

# resoltech 1090 FRT

Hardeners 1093 HTD & 1094 HTD  
Self-extinguishing epoxy system



- Low viscosity & reactivity epoxy system
- Low settling tendency
- Improved wettability
- $T_g$  up to 100°C

## INTRODUCTION

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RESOLTECH 1090 FRT / 1093 HTD & 1094 HTD is a **self-extinguishing** epoxy resin system. It is possible to produce **structural composite parts** with all current reinforcements and core materials.

Thanks to its **low viscosity** and its **low reactivity**, 1090 FRT can be laminated by traditional wet processes such as filament winding and hot forming. Hardener 1093 HTD is proportioned in the ratio of 19 parts hardener to 100 parts resin (by weight) and gives good glass transition temperature (80°C).

Once hardened, the parts can be **released from the mould without post curing**.

The optimal thermomechanical properties are obtained after an adapted cycle of curing. However, **post-curing is not essential** depending on the final use of the parts.

## MIXING RATIO

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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.

Systems	1090 FRT / 1093 HTD	1090 FRT / 1094 HTD
Mixing ratio by weight	100/19	100/14

## APPLICATION

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- 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.
- Thanks to its **low viscosity** and to its **good wetting ability** thanks to its specific additives, the 1090 FRT - 1093 HTD & 1094 HTD is adapted to many applications including : wet lay up, pre-impregnated applications and filament winding.

# PHYSICAL CHARACTERISTICS

## 1 Visual aspect

### 1090 FRT :

Thixotropic light brown liquid

### 1093 HTD :

Colourless transparent liquid

### 1094 HTD :

Colourless to yellow liquid

### Mix :

Thixotropic light brown liquid

## 2 Density

References	1090 FRT	1093 HTD	1094 HTD
Density at 23°C	1.45	0.93	0.98
Mix density at 23°C	-	1.35	1.39

ISO 1675, ± 0.05 tolerance

## 3 Viscosity

References	1090 FRT	1093 HTD	1094 HTD
Viscosity at 23°C (mPa.s)	17 000 <sup>1</sup>	11 <sup>3</sup>	20 <sup>3</sup>
Mix viscosity at 23°C (mPa.s)	-	1023 <sup>2</sup>	2255 <sup>1</sup>

<sup>1</sup> Measured with rheometer, shear rate 20s<sup>-1</sup>, 120sec, ± 30% tolerance

<sup>2</sup> Measured with rheometer, shear rate 50s<sup>-1</sup>, 60sec, ± 30% tolerance

<sup>3</sup> ISO 12058.1, ± 30% tolerance

# REACTIVITIES

Systems	1090 FRT / 1093 HTD	1090 FRT / 1094 HTD
Gel time on 70 mL at 23 °C* (4cm high)	9h	4h50min
Temperature at exothermic peak on 70 mL at 23 °C	30°C	35.4°C
Time at exothermic peak on 70 mL at 23 °C	-	4h39min
Time at exothermic peak on 70 mL at 35 °C	2h	1h
Gel time on film 1mm at 35 °C**	6h10min	4h27min

\* Gel time measurements realized with Rheotech\*

\*\* Gel time on film measurement realized on rheometer

## 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 (DSC) according to different curing cycles.

Systems		1090 FRT / 1093 HTD	1090 FRT / 1094 HTD
24h à 23°C + 5h à 80°C	T <sub>g</sub>	78°C	-
	Shore D hardness	86	-
T <sub>g</sub> max		82°C	102°C

T<sub>g</sub> measured by DSC, 10°C/min, inflexion point

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.

## MECHANICAL PROPERTIES

System		1090 FRT / 1093 HTD
4h at 80°C	FLEXION <sup>1</sup> Modulus	22.2 GPa
5h at 80°C	FLEXION <sup>2</sup> Modulus	5.84 GPa
	Max strength	46.5 MPa
	Elongation at max strength	1%
	Elongation at break	1%

<sup>1</sup>Flexion properties on resin / glass composite, ratio by weight : 0.72 / 1.  
Composite made with 5 layers of 60g/m<sup>2</sup> & 1090 FRT / 1093 HTD epoxy system.

<sup>2</sup>Flexion on pure resin according to ISO 178

## PACKAGING

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- Metal bucket kit of 5kg + 0.95kg
- Metal bucket kit of 25kg + 4.75kg
- Metal drum kit of 200kg + 2 x 19kg
- Metal drum kit of 266.67kg + 2 x 25.66kg

## TRANSPORT & STORAGE

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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

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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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