



# rēsoltech

ADVANCED TECHNOLOGY RESINS

## RESOLTECH COMPOSITE TOOLING RANGE



# RESOLTECH COMPOSITE TOOLING RANGE

## *Plugs & Models*

Reference	Description	Key properties	Page
1040T	High performance thixotropic epoxy laminating system.	Easy to use non sag laminating system with excellent wettability.	7
8020 EX	Epoxy fairing filler.	Room temperature curing – next day sanding and ultra fast hardener enables sanding within 3 hours.	5
8030	Epoxy profiling lightweight filler.	Easy application: Non sag application up to 40 mm thickness @ 20° C. Room temperature curing.	5
3010T	Epoxy surfacing highbuild.	Easy application: Ultra long pot life, but fast hardening when applied. Touch dry in 2h30 sandable in 8h.	5





## Resin Systems for Moulds

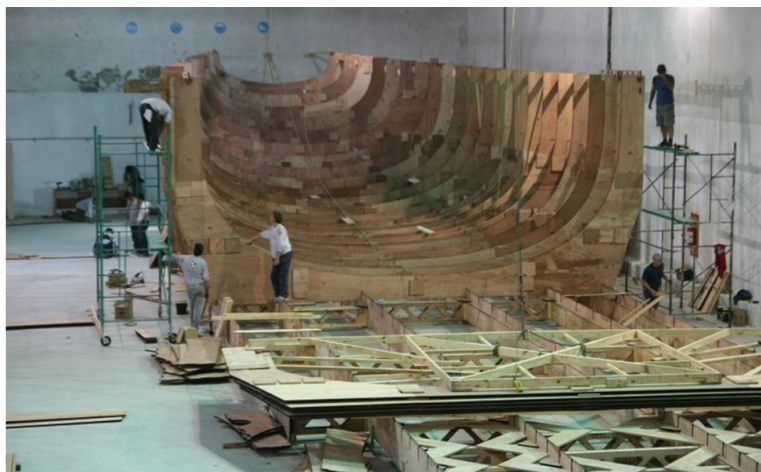
Reference	Description	Key properties	Page
1040 (T)	High performance epoxy laminating system.	Easy to use laminating system with excellent wettability and Tg up to 144° C. High rigidity system.	7
1050 (T)	Lamination and infusion epoxy system for large tools that cannot be post-cured.	Best room temperature system available in the market. Adjustable pot life from 10 h to 15 min.	8 & 9
1080 (T)	High performance structural laminating system.	May be released from plug without curing	8
1450TALU25	Aluminum filled epoxy casting and laminating system.	Tg up to 170° C aluminum system.	11
1800	Lowest viscosity infusion epoxy system.	Tg from 85° C to 130° C. Fast curing system.	9
2010HP	Low density epoxy casting system.	Room temperature filler free casting system.	11
2060ALU25	Aluminium casting and laminating resin.	Formulated to produce moulds from a few millimeters to several centimeters thick.	11
HTG160	High TG infusion and laminating system.	Tg up to 160° C. Low viscosity and high wetting out properties.	10
HTG180	High TG infusion and laminating system.	Tg up to 180° C. Low viscosity and high wetting out properties.	10
HTG200	High TG infusion and laminating system.	Tg up to 200° C. Low viscosity and high wetting out properties.	10
HTG240	High TG infusion and laminating system.	Tg up to 240° C. Low viscosity and high wetting out properties.	10

## Tooling Gel Coats

Reference	Description	Key properties	Page
VI5090	Vinylester gel coat compatible epoxy.	Excellent chemical resistance.	12
2060ALU25	Tooling aluminium epoxy gelcoat.	High gloss surface, high mechanical properties.	12
7080CSI	Anti abrasive epoxy gel coat.	High mechanical properties.	12
7080GC	Epoxy tooling gel coat system.	Application and demoulding at room temperature. High mechanical properties.	12
7090	Epoxy tooling gel coat system for prepreg.	Superior adhesion to prepregs.	12

## Various

Reference	Description	Key properties
3040	Reparation mould system. Black color.	High performance adhesive formulated for ambient temperature bonding



# RESOLTECH TOOLING

Resoltech offers a large variety of tooling systems: wet layup , infusion, RTM, filament winding or pre-preg resins as well as tooling gelcoats, adhesives and mould repair systems.

All these resin systems have been formulated in a spirit of performance, ease of use, preservation of the health and safety of the workers applying these systems as well as respect for the environment by a careful selection of the raw materials used in the formulations.

This quick reference guide was born from the experience of day to day work close with our costumers allowing us to developed tooling systems adapted to the market needs for quality parts production.

The goal of this guide is to help chose the right system to build the right mould for any given application.

Feel free to contact our technical department for any technical question that may arise and to get a personalized advice.

[technical@resoltech.com](mailto:technical@resoltech.com)



## HOW TO USE THIS GUIDE?



The goal of this document is to help select the most adapted materials to the technical requirements of the tool and of the parts to be manufactured in this tool.

In order to chose the right system & process you need to start be defining a few basic things:

### **Number of parts to get from the mould**

- Is it a one-off mould to make one part?
- How many parts/day should this tool be prepared for?
- How many parts in total should this tool be prepared for?
- Is the mould subject to mechanical stress other than normal thermal and gravitational loading such as foaming or use of bladders?
- The number of parts and size will determine the durability requirement of the tool and therefore the investment to be done in the tool, its backing structure and potentially its heating system.

### **Temperature requirements:**

This is the most important aspect for the resin system choice:

- Will you need to postcure the part produced in the tool? If yes, at what temperature, and what is the maximum temperature of your oven can reach for both tool and part making.
- Will your tool be subject to thermal chock with fast cycles of heating and cooling?
- Is there any possibility of exothermic temperatures during the part production?
- This will define the resin systems but also the reinforcement type and backing structure design if the part is made of carbon and heat is required in the manufacturing process.



# RESOLTECH TOOLING SOLUTIONS

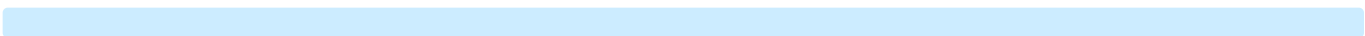
## What products to use for your model?

PLUGS AND MODELS SYSTEMS

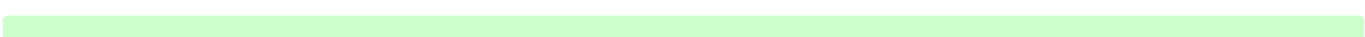


## Mould making process

HAND LAY UP



INFUSION



CASTING



## Choosing the best gel coat for your tool

GEL COATS



# PLUGS AND MODELS



RESOLTECH recommends to use 1040T resin system to laminate the model.

## RESOLTECH 8030

### Hardeners 8035 & 8037

#### Epoxy profiling lightweight filler

- Light: 0,7 Density
- Easy Preparation: mixing ratio 1/1 in volume or 2/1 by weight, dark grey resin & white hardener enable visual control of the mix
- Easy application: Non sag application up to 40 mm thickness @ 20° C
- Room temperature curing
- Good sandability, can also be milled by CNC.
- Fast & Slow hardeners available



## RESOLTECH 8020EX

### Hardener 8026H, 8029H

#### Epoxy fairing filler

- Easy Preparation: mixing ratio 1/1 by weight
- Pink resin & white hardener enable visual control of the mix
- Easy application: "creamy product" that can be applied in ultra thin layers if needed or in up to 3 mm
- Excellent sandability – any one who tries to sand it buys it
- New layer applied easily differentiated from prior layer that has lighter colour when sanded
- Room temperature curing – next day sanding with standard hardener 8026H or 3h sanding with 8029 H hardener

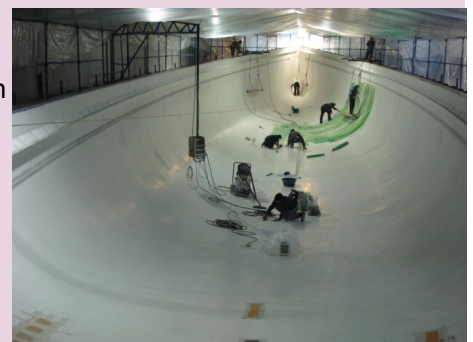


## RESOLTECH 3010T

### Hardeners 3014T

#### Epoxy highbuild surfacing

- Easy application: Ultra long pot life, but fast hardening when applied
- May be applied by roller or sprayed
- Excellent sandability – any one who tries to sand it buys it – even 4 months after its application it stays easy to sand
- No sanding required between coats
- Touch dry in 2h30 sandable in 8h
- Excellent adhesion on all substrates





## PLUGS AND MODELS

Resoltech offer a range of filler & highbuilds that are acclaimed for their ease of sanding, and dimensional stability

### APPLICATION TIPS

- If the surface defects are deeper than 2 mm, use preferably the **8030 lightweight filler**:
- It is recommended to apply the first layer of filler with notch spreaders in order to apply even quantities of fillers and minimize sanding:
- Before starting the procedure, use a batten to determine the depths of the areas to be filled. Use a spreader with notches that match the deepest area.
- The first layer of fairing compound is applied with a notched spreader to leave a pattern of ridges.
- Hold the spreader at a higher angle to leave deeper ridges on the lowest areas and at a lower angle to leave shallower ridges on the higher areas. The tops of the ridges should be slightly above the finished fair level.
- Once the filler cured, sand the ridges fair. The ridges of fairing compound are much easier to sand than solid material.
- Use a wire brush to rough up the exposed surface of the fairing compound within the grooves.
- Trowel a second layer of fairing compound over the surface to fill the grooves.
- Use a smooth-edged spreader held firmly against the surface to drag away excess compound, leaving a smooth surface flush with the faired ridges.
- Sand the surface smooth. It should require only minor local fairing with the **8020EX fairing compound**, specially conceived for fairing defects up to 2 mm.
- Once the 8020EX hard and sanded smooth with 80 grit, apply the **3010T highbuild** by spraygun or roller – usually 2 coats are enough.
- The 3010T has exceptional sanding properties that will be best sanded with 120, 240 and 400 grit before application of a high gloss top coat – or it can be polished and covered with a mould release system.



# HAND LAY UP TOOLING SYSTEMS



RESOLTECH recommends to use always thixotropic resins for hand lay up.

## RESOLTECH 1040 T Hardeners 1045 to 1048N

### High Performance Epoxy Laminating System

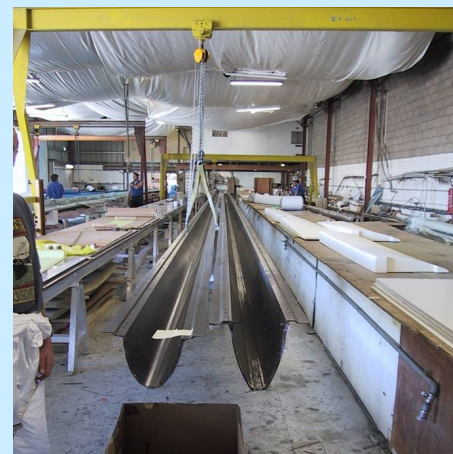
- Easy to use system: hardeners slow and fast (1045N, 1048N)
- Excellent wettability
- Room temperature cure & model release
- TG up to 97° C with 1045N and 1048N



## RESOLTECH 1040 T Hardeners 1041SL, 1041HT, 1042HT

### High Performance Epoxy Laminating System

- Excellent wettability
- TG up to 144° C with SL and HT hardeners



You need high temperature post-cure to obtain the highest Tg

Resoltech offer thixotropic versions of all it's wet layup resins. These resins are particularly liked by our customers and we recommend the use of these resins for tooling in order to build up the thickness of the tool the easiest way and with the least porosity.

All our systems offer a wide range of hardeners from ultra slow to fast, most of them maybe mixed together in order to obtain the right pot life for the size of lamination you plan to do

In the case of one off moulds such as large boat mould made of frames, wood strips and plywood sheets – or plugs that will be covered by tooling paste it is recommended to laminate at least 2 layers of a close woven 300 gr/m2 with a peel ply at last layer: this is the best guarantee to obtain good vacuum integrity on the mould surface.



## RESOLTECH 1080 T

### Hardener 1082, 1084, 1086

#### Highest performance epoxy laminating system

- Laminates with Tg up to 110° C
- Enable model release at room temperature and post-curing outside model while obtaining a TG of 110° C
- Highest modulus resin available (4000 Mpa·s)
- Pure Novolac for high chemical resistance
- High toughness
- Enables to build the lightest—very rigid moulds



You can demould from model without post-cure



## RESOLTECH 1050 T

### Hardeners 1054 to 1059

#### Structural Lamination Epoxy System

- Adjustable pot life (slow and fast hardeners)
- Room temperature cure & model release
- Final TG 75°C
- Excellent fatigue properties for light RTM thin counter moulds
- Best wettability of all resins



You can make moulds by hand lay up also with resin filled with Aluminium using the reference RESOLTECH 2060ALU25 and RESOLTECH 1450TALU25, you will find more information at page 11.

# INFUSION TOOLING SYSTEMS

## RESOLTECH 1050

### Hardeners 1053

#### Structural Infusion Epoxy System

- Ultra slow 10h hardener
- Room temperature cure & model release
- Final TG 70°C
- Best large tool infusion resin
- Excellent fatigue properties
- Best wettability of all resins



## RESOLTECH 1800

### Hardeners 1805 & 1808

#### Structural Epoxy system for infusion & injection

- Adjustable pot life from 50min to 2h
- Ultra low viscosity and high wetting power
- TG: 85° to 130° depending on hardener used
- Excellent cross linking properties even at low post-curing temperatures
- Lowest viscosity infusion resin available
- Very fast demoulding schedules with 1808 hardener for light craft fast output production



You need high temperature post-cure to obtain the highest Tg



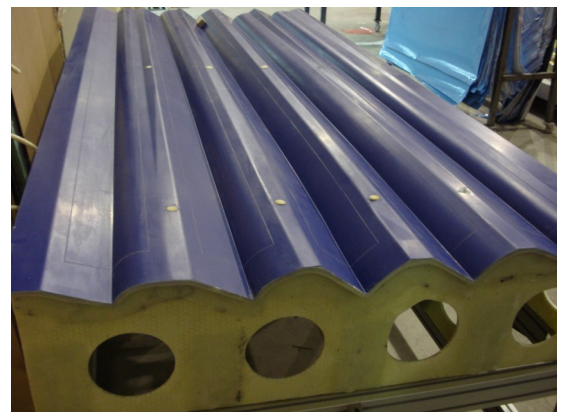
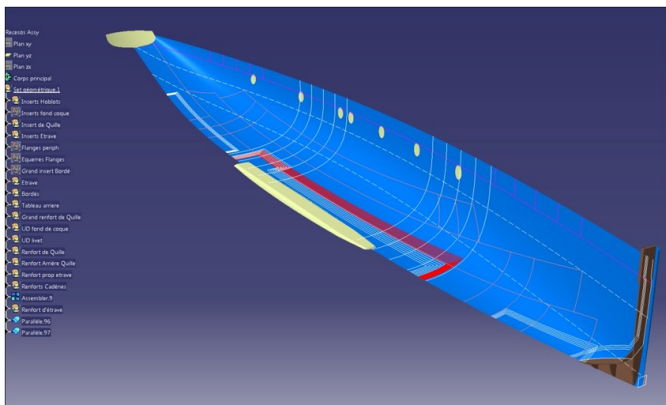
## INFUSION TOOLING SYSTEM

Resoltech has developed a complete range of very low viscosity, superior wetting ability and long pot life.

Our infusion resins range from the 1050 system for moulds that cannot be post cured due to their large sizes, to the 1800 system with 130°C TG, a system preferred by prepreg part builders or the more technical HTG series ranging from 160°C to 240°C of TG for Wind blade manufacturing, aerospace tools but also thermoplastic forming like the Twintex

Infusing mould is the best guarantee to obtain non porous moulds that enable perfect vacuum when producing parts, and in the case of very large tools, it is by far the most time and cost efficient process.

Resoltech offers tooling gelcoats adapted for infusion: the VI5090, a Viny-lester epoxy compatible gelcoat with a TG of 105°C, the 7080 GC, an epoxy gelcoat with a TG from 90 to 144°C or the Pre-preg specific gelcoat, the 7090. All HTG infusion resins may also be used with the HTG gelcoats.



## RESOLTECH HTG SYSTEMS

**HTG 160, HTG 180, HTG 200, HTG 240, CE15(340° C TG)**

### High TG INFUSION AND LAMINATING SYSTEM

- Complete range of high TG infusions resins
- Low viscosity
- High wetting out properties





## CASTING TOOLING SYSTEM

### RESOLTECH 2060ALU25

#### Hardener 2061S

##### Aluminium casting and laminating resin

- Formulated to produce moulds from a few millimeters to several centimeters thick
- Low viscosity
- Excellent mechanical resistance
- Good CNC milling properties
- Excellent thermal and chemical resistance
- Low surface tension, good debulking



### RESOLTECH 1450TALU25

#### Hardener 2061S

##### Aluminium casting epoxy resin system

- □ High TG ~ 170°C
- □ Excellent mechanical resistance
- □ Good CNC milling properties
- □ Excellent thermal and chemical resistance



### RESOLTECH 2010HP

#### Hardeners 2013HP to 2019HP

##### Low density epoxy casting system

- □ Low density casting epoxy system with low exothermic peak
- □ Room temperature curing
- □ 15 min to 10 h hardeners



**RESOLTECH recommends avoid the employ of MICROBALLONS**

Resoltech offer casting system that ranges from room temperature curing to 175°C of TG

For small parts, it may be faster and cost efficient to use casting aluminum resins in order to produce tools or basic pre-shapes that may be milled like would be milled an aluminum block or a milling board and used directly as mould

Aluminum filled resins conduct better heat than conventional resins. This helps improve post curing times and temperatures.

These improved heat transfer properties help « level » possible exothermic peaks of the part manufactured in the tool.

The Coefficient of Thermal Expansion of aluminum and epoxy resins are close and linear - this results in a homogeneous material, that absorbs the tensions due to the mould shape while going through heating and cooling cycles - This means better aging and in longer life spans of the tools.

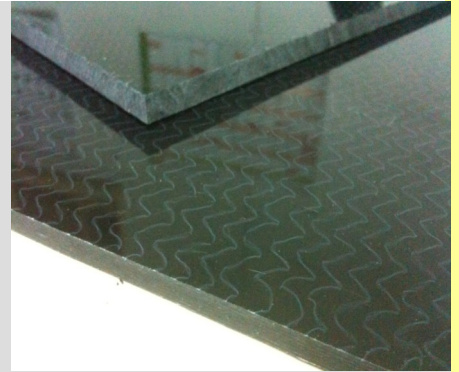
The 2010 system is a multipurpose system that maybe filled with a variety of available charges and if mainly used to chock and level tools on the ground but also as tooling material for concrete mouldings – contact us for the best selection of the charge to be used for your application.

## TOOLING GEL COAT SYSTEMS

### RESOLTECH VI5090

#### Vinylester Gelcoat Compatible Epoxy

- Excellent adhesion with epoxy wet lay up or infused
- Good chemical resistance
- Good UV resistance
- Easy to apply spraying or by roller



Cure minimum 8h @ 30° C or 3 days @ room temperature before over coating.

### RESOLTECH 2060LAU25GC

#### Tooling Aluminium Epoxy Gelcoat

- High gloss surface
- For demanding heat cycles postcures & thermoforming
- High modulus & mechanical properties
- TG 115°C



### RESOLTECH 7080CSI

#### Tooling anti-abrasive epoxy gel coat

- Good chemical resistance
- Good UV resistance
- High modulus & mechanical properties
- TG 100°C



### RESOLTECH 7080GC

#### Epoxy gel coat for tooling

- Application and demoulding at room temperature
- High modulus & mechanical properties
- TG > 90°C



### RESOLTECH 7090

#### High Tg epoxy gel coat for tooling

- High TG 150°C
- High mechanical properties
- Clear or colored versions for tooling



## QUICK REFERENCE GUIDE

	Tg up to °C									Hand lay up	Infusion	Casting	Gel Coat	Fillers	Adhesive
	75	90	110	130	150	160	180	200	240						
1040 (T)				x						x					
1050 (T)	x									x	x				
1450TALU25						x				x		x			
1800				x							x				
2010HP	x											x			
2060ALU25			x							x		x			
2060A-LU25GC			x										x		
3010T														x	
3040															x
VI5090		x											x		
7080CSI		x											x		
7080GC		x											x		
7090					x								x		
8020 EX														x	
8030														x	
HTG160						x									
HTG180							x								
HTG200								x							
HTG240									x						





Resoltech is considered as one of Europe's leading epoxy resin formulator.

It was created in 1996 by a team of highly experienced people from the composite field. They focused on formulation and polymer engineering, developing over 800 systems.

Most formulations were invented in partnership with customers to fit specific applications. The creativity of Resoltech has led the company to offer a wide range of systems, while also formulating and contract manufacturing for world leading chemical companies.

It also led to the creation of very advanced polymers such as water based epoxy systems, fire resistant systems or water based pre-preg resins with Lloyds, IMO SOLAS 2000, FAR25 and Airbus certifications. The world's largest carbon epoxy yacht ever infused as of today used our 1050 infusion resin.

Low toxicity for users and environmental concerns are priorities in all Resoltech product development.

**RESOLTECH**

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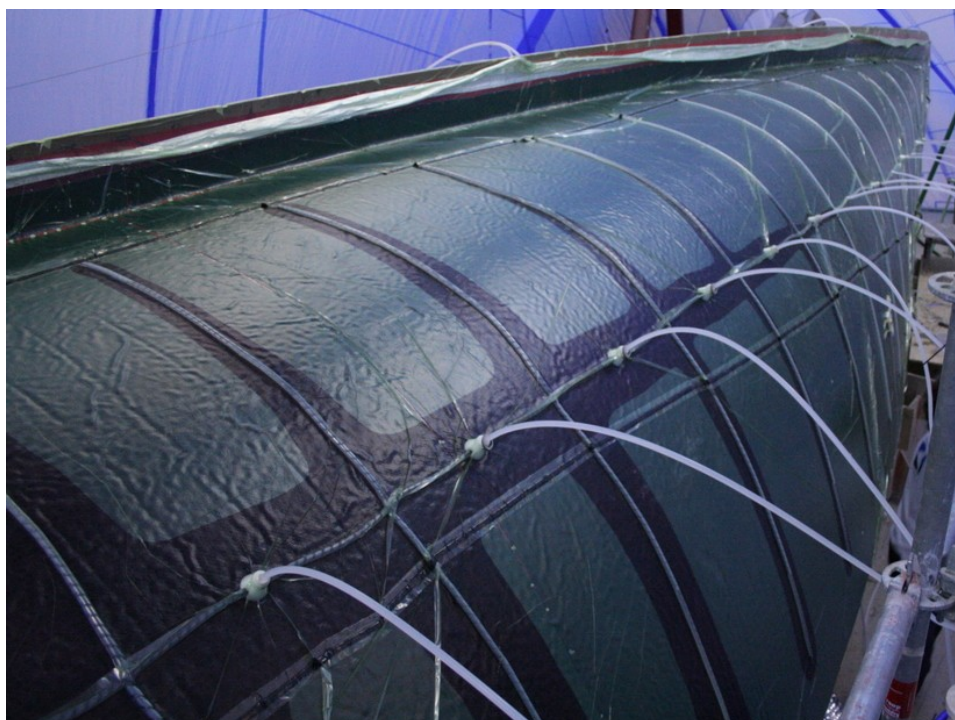
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