

resoltech HTGL-210

Hardener HTGL-216

High T_g structural epoxy system



- High T_g 210 °C
- Low viscosity and high wetting out properties

INTRODUCTION

RESOLTECH HTGL-210 / HTGL-216 epoxy system is very high T_g resin specially formulated for the production of **tooling and large structural** composites parts requiring T_g 's up to 210 °C.

Due to its **low viscosity, high wetting properties and excellent air release**, is suitable for the manufacture of structures and composite parts by wet lay-up or filament winding while guaranteeing low toxicity working conditions to the users. The stable low viscosity vs temperature makes of the HTGL 210 system a prime choice for infusion process.

This system guarantees **high inter-laminar** properties and impact resistance thanks to its **exceptional wetting properties** even on aramid reinforcements.

Laminates can be released from the moulds after a low temperature cure cycle (8h @ 50°C). Final thermo-mechanical properties will be obtained after a post curing cycle defined according later in this technical data sheet.

MIXING RATIO

The mixing ratio must be accurately followed. It is not possible to change the ratio, it would result in lower mechanical properties.
The mixture should be thoroughly stirred to ensure full homogeneity.

System	HTGL-210 / HTGL-216
Mixing ratio by weight	100/36

APPLICATION

- The HTGL 210 system can be applied by brush, roller, infused or injected. In case of laminating over a cured surface without peel ply, it is required to deglaze, clean and degrease the support prior to laminating.
- It is recommended to use products at a temperature close to **18-25 °C** in order to facilitate the mixing and the reinforcements impregnation.
- Lower temperatures will increase the viscosity of the mixture and the gel time, but the resin will not crystallize at low temperatures.
- On the contrary, a higher temperature will reduce the viscosity of the mixture as well as the pot life.

PHYSICAL CHARACTERISTICS

1 Visual aspect

HTGL-210 :

Opalescent yellow liquid

HTGL-216 :

Neutral transparent liquid

Mix :

Opalescent yellow liquid

2 Density

References	HTGL-210	HTGL-216
Density at 23 °C	1.17	0.92
Mix density at 23 °C	-	1.09

ISO 1675, ± 0.05 tolerance

3 Viscosity

References	HTGL-210	HTGL-216
Viscosity at 23 °C (mPa.s)	6000	15
Mix viscosity at 23 °C (mPa.s)	-	718

ISO 12058, ± 15% tolerance

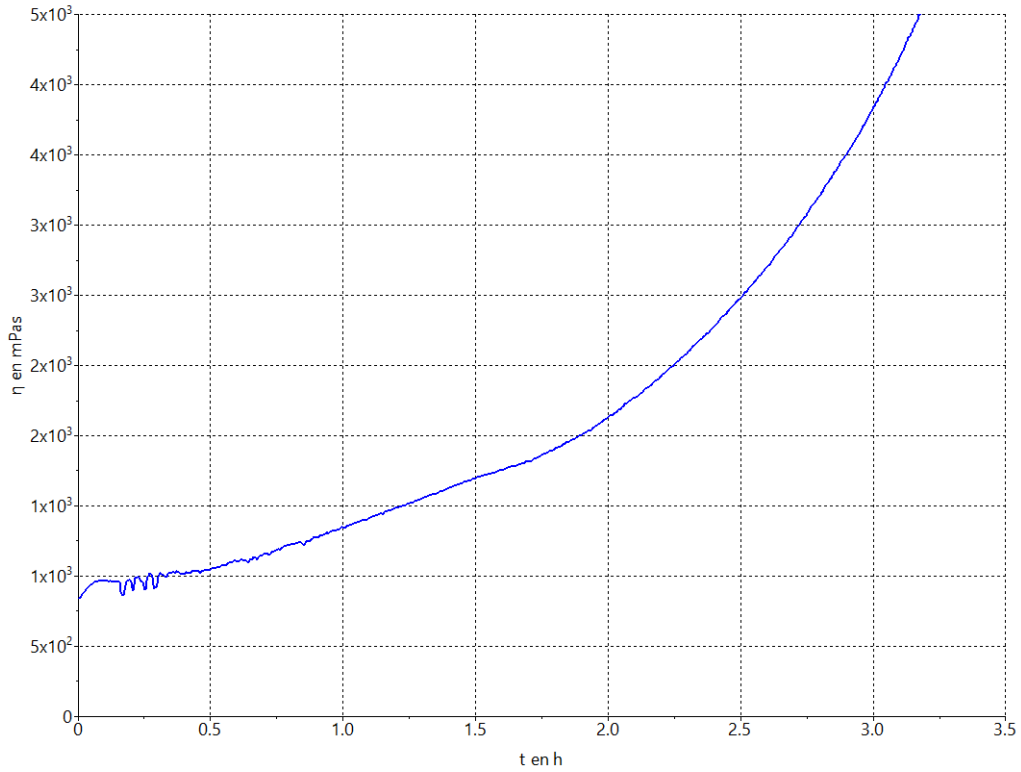
REACTIVITIES

System	HTGL-210 / HTGL-216
Gel time on 70 mL at 23 °C* (4cm high)	13h30
Time at exothermic peak on 70 mL at 23 °C	13h30
Temperature at exothermic peak on 70 mL at 23 °C	33.8°C
Gel time on film 1 mm thick at 23°C	8h40
Gel time on 2 layer of glass multiaxial 600 grams (approx 1,2mm)	8h45

* Gel time measurements realized with Rheotech*

Viscosity evolution

HTGL-210 mixed viscosity evolution at 23 °C



Viscosity measurements realized on rheometer : gap 1 mm, shear rate = 1 s⁻¹, ø = 35 mm

RETICULATION & POST-CURING

In order to obtain the maximum thermo-mechanical properties, it is necessary to respect the recommended curing cycle. The table below shows the glass transition temperatures (DMA) according to different curing cycles. **This product must be post-cured before demoulding.**

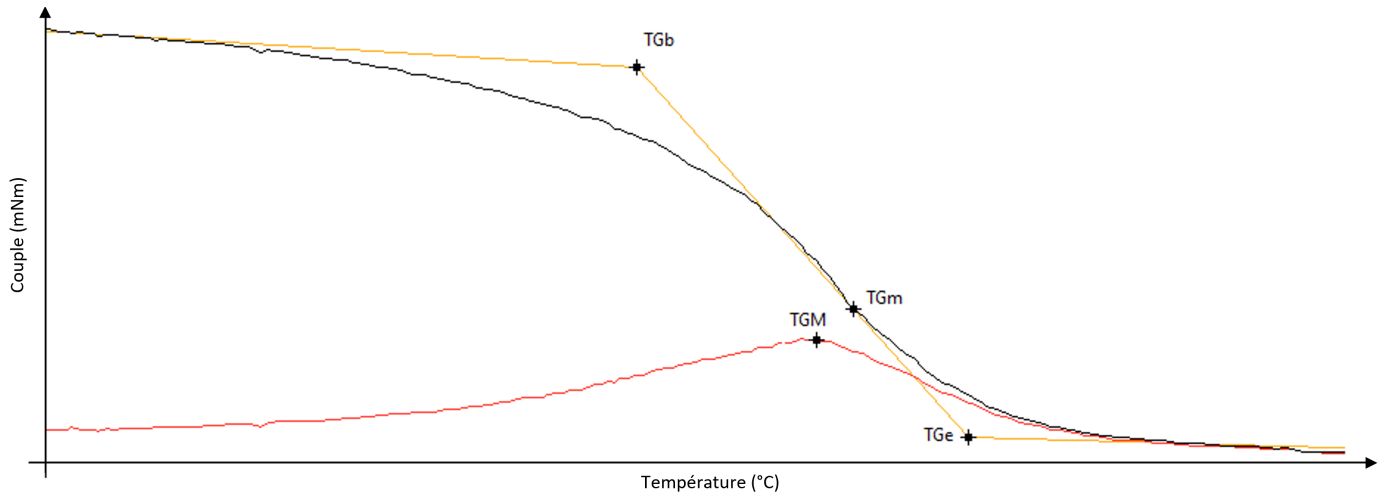
System		HTGL-210 / HTGL-216		
Post-curing cycle		8h at 50 °C (minimum)	8h at 50°C + 2h at 150°C	4h at 50 °C + 2h at 90 °C + 2h at 120 °C + 2h at 150 °C + 1h at 200 °C
DMA	T _{Gb}	70 °C	165 °C	191 °C
	T _{Gm}	77 °C	172 °C	210 °C
	T _{Ge}	83 °C	176 °C	223 °C
	T _{GM}	77 °C	177 °C	208 °C

T_e measured by DMA, 3 °C/min

Post-curing cycles previously presented were chosen in order to reach the maximum potential of each systems. Depending on parts size, oven performance and hardener used, shorter post-curing cycles could lead to fully cured parts.

Please contact our laboratory service for any help on post-curing cycles.

1 DMA T_g



MECHANICAL PROPERTIES

System		HTGL-210 / HTGL-216	
8h50°C	FLEXION Modulus Maximum strength Elongation at break		3.71 GPa 94.5 MPa 2.6% 2.6%
4h at 50 °C + 2h at 90 °C + 2h at 120 °C + 2h at 150 °C + 1h at 200 °C	FLEXION Modulus Maximum strength Elongation at break		3.62 GPa 98 MPa 3.1% 3.1%

Flexion properties on pure resin according to ISO 178

PACKAGING

- Plastic jerrycan kit of 1 kg + 0.36 kg
- Plastic jerrycan kit of 5 kg + 1.80 kg
- Plastic drum kit of 25 kg + 9 kg
- Metal drum kit of 200 kg + 3 x 24 kg
- IBC kit of 1000 kg + 2 x 180 kg

TRANSPORT & STORAGE

Keep containers sealed and away from heat and cold preferably between 10 °C and 30 °C in a well ventilated area. Our products are guaranteed in their original packaging (check expiry date on the label).

HEALTH & SAFETY

Skin contact must be avoided by wearing protective nitrile gloves & overalls or other protective clothing.

Eye protection should be worn to avoid 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.

Ensure adequate ventilation in work areas. Respiratory protection should be worn with ABEKP coded filters.

Resoltech issues full Material Safety Data Sheet for all hazardous products. Please ensure that you have the correct MSDS to hand for the materials you are using before commencing work.

! The data provided in this document is the result of tests and is believed to be accurate. We do not accept any responsibility over the mishandling of these products and our liability is limited strictly to the value of the products we manufacture and supply.



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