Version 1.0
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Hydrophobic Outdoor Epoxy Resin System Material

	EP9101A	**100 PBW**
	EP9101B	**120 PBW**
Filler	**Silica Flour**	**300-400PBW**

It is recommended to use the active silicon flour adapted by our company to better achieve the electrical and mechanical properties of the material.
Cycloaliphatic, hot-curing, two component epoxy casting resin system for outdoor applications.

Applications

Outdoor medium and high voltage electrical insulation parts and current and voltage transformers, etc.

Processing methods

Conventional casting with stage-wise curing, or automatic pressure gelation casting (APG process).

Properties

Excellent mechanical and electrical performance
Good thermal shock resistance
Resist corrosion caused by ultraviolet radiation
Super hydrophobicity, suitable for making insulators with good weather resistance and bad operating conditions

Silicon flours treated with silane coupling agents ensure stable dielectric and mechanical properties under outdoor wet conditions

	Liquid, epoxy resin				
EP9101A	Viscosity	at 25°C		mPas	500 - 1000
	Vapour Pressure	at 20°C	(Knudsen)	mbar	<0.01
	Specific Weight	at 20°C	γ- Kugel	g/c	1.16 - 1.18

	Liquid, modified hardener				
EP9101B	Viscosity	at 25°C		mPas	100 - 400
	Vapour Pressure	at 20°C	(Knudsen)	mbar	<0.01
	Density	at 20°C	γ- Kugel	g/cm^3	1.1 - 1.3

EP9101B contains accelerators and storage at high temperatures should be avoided to avoid adverse effects on gel properties. When the above materials are not used in whole drums, the remaining materials must be sealed in containers, and should not be exposed to moisture and air for a long time.

Storage

The components have to be stored under dry conditions at 6-35°C, in tightly sealed original containers. Under these conditions, the shelf life will correspond to the expiry date stated on the label. After this date, the product may be processed to see if it is still effective only following reanalysis. Partly emptied containers should be closed tightly immediately after use.

Processing (guideline values)

System Preparation

General instructions for preparing liquid resin systems

The following is the suggested preheat temperature of Resin and Hardener:

Resin:	preheat at 50°C for 6h
to 12h hrs Hardener:	room temperature
Filler:	80°C - 110 °C for 6h to 12h depends on process condition

Mix all of the components together very thoroughly, (the mixture temperature will be reached at or about 60°C. If lower mix viscosity is expected, preheat resin at higher temperature **but not exceed 80°C**) and under vacuum.

Adequate wetting of the feed is extremely important. Proper mixing will result in:

- Better flow properties and reduced tendency to shrinkage
- Lower internal stresses and therefore improved mechanical properties on object
- Improved partial discharge behaviour in high voltage applications.

For the mixing of medium to high viscous casting resin systems and for mixing at lower temperatures, it is recommended special thin film degassing mixers that may produce additional self-heating of 10-15°C as a result of friction. For low viscous casting resin systems, conventional anchor mixers are usually sufficient. In larger plants, two pre-mixers are used to mix the individual components (resin, hardener) under vacuum. Metering pumps then feed these premixes to the final mixer or a continuous mixer. The individual premix can be stored at elevated temperature (about 60°C) for up to about 1 week, depending on formulation. Intermittent agitation during storage is advisable to prevent filler sedimentation.

Mixing time can vary from 0.5 to 3 hours, depending on mixing temperature, quantity, mixing equipment and the particular application. The required vacuum is 0.5 to 8 mbar. The vapour pressure of the individual components should be taken into account.

Specific Instructions

Dilute the remaining mixture with resin before overnight or weekend storage and level with another component before returning to work. Piping containing prefilled components or casting mixes should be cooled immediately after work to prevent sedimentation and/or undesired viscosity increases.

Mould temperature

APG process	130 - 160°C
Conventional vacuum casting	70 - 100°C

Demoulding times (depending on mould temperature and casting volume)

APG process	10 - 40 min
Conventional vacuum casting	5 - 8h

Cure conditions

APG process (minimal postcure)	12h at 130°C or 8h at 140°C
Conventional vacuum casting	12h at 130°C or 8h at 140°C

To determine whether curing has been carried to completion and the final proper-ties are optimal, it is necessary to carry out relevant measurements on the actual object or to measure the glass transition temperature. Different gel and curing cycles in the manufacturing process could influence the curing and the glass transition temperature respectively.

Processing (guideline value)

System tested:
EP9101A / EP9101B / Filler (Coupling agent treated)
Mix ratio: 100 / 120 / 300

Reactive Mixture	Mix Viscosity	at 40°C		m Pas	ca. 2,000
		at 60°C		m Pas	ca. 700
	Pot Life	at 40°C	DIN16945	hours	ca. 8
		at 60°C		hours	ca. 3.3
	Geltime	at 80°C	DIN16945	mins	ca. 120
		at 120°C		mins	ca. 10
		at 140°C		mins	ca. 5

Mechanical and Physical Properties (guideline value)

System tested:
EP9101A / EP9101B / Filler (Coupling agent treated)
Mix ratio: 100 / 120 / 300

Determined on standard test specimen at 23°C
cured for 8 hours at 140°C

Tensile strength	ISO 527.2	MPa	80-100
Tensile strain	ISO 527.2	%	ca. 1.3
E modulus from tensile test	ISO 527.2	N/mm²	ca. 11500
Flexural strength at 25°C	ISO178	MPa	130-160
E modulus from flexural test	ISO178	MPa	ca. 12000
Glass transition temperature (DSC)	IEC61006	°C	90-105
Water contact angle	ISO15989	°	>100
Water absorption (specimen: 50x50x4 mm)			
10 days at 23°C	ISO62	% by wt.	0.10 - 0.20
60 min at 100°C	ISO62	% by wt.	0.08 - 0.15
Density (**Filler load: 60% by wt.**)	DIN55990	g/cm³	1.75-1.80

System tested:
EP9101A / EP9101B / Filler (Coupling agent treated)
Mix ratio: 100 /120 / 300

Determined on standard test specimen at 23°C
cured for 8 hours at 140°C

Breakdown strength	IEC60243	kV/mm	20 - 30
HV arc resistance	IEC61621	s	200 - 220
Tracking resistance	IEC61621	—	**1A4.5**

Industrial hygiene

Industrial hygiene procedures should be followed whenever our products are being handled and processed. For additional information please consult the corresponding Safety Data Sheets and the brochure "Hygienic precautions for handling plastics products".

Handling precautions

Safety precautions at workplace:

protective clothing	yes
gloves	essential
arm protectors	recommended when skin contact likely
goggles/safety glasses	yes
respirator/dust mask	recommended
Skin protection	
before starting work	Apply barrier cream to exposed skin
after washing	Apply barrier or nourishing cream
Cleansing of contaminated skin	Dab off with absorbent paper, wash with warm water and alkali-free soap, then dry with disposable towels. Do not use solvents
Clean shop requirements	Cover workbenches, etc. with light coloured paper. Use disposable beakers, etc.
Disposal of spillage	Soak up with sawdust or cotton waste and deposit in plastic-lined bin
Ventilation:	
of workshop	Renew air 3 to 5 times an hour
of workplace	Exhaust fans. Operatives should avoid inhaling vapours.

First Aid

Contamination of the **eyes** by resin, hardener or casting mix should be treated immediately by flushing with clean, running water for 10 to 15 minutes. A doctor should then be consulted.

Material smeared or splashed on the **skin** should be dabbed off, and the contaminated area then washed and treated with a cleansing cream (see above). A doctor should be consulted in the event of severe irritation or burns. Contaminated clothing should be changed immediately.

Anyone taken ill after **inhaling** vapours should be moved out of doors immediately. In all cases of doubt call for medical assistance.

Statement	Buyer's contract is subject to the conditions that seller does not represent, warrant, or imply fitness for a specific purpose, that the Instructions for use shall not be construed to induce infringement of any relevant patent, and that Seller shall not be liable for incidental or consequential damages arising out of negligence, breach of warranty, extralculation, civil interest or contract. Buyer's sole remedy and Seller's sole liability for any claim shall be buyer's payment for the goods. All data are measured in the laboratory based on specific conditions and shall be confirmed by the purchaser through tests according to the conditions and purposes of use. This product is not recommended for mucous membrane, skin or blood related long-term exposure, and human transplantation related use.