

***Composites.  
The high-performance programme.***

*tooling resins blocks ancillaries silicones*

***ebalta***  
*Solution takes shape*

# ebalta composite resins. For your strongest ideas.

ebalta epoxy resin systems for composites have been specially developed for the manufacture of high-strength components reinforced with glass and carbon fibres. They are used, for example, in high-tech fields such as racing, boatbuilding, the automotive industry, rail vehicle construction and wind turbines.

Temperature range T <sub>g</sub>	80-90 °C						
Resin	BIV Epoxy 800		BLH Epoxy 200			LH 25	
Hardener	BIV Hardener 20	BIV Hardener 800	K 25	K 30	W 400	LH 25 Hardener	LH 25 L Hardener
Mixing ratio (p.b.w.)	100:30		100:30			100:15	
Pot life approx. [min] 200 g (20 °C)	18-22	270-310	20-25	25-30	270 ± 310	50-60	70-90
Mixing viscosity [mPas] (25 °C)	450	220	650	450	330	950	950
Glass transition temperature T <sub>g</sub> approx. [°C] after curing	77	82	85	81	80	89	89
Curing [h / °C]	4-6 / 80	4-6 / 80	12-15 / + 50-80	12-15 / + 50-80	10-12 / 70	12-16 / 80	12-16 / 80
Properties and applications	<ul style="list-style-type: none"> <li>• Very low viscosity system for vacuum infusion and RTM</li> <li>• With BIV Hardener 800 GL-approval for boatbuilding applications</li> <li>• By mixing the hardeners above, the system can be accelerated</li> </ul>		<ul style="list-style-type: none"> <li>• Low viscosity system for hand laminating, vacuum bagging and infusion</li> <li>• With hardener K 25 and W 400 GL-approval for boatbuilding applications</li> <li>• By mixing the hardeners above, the system can be accelerated</li> <li>• Hardener K 30 transparent</li> </ul>			<ul style="list-style-type: none"> <li>• Flameproof laminating resin for precision components</li> <li>• Combustibility class S 4, smoke development class SR-2</li> <li>• 2 hardener variants with various pot lives</li> <li>• Colour: white</li> </ul>	

## Epoxy resin systems are our world and composites the future.

30 years of experience in the production of high-quality tooling resins – this was the driving motivation for **ebalta** to devote itself to the development of first-class materials for high-performance composites. The result: **ebalta** epoxy resin systems ideal for the manufacture of composite components and mould making. Should you have any specific questions on products or the manufacturing process, just contact our experts on: +44 1332 814700.

## High quality and efficient: our composite resin systems and materials for composites

- Epoxy resin systems with GL-approval (laminating and infusion resins)
- Resin systems for mould making (laminating and infusion resins) for job lots and series
- Lay-up pastes, block and board materials
- Consumables for vacuum infusion processes
- Ancillaries and additional products



Motorcycle cladding part



up to 100 °C					up to 120 °C		up to 150 °C	up to 175 °C	up to 200 °C
AH 110		AH 140			AH 140		LH 26	LH 28-1	LH 30
SR	TGL	LI 20	LI 60	LI 130	TC 60	TC 90	LH 26 Hardener	TM	LH 30 Hardener
100:22		100:35			100:32		100:27	100:40	100:42
13-15	55-65	18-22	50-60	120-140	55-65	90-105	120-150	240-360	160-200
1850	1000	600	600	550	600	370	400	750	2200
100	102	83	95	103	114	114	150	182	200
12 / 80	12 / 80	4 / 60 + 6 / 80 + 4 / 120	4 / 60 + 6 / 80 + 4 / 120	4 / 60 + 6 / 80 + 4 / 120	4-6 / 60 + 5-6 / 80	4-6 / 60 + 5-6 / 80	Gradual postcuring up to 180 °C	Gradual postcuring up to 160 °C	Gradual postcuring up to 180 °C
<ul style="list-style-type: none"> <li>High-strength laminating resin</li> <li>Bonding resin for fillers</li> <li>Temperature-resistant, with medium viscosity system</li> <li>Hardener SR and TGL also cure well at room temperature</li> </ul>		<ul style="list-style-type: none"> <li>Cures tack free</li> <li>Vacuum infusion of carbon and glass fibre parts</li> <li>Hand lay-up of carbon and glass fibre parts</li> </ul>			<ul style="list-style-type: none"> <li>Temperature-resistant, low-viscosity system for carbon fibre visible parts</li> <li>Hardener TC 60 also cures well at room temperature</li> </ul>		<ul style="list-style-type: none"> <li>High-temperature resistant, low-viscosity system for components and moulds</li> </ul>	<ul style="list-style-type: none"> <li>High-temperature resistant system for components and moulds</li> </ul>	<ul style="list-style-type: none"> <li>High-temperature resistant laminating and bonding resin for moulds</li> </ul>

### Advantages of *ebalta* epoxy resins

High-quality *ebalta* epoxy resins have numerous advantages compared to polyester resins:

- Lower component weight with identical strength
- Better mechanical properties:
  - tensile strength, flexural strength and elongation at break are much higher
  - shrinkage is much lower
- Parts are of a higher quality and have a longer service life
- High osmosis resistance



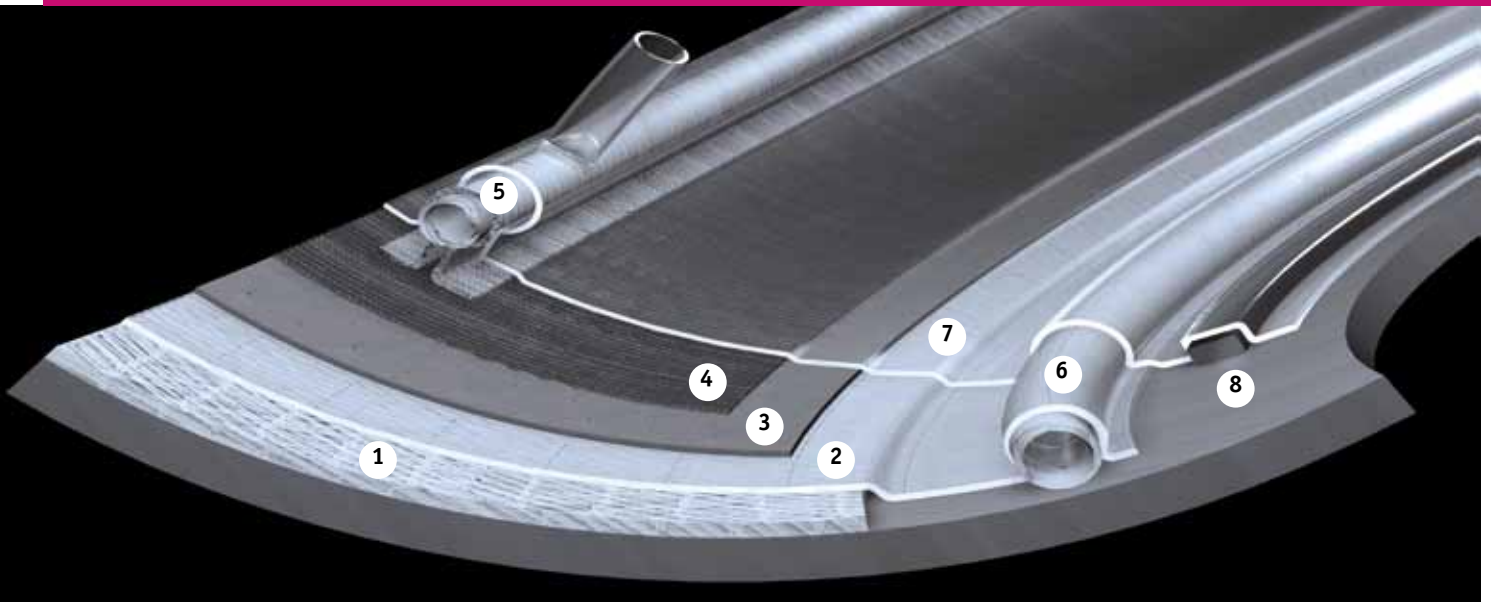
Motorcycle fender



GL-approval as boatbuilding resins for BIV Epoxy 800 and BLH Epoxy 200

## Vacuum infusion – modern manufacturing for high-quality composite parts

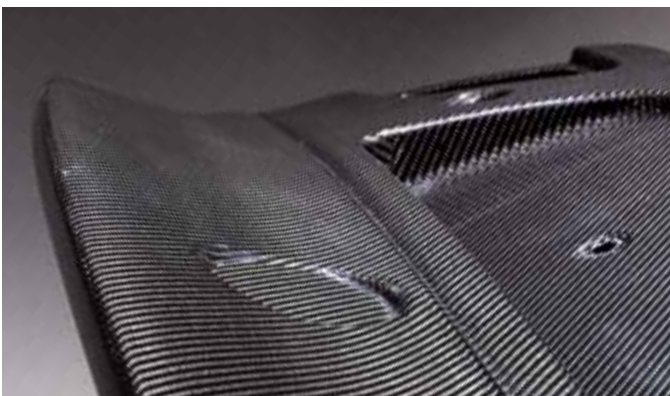
Special manufacturing methods are used for composite parts that have to provide a high level of strength and longevity. A higher fibre and lower resin content with an identical component weight is achieved by vacuum methods such as vacuum infusion.



During vacuum infusion, resin is sucked into the fibre material by applying a vacuum. The method works as follows:

1. The various fabrics (1) are cut to size and placed in the tools or moulds in dry condition depending on the desired wall thickness and strength.
2. The peel ply (2) is then placed on the glass or carbon fibre fabric followed by the perforated release film (3). Flow medium and hoses can be easily removed through

- the perforated release film after curing of the resin.
3. The flow medium (4) is now placed in position and fixed.
4. The resin feed (5) and vacuum hoses (6) are attached and fixed with an adhesive tape.
5. The vacuum film (7) is then applied and sealed with the aid of sealant tapes (8).
6. The resin is now sucked in through the resin feed and is distributed over the entire component.



Rear hatch

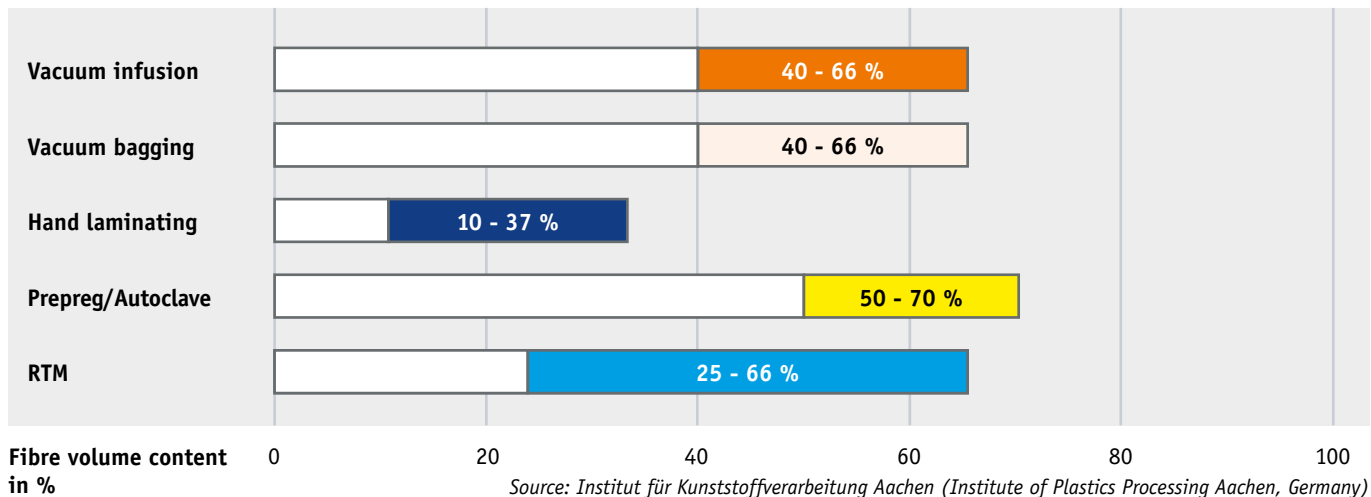


Infusion resin flow

## High fibre volume content for the highest requirements

Wherever high quality is needed or large components are involved – vacuum infusion has crucial advantages compared to other manufacturing processes: an excellent cost-quality ratio, enormous strength and great progress towards occupational safety and efficiency. No matter which demanding manufacturing process you choose – **ebalta** offers the resin system that suits your needs.

### Comparison of fibre volume contents of various manufacturing processes



#### Advantages of vacuum infusion compared to hand laminating

- Closed process and clean working conditions: fibres are inserted in dry condition (greater occupational safety: significant reduction of emission load)
- Lower resin content in component
- Lower weight with identical strength
- Constant quality of components (even and bubble-free saturation), resin content fluctuates by less than 0.5 %, almost no differences in thickness
- Time savings, decisive advantages above all for larger parts with core material

#### compared to vacuum bagging

- Lower resin requirement for larger parts
- Better surface quality of components
- Closed process and clean working conditions

#### compared to prepreg/autoclave

- No procurement costs for autoclave
- Thick laminates can be produced in one step (no debulking necessary)

#### compared to RTM (Resin Transfer Moulding)

- Lower tool costs
- No expensive injection system
- RTM only becomes economical around 100 pieces



Radiator grill

## Products for model, mould and tool making

*ebalta epoxy resin systems were developed especially for the production of moulds for highly resistant components strengthened with glass or carbon fibers. They are chemical and styrene-resistant, easily polishable and have a very dense surface.*

Method	Product recommendation	Hardener	Colour	Material properties	Pot life 200 g/20 °C [min.]	Curing time at RT [hrs.]	Heat resistance (HDT) ISO 75 [°C]
<b>Build-up method</b>							
Gelcoat layer	OH 4	SR	white	universal	15-20	3-5	82
	OH 50	Hardener 03	black	dense surface	12-18	16-24	93
	OH 6-1	CH-1	blue	very abrasion resistant	20-25	20-24	98
	OH 35	CH-1	black	chemical resistant	20-30	16-24	98
	OH 35	HM	black	heat resistant	20-30	16-24	143
	OH 82	TM	black	high heat resistant	220-260	24-48	175
	OH 30	OH 30 Hardener	white	high heat resistant	160-200	> 48	> 170
Coupling layer	KP 6	TGL	grey	aluminium filled	30-40	8-12	n. a.
	KP 7-1	TM	grey	heat resistant	240-360	24-48	n. a.
Backfilling stamping	AH 110 + alu grit	TL	yellow transparent	highly fillable	85-95	24-28	100
	PS 06	TL	alu grey	heat conductive	50-60	12-18	120
	PS 07-1	TM	alu grey	high heat resistance	70-80	24-36	175
Backfilling laminating	BLH Epoxy 200	K 25	green like	good wetting properties GL-approval	20-25 (100 g)	8-10	81
	AH 110	TL	yellow transparent	high strength	85-95	24-28	100
	LH 26	LH 26 Hardener	brown transparent	heat resistant	120-150	10-16	147
	LH 28-1	TM	brown transparent	high heat resistance	240-360	24-48	175
	LH 30	LH 30	brown transparent	high heat resistance	160-200	> 48	181
	PS 03-1	PS 03-1	blue grey	glassfiber-filled	40-50	16-24	68
	PS 05 ebacryl L-1	TLB ebacryl EM-1	grey light beige	heat resistant shrinkage free	50-60 approx. 35	16-24 8-12	105 n. a.



CF component produced using *ebalta* epoxy resin



RTM mould of *ebalta* epoxy resin



Customised block material: with **ebablock®**, you receive a product that is manufactured individually according to your requirements allowing you to manufacture joint-free moulds and tools.

Method	Product recommendation	Colour	Material properties	Heat resistance (HDT) ISO 75 [°C]	Coefficient of thermal expansion [10 <sup>-6</sup> K <sup>-1</sup> ]	Density at 20 °C [g/cm <sup>3</sup> ]	Dimensions
<b>Milling</b>							
EP board	<b>TB 650</b>	green	heat resistant, low coefficient of thermal expansion	111	38	0.68	1000 x 500 x 49 mm 1000 x 500 x 123 mm 1000 x 1000 x 49 mm 1000 x 1000 x 123 mm
	<b>EP 678</b>	light blue	heat resistant, low coefficient of thermal expansion	119	36	0.71	60 x 24 x 2" 60 x 24 x 3" 60 x 24 x 4" 60 x 24 x 6"
	<b>EP 700</b>	beige	heat resistant, low coefficient of thermal expansion	129 <sup>i</sup>	34	0.64	60 x 24 x 2" 60 x 24 x 3" 60 x 24 x 4" 60 x 24 x 6"
	<b>EP 750</b>	pink	heat resistant, low coefficient of thermal expansion	151 <sup>i</sup>	43	0.63	60 x 24 x 2" 60 x 24 x 4"
	<b>TC 460</b>	purple	very high heat resistance	232	31	0.74	60 x 24 x 2" 60 x 24 x 4" 60 x 24 x 6"
PU board	<b>ebaboard L-1</b>	orange	very easy to machine	92	66	0.45	1500 x 500 x 50 mm 1500 x 500 x 75 mm 1500 x 500 x 100 mm 1500 x 500 x 200 mm
EP block	<b>ebablock® EP 138</b>	mint green	heat resistant up to 140 °C	140	49	0.82	variable
PU block	<b>ebablock® P 185</b>	beige	easy to machine	115	39	1.86	variable
EP paste	<b>P 25</b>	red brown	low density	50	100	0.50	variable
	<b>P 26</b>	red brown	layer up to 50 mm, EP	54	65	0.75	variable
	<b>P 27</b>	grey	heat resistant	86	51	1.00	variable

	Product recommendation	Colour	Material properties	Heat resistance (HDT) ISO 75 [°C]	Coefficient of thermal expansion [10 <sup>-6</sup> K <sup>-1</sup> ]	Density at 20 °C [g/cm <sup>3</sup> ]	Hardness [Shore D]
<b>Adhesive</b>							
	<b>EP 551</b>	transparent	unfilled, thin glue line	177 <sup>ii</sup>	48	1.13	88
	<b>EP 578</b>	blue	density matched to EP 678	n.a.	32	0.65	68
	<b>EP 661</b>	dark amber	rapid setting, general use	235 <sup>ii</sup>	48	1.15	90
	<b>AH 110 / TL</b>	transparent	high strength, general use	100 <sup>iii</sup>	n.a.	1.13	86
<b>Repair Paste</b>							
	<b>EP 679</b>	blue	repair patch paste	n.a.	32	0.65	68

All data is summarised, please refer to individual data sheets for a full technical specification.

i = Glass transition temperature ii = ASTM D648 iii = DIN 53458 n.a. = not available

Are you looking for a specific product? Simply give us a call if you can't find what you are looking for on: +44 1332 814700.

*tooling resins   blocks   ancillaries   silicones*

***Composites***

***Mould and tool making***

***Design model making***

***Foundry tooling***

***Rapid prototyping***

***Electrical encapsulation***

***Further applications***

*If you have any questions about our technology or products, please call us anytime to make an appointment with our experts.*

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Solution takes shape