

# OP281-1

## Optoelectronic Epoxy

### Description

OP 281 is a clear, bluish water-clear epoxy system suitable for potting of high performance optoelectronic devices like LED displays. This system is cured with anhydride hardeners. It is recommended for potting of LED chips and components, bonding of electronic parts, most plastics, ceramics and metals. It is designed for excellent performances in temperature cycling, high temperature storage, high humidity storage, minimal light output degradation, and outdoor weathering. It is enhanced for maximum resistance to yellowing from UV light and oxidation, high temperature degradation and sunlight. It is specially improved to provide good crack resistance from thermo-mechanical stresses.

### Applications

1. Encapsulation of high performance LED lamps devices.

### Guidelines for Use

1. Wear rubber gloves when handling epoxy resins and epoxy hardeners.
2. Agitate the Part A resin and Part B hardener in their original bottles before use. Either of these parts may crystallize on storage at low temperatures. However, warming and stirring of these individual parts at 70 °C will ensure homogeneity.

### Properties

Property	Unit	Typical Value		
		Part A Resin	Part B Hardener	Mixed
Chemical type		Epoxy	Anhydride	
Appearance		Blue liquid	Clear liquid	
Mix ratio, by weight		1.0	1.0	
Shelf life, 25 °C	Month	12	12	
Pot life, 25 °C	Hour			8
Viscosity, Brookfield RVT, 25 °C	cP	7000	300	1450
Specific gravity, 25 °C		1.17	1.16	
Refractive index, 25 °C		1.57	1.48	1.53
Hardness	Shore D			90
Tg, DSC	°C			140
Modulus, 25 °C	MPa			600
CTE, TMA, $\alpha_1$ (60-100 °C) $\alpha_2$ (160-220 °C)	m/m/°C			62 x 10 <sup>-6</sup> 152 x 10 <sup>-6</sup>
Mass lost on cure, 35mm diam. mold 5 g epoxy 10 g epoxy 15 g epoxy	%			1.10 0.78 0.66
Atmospheric moisture absorption, 10mm x 15mm x 3mm, 7 days	%			0.50
Cure shrinkage, volume	%			1.3

3. Mix Part A resin and Part B hardener in the ratio of 1.0:1.0 by weight.
4. Remove the air bubbles in the epoxy mix by vacuum degas at 0.001 mbar (0.1 Pa) for 20 minutes.
5. The epoxy mix can be dispensed with a syringe into the polycarbonate (PC), polyphenylene oxide (PPO), or other casing materials.
6. Cure the epoxy at 115 °C for 1 hour to set the epoxy

- within the casing. Further cure the epoxy at 125 °C for 2 hours to complete the cure and increase Tg. Depending on the type of casing material, the curing may be performed a lower temperature.
7. Wipe off any uncured epoxy spillage with tissue or dry cloth. Further cleaning may be achieved with tissue wetted with iso-propanol.

## Recommended Cure

No.	Pre-cure	Post-cure	Substrate
1	115°C/1hr	125°C/2hr	Polycarbonate, PC
2	110°C/1hr	110°C/3hr	Polybutylene terephthalate, PBT

## Storage

Store both Part A resin and Part B hardener in a cool, dark place to prolong shelf life. They must be kept away from sunlight and bright room lights.

Part B is moisture sensitive. Close the seal and cap of the bottle tightly immediately after use.

## Packaging

- 1 kg plastic bottle
- 5 kg plastic bottle

## Environment, Health & Safety

This product is RoHS compliant. It does not contain any known carcinogenic, mutagenic or teratogenic components.

## Contact Information

Penchem Technologies Sdn Bhd  
(767120-A), 1015, Jalan  
Perindustrian Bukit Minyak  
7,14100 Penang, Malaysia  
T: +604-5015976, 77,78, 79  
E: [enquiry@penchem.com](mailto:enquiry@penchem.com)  
W: [www.penchem.com](http://www.penchem.com)

Revision 4.11-Jul-18.AA