

*ebalta tooling resins*

# *Contemporary solutions in mould and tool making*

*tooling resins   blocks   ancillaries   silicones*



**ebalta**  
Solution takes shape

## *Tooling resins are our world. The power of innovation is our motor.*

*In 30 years of the production of high-quality tooling resins, **ebalta** has developed new resin systems for the optimisation of the production of parts again and again. Especially the high requirements in the making of moulds and tools motivate us to find more and more efficient solutions. Today, **ebalta** tooling resins mark a new standard for this demanding area – as an economical alternative to all the conventional materials.*



### *Factor progress: growing demands require new ways of thinking*

Formula 1, aerospace, shipbuilding – plastic compounds today characterise the most sensitive and modern technologies and fields of research since they are much cheaper and lighter than metallic materials, although they are as solid as them. For the same reasons, the materials being used here also offer an enormous potential for the making of moulds and tools: the time and cost expenses in the production of parts are clearly reduced – and your competitive advantage is enhanced. This is a valuable aspect with regard to the growing competitive pressure.

The strategy of success: resin systems that are adapted to your requirements, a broad range of additional products aligned to these and the intense dialogue. These three pillars guide you from the first consultation on the selection of materials through to the support in the production directly to your goal: a perfect result of a convincing quality.

# Whoever goes new ways proves to be farsighted. And deserves the most experienced advisors.

Many ways lead to the mould: as different as the production processes and materials used may be in mould and tool making, the framework conditions are the same everywhere. Increasing time and cost pressure may not affect precision, rapidity and the high technical quality of the production. Efficient approaches to a problem with new materials and the continuous advice of our very experienced technicians offer a promising perspective for this.

## Plastics instead of metals – benefit from our experience

The most convincing criterion for the use of tooling resins: You obtain an enormous competitive advantage. In order to facilitate the correct handling of these new materials, we ensure that you are supported by skilled experts right from the beginning. In this, experience is the best advisor: on the basis of numerous successful projects, we find the solution which perfectly satisfies your needs. Already the right choice of materials and processes is a decisive factor:

- What does your tool have to perform?
- What is the target life cycle?
- Would the use of tooling resins fulfil your target or would a metallic material suit better?

Whenever you are looking for advice, our experts are at your disposal for the complete duration of the project.

## *ebalta* materials for mould and tool making

- Surface and casting resins
- Blocks and boards
- Silicones
- Additional products and auxiliaries

## Fast, guaranteed: worldwide distribution network

**ebalta** will deliver your product quickly and reliably – including customer support, order assembly and shipping – so that you can concentrate on what's important to you: tool making.

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# *ebalta tooling resins for the highest precision and safe production cycles in mould and tool making*

*Wherever perfection, precision and process safety are demanded, high-quality tooling resin systems are the more economical and safer solution. Our product portfolio which was developed especially for this area of use is manifold. ebalta offers you a high-performance product for any kind of requirements.*

## *The sum of all the advantages is your competitive advantage.*

Moulds made of **ebalta** tooling resins offer numerous advantages. Depending on the manufacturing process in which moulds of plastic are used, there are great potentials for saving costs. Regardless of the requirements to the mould, you will always achieve an optimum price-performance ratio with plastics – and of course the result is of the highest quality. With many applications and especially with very complex geometries, tooling resins are the only possibility to have the production carried out economically.

## *Time*

Thanks to the quick availability of **ebalta** tooling resins, such moulds lead to a considerable reduction of the overall duration of the project – depending on the process, it can be reduced to up to 30% of steel moulds, for example.

## *Material*

Very often, the material used is the highest cost factor. Due to their low specific weight the use of plastics can contribute to a clear reduction in cost here, too, with

sufficient strength. Especially with big moulds, the use of material can be decreased to up to 50%.

## *Geometry*

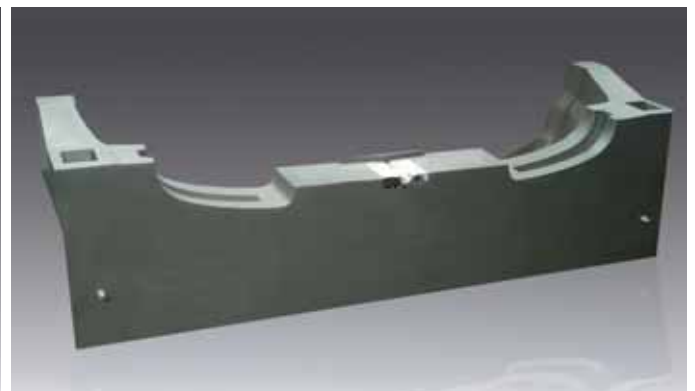
The increasing complexity of the geometries can be much easier implemented with **ebalta** tooling resins than with metals. This is the only possibility to get big bended open-die surfaces.

## *ebalta tooling resins versus metals – all the advantages at a glance*

- quick
- at a favourable price
- considerably lower weight
- smooth production, even of very big and complex moulds
- easy carrying out of alterations
- individual alignment to the respective application
- heating close to the contours
- moulding of already existing models or parts
- quicker milling



RTM mould with a surface of OH 50  
Picture credits: First Composites GmbH



RIM mould with a surface of OH 35  
Picture credits: Ajas GmbH

## *30 years of experience are the best expert knowledge: ebalta shows you new potentials and individual solutions*

*As a manufacturer of tooling resin systems as well as of block and board materials, **ebalta** has gained a maximum of competence and experience in the making of moulds and tools, which is now the best basis for developing new tooling resin systems exactly adapted to the application practice. Every project is a new challenge, and even experienced mould makers seek advice from our experts. This does not only but especially apply for the switch towards an innovative technology.*

### *Special tasks require special solutions*

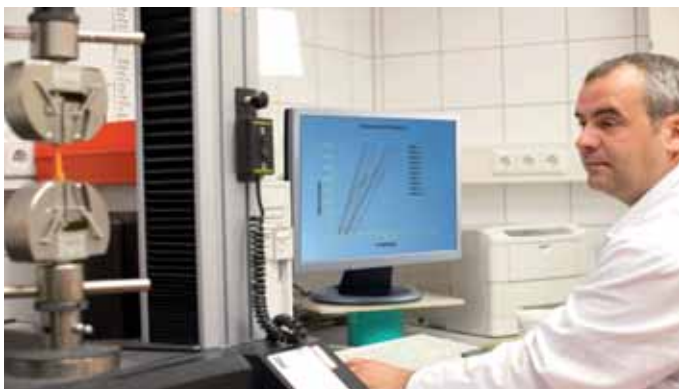
Which possibilities do our materials offer you? What has to be observed in the manufacturing process? Are the geometries of the parts limited? All these questions will be answered by our team of experts whenever you need to be supported. In addition, we supply you with a material which fulfils the requirements to the desired tool or the mould by 100%. If necessary, it will be aligned with your specific requirements in our company laboratory. **ebalta** tooling resins have proved to be reliable materials offering you an exceptionally broad range of characteristics.

### *Compare it – here comes an overview of the advantages of **ebalta** tooling resins*

- complete product range
- very high quality of characteristics
- individual complete solutions according to your requirements
- individual development of materials: materials are modified or customised for the respective application

### *Performance and service for mould and tool making*

- 30 years of experience
- Deep know-how: counselling by application engineers, model and tool makers with many years of experience
- Intensive advice during the overall duration of the project
- High technical level
- Competent customer service
- Quick delivery
- Company laboratory



*Mechanical testing of the materials*



*Development and modification in the company laboratory*

## Production methods

### *Various production methods require flexible products – and good counselling*

*For the production of moulds and tools, different methods are used. The most common ones are the build-up and the casting method as well as milling. Our experts are at your disposal with a lot of expert knowledge and practical experience for the right choice of method and materials.*

#### *The methods:*

- Build-up method
- Casting method
- Milling

#### *This is how we find the right method*

- Size
- Precision
- Equipment available
- Time available
- Initial situation: CAD data, master model, part or drawing

#### *Product diversity includes a diversity of solutions*

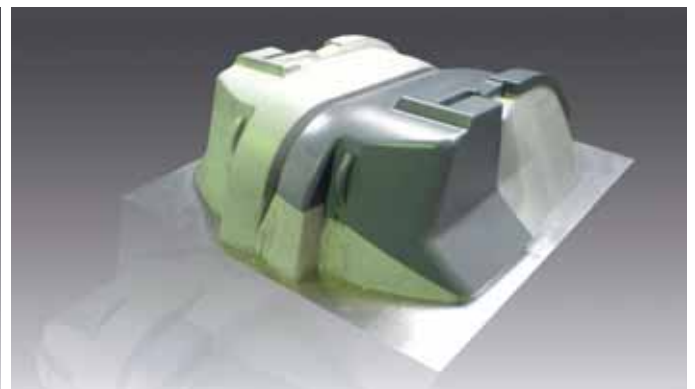
- Casting resins
- Surface resins
- Blocks and boards  
(*ebablock*<sup>®</sup>, *ebaboard*, *ebazell*)
- Silicones
- Additional products and auxiliaries

**ebalta** avails of the right material and an economical solution for you for any type of task. You have the task, we have the experience for aligning the material exactly with your task and the production method. Our team knows which product is the right one for your special application.

If necessary, your material will be individually developed in our laboratory. All the **ebalta** materials are tested according to all the quality standards and technically faultless.



Foam mould of **GH 781**  
Picture credits: Frimo Group GmbH



Vacuum forming double tool of **GH 705** (1200 x 1200 x 400 mm<sup>2</sup>)

# The build-up method

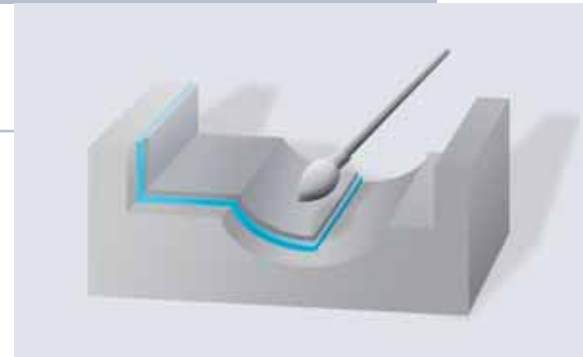
## 1. Surface layer

The surface resin has to be aligned with mechanical, thermal and chemical requirements and with the loads to be expected. Within the pot life, a surface layer of 1-2 mm thickness is applied free of blisters to the counter mould, to which a release agent has been applied.



## 2. Coupling layer

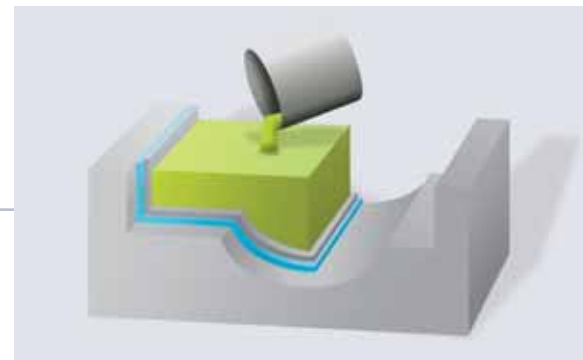
The coupling layer is applied with a thickness of max. 1 mm to the slightly cured but still sticky surface layer. This ensures a good adhesion of the surface resin to the backfilling. Furthermore, this grants for a sufficiently long processing time for the following working cycles.



## 3. Backfilling

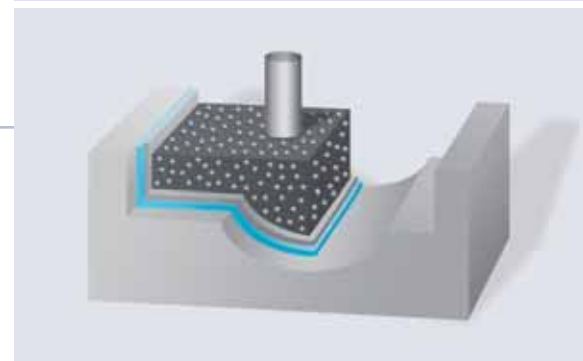
### Backfilling casting

The next step is the casting with a casting resin system which in most of the cases is additionally filled with granular materials such as e.g. aluminium grit. In doing so, shrinkage is reduced and the casting volume is increased.



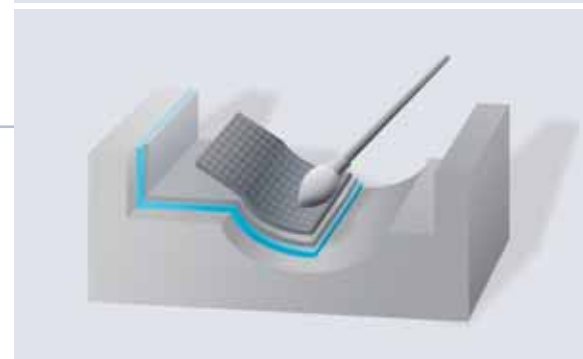
### Backfilling stamping

A general purpose resin is filled with granular materials such as aluminium grit for example in order to get a stamping mass. This is stamped to the coupling layer in several layers. Due to the stamping, the material solidifies to a compact mass which is able to absorb developing forces.



### Backfilling laminating

A laminate is made of glass fabrics and laminating resin. The laminate should be manufactured symmetrically and with as little resin as possible. Instead of fabrics, it is also possible to work with laminate paste. The support of the laminate layer is achieved with a frame construction.

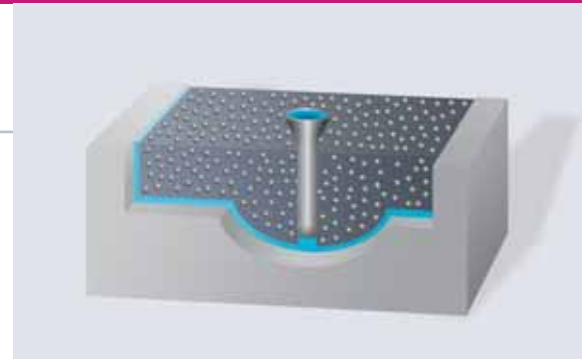


## The casting method

For face casting and for mass casting, *ebalta* offers different casting resin systems depending on the task.

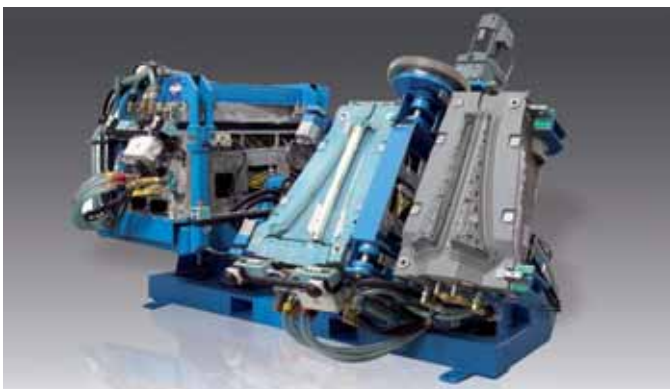
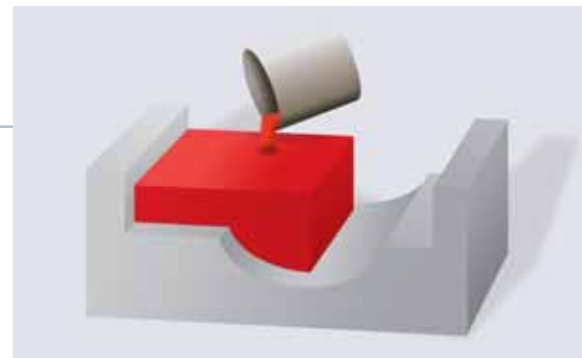
### Face casting

In this method, an easily castable resin system is applied with a thickness of 10-20 mm to a prefabricated carrier or a core. This allows for building large surfaces with complex structures.



### Mass casting

Small to medium volumes are mass cast with a filled casting resin system – very simple, very quick.



Double tool of *GH 781* and *GH 705* (face casting)  
Picture credits: Frimo Group GmbH



Fixture of *SG 2000* (mass casting)

## The milling

The blocks and boards of **ebalta** are especially suited for milling. For the optimum machining, we offer you the material-dependent milling parameters for all the **ebablock**<sup>®</sup>, **ebaboard** and **ebazell** products. The milling resistance of plastics is lower so that shorter machine runtimes are achieved.

### Milling of the block material **ebablock**<sup>®</sup>

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A contour block cast and customised according to your individual requirements is milled to the final dimensions. The result: a homogenous surface free of joints is achieved (c.f. page 20/21).

### Milling of the board material **ebaboard** + **ebazell**

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The board material **ebaboard** and **ebazell** are available in various standard dimensions. A milling blank which will finally be milled to its final dimensions is manufactured by cutting and gluing the boards with the recommended **ebalta** glues.

### Milling of lay-up paste

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In this manufacturing process, PU or EP paste systems are machine-applied with a layer thickness of up to 40 mm to a carrier and then milled to their final dimensions after the paste has hardened.



Vacuum forming mould of **ebablock**<sup>®</sup> W

## Foam and RIM moulds

For producing rigid and flexible foam parts, **ebalta** tooling resins are especially suited. Their dense surface presents even the finest surface details true to nature. To PU foam and release and cleaning agents, they are highly resistant. They are abrasion resistant and heat resistant and are very accurate to dimension.

Method	Product recommendation	Hardener	Color	Material properties	Pot life 200 g/20 °C [min.]	Curing time at RT [hrs.]	Heat resistance (Martens) [°C]	Compressive strength [MPa]
<b>Build-up method</b>								
Surface layer	<b>OH 35</b>	CH-1	black	resistant to chemicals, can be polished	20-30	16-24	97 ± 3	105 ± 10
Coupling layer	<b>KP 6</b>	TGL	grey	aluminium filled, heat resistant	30-40	8-12	-	-
Backfilling Casting	<b>GH 705 + alu grit</b>	TL	alu- grey	heat resistant, very dimensional accurate	65-75	16-24	80 ± 3	80 ± 5
Backfilling Stamping	<b>AH 110 + alu grit</b>	TL	trans- parent	unfilled, high fillable	85-95	24-28	100 ± 3	115 ± 10
	<b>PS 06</b>	TL	alu- grey	heat resistant, conductive	50-60	12-18	104 ± 3	105 ± 10
Backfilling Laminating	<b>AH 110 + fabrics</b>	TL	alu- grey	unfilled, high strength	85-95	24-28	100 ± 3	115 ± 10
	<b>PS 05</b>	TLB	grey	heat resistant, glassfiber-filled	50-60	16-24	88 ± 3	75 ± 5
<b>Casting method</b>								
Face casting	<b>GH 781</b>	GH 781-S	grey	heat resistant, high strength	90-110 (1000 g)	12-14	94 ± 3	145 ± 10
Mass casting	<b>GH 754</b>	GH 754	alu- grey	heat resistant, thick pouring	100-120	18-24	106 ± 3	120 ± 10
	<b>SG 150</b>	Hardener powder	grey	heat resistant, fast curing	18-22	0.5-1	97 ± 3	90 ± 10
<b>Milling</b>								
	<b>ebablock® W</b>	-	grey	high strength, wear resistant	n. a.	n. a.	68 ± 2	110 ± 10
	<b>ebaboard PW 920</b>	-	green	very easy to machine, good edge strength	n. a.	n. a.	62 ± 2	56 ± 5

# Vacuum forming moulds

*ebalta* tooling resins are perfectly suited for the stress of surfaces of vacuum forming. The good heat resistance, the very good making and the easy handling are characteristics of these high-quality materials.

Method	Product recommendation	Hardener	Color	Material properties	Pot life 200 g/20 °C [min.]	Curing time at RT [hrs.]	Heat resistance (Martens) [°C]	Compressive strength [MPa]
<b>Build-up method</b>								
Surface layer	<b>OH 38</b>	SR	alu-grey	good grinding, aluminium filled	20-30	16-24	95 ± 3	110 ± 10
Coupling layer	<b>KP 6</b>	TGL	grey	aluminium filled, heat resistant	30-40	8-12	-	-
Backfilling Casting	<b>GH 754 + alu grit</b>	GH 754	alu-grey	heat resistant, high dimensional accuracy	100-120	18-24	100 ± 3	120 ± 10
Backfilling Stamping	<b>AH 110 + alu grit</b>	TL	transparent	unfilled, high fillable	85-95	24-28	100 ± 3	115 ± 10
	<b>PS 08</b>	TL	alu-grey	air permeable, aluminium filled	45-60	16-24	60 ± 3	16 ± 2
Backfilling Laminating	<b>AH 110 + fabrics</b>	TL	transparent	unfilled, high strength	85-95	24-28	100 ± 3	115 ± 10
	<b>PS 05</b>	TLB	grey	heat resistant, glassfiber-filled	50-60	16-24	88 ± 3	75 ± 5
<b>Casting method</b>								
Face casting	<b>GH 781</b>	GH 781-S	grey	heat resistant, high strength	90-110 (1000 g)	12-14	94 ± 3	145 ± 10
Mass casting	<b>GH 705</b>	TL	alu-grey	heat resistant, aluminium filled	65-75	16-24	80 ± 3	80 ± 5
	<b>GH 754</b>	GH 754	alu-grey	heat resistant, thick pouring	100-120	18-24	106 ± 3	120 ± 10
	<b>SG 150</b>	Hardener powder	grey	heat resistant, fast curing	18-22	0.5-1	97 ± 3	90 ± 10
	<b>ebatemp</b>	PUR 5	alu-grey	fast curing, aluminium filled	4.5-5.5	1-2	68 ± 2	56 ± 5
<b>Milling</b>								
	<b>ebablock® Alu</b>	-	alu-grey	heat resistant, very fine microstructure	n. a.	n. a.	90 ± 3	52 ± 5
	<b>ebablock® W</b>	-	grey	high strength, wear resistant	n. a.	n. a.	68 ± 2	110 ± 10

n. a. = not applicable

# Moulds for the production of composites

*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	Color	Material properties	Pot life 200 g/20 °C [min.]	Curing time at RT [hrs.]	Heat resistance (Martens) [°C]
<b>Build-up method</b>							
Surface layer	<b>OH 4</b>	SR	white	universal	15-20	5-8	89 ± 3
	<b>OH 6</b>	CH-1	blue	very abrasion resistant	20-25	8-10	87
	<b>OH 33</b>	CH-1	black	styrene resistant	20-30	16-24	95 ± 3
	<b>OH 50</b>	EP 03	black	dense surface	20-30	16-24	95 ± 3
	<b>OH 82</b>	TM	black	very heat resistant	220-260	24-48	164 ± 5
Coupling layer	<b>KP 6</b>	TGL	grey	aluminium filled	30-40	8-12	-
	<b>KP 7-1</b>	TM	grey	heat resistant	240-360	24-48	-
Backfilling Stamping	<b>AH 110 + alu grit</b>	TL	transparent	high fillable	85-95	24-28	100 ± 3
	<b>PS 06</b>	TL	alu-grey	conductive	50-60	12-18	104 ± 3
	<b>PS 07-1</b>	TM	alu-grey	heat resistant	70-80	24-36	158 ± 3
Backfilling Laminating	<b>AH 110</b>	TL	transparent	high strength	85-95	24-28	100 ± 3
	<b>LH 28-1</b>	TM	transparent	very heat resistant	240-360	24-48	127 ± 5
	<b>BLH Epoxy 200</b>	K 25	green-like	good wetting properties	20-25 (100g)	8-10	66 ± 2
	<b>PS 03</b>	PS 03	blue	glassfiber-filled	50-60	16-24	36 ± 2
	<b>ebacryl</b>	<b>ebacryl</b>	white	no shrinkage	25	8-12	-



CRP component of *ebalta* epoxy resin



RTM mould of *ebalta* epoxy resin

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

Method	Product recommendation	Color	Material properties	Heat resistance (Martens) [°C]	Coefficient of thermal expansion [10 <sup>-6</sup> K <sup>-1</sup> ]	Density at 20 °C [g/cm <sup>3</sup> ]
<b>Milling</b>						
	<b>ebablock<sup>®</sup> W</b>	grey	high strength	68 ± 2	approx. 50	1.76 ± 0.03
	<b>ebablock<sup>®</sup> L</b>	ochre	very easy to machine	65 ± 5	approx. 40-60	0.45 ± 0.02
	<b>ebaboard PW 920</b>	green	high-quality surface	62 ± 2	approx. 109	1.21 ± 0.05
	<b>TB 650</b>	green	low thermal expansion, EP	-	approx. 38	0.7
	<b>EP 678</b>	blue	low thermal expansion, EP	-	approx. 35	0.7
	<b>P 24</b>	red brown	easy to machine, PU	-	-	0.90 ± 0.02
	<b>P 26</b>	red brown	layer up to 50 mm, EP	-	approx. 65	0.75 ± 0.03

\* = Glass transition temperature  $T_g$  at ASTM D-3418

## ebalta lay-up pastes for moulds and tools

The machine-applied paste systems of **ebalta** produce joint-free surfaces of moulds and tools. They can be easily applied, can be easily milled and render dense surfaces.

### Advantages PU lay-up paste P 24

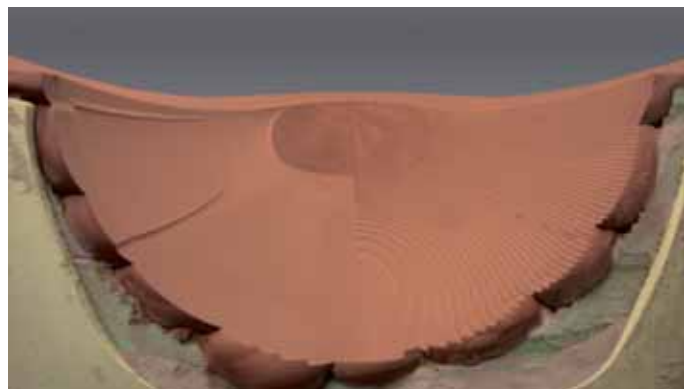
- good curing in thin layers
- can be machined after 10-12 hours
- good edge strength
- joint-free models and moulds for boat building, the wind power industry and aircraft construction

### Advantages EP lay-up paste P 26

- very exact with high dimensional accuracy
- layer thicknesses of 30-50 mm in one step
- low exothermy
- joint-free models and moulds for the automobile industry and vehicle design



Smooth EP lay-up paste P26



CFK mould of P 24 (milled)

# Sheet metal forming tools

Tooling resins are especially an alternative to steel in the production of deep-drawing tools. The use of **ebalta** tooling resins as a material for your sheet metal forming tasks offer you numerous advantages in comparison to the conventional use of metals. Our tooling resins for the forming of sheet metal are available as casting systems, boards and blocks.

Method	Product recommendation	Hardener	Color	Material properties	Pot life 200 g/20°C [min.]	Curing time at RT [hrs.]	Heat resistance (Martens) [°C]	Compressive strength [MPa]
<b>Casting method</b>								
Face casting	<b>GH 760</b>	GL	grey	very dimensional accurate, abrasion resistant	45-55	18-24	60 ± 3	120 ± 10
Mass Casting	<b>GM 708 + filler F-B</b>	PUR 4	beige	unfilled, high fillable	45-60	16-24	50 ± 2	80 ± 8
	<b>GM 725-7</b>	PUR 13	beige	thick pouring, high dimensional accuracy	40-50	12-16	39 ± 2	76 ± 8
<b>Build-up method</b>								
Surface layer	<b>OH 11 - steel</b>	PUR 3	oxide red	good surface slip, wear resistant	30-40	3-5	54 ± 2	80 ± 5
Coupling layer	<b>KP 6</b>	TGL	grey	aluminium filled, heat resistant	30-40	8-12	-	-
Backfilling Casting	<b>GM 708 + filler F-B</b>	PUR 4	brown	unfilled, high fillable	45-60	16-24	50 ± 2	80 ± 8
	<b>GM 725-7</b>	PUR 13	beige	thick pouring, very dimensional accurate	40-50	12-16	39 ± 2	76 ± 8
Backfilling Stamping	<b>AH 100 + filler F-B</b>	TGL	trans-parent	unfilled, high fillable	65-75	18-20	82 ± 3	100 ± 8
Backfilling Laminating	<b>AH 100 + fabrics</b>	TGL	trans-parent	unfilled, slow curing	65-75	18-20	82 ± 3	100 ± 8
<b>Milling</b>								
	<b>ebablock® W</b>	-	grey	high strength, wear resistant	n. a.	n. a.	68 ± 2	110 ± 10
	<b>ebablock® 708</b>	-	beige	high strength, wear resistant	n. a.	n. a.	65 ± 2	95 ± 8

n. a. = not applicable

## Advantage counselling competence: Service right from the beginning

Our team of experts will support you with the choice of the right material for sheet metal forming. Three parameters are decisive:

- the geometry: drawing depth, radii, etc.
- the sheet metal material: alloy, thickness of the metal sheet
- the quantity

According to these three parameters, **ebalta** will supply you with the optimum advice: optimum feasibility, optimum safety, highest economic efficiency.

# A sophisticated service concept for sheet metal forming

Besides well-grounded advice, **ebalta** will offer continuous support for your project, including support for the construction of tools and the process design.

## **ebalta** tooling resins for your sheet metal forming task – all the advantages at a glance

### Advantage of saving time

- Casting systems and boards will be delivered within a short time, individually cast blocks within 5-7 work-days in Germany
- Quick processing: **ebalta** tooling resins can be processed with clearly higher milling speeds and cutting depths. This results in a timely advantage of ca. 60% in comparison to the grey casting GG25CrMo.

### Advantage of saving costs

- Material, personnel, processing: the use of tooling resins as a material for your sheet metal forming task offers a high potential for cost savings in comparison to the use of steel. Our service team will gladly prepare a comparison of costs for you.

### Advantage of flexibility

- The variety of the **ebalta** tooling resins allows for a flexible production. You can prepare any of our systems for the sheet metal forming technology as a casting system, standard board or an individually cast block.

### Advantage of enlarged forming limits

- Higher maximum drawing ratios, lower maximum stamping forces, more even sheet thicknesses – the optimum sliding characteristics of **ebalta** tooling resins for sheet metal forming allow for numerous extensions of the forming limits.



Sheet metal forming tool of **ebablock**® W (outside door layer of a luxury sedan)



Formed sheet part (outside door layer of a luxury sedan)

## Moulds for plaster, concrete and ceramics

Moulds for materials such as plaster, concrete and ceramics have to be very chemical-resistant, absorb little water and have a high-quality surface. Elastic systems should furthermore have a high tear strength. **ebalta** tooling resins fulfil all of these requirements to the highest extent.

Method	Product recommendation	Hardner	Color	Material properties	Pot life 200 g/20 °C [min.]	Curing time at RT [hrs.]	Shore hardness [Shore A/D]	Tensile strength [MPa]	Tear strength [kN/m]
<b>Build-up method</b>									
Surface layer	<b>OH 16</b>	Comp. B	light green	very abrasion resistant, hard flexible	10-15	6-8	D 58 ± 3	23 ± 4	-
	<b>GM 951 Thix</b>	Comp. B	black	spreadable, high tear strength	25-30	2-5	A 55 ± 5	2.0 ± 0.5	10 ± 0.5*
Coupling layer	<b>KP 6</b>	TGL	grey	aluminium filled, heat resistant	30-40	8-12	-	-	-
Backfilling Casting	<b>GM 708 + filler F-B</b>	PUR 4	brown	unfilled, high fillable	45-60	16-24	D 82 ± 3	50 ± 5	-
	<b>GM 725-7</b>	PUR 13	beige	thick pouring, high dimensional accuracy	40-50	12-16	D 87 ± 3	-	-
Backfilling Stamping	<b>AH 100 + alu grit</b>	TG	transparent	unfilled, high fillable	40-50	10-12	D 82 ± 3	-	-
Backfilling Laminating	<b>AH 100 + fabrics</b>	TGL	transparent	unfilled, slow curing	65-75	18-20	D 87 ± 3	-	-
	<b>PS 03</b>	PS 03	blue	glassfiber-filled, smooth	50-60	16-24	D 75 ± 2	-	-
<b>Casting method</b>									
Face casting	<b>GM 958</b>	Comp. B	red brown	very low water absorption, good flow properties	20-30	20-24	A 60 ± 3	5.5 ± 0.8	9.2 ± 5**
	<b>GM 959</b>	Comp. B	amber	good flow properties, good degasing	22-28	20-24	A 45 ± 2	3.8 ± 0.3	9.2 ± 0.3**
Mass Casting	<b>GM 958</b>	Comp. B	red brown	very low water absorption, good flow properties	20-30	20-24	A 60 ± 3	5.5 ± 0.8	9.2 ± 5**
	<b>GM 959</b>	Comp. B	amber	good flow properties, good degasing	22-28	20-24	A 45 ± 2	3.8 ± 0.3	9.2 ± 0.3**
<b>Milling</b>									
	<b>ebaboard PW 920</b>		green	easy to machine, good edge strength	n. a.	n. a.	D 79 ± 2	44 ± 5	-

n. a. = not applicable

\* angle test specimen

\*\* arcuate specimen with a notch of 1 mm

# Fixtures and gauges

With **ebalta** tooling resins, fixtures and gauges can be manufactured in the easiest and quickest way. Compared to metallic materials, they facilitate the production and clearly save weight.

Method	Product recommendation	Hardener	Color	Material properties	Pot life 200 g/20 °C [min.]	Curing time at RT [hrs.]	Shore hardness [Shore D]
<b>Build-up method</b>							
Surface layer	<b>OH 4</b>	SR	white	very well spreadable, easy to grind	15-20	3-5	90 ± 3
	<b>OH 6</b>	SR	blue	very abrasion resistant, very hard	15-20	5-8	85 ± 3
Coupling layer	<b>KP 6</b>	TGL	grey	aluminium filled, heat resistant	30-40	8-12	-
Backfilling Laminating	<b>AH 110 + fabrics</b>	TGL	transparent	unfilled, slow curing	65-75	18-20	87 ± 3
	<b>PS 03</b>	PS 03	blue	glassfiber-filled, smooth	50-60	16-24	75 ± 2
<b>Casting method</b>							
Mass Casting	<b>GM 708 + filler F-B</b>	PUR 4	brown	unfilled, high fillable	45-60	16-24	82 ± 3
	<b>GM 725-7</b>	PUR 13	beige	thick pouring, high dimensional accuracy	40-50	12-16	87 ± 3
	<b>SG 2000 A + filler DN 20</b>	SG 2000 B	amber	unfilled, high fillable	2.5-3.5	0.5-1	72 ± 2
<b>Milling</b>							
	<b>ebablock® 1200</b> <b>ebaboard 1200</b>		light beige	low thermal expansion, good edge strength	<b>Coefficient of thermal expansion</b> [10 <sup>-6</sup> K <sup>-1</sup> ]: approx. 58	-	82 ± 2
	<b>ebaboard LX</b>		beige	low thermal expansion, good edge strength	<b>Coefficient of thermal expansion</b> [10 <sup>-6</sup> K <sup>-1</sup> ]: approx. 44	-	90 ± 3

## Advantages of **ebalta** tooling resins for fixtures

- high dimensional accuracy
- very low linear expansion coefficient
- low weight, simple handling of the gauge
- mechanical load capacity, dimensional stability

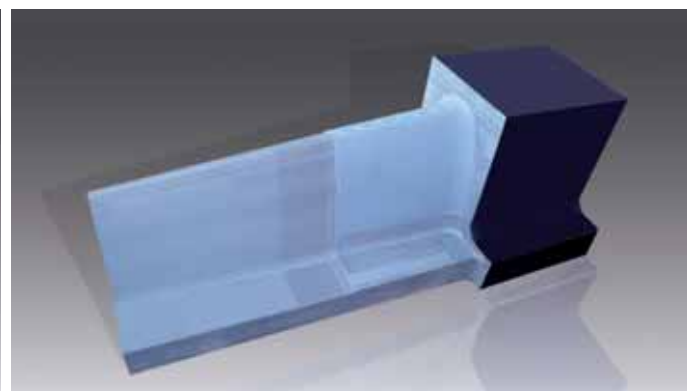
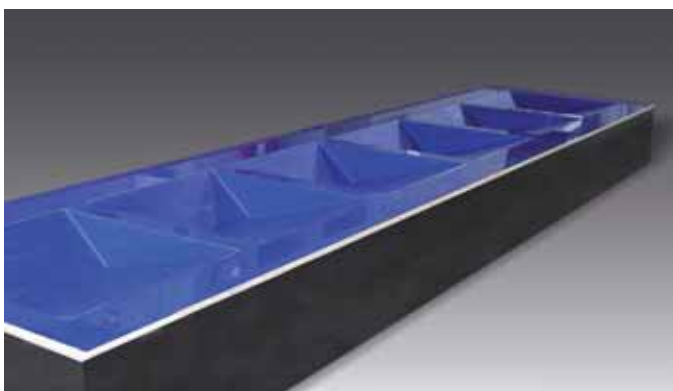
## Advantages of **ebalta** tooling resins for gauges

- very low linear expansion coefficient
- dimensional accuracy
- edge strength

## Bath models for nickel shell tools

Nickel shells are mainly used for the presentation of leather pittings of synthetic leather in the automobile industry and for the production of big and strongly contoured composite parts, e.g. in aviation. The requirements on the materials are accordingly high. With **ebablock®** and special casting and surface resins, **ebalta** offers the ideal materials for this purpose.

Method	Product recommendation	Hardener	Color	Material properties	Pot life 200 g/20 °C [min.]	Curing time at RT [hrs.]	Coefficient of thermal expansion [10 <sup>-6</sup> K <sup>-1</sup> ]
<b>Casting method</b>							
Face casting	<b>GH 761</b>	GL	black	well castable, good compressive strength	50-60	14-16	approx. 52
<b>Build-up method</b>							
Surface layer	<b>OH 4</b>	SR	white	very well spreadable, easy to grind	15-20	3-5	-
	<b>OH 60 SP</b>	GL	black	very well sprayable, low viscosity	60-90	16-24	-
Coupling layer	<b>KP 6</b>	TGL	grey	aluminium filled, heat resistant	30-40	8-12	approx. 54
Backfilling Laminating	<b>AH 100 + fabrics</b>	TGL	trans- parent	unfilled, slow curing	65-75	18-20	-
	<b>PS 03</b>	PS 03	blue	glassfiber-filled, smooth	50-60	16-24	-
<b>Milling</b>							
	<b>ebablock® W mineral</b>	-	blue	very low thermal expansion, high strength	n. a.	n. a.	approx. 39



Blank for electroplating bath model **ebablock® W mineral** (5700 x 1600 x 540 mm<sup>3</sup> )

Electroplating bath model of **ebablock® W mineral**

# High-quality materials with the best characteristics for high-tech applications

Whether for large surfaces, complex geometries or the best optics for nickel shell tools – **ebalta** offers you a broad product portfolio with the appropriate material which can also be used for complex tasks.

## Requirements for the presentation of leather pittings

- high-quality surfaces of the models and accordingly high-quality materials for the production
- perfect suitability especially of **ebablock**® due to the joint-free homogenous tool surfaces

## Requirements for the production of big composite parts

- big models if possible just made of one material in order to avoid irregular thermal expansion and distortion and/or irregularities

## **ebalta** special synthetic resins for nickel shell tools – all the advantages at a glance

- use in the aviation with large surfaces and strongly contoured geometries
- ideal for the leather-covering of automobile interior models
- lead to joint-free surfaces up to 15 m<sup>2</sup> (very large surface possible with **ebablock**®)
- **ebablock**®: homogenous material for homogenous models (no gluing joints)
- very low linear expansion
- fine microstructure
- useable for several purposes
- complete product range for any type: epoxy casting resins and pastes, blocks, boards, silicones



Blank for electroplating bath model (aircraft component) of **ebablock**® M 007  
Picture credits: Konrad Schäfer GmbH



Blank for electroplating bath model dashboard of **ebablock**® W mineral blue  
Picture credits: Heinz Gaubatz Modell- und Formenbau GmbH / Galvanoform GmbH

# *ebablock®: the net-sized contour block material for jointless models, moulds and tools*

*Customized block material for easier and more precise machining: **ebablock®** provides you with an individually created product prefabricated exactly to your specifications. Our experts are happy to advise you from the choice of materials to the final model or tool.*

## *A new technology for individual tasks*

**ebablock®** is produced in close cooperation with the customer. **ebablock®** is manufactured according to your individual geometries as either block goods or net-sized blanks. Block thicknesses of up to 500 mm are possible. Outstanding performance features include the excellent surface quality, resulting from the homogeneously cast and stress-free tempered blocks with no adhesive joints. We can offer different qualities depending on the requirements profile. Common features of all of these are the good mechanical properties, easy machinability and a fine microstructure.

## *Higher performance, point by point*

Each **ebablock®** makes models, moulds and tools more comfortable and efficient.

- You receive the block material to your specifications in individual sizes and geometries
- Models, moulds and tools are jointless
- Adhesive work and joints become a thing of the past
- The net-sized contour significantly reduces milling times

- Each **ebablock®** possesses outstanding dimensional stability
- Noticeable reduction in waste and refinishing
- No operating capital is tied up since no boards have to be stocked

Altogether these plus points add up to one thing for you: a higher quality in the production of models, moulds and tools.

## *High performance in customer support*

The **ebablock®** product series includes comprehensive customer support from your first contact with us to the completion of your job.

- We accompany your project from the beginning to end
- We submit you with a precise and individualised offer
- We create your **ebablock®** based on your specifications, regardless of whether you provide them as a CAD file or a sketch
- We manufacture the moulds you need
- We can also provide milling parameters and additional products for the optimum machining of the **ebablock®**



**ebablock® M 007** (3900 x 500 x 300 mm<sup>3</sup>)



Blank for cubing model of **ebablock® M 007** (3200 x 1600 x 420 mm<sup>3</sup>)

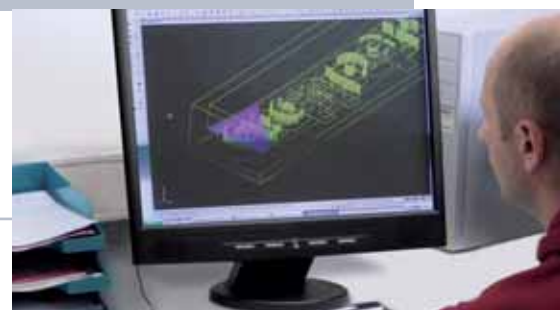
## Step by step to *ebablock*®

*It's easy to receive your individually manufactured block material. We will ship your ready-to-machine *ebablock*®, depending on the complexity and volume of your order as quickly as possible.*

### 1. Your order

You send us a drawing or CAD file with the specifications and dimensions for the *ebablock*® you require.

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### 2. Mould making

We make a mould based on this data.

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### 3. Mixing materials

We convert the raw material into a homogeneous mixture to meet your requirements 100%.

---



### 4. Casting the *ebablock*®

Then we cast your individual block material. The resin matrix is free from bubbles thanks to prior evacuation.

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### 5. Postcuring the *ebablock*®

Once it has been cast, the *ebablock*® is postcured with an electronically controlled tempering process to rid the block of stresses and achieve optimal strength.

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## Production ancillaries for mould and tool making

*ebalta* offers a complete product range of ancillaries for all kinds of working steps related to the making of moulds and tools.

<i>Fillers</i>	Mineral and metallic filling materials, available as powder or granulate (aluminium grits and powders in different grainings)	Good filling properties
<i>Glass fabrics</i>	Glass silk and staple fibre glass yarn in different basic weights.	High strengthening effect
	Glass silk short fibres with fibres of 6 mm length	Easy to process
<i>Wax sheets</i>	Normal and thermostable sheets, various types available in different thicknesses	Fast and easy handling Adhesive-backed
<i>Repair paste alu</i>	Two-component system for repairs of tools and models made of metal or tooling resin (also for cast parts of aluminium or iron)	Aluminium filled High heat resistance
<i>Adhesive for boards</i>	Two-component system for gluing <i>ebaboard</i> and <i>ebablock</i> ® in corresponding colors	High strength Very good to machine Weather and moisture-resistant
<i>Release agent T 1-1</i>	For release of component surfaces	Very short curing time Polishable Apply with brush or spray
<i>Release wax T-2</i>	For release of temperature-stressed mould surfaces. Suited for rough or porous surfaces	Pasty Polishable Easy to apply
<i>Release wax T 7</i>	For applying on temperature-stressed mould surfaces. Suited for epoxy and polyurethane resins, polydur and polyester	Pasty Applicable up to 120 °C Very well polishable
<i>Pore sealer</i>	Primer for sealing porous surfaces (wood, plaster), creates highly smooth surfaces	Quick drying Apply with brush or spray

Please contact us if you cannot find the product you are looking for.

Developed specially for **ebalta** materials, this multi-faceted spectrum of ancillaries make it as easy as possible for you to handle our products.

<b>Brushes</b>	
Flat brushes	10 / 20 / 30 mm
Gussow brush	12 mm
Gussow bristle brush	20 mm
<b>Stirrers</b>	
Star stirrer	90 / 130 mm
Spiral stirrer	70 / 90 mm
<b>Gauntlet gloves, disposable aprons</b>	
Safe protection of clothes against splatters and stains	
<b>Gloves</b>	
Latex gloves with / without powder	S / M / L / XL
Vinyl gloves without powder	S / M / L / XL
Nitrile gloves without powder	M / L / XL
Cotton gloves	One size fits all
<b>Mixing Cups</b>	
Plastic mixing cup	350 / 860 / 2100 ml
Cardboard mixing cup	Small / Large
<b>Adhesives</b>	
Dries-in-seconds adhesive AD 51	20 g bottle
Spray adhesive	400 ml can
<b>Plasticine (kneadable wax)</b>	
Superplasticine	Yellow
Plasticine	Red
Plasticine	White
<b>Rotary fabric cutter, replacement blades</b>	
Sharp blades for quick, exact cutting of thick or rigid material	



*tooling resins   blocks   ancillaries   silicones*

*Mould and tool making*

*Design model making*

*Rapid Prototyping*

*Foundry tooling*

*Composites*

*Electrical encapsulation*

*Further applications*

*If you have any questions concerning technical and production issues, please call us anytime to make an appointment with our experts.*

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Solution takes shape