

resoltech 1090 FR

Hardeners 1094 HTD, 1098 HTD & 1206 HT

Self-extinguishing epoxy system complying to FAR 25.853



- Approved self-extinguishing horizontal and vertical (FAR 25.853)
- Approved smoke & toxicity according to the directive AIRBUS ABD0031
- Filament winding or wet lay-up applications
- T_g up to 125°C with 1206 HT hardener

INTRODUCTION

RESOLTECH 1090 FR/109x HTD is a self-extinguishing epoxy resin system, approved by aeronautical standards, it is possible to produce structural composite parts with all current reinforcements and core materials.

Thanks to its low viscosity and its reactivity, 1090 FR can be laminated by traditional wet processes such as filament winding, wet lay-up and hot forming.

The hardeners 109x HTD are proportioned in the ratio of 11 parts of hardener to 100 parts of resin (by weight) and give very good vitreous transition temperatures.

The hardener 1206 HT is proportioned in the ratio of 12 parts of hardener to 100 parts of resin (by weight) and give very good vitreous transition temperatures of 125°C after an adapted cycle of curing.

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.

The 1090 FR exceptional wettability makes hand lamination easier to the workers while guaranteeing a safer work place due to the low toxicity of this system, it contains no CMR components and complies to the latest 2015 REACH European regulation.

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.

Systems	1090 FR/1094 HTD	1090 FR/1098 HTD	1090 FR / 1206HT
Mixing ratio by weight	100/11		100/12

APPLICATION

- It is recommended to use the products at a **temperature close to 18-25°C** in order to facilitate the mix and wetting out of reinforcements.
- A lower temperature will increase the viscosity of the mix and the gel time.
- On the opposite, a higher temperature will lower the viscosity of the mix and shorten the gel time.

PHYSICAL CHARACTERISTICS

1 Visual aspect

1090 FR :

Beige filled liquid

109x HTD & 1206 HT :

Clear to yellow liquid

Mix :

Beige filled liquid

2 Density

References	1090 FR	1094 HTD	1098 HTD	1206 HT
Density at 23°C	1.55	0.98	0.94	0.92
Liquid mix density at 23°C	-	1.43	1.42	1.41

ISO 1675, ± 0.05 tolerance

3 Viscosity

References	1090 FR	1094 HTD	1098 HTD	1206 HT
Viscosity at 23°C (mPa.s)	10000	20*	54*	15*
Mixed viscosity at 23°C (mPa.s)	-	2600	3017	2600

Measured with rheometer, shear rate 20s⁻¹, 2 min, ± 15% tolerance

*ISO 12058.2, ± 15% tolerance

FIRE PROPERTIES / SMOKE

Homologations :

- « Flame Retardant» according to FAR 25.853 horizontal
- « Flame Retardant» according to FAR 25.853 vertical
- Fire/Smoke complies with AIRBUS ABD0031 directive

REACTIVITIES

Systems	1090 FR/1094 HTD	1090 FR/1098 HTD	1090 FR/1206 HT
Geltime on 70 mL at 23 °C* (high : 4cm)	5h53min	1h05min	3h08min
Time at exothermic peak on 70 mL at 23 °C	NR	1h11min	3h27min
Temperature of peak on 70 mL at 23 °C	NR	97.4°C	32.3°C
Geltime on 1mm thickness at 23 °C**	7h	2h	5h

Reactivity measurements realized on Rheotech

** Geltime on film measurements realized on rheometer : gap 1 mm, shear rate = 1 s⁻¹, Ø = 35 mm

NR : Non Representative

CURING & 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 FR / 1094 HTD	1090 FR / 1098 HTD	1090 FR / 1206HT
14 days at 23°C	T _g	55°C	58°C	60°C
	Shore D Hardness	93	93	93
4h60°C + 2h90°C+2h120°C	T _g	94°C	96°C	120°C
	Shore D Hardness	94	93	93
T _g max		94°C	96°C	125°C

T_g measured by DSC, 10 °C/min, inflexion point
Shore D hardness measured at 23 °C according to ISO 868

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

Systems		1090 FR / 1094 HTD	1090 FR / 1098 HTD	1090 FR / 1206HT
14 days at 23°C	FLEXION	7.05 GPa	7.26 GPa	8.46 GPa
	Modulus	59.4 MPa	58.9 MPa	47.1 MPa
	Maximum strength	0.96%	0.90%	0.60%
	Elongation at break	0.96%	0.90%	0.60%
4h60°C + 2h90°C+2h120°C	FLEXION	7.06 GPa	7.10 GPa	6.30 GPa
	Modulus	73.8 MPa	76.3 MPa	61.2 MPa
	Maximum strength	1.20%	1.24%	1.10%
	Elongation at break	1.20%	1.24%	1.10%

Tests realized on pure resin samples according to : Flexion / ISO 178

Systems		1090 FR / 1094 HTD	1090 FR / 1098 HTD	1090 FR / 1206HT
14 days at 23°C	TRACTION	7.10 GPa	7.36 GPa	6.51 GPa
	Modulus	37.7 MPa	36.5 MPa	23.9 MPa
	Maximum strength	0.93%	0.80%	0.40%
	Elongation at break	0.93%	0.80%	0.40%
4h60°C + 2h90°C+2h120°C	TRACTION	5.08 GPa	5.31 GPa	5.33 GPa
	Modulus	34.1 MPa	44.6 MPa	36.4 MPa
	Maximum strength	0.93%	0.97%	0.80%
	Elongation at break	0.93%	0.97%	0.80%

Tests realized on pure resin samples according to : Traction / ISO 527

PACKAGING

1090 FR / 109x HTD :

- Metal box kit of 1kg + 0.11kg
- Metal bucket kit of 5kg + 0.55kg
- Metal bucket kit of 25kg + 2.75kg
- Drum kit of 200kg + 22kg

1090 FR / 1206 HT :

- Metal box kit of 1kg + 0.12kg
- Metal bucket kit of 5kg + 0.6kg
- Metal bucket kit of 25kg + 3kg
- Drum kit of 200kg + 24kg

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 or hardener 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.

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 stated on the label).



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.



249, Avenue Gaston Imbert
13790 ROUSSET
FRANCE

Tel. : +33 (0)4 42 95 01 95
Fax : +33 (0)4 42 95 01 98
export@resoltech.com