PROPERTY	UNITS	25°C	TEST METHOD
GR230 Resin viscosity	cP	2000	-
GR230 Hardener viscosity	cP	51	-
Initial mixed system viscosity	cP	590	-
Geltime (150 g, mixed in water)*	hrs:min	00:30	Tecam gel time
Preform working time	hrs:min	01:00	Gurit internal method

## THERMAL PROPERTIES CURE PROGRESSION

PROPERTY	SYMBOL	UNITS	5 MINS @ 130°C	10 MINS @ 130°C	15 MINS @ 130°C	20 MINS @ 130°C	15 MINS @ 140°C	TEST METHOD
Glass transition temp	T <sub>g1</sub>	°C (°F)	97 (207)	114 (237)	121 (250)	121 (250)	125 (257)	ISO 11357 (DSC)

## CURED RESIN PROPERTIES

PROPERTY	SYMBOL	UNITS	15 MINS @ 130°C	TEST METHOD
Glass transition temp.	T <sub>g2</sub>	°C (°F)	121 (250)	ISO 11357 (DSC)
Glass transition temp.	T <sub>g1</sub>	°C (°F)	126 (259)	ISO 6721 (DMA)
Ultimate glass transition temp.	T <sub>g2</sub>	°C (°F)	130 (266)	ISO 11357 (DSC)
Cured density	ρ <sub>CURED</sub>	g/cm <sup>3</sup>	1.150	ISO 1183-1A
Linear shrinkage	-	%	1.18	ISO 1183-1A
Barcol hardness	-	-	41.0	ISO 62
Tensile strength	σ <sub>T</sub>	MPa	87.3	ISO 527-2
Tensile modulus	E <sub>T</sub>	GPa	3.04	ISO 527-2
Flexural strength	σ <sub>F</sub>	MPa	130.0	ISO 178
Flexural modulus	E <sub>F</sub>	GPa	3.12	ISO 178

## CURED LAMINATE MECHANICAL PROPERTIES

PROPERTY	SYMBOL	UNITS	245 g/m <sup>2</sup> 0/90 (0° Warp) 2x2 TWILL WOVEN CARBON FABRIC	TEST METHOD
Resin content (by weight)	%	-	42	-
Cure temperature profile	-	-	15mins @ 130°C (266°F)	-
Cure pressure profile	-	-	Press 6 bar	-
Cured fiber volume fraction	FVF	%	56.1	-
Cured ply density	g/cm <sup>3</sup>	P <sub>ply</sub>	1.50	-
Cured ply thickness	mm	t <sub>ply</sub>	0.24	-
0° tensile strength*	MPa	X <sub>T</sub>	689*	ISO 527-4
0° tensile modulus	GPa	E <sub>T11</sub>	62.9*	ISO 527-4
90° tensile strength	MPa	X <sub>T</sub>	634*	ISO 527-4
90° tensile modulus	GPa	E <sub>T11</sub>	65.6*	ISO 527-4
0° compressive strength	MPa	X <sub>C</sub>	613*	SACMA SRM1-94
0° compressive modulus	GPa	E <sub>c11</sub>	58.7*	SACMA SRM1-94
90° compressive strength	MPa	X <sub>C</sub>	499*	SACMA SRM1-94
90° compressive modulus	GPa	E <sub>c11</sub>	60.3*	SACMA SRM1-94
0° flexural strength	MPa	X <sub>f</sub>	760.5	ISO 14125
0° flexural modulus	GPa	E <sub>F11</sub>	55.7	ISO 14125
0° ILSS	MPa	X <sub>ILSS</sub>	65.4	ISO 14130

\*normalized to 55% fiber volume fraction

## HEALTH AND SAFETY

The following points must be considered:

1. Skin contact must be avoided by wearing protective gloves. Gurit recommends the use of disposable nitrile gloves for most applications. The use of barrier creams is not recommended, but to preserve skin condition a moisturizing cream should be used after washing.
2. Protective clothing should be worn when mixing, laminating or sanding. Contaminated work clothes should be thoroughly cleaned before re-use.
3. Eye protection should be worn if there is a risk of resin, hardener, solvent or dust entering the eyes. If this occurs flush the eye with water for 15 minutes, holding the eyelid open, and seek medical attention.
4. Ensure adequate ventilation in work areas. Respiratory protection should be worn if there is insufficient ventilation. Solvent vapors should not be inhaled as they can cause dizziness, headaches, loss of consciousness and can have long term health effects.
5. If the skin becomes contaminated, then the area must be immediately cleansed. The use of resin-removing cleansers is recommended. To finish, wash with soap and warm water. The use of solvents on the skin to remove resins etc must be avoided.

Washing should be part of routine practice:

- before eating or drinking
- before smoking & vaping
- before using the lavatory
- after finishing work

6. The inhalation of sanding dust should be avoided and if it settles on the skin then it should be washed off. After more extensive sanding operations a shower/bath and hair wash is advised.

Gurit produces a separate full Safety Data Sheet for all hazardous products. Please ensure that you have the correct SDS to hand for the materials you are using before commencing work.

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## CONTACT INFORMATION

Please see local contact information at [www.gurit.com](http://www.gurit.com)

## 24-HOUR CHEMICAL EMERGENCY NUMBER

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