Epoxy Resin Systems HP-E25KL / HP-E45KL

- Epoxy-based multi-purpose systems -

The Epoxy-Systems HP-E25KL and HP-E45KL are unfilled, **medium-viscous**, chemical resistant 2 components combinations of resin and hardener with short or medium working times.
They are versatile suitable for laminating and for bonding / gluing applications.

Properties and field of application:

For laminating:
- good wet-out of reinforcement fibres
- create bright, non-gluey surfaces
- cold-hardening, medium-viscous, HP-E25KL: applicable from 5°C

For mould making:
- as mould making resin (mixable with colour pigments)
- usable for coupling-layers (with fillers)

For coatings / final layers:
- create glossy, non-gluey surfaces
- usable for repairs / refit of osmosis damages
- High resistance to different chemicals such as styrene, fuel, …

(See list of chemical resistance on the third page)
Therefore suitable for coatings of tanks, pipes, basins…

For bonding / gluing:
- Applicable for gluing / bonding applications and for mixing putties (e.g. in combination with HP-PK22 and HP-BF1).

Special formulation allows the use under difficult conditions (low temperatures, air humidity) and are less sensitive against unwanted intermediate reactions (e.g. the formation of amine blush).

HP-E25KL / HP-E45KL are free of nonylphenol and contain no active diluents.

Please note: HP-E25KL and HP-E45KL come with the same resin.
Both hardeners can be mixed among themselves.

Product Properties:

		HP-E25KL	HP-E45KL
Colouring		slightly yellow / clear	
Mix ratio *(resin : hardener)*	[by weight]	100:60	
	[by volume]	100:70	
Mixed viscosity *(at 20°)*	[mPa s]	2500 – 3500 (medium-viscous)	
Mixed viscosity *(at 25°)*	**[mPa s]**	**1400 – 1800 (medium-viscous)**	
Working time / pot life *(at 20°C)*	**[minutes]**	**25**	**45**
Demouldable after	[h]	<18	<30
Processing temperature (optimum)	[°C]	15-25	20-25
Processing temperature **(minimum)**	**[°C]**	**5**	**15**

Raw material data:

			HARDENER		
		RESIN	HP-E25KL	HP-E45KL	
Viscosity (at 25°C)	[mPa s]	7.000 - 9.000	600 - 800	350 - 550	HP.07.0003
Density (at 20°C)	[g/cm³]	1.14 - 1.16	1.01 - 1.03	1.01 - 1.03	HM.07.0002
(NH)-Equivalent	[g/EQ]		113 - 117	113 - 117	HM.07.0014
Epoxy-Equivalent	[g/EQ]	185 - 195			HM.07.0013

Moulding properties -without reinforcing material-:

		HP-E25KL	HP-E45KL	
Tensile strength	[N/mm²]	68	60	HM.07.0004
Elongation	[%]	5 - 6	5	HM.07.0004
Flexural strength	[MPa]	115	100	HM.07.0005
E-Modulus	[GPa]	3,1	3	HM.07.0004
Hardness	[Shore D]	85	84	HP04.07
Glass transition temperature Tg MAX	[°C]	78	66	HP04.08

Specifications with unreinforced resin, after curing for 24h at 23°C + 15h at 80°C

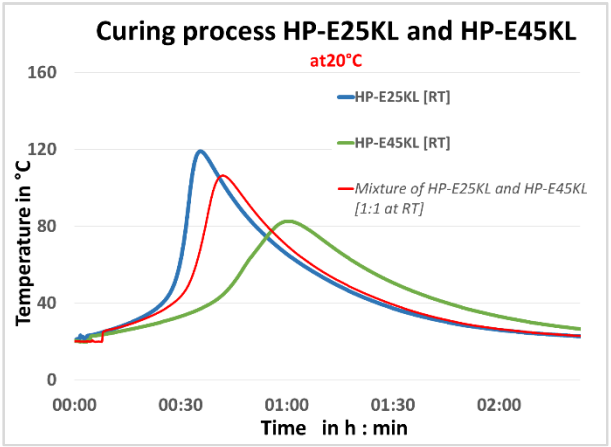
Curing and exothermic progress:

According to HP04.051.
Resin and hardener are tempered to 23°C and 100g mixed 100:60 (by weight). The sensing element is placed on the bottom of the cup (aluminium bowl).

Higher temperature or larger amounts will cause to a reduction of the working time.

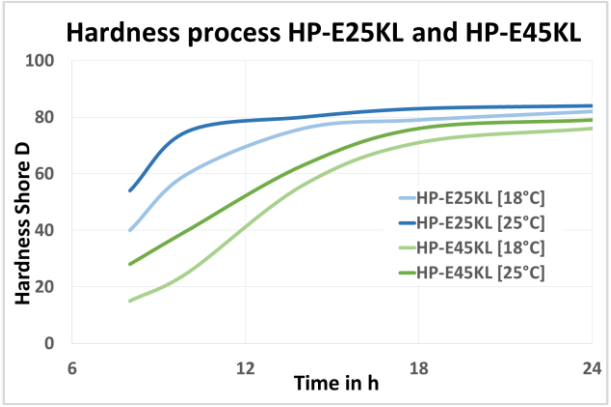
Temperature peaks:

	HP-E25KL	HP-E45KL
t up to T_{max} [h:mm]	Approx. 0:36	Approx. 0:42
T_{max} [°C]	119	106



Curing and hardness Shore:

According to HP04.04.
Mixing resin and hardener (100:60 by weight). Amounts of 10g will be placed in cups and hardness (shore) will be measured regularly under isothermic conditions.



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TECHNICAL DATA SHEET

Below you can find a table of the chemical resistance of HP-E25KL / HP-E45KL at room temperature (20°C).
Generally, the stability depends on loading time, concentration and temperature.

LEGEND			
P = loss in pendulum hardness	**++**	=	resistant
D = long-term storage	**+**	=	limited resistant
E = expected (untested)	**-**	=	not resistant
	→	=	tendency

2-Ethoxy ethanol	P	-	Formaldehyde 35%	P	++	Petrol / gasoline	P	++
2-Nitropropane	P	++	Grape juice	E	++	Petroleum ether / Naphtha	D	++
Acetic acid 10%	P	++	Heptane	E	++	Phenol	P	-
Acetic acid 30%	P	+	Hexane	E	++	Phosphoric acid 10%	P	++
Acetic acid 60%	P	+	Hydraulic fluid	D	++ > +	Phosphoric acid 20%	P	+
Acetic acid 80%	P	-	Hydrochloric acid 10%	D	++	Phosphoric acid 45%	P	+
Acetone	P	-	Hydrochloric acid 20%	P	++	Phosphoric acid 5%	P	+
Amines	P	-	Hydrochloric acid 30%	P	+ > -	Phosphoric acid conc.	P	-
Ammonia 25%	P	++ > +	Hydrochloric acid 37%	P	-	Potassium hydroxide	E	++
Antifreeze	E	++	Hydrochloric acid 5%	E	++	Propyl acetate	E	+
Aromatic hydrocarbons	D	++	Hydrogen peroxide 3%	P	++	Salt solution conc.	P	++
Beer	P	++	Isopropyl alcohol	E	+	Silicone oil	P	++
Benzene	D	++	Jet fuel	E	++	Snow	E	++
Boric acid 3% at 30°C	D	++	Kerosene	P	++	Soap solution 5%	E	++
Carbon tetrachloride	P	+	Lactic-/ butyric-/ acetic acid each 1%	D	++	Sodium carbonate	E	++
Chalk	E	++	Lard	P	++	Sodium chloride 3%	P	++
Chlorinated water	D	+	Linseed oil	P	++	Sodium chloride 30%	P	++
Chlorobenzene	P	+	Lubricants	E	++	Sodium hydroxide 10-50%	D	++
Chloroform	P	-	Methanol	E	-	Sodium hypochlorite 16% (+ 12% sodium chloride)	D	+
Chromic acid 40%	P	++	Methyl isobutyl ketone	P	+ > -	Styrene	P	++
Chromic acid 5%	P	++	Milk	P	++	Sulphuric acid 10%	P	++
Citric acid	D	++	Mineral oil	D	++	Sulphuric acid 30-80%	P	+
Cod liver oil	P	++	Molasses	D	++	Sulphuric acid, fuming	E	-
Crude oil	E	++	n-Butanol	P	++	Tetrachloroethylene	P	++
Cyclohexanone	P	++	n-Butyl acetate	P	+	Toluene	E	++
Developing bath 1:10 diluted	P	++	n-Butyl ether	P	++	Trichloroethylene	P	+
Dibutyl phthalate	D	++	Nitric acid 10%	P	+	Turpentine	P	++
Dichloromethane	P	-	Nitric acid 20%	P	+ > -	Vegetable juice	P	++
Diesel oil	P	++	Nitric acid 30%	P	+ > -	Vegetable oils	E	++
Dioctyl phthalate	D	++	Nitric acid 40%	P	-	Waste water	D	++
Ethyl acetate	E	+ > -	Nitric acid 5%	P	++	Water, 100°C (212°F)	D	+
Ethyl alcohol	D	+ > -	Nitric acid 60%	P	-	Water, distilled	D	++
Ethyl alcohol 10%(water)	P	++	n-Propyl alcohol	E	+	Whisky	E	+
Ethylene glycol	P	++	Olive oil	P	++	Wine	P	++
Fatty acid	D	++	Oxalic acid 10%	P	++	Xylene	P	++

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Rev. 2023-02rds

Safety instructions:

The safety instructions are to be taken from the respective containers. Do not allow children to handle. Prevent inhalation of the 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.
Higher resistance against crystallization.
However, at very low temperatures, a crystallization of the hardener may occur. The process is reversible e.g. by heating it in a water bath to 40-60°C. A complete melting is important. Storage and processing with air admission may lead to carbamate formation (white coloration).

Application Instructions:

We recommend tests be performed for trials and suitability for the particular type of application. The system should only be used in the mentioned temperature conditions. The relative air humidity should not be above 70%. In respect of the safety instructions the epoxy and hardener should be mixed in a suitable mixing vessel in accordance with characteristics given in the data sheet. Deviating from the mixing recommendations can lead to incomplete hardening and through that loss of performance.
Ensure that the edges are well mixed using a stirring stick or a propeller type mixer. Streaks indicate insufficient stirring and mixing of the components. Larger amounts (more than 100g) and higher temperatures (higher than 20°C) reduce the pot life time.
Mixtures which rise to over 40°C in the mixing vessel should not be used any further since processing is associated with property losses. Increases in temperature can be reduced by pouring the mixture into flat paint trays.

Generally for epoxy: Full cure (strength) after 7 days at 20°C (literature value).
Higher temperatures will decrease this time.
Improved heat resistance and better mechanical properties can be achieved by tempering (post-curing).
Optimal tempering cycles: 24h at 23°C + 5h at 60°C + 6h at 80°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, e.g. by sanding.

Storage:

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

Deliverable quantities:

Plastic containers with safety fastening in several 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 application information can be obtained from our website, by selecting Product Info on the homepage. Please do not hesitate to contact us by telephone if you have further queries.

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