

## SR 8450

### Wood Epoxy system for tropical conditions

SR 8450 has been formulated for building marine composites : bonding, laminating and wood protection.

It is adapted for tropical climate. This system is handy with a simple mixing ratio of 2 / 1 by volume and an adjustable working time : 3 hardeners available.

Suitable for ambient temperature applications, with a low surface pollution and high gloss finish.

SR 8450 has an excellent adhesion to all type of wood.

It is resistant to marine environment.

This wood epoxy system has a low toxicity ( Phenol and amine free ).

### Epoxy resin SR 8450

Aspect		Liquid
Colour		Slightly milky
Viscosity	@ 15 °C	7 200 ± 1450
	@ 20 °C	3 500 ± 700
	@ 25 °C	1 900 ± 400
	@ 30 °C	1 000 ± 200
	@ 40 °C	410 ± 80
Density	@ 20 °C	1,14 ± 0.02
Storage stability		24 months Can cristallize under adverse conditions : low temperature, open drum...

### Hardeners SD 845x

Products	SD 8451	SD 8453	SD 8454	
Reactivity	Slow	Standard	Fast	
Application	Laminating, bonding, filling & casting	Laminating & bonding	Clear coating, laminating & bonding	
Aspect / colour	Yellow liquid	Yellow liquid	Yellow liquid	
Viscosity	@ 20 °C	155	960	
	@ 25 °C	110	600	
	@ 30 °C	85	400	
Density	@ 20 °C	0.980	1.024	1.035
Storage stability	24 months Hardeners react with carbon dioxide and moisture. Need to be kept in its original closed container. Avoid to a maximum any contact with air.			

## Systems SR 8450 / SD 845x

Viscosity of the mixes (mPa.s)	SR 8450 / SD 8451	SR 8450 / SD 8453	SR 8450 / SD 8454
@ 20 °C	700	1300	1500
@ 30 °C	370	550	600
@ 40 °C	180	280	350
Parts by weight <b>SR 8450 / SD 845x</b>	<b>100 g / 45 g</b>		
Parts by volume <b>SR 8450 / SD 845x</b>	<b>100 ml / 50 ml ou 2 / 1</b>		

## Reactivity of the mixes

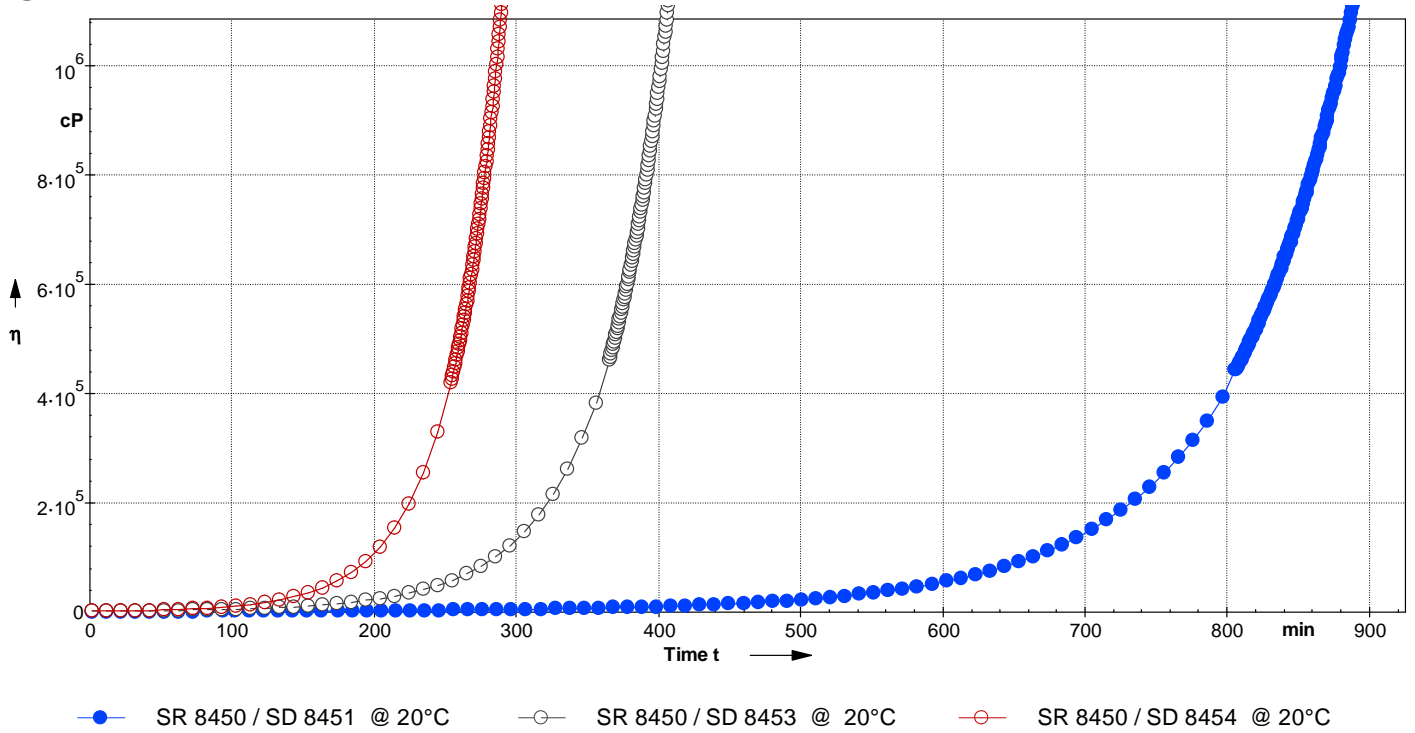
Systems SR 8450 / SD 845x	SR 8450 / SD 8451	SR 8450 / SD 8453	SR 8450 / SD 8454
Exothermic temperature (°C) on 500 g mix			
@ 30°C	150	200	210
@ 20°C	35	160	195
Time to reach the exotherm on 500 g mix			
@ 30 °C	2h 45'	55'	35'
@ 20 °C	9 h 00	2 h 40'	70'
Time to reach 50°C on 500 g mix			
@ 30 °C	1 h 00	38'	22'
@ 20 °C	nm	2 h 15'	50'
Drying time, set-to-touch on film of 500 microns			
@ 30 °C	8 h 00	3 h 20'	2 h 20'
@ 20 °C	10 to 11 h	5 h 00	3 h 30'
nm : non mesurable			

## Curing

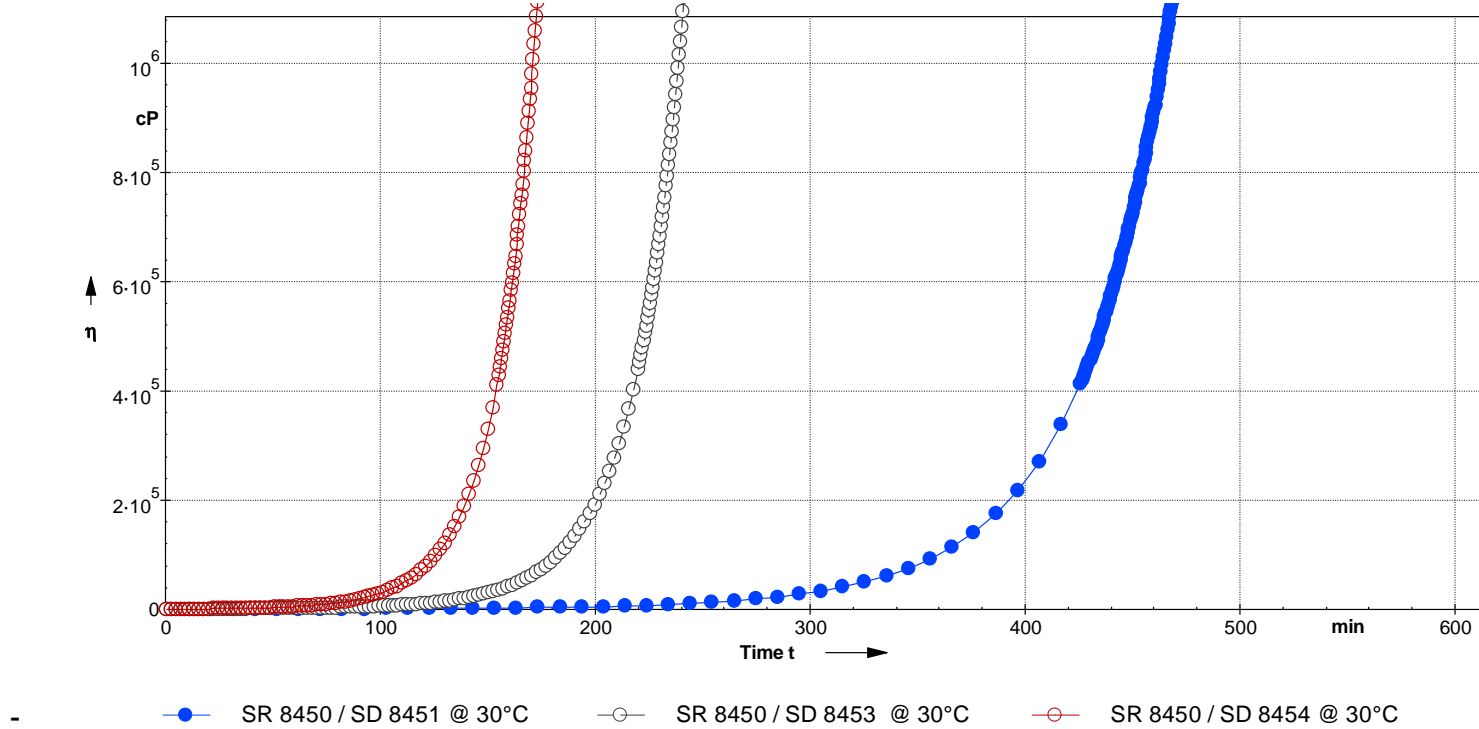
**SR 8450 / SD 8451, SD 8453 and SD 8454** systems are curing @ ambient temperature. Optimisation: minimum of 7 days @ 23 °C or 12 h @ 40°C before use of the part.

Increase of the viscosity on 1 mm film thickness @ 20, 30 et 40 °C

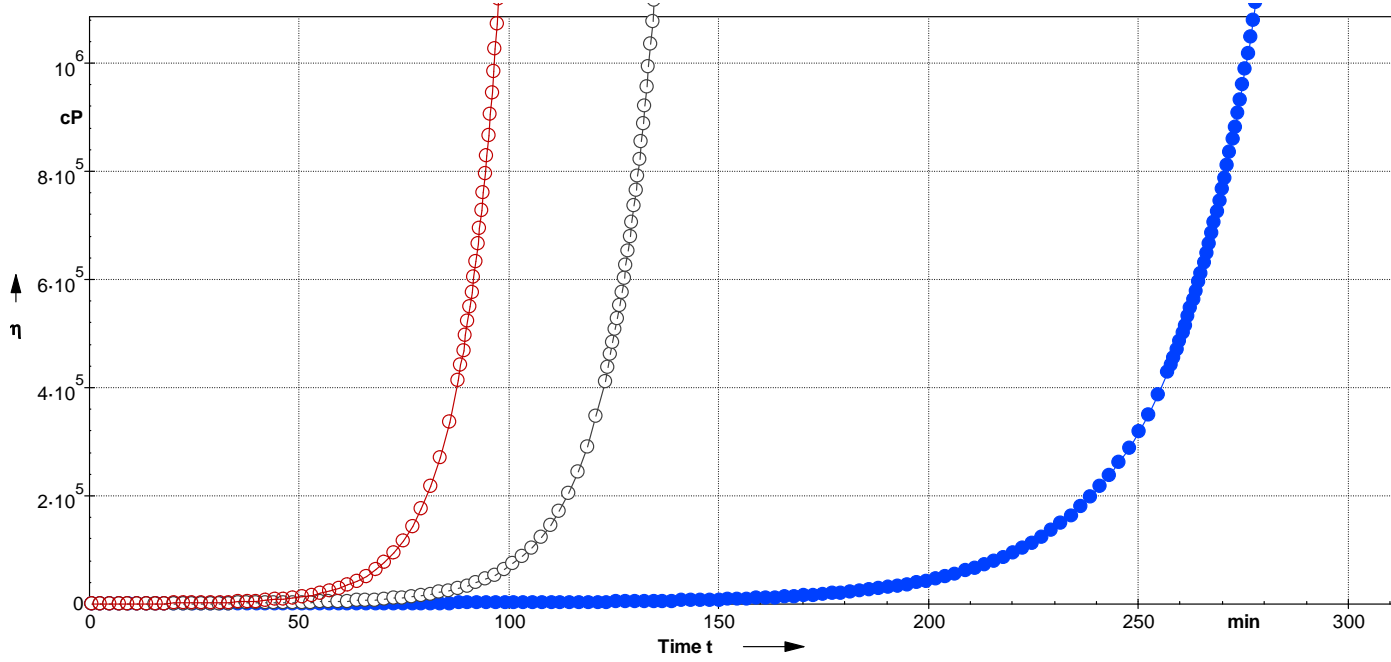
@ 20 °C



@ 30 °C



@ 40 °C



● SR 8450 / SD 8451 @ 40°C      ○ SR 8450 / SD 8453 @ 40°C      ○ SR 8450 / SD 8454 @ 40°C

## Mechanical properties of cast resin :

Systems	SR 8450 / SD 8451			SR 8450 / SD 8453			SR 8450 / SD 8454			
	Curing cycle	7 days 23 °C	24 h ambT + 24 h 40°C	24 h ambT + 8 h 60°C	7 days 23 °C	24 h ambT + 24 h 40°C	24 h ambT + 8 h 60°C	7 days 23 °C	24 h ambT + 24 h 40°C	24 h ambT + 8 h 60°C
<b>Tension</b>										
Modulus of elasticity	N/mm <sup>2</sup>	2230	2530	2420	2750	2620	2510	2800	2600	2580
Maximum resistance	N/mm <sup>2</sup>	52	61	55	59	65	63	65	65	64
Resistance at break	N/mm <sup>2</sup>	37	49	41	59	52	53	64	59	54
Elongation at maximum resistance	%	3.0	3.8	3.6	3.6	4.1	4.5	3.4	3.8	4.3
Elongation at break	%	3.9	5.4	8.4	4.0	5.6	7.4	3.7	4.9	8.4
<b>Flexion</b>										
Modulus of elasticity	N/mm <sup>2</sup>	2630	2840	2740	3075	2740	2820	3030	2970	2850
Maximum resistance	N/mm <sup>2</sup>	86	95	90	101	98	99	100	105	100
Elongation at maximum resistance	%	4.2	4.9	4.8	4.8	5.2	5.5	4.6	5.0	5.6
Elongation at break	%	14.5	15.6	17.2	6.7	13.4	15.2	7.8	13.3	13.3
<b>Compression</b>										
Compressive yield strength	N/mm <sup>2</sup>		87			98			104	
Offset compressive yield	%		6.2			6.8			7.4	
<b>Charpy impact strength</b>										
Resilience	KJ/m <sup>2</sup>	24	34	42	21	33	33	23	31	36
<b>Glass transition</b>										
Tg1	°C	53	58	67	55	65	76	55	62	70

Tests carried out on cast resin, without prior degassing, between steel plates.

Procedures carried out in accordance with AFNOR norms:

Tensile : NF T51-034  
 Flexion : NF T51-001  
 Compression: NF T51-101  
 Charpy Impact Strength:: NF T51-501  
 Glass transition : ISO ISO 11357-2 : 1999 -5°C/180°C  
 DSC Tg 1 or onset = 1° point at 20°C / mn under N2. I

## **SR 8450**

### **Wood epoxy system application**

#### **Workshop conditions**

Ventilated workshop.

Minimum ambient temperature for bonding: 15°C

Minimum ambient temperature for coating: 18 °C

Risks taken if used at too low temperature and high relative humidity: fiber, wood not thoroughly wet-out excessive consumption of resin, slow hardening, pollution of the system .

#### **Storage**

The products will be stored sheltered from moisture at 18-25°C. Close immediately after use, especially the hardeners which react with carbon dioxide and moisture. The products are stable at least one year in the original container.

#### **Mixing instructions**

Quantity determination can be by weight (scale +/- 1g) or by volume (graduated container, syringes). Close the container after use to preserve the whole physico-chemical properties of the components.

Mix the two components thoroughly.

Pour into a large and open container which is dry and clean. The results obtained are directly subject to the precision and the care given to the quantity determination and mixing operations.

Tool cleaning: **MEK**, **EP 217** or Acetone.

#### **Surface preparation**

The wood must be dry (joinery quality), sanded and dust free.

The adhesion of the epoxy resin is better onto sanded rather than planed wood.

For surfaces already treated with epoxy, sand down and dust off.

Avoid the use of greasy solvent such as white spirit.

Keep the surfaces clean before bonding or coating.

Respect the operations order : 1- degrease.

2- sand.

3- remove dust.

### Wood wet out

Work at decreasing temperature. For example start the laminate at midday and finish later, because when the wood is warm and dry, the air contained in it expand and get out (degassing). So if you laminate onto a warm substrate that is cooling down then the resin is sucked in by the wood.

The first coat can be diluted with **EP N° 217** diluent.

<b>SR 8450 / SD 8454</b>	1 volume
Diluent <b>EP 217</b>	0.5 to 1 volume maximum

Advice : Mix the resin and hardener first, then wait 5 minutes @ 25 °C or 10 minutes @ 15 °C before dilution. Mix the epoxy system and diluent thoroughly for 3 minutes.

Wet out the surface, the thickness should be as thin as possible to let the solvent evaporate quickly.

Recommended tools : spatula, short-haired roller.

Wait approximately half an hour before starting the laminating or bonding operations.

### laminating

The **SR 8450** system is perfectly adapted for laminating glass fiber onto wood.

The use of peel ply fabric **PEELTEX** for the last layer limits surface defects, suppresses the sanding operation before the priming, bonding or laminating.

### Adhesion between coats / overlay

Work « wet on wet »

The adhesion between the layers is optimal when they are applied before the out of dust time (depends on the hardener, the temperature and moisture). If the overlay cannot be done in this period of time, let it polymerise till the next day and sand the surface before applying the next layer.

### Structural bonding

Apply with a spatula or a brush.

The bonding epoxy system can be filled with **Treecell** or **Wood Fill 250**, in order to increase its viscosity and to fill up the wood defects.

For bonds under load, maintain under pressure during :

36 hours if the ambient temperature is 15 °C

24 hours if the ambient temperature is 18-20°C

16 hours if the ambient temperature is 25 °C.

The fillers are always added **after** mixing the resin and the hardener.

<b>8450 / 845x</b>		<b>Treecell</b>		<b>Silicell</b>		<b>Wood Fill 250</b>
<b>1 volume</b>	+	<b>0.5 volume</b>	+	<b>0.2 to 0.5 volume</b>		
<b>or 1 volume</b>					+	<b>1 volume</b>

spreadsheet 1- Advised proportions of fillers for the structural bonding based on **SR 8450 / SD 845x**

## Radius or Fillet joint

The radius or fillet joint permits the assembling of panels, it can be overlaid with a stripe of bi-axial fabric, if the loads require it.

- High density radius, fillet joint : add to the mix resin / hardener the **Wood Fill 250**, or a **Treecell / Silicell** mix.
- Low density radius, fillet joint : add to the mix resin / hardener the **Wood Fill 130**, or a **micro balloon / Silicell** mix.

SR 8450 / SD 845x	Treecell	Silicell	Wood Fill 250	Wood Fill 130
1 volume	+ 0.5 volume	+ 0.2 to 0.5 volume		
or 1 volume			+ 1.5 volume	
or 1 volume				+ 2 to 2.5 volume

spreadsheet 2- Advised proportions of fillers for the structural bonding based on **SR 8450 / SD 845x**

## Coating on vertical surfaces

Two thin coats of **SR 8450 / SD 845x** are better than one thick coat.

## Health and safety

The epoxy resins can be used safely, by respecting certain rules and precautions.

The mix resin / hardener is corrosive and can irritate, by contact with the skin, or the eyes. Wear gloves, protective glasses and clothing.

Contact with skin : wash with soap and water, remove contaminated clothing and obtain medical attention.

Contact with eyes : immediately flush the eyes with plenty of water and continue for at least 5 minutes. obtain medical attention.

In a workshop properly ventilated and temperate, the handling of the resin does not require a breathing apparatus

However, in case of insufficient ventilation, of work in a confined environment, or for any persons having breathing problems : wear full face respirator with organic vapour cartridge A2B2 or extract the vapours.

Wear a dust-mask for sanding operations.

Do not smoke, drink or eat around the preparation and application areas using epoxy resins.

Do not wash the hands with solvent.

Read the instructions on the back of each packaging.

For more information, consult the complete health and safety data sheet of each component.



## Nature and functions of the fillers

It is essential to thoroughly mix the resin **SR 8450** with the hardeners **SD 845x** before adding the fillers.

### Lightening microballoons

**Whitecell:** *micro balloons of white thermoplastic copolymer.*

Very low bulk density. Very low density of the finished filler. Fine particle sizes, easy to apply ( good, even consistency and flow characteristics , easy to smooth), easily sanded. Ideal for hyper light structures, radius or fillet joints under laminate, finishing filler or « stopper » before painting.

**Glasscell 10:** *white glass micro balloons.*

Ultra light version of the **Glasscell 25** for filling and finishing before painting, increases the density of foam, bonding of soft wood, syntactic foam having excellent compression characteristics. Mechanical performances and chemical stability, excellent density / compression resistance ratio.

**Phenolic micro balloons :** *brown coloured phenolic micro balloons.*

This filler do not « fly » and is easier to mix than **Whitecell**.  
Structural applications : syntactic foams, bonding, brown coloured radius or fillet joints blending with wood, finishing filler and « stopper » before painting. Easy to apply ( good, even consistency and flow characteristics, easy to smooth ), easily sanded.  
Hygroscopic : keep the packing tightly sealed when not in use.

**Glasscell 25 :** *white glass micro balloons.*

Easy to mix and to apply, better abrasion resistance than phenolic micro balloons. Finishing filler and « stopper » before painting, increases the density of foam, bonding of soft wood, syntactic foam having excellent compression characteristics. Mechanical performances and chemical stability, excellent density / compression resistance ratio.

**Fillite:** *aluminium silicate micro balloons*

Easy to mix, good hardness and rigidity of the mouldings. Used for coarse fillers, resurfacing, sound-proofing and thermal insulation, volume filling. The best of the micro balloons fillers for compression resistance, chemical stability. Economical.

## Thixotropic agent

### **Silicell:** *fumed colloidal silica*

Thickening and thixotropic agent ( increases the holding qualities on vertical surface). Added to the epoxy systems, it increases the viscosity, the initial adherence (tack), the bonding rate and maintains fillers in suspension during cure.  
Hygroscopic : keep the packing tightly sealed when not in use.

## Formulated fillers ready to use

### **Mixfill 30** : *fillers for sanding mastic.*

Formulated filler mainly made with micro balloons for the fabrication of medium particle size paste which is easy to sand. Usually used with the **SR 1610 / SD 2613** system.  
**Saves time** : only one filler to add, **reproducible consistency**. Very interesting economically compared to the ready to use epoxy fillers. Fill up **3 cm** deep defects ( with a spatula or a long ruler ).  
The finishing paste will be made with a softer filler as the **Mixfill 10**, the **Whitecell** or the **phenolic micro balloons**.

### **Mixfill 10** : *fillers for sanding mastic*

Softer than **Mixfill 30**, easy to sand, fine particle size. Used before polyurethane or epoxy primers.  
The dust is not sticky, doesn't clog the sandpaper.

### **Wood Fill 250** : *polyvalent and resistant filler.*

Cream coloured powder blending with wood after being mixed with the resin. Used for making high density radius or fillet joints, to bond wood and increase its density.

### **Wood Fill 130** : *polyvalent and low density filler.*

White filler for low density radius or fillet joints, mastic, gap or hole filling.

### **Fill' Tool** : *hard filler for tooling gel-coat.*

Formulated grey filler for making tooling gel-coat on site. Increases the hardness of the surface and abrasion resistance of the epoxy systems. Its dark colour help to control the void content of laminates. Thixotropy modified by the quantity of **Fill'Tool** added.

### **Fill' Tool Alu** : *filler for aluminium filled tooling.*

Formulated filler made with aluminium powder for the fabrication of tooling gel-coat on site. Used with aluminium granules casting, when thermal conduction parameter must be optimal.

## Other fillers:

***Treecell*** : pure cellulose microfibers.

White cotton texture powder. Used generally with epoxy system for the wood (**SR 8450**, **SR 5550**) as a structural additive. Excellent thickening properties and good filling of the bonding surfaces on the wood, high density radius or fillet joints. Combined with **Silicell**, it is easier to smooth and more thixotropic

### ***Graphite powder***

Black plate shape filler. Applications : chemical resistance, friction modifier, lubricating properties, wear reduction, thermal shocks resistance, vibrations absorbing properties, electric and thermal conductivity.

### ***Coarse aluminium powder 200-1000 microns***

Permits the fabrication of large volume tooling having an excellent thermal conductivity : thermoforming under vacuum or pressure. For an equal volume and the same epoxy system, the casting made with the coarse aluminium powder will be less exothermic and more resistant in compression, than the one made with micro balloons. Can be added as much as 3 : 1 by weight with the mixed epoxy system for vac form tools.

In practice, the fillers are often combined together. We give the mini-maxi to add, as well as the densities that you can obtain.

### Proportions of the fillers in the resin

Fillers ↓	bulk density	weight min. – max for 100 g of R + H*	Volume min. – max for 100 ml de R + H*	Maximum density of the filled mix (g/l)
<b>Whitecell</b>	36	2 - 7	120 - 190	370
<b>Glasscell 10</b>				
<b>Phenolic</b>	104	7 - 35	60 - 320	500
<b>Glasscell 25</b>	140	5 - 25	30 - 200	600
<b>Fillite</b>	350	30 - 110	85 - 320	730
<b>Mix Fill 30</b>	310	40 - 100	130 - 320	600
<b>Mix Fill 10</b>	100	24-30	240-300	660
<b>Wood Fill 250</b>	250	20 - 80	80 - 320	1080
<b>Wood Fill 130</b>	130	20 - 50	150 - 380	770
<b>Treecell</b>	80	5 - 17	40 - 210	1150
<b>Silicell</b>	50	3 - 9	60 - 180	1170
<b>Fill' tool</b>	930	80 - 200	90 - 210	1800
<b>Fill' tool Alu</b>		60 - 180		1630
<b>Graphite powder</b>	415	20 - 70	50 - 170	1360
<b>coarse alu powder 200-1000</b>	1160	100 - 250	90 - 220	1720

Spreadsheet 3 - Mini-maxi rates of fillers that you can add, in a resin system having a viscosity of 800 Cps at 20°C.

\* : R+H Mélange Resin et Hardener