



# Technical Data Sheet

## ER2188 Epoxy Resin

### Product Description

ER2188 is a flame retardant, general purpose, two part potting and encapsulating compound. The system utilises a hardener free of DDM or other aromatic amines. The flame retardant technology used is of a 'clean' type leading to relatively low toxicity fumes and low smoke emission.

### Features

- Excellent electrical properties
- Flame retardant approved to UL94 V-0
- Excellent adhesion to a wide variety of substrates
- Low shrinkage and exotherm
- Good chemical and water resistance
- Low toxicity, direct replacement for ER2002
- Cost effective

<b>Approvals:</b>	RoHS Compliant	Yes
	UL Approval	UL94 V-0

### **Typical Properties:**

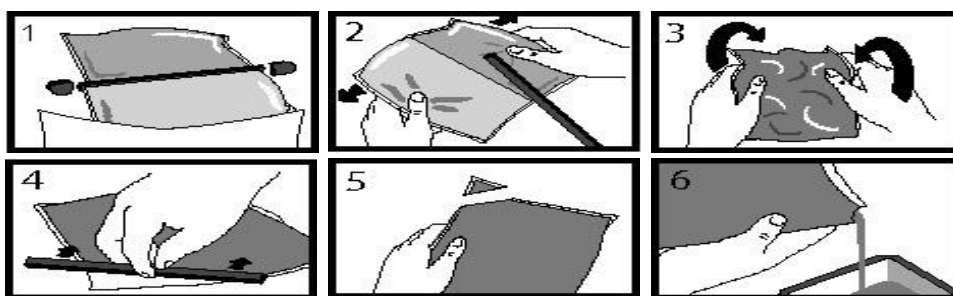
Liquid Properties:	Base Material	Epoxy
	Density Part A - Resin (g/ml)	1.83
	Density Part B - Hardener (g/ml)	0.92
	Part A Viscosity (mPa s @ 23°C)	150000
	Part B Viscosity (mPa s @ 23°C)	200
	Mixed System Viscosity (mPa s @ 23°C)	9000
	Mix Ratio (Weight)	10.97:1
	Mix Ratio (Volume)	5.53:1
	Usable Life (20°C)	60 mins
	Gel Time (23°C)	150 mins
	Cure Time (23°C)	24 hours
	Cure Time (60 °C)	2 hours
	Cure Time (100 °C)	20 minutes
	Colour Part A - Resin	Black
	Colour Part B - Hardener	Amber
	Storage Conditions	Dry Conditions: Above 15°C, Below 30°C
	Shelf Life	24 Months (bulk) 18 months (resin pack)
	Exotherm	
	(Measured on 100ml sample in a cylinder of diameter 49.4mm @ 23°C)	< 35°C
	Shrinkage	< 1%

<b>Cured System:</b>	Thermal Conductivity (W/mK)	0.45
	Cured Density (g/ml)	1.69
	Temperature Range (°C)	-40 to +120
	Max Temperature Range (Short Term °C / 30 Mins) (Application and Geometry Dependent)	+140
	Dielectric Strength (kV/mm)	10
	Volume Resistivity (ohm-cm)	10 <sup>14</sup>
	Shore Hardness	D85
	Colour (Mixed System)	Black
	Flame Retardancy	Yes
	Tensile Strength (MPa)	50
	Compressive Strength (MPa)	120
	Deflection Temperature (°C)	50
	Coefficient of Expansion (ppm/°C)	40
	Loss Tangent @ 50 Hz	0.04
	Permittivity @ 50 Hz	4.00
	Comparative Tracking Index	>850 Volts
	Water Absorption (9.7mm thick disk, 51mm diameter)	
	10 days @ 20°C / 1 hour @ 100°C	< 0.5% / < 1%
	Elongation At Break	0.4%

## Mixing Procedures

### Resin Packs

When in Resin pack form, the resin and hardener are mixed by removing the clip and moving the contents around inside the pack until thoroughly mixed. To remove the clip, remove both end caps, grip each end of the pack and pull apart gently. By using the removed clip, take special care to push unmixed material from the corners of the pack. Mixing normally takes from two to four minutes depending on the skill of the operator and the size of the pack. Both the resin and hardener are evacuated prior to packing so the system is ready for use immediately after mixing. The corner may be cut from the pack so that it may be used as a simple dispenser.



### **Bulk Mixing**

When mixing, care must be taken to avoid the introduction of excessive amounts of air. Automatic mixing equipment is available which will not only mix both the resin and hardener accurately in the correct ratio but do this without introducing air. Containers of Part A (Resin) and Part B (Hardener) should be kept sealed at all times when not in use to prevent the ingress of moisture. Bulk material must be thoroughly mixed before use. Incomplete mixing will result in erratic or partial curing.

### **General**

Sedimentation of the resin has been minimised by careful attention to the formulation. However, any sediment which may have occurred over long periods of time must be dispersed before removing any material from the container. This dispersion can be carried out (if necessary) by stirring with a broad bladed spatula or gently rolling the can. Take care not to introduce excessive amounts of air during this operation or it may be necessary to re-evacuate the resin. Sedimentation will be accelerated by storage at high temperatures. Sedimentation found in resin packs forms no problem since the sediment is re-mixed when the pack is used.

## **Additional Information**

### **Curing Schedule**

Do not heat cure large volumes immediately. Allow these to gel at room temperature and post-cure at high temperature if required (refer to liquid properties for details). Small volumes (250ml) may be heat cured immediately.

### **Cleaning**

It is far easier for machines & containers to be cleaned before the resin has been allowed to cure. Electrolube's OP9004 is a non-flammable cleaner designed for this purpose. Cured resin may be slowly softened and removed by soaking in our OP9003 Resin Stripper.

### **Storage**

When storing under very cold conditions, the hardener may crystallise. If this occurs, simply warm (40 °C) the container gently until all crystals have re-melted.

### **Health & Safety**

Always refer to the Health & Safety data sheet before use. These can be downloaded from [www.electrolube.com](http://www.electrolube.com)

Diamino Diphenyl Methane (DDM) has been used extensively in the resin industry but under changes to the EEC guidelines now requires a TOXIC label with the risk phrase "May Cause Cancer". **ER2188** does **NOT** contain DDM.

Rev: 1 (August '06)

#### **Copyright Electrolube 2005**

All information is given in good faith but without warranty. Properties are given as a guide only and should not be taken as a specification.

Electrolube cannot be held responsible for the performance of its products within any application determined by the customer, who must satisfy themselves as to the suitability of the product.