

# resoltech 7090 CLEAR & 7090 COLOUR

Hardener 7091(T) & 7096

High Abrasion Resistance Epoxy Gelcoat



- Improved applicability
- Better film tension & gloss
- Better vertical application
- High  $T_g$  of 140°C
- Available on colorless, black, white and RAL tints

# INTRODUCTION

RESOLTECH **7090 / 7091(T) & 7096** epoxy system is a high T<sub>g</sub> gelcoat specially formulated for the production of tooling and structural composites parts requiring high service temperatures, **up to 140°C**.

This gelcoat may be applied from thicknesses from 300 to 600 microns depending if it is for parts or tool manufacturing where thickness of 600 microns is recommended.

The gelcoat may be ordered in clear version : **7090 CLEAR / 7091** mainly for parts such as carbon look parts. Factory coloured version **7090 COLOUR / 7091T & 7096** is available for tools production. The clear version could also be pigmented to any RAL colour : simply add 5% epoxy pigment paste in the resin part before mixing with the hardener.

The 7090 formula guarantees low toxicity working conditions to the users. 7090 it is best applied by brush or roller. Laminates can be released from the moulds after a low temperature cure cycle (8h at 60°C) before post curing. Do not attempt to release from mould after room temperature cure.

RESOLTECH **7090 / 7091(T)** may be used in wet layup, infusion and with pre-pregs. Prepregs will be applied on the gelcoat in a window of minimum 8h at 23°C and maximum 16h. Post-curing of the prepreg laminate should be done within the next few days.

Small part & tools that may be infused within 16h of the gelcoat application. For larger parts/tools needing multiple days of fibre laying up, it is recommended to apply the gelcoat within 4h cover with **ALU250 TV aluminium powder** (refer to ALU250 TV datasheet available on our website). Wet layup application should be done in a window of minimum 8h at 23°C and maximum 16h.

# 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	7090 CLEAR / 7091	7090 COLOUR / 7091T & 7096
Mixing ratio by weight	100 /30	

# APPLICATION

- The standard procedure of working with epoxy gelcoats applies this system. This epoxy system is best applied by brush, but some customers manage spraying it diluted with 5 to 10% MEK or acetone with 3,5mm nozzle gravity sprayguns. This method exposes to a high risk of solvent entrapment if spraying is not done from far enough, resulting in possible delaminating between the gelcoat and the laminate during the post curing. It is mandatory to test within the real workshop conditions before any industrial size spray application.
- After a room temperature cure, the gelcoat will harden enough to enable laminating, infusing or placing prepregs onto the gelcoat without print through of the fiber on its surface.
- After a room temperature cure, the crosslinking between the gelcoat resin+hardener will not be complete, so when final post cure of the laminated part or tool will be done, the lamination or prepreg resin, will co-cure with the gelcoat ensuring a good chemical and mechanical bond between the gelcoat and the laminate. Prepregs with very low resin content are not recommended.

- It is recommended to have workshop temperature conditions between 18–25°C in order to facilitate the mixing and the application. A lower temperature will increase the viscosity of the mix as well as its pot life, and brush application of the clear version may result in a thicker gelcoat film reducing the transparency. On the contrary, a higher temperature will reduce the viscosity and the pot life of the mix.

## PHYSICAL CHARACTERISTICS

### 1 Visual aspect

**7090 CLEAR :**

Opalescent thixotropic liquid

**7090 COLOUR :**

Coloured thixotropic liquid

**7090 COLOUR :**

Coloured thixotropic liquid

**7091:**

Clear liquid

**7091T:**

Opalescent gel

**7096:**

Slightly orange liquid

**Mix :**

Opalescent gel

**Mix :**

Coloured gel

**Mix :**

Coloured gel

### 2 Density

Resins	7090 CLEAR		7090 COLOUR		
Hardeners		7091		7091T	7096
Density at 23°C	1.17	0.96	1.20	0.99	0.98
Mix density at 23°C	-	1.12	-	1.15	1.15

ISO 1675, ± 0.05 tolerance

### 3 Viscosity

Resins	7090 CLEAR		7090 COLOUR		
Hardeners		7091		7091T	7096
Viscosity at 23°C (mPa.s)	17 320*	65**	17 320*	6 200*	250**
Mix viscosity at 23°C (mPa.s)	-	2829*	-	8 700*	6765*

\*Measured on rheometer, 50s<sup>-1</sup>, 1min

\*\*ISO 12058.2

± 15% tolerance

## REACTIVITIES

Systems	7090 CLEAR & COLOUR 7091 – 7091T	7090 COLOUR / 7096
Gel time on 70mL at 23°C* (4cm high)	4h	26min
Time at exothermic peak on 70mL at 23°C	69°C	214°C
Temperature at exothermic peak on 70mL at 23°C	4h	26min
Dry to touch at 23°C	8h à 12h	2h

\* Gel time measurements realized with Rheotech\*

## 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		7090 CLEAR & COLOUR 7091 – 7091T	7090 COLOUR / 7096
24h23°C + 4h60°C + 4h at 80°C	T <sub>g</sub>	107°C	-
24h à 23°C + 8h à 60°C + 2h à 80°C + 2h à 120°C	T <sub>g</sub>	141°C	117°C
	Dureté Shore D	90	88
T <sub>g</sub> max		150°C	119°C

T<sub>g</sub> 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.

## SAGGING

Systems	7090 COLOUR / 7091T	7090 COLOUR / 7096
Maximum thickness without sagging at 23°C	> 1500 µm	< 500 µm

Measurements made at an angle of 90° to the horizontal

## PACKAGING

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- Metal box kit of 1kg + 0.3kg
- Metal bucket kit of 5kg + 1.5kg
- Metal bucket kit of 10kg + 3kg
- Metal bucket kit of 25kg + 7.5kg
- Metal drum kit of 200kg + 3 x 20kg

## 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). 7091 hardener can, under certain conditions, crystallize. Some hours at 60°C in an oven will make the hardener liquid again without consequences on final product.

## 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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