

## Epoxy - System **HP-E3000GL**

- Hardener **HP-E15GL** / **HP-E200GL** / **HP-E300GL** -

The basis of the series **HP-E3000GL** is an unfilled epoxy-resin, which is mixable with different hardeners for individual purposes.

A special feature of this series is a high initial glass transition temperature ( $T_g$ ) when hardening at room temperature.

The use of the hardener **HP-E200GL** increases the maximum glass transition temperature ( $T_g$  MAX) up to 107°C. The series also has a high transparency so that it is very suitable for visible carbon parts.

### Properties:

- extremely low viscosity, therefore very good fibre wet-out
- pot life can be individually adjusted between 15 minutes (**hardener HP-E15GL**) and 300 minutes (**hardener HP-E300GL**)
- glass transition temperature ( $T_g$  max) up to 107 °C (**hardener HP-E200GL**)
- high static and dynamic strength

### Field of Application:

- Vacuum-infusion methods (IMC/MTI, RI, VARI, SCRIMP®,...)
- Pressure injection methods (RTM, RIM,...)
- Filament winding
- Hand laminating
- optical applications such as visible carbon parts (**hardener HP-E200GL**)

### Processing data -Resin-:

		<b>RESIN</b>
<i>article name</i>		<b>HP-E3000GL</b>
colouring		colourless
colour index	[Gardner]	< 1
mixing ratio (weight)	[parts]	100 : 30 <i>(hardener see next page)</i>
<b>pot life<sup>1</sup> (at 20°C)</b>	<b>[minutes]</b>	<b>15 - 300</b>
pot life <sup>1</sup> (at 25°C)	[minutes]	10 - 180
optimal working temperature	[°C]	20 - 25
minimal working temperature	[°C]	10

## Processing data -Hardener- :

		HARDENER		
		<i>fast</i>	<i>temp</i>	<i>slow</i>
main features		- short pot life - for low working temperatures	- higher Tg - colourless (visible carbon parts)	- long pot life - for infusions/ injections
Name of article		<b>HP-E15GL</b>	<b>HP-E200GL</b>	<b>HP-E300GL</b>
colouring		colourless / slightly yellowish		
colour index	[Gardner]	< 5	< 1	< 1
colouring		yellowish	colourless	colourless, clear
mixing ratio (weight)	[parts]	100 : 30 ( <i>Resin see above</i> )		
<b>pot life time<sup>1</sup> (at 20°C)</b>	<b>[minutes]</b>	<b>15</b>	<b>200</b>	<b>300</b>
pot life time <sup>1</sup> (at 25°C)	[minutes]	10	150	180
optimal processing temperature	[°C]	20-25	20-30	20-30
minimal processing temperature	[°C]	10	15	15

recommended curing cycle  
**HP-E15GL, HP-E300GL, HP-E200GL** [h at °C] 5h/60°C and 6h/80°C  
 for higher temperature stability [h at °C] additionally 2h/120°C  
 (*Tg Max e.g. HP-E200GL*)

## Specifications:

Defined and quantified features underlie persistent controls.

	Resin	Hardener				
		<i>fast</i>	<i>temp</i>	<i>slow</i>		
Name of article		<b>HP-E3000GL</b>	<b>HP-E15GL</b>	<b>HP-E200GL</b>	<b>HP-E300GL</b>	
density (20°C)	[g/cm <sup>3</sup> ]	1.14 - 1.16		0.92 - 0.96	0.94 - 0.98	PM.01.002
viscosity (25°C)	[mPa s]	600 - 900	20 - 30	40 - 60	8 - 13	PM.01.003
Mix viscosity (approx. at 25°C)	[mPa s]	165 - 185				PM.01.003
(NH)-equivalent	[g/EQ]		50 - 55	50 - 55	50 - 55	calculated
epoxy-equivalent	[g/EQ]	170 - 180				calculated

The hardeners can be combined with each other in any ratio in order to be able to flexibly adjust the heat resistance and the pot life (the faster hardener has a greater influence on the mixing pot life).

### Mechanical data using the respective hardener:

article name		fast	temp	slow	method	GL required
		HP-E15GL	HP-E200GL	HP-E300GL		
density	[g/cm³]	1,16	1,16	1,16	DIN EN ISO 1183-A	none
tensile strength	[MPa]	72	82	69	DIN EN ISO 527	≥ 55
tensile modulus of elasticity	[MPa]	2800	2.830	2.950	DIN EN ISO 527	≥ 2.700
elongation	[%]	5,1	6,9	7,8	DIN EN ISO 527	≥ 2,5
flexural strength	[MPa]	102	106	106	DIN EN ISO 178	≥ 100
flexural modulus of elasticity	[MPa]	2.800	2.850	2.750	DIN EN ISO 178	none
temperature resistance	[°C]	79	83	82	DIN EN ISO 75-2	≥ 70
hardness	[Shore D]	83	83	83	after tempering	none
water absorption 168h at 23°C	[mg]	18	22	40	DIN EN ISO 175	≤ 50
glass transition temperature Tg MAX	[°C]	91	107	92	HP04.08	none

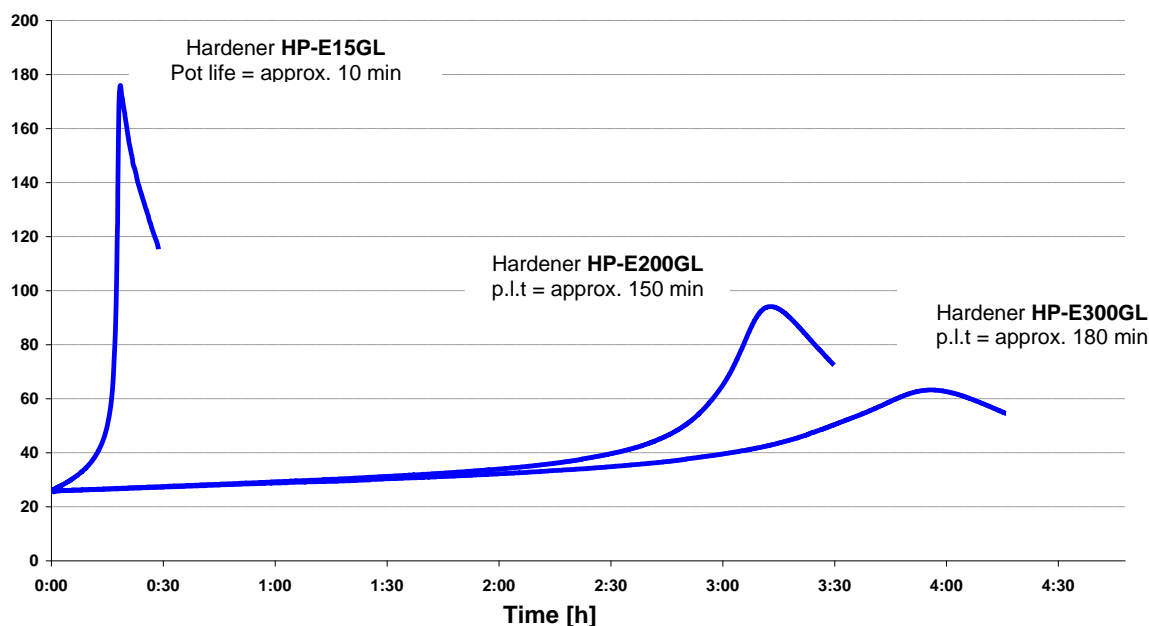
Physical data are determined at an unfilled specimen at 20°C.  
Hardening took 5h at 60°C + 6h at 80°C, further 2h at 120°C for "Tg MAX".

### Pot life:

<sup>1</sup> The pot life (times) are determined by internal method (HP04.06) in which 100g mixed resin is weighed-in an aluminium bowl. The pot life is the temporal value at 40°C on the base of the bowl.

#### Pot life with temperature curve (according to HP04.06)

Measurements at 25°C



Note: Higher temperatures or larger amounts reduce the pot life!

### Safety Instructions:

The safety instructions are to be taken from the respective containers. Do not allow children to handle. Prevent inhalation of fumes and contact with bare skin. Wear suitable protective gloves and safety goggles. Do not eat, drink or smoke while using. During the hardening process, energy can be released in the form of heat, hence a cooling/heat exchanging should be provided in order to prevent hot spots. Only mix the components in the recommended proportions in accordance with the instructions.

At very low temperatures, the hardener can tend to crystallisation. This process is reversible, e.g. by heating it to 40°C in a water bath. Ensure the melting of the complete hardener.

Storage and processing with access to air may cause the building of carbamates.

### Application Instructions:

We recommend tests be performed for trials and suitability for the particular type of application.

Prior to processing, the applied resin should rest and then be deaerated in a desiccator under vacuum and with gentle stirring for at least 20°C.

Tempering is recommended to achieve the optimal component properties.

Optimal tempering cycles: 5h at 60°C + 6h at 80°C

For a higher temperature stability ("Tg Max" HP-E200GL) further 2h at 120°C.

### Cleaning of work tools:

Unhardened product remains can be removed from tools by means of acetone or Thinner XB. Tools should be given a good airing after being cleaned with these solvents, in order to prevent the solvent from being retained until the tool is used again.

Hardened remains can only be removed by mechanical means such as grinding tools.

### Storage:

Threaded container tops should be kept free of material remains. Do not exchange tops/lids. Close opened containers tightly. Store in cool and dry place. With optimal storage conditions, shelf-life should be beyond 12 months.

### Deliverable quantities:

Plastic containers with safety fastening in different quantities.

Larger containers (e.g. barrels) can be obtained upon request.

### Disposal:

Do not allow to enter drains, waterways or soil. Uncured product residues are hazardous waste. The cured system is construction site waste / household waste.

### Further Information:

Further information can be obtained from our website, by selecting *Product Info* at our homepage. Please do not hesitate to contact us by telephone or via mail if you have further queries.

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We recommend tests be performed for trials and suitability for the particular type of application.  
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