Encapsil-11 & Encapsil-12

High Performance Silicone Potting and Encapsulating Materials for Electrical and Electronic Components

Preliminary Product Technical data sheet

PRODUCT DESCRIPTION

Encapsil-11 silicone rubber compound is a two-part silicone elastomer which is supplied as a ready-to-use compound with a base and a catalyst. Encapsil-12 is a high strength version that can be used in some specific applications requiring good mechanical strength.

PRODUCT FEATURES

- Room temperature cure and ease of application.
- Retention of elastomeric properties at temperatures from -50°C up to 200°C continuously and up to 260°C for short periods of time.
- Resists weathering, moisture, ozone and corona.
- Composition free of solvents and solvent odour.
- Variable work time and cure rates.
- Excellent dielectric and heat transfer properties.
- Excellent adhesion capabilities with primer.
- Excellent release properties.

APPLICATIONS

- Potting and encapsulating connectors, electrical coils, switches and components to protect them from dust and moisture.
- Making formed-in-place gaskets and low strength molds
- Insulating and sealing wire and cable splices.
- Insulating and sealing conduits and motor coils.

TECHNICAL OVERVIEW

Uncured Properties of Base Compound

Properties	Encapsil-11	Encapsil-12
Colour	White	White
Consistency	Easily Pourable	Easily Pourable
Viscosity, mPa.s	10000	15000
Specific Gravity, g/cc	1.18	1.18

Curing Characteristics of Encapsil-11 & Encapsil-12 (With 5 wt % catalyst : CAT-04)

Curing Characteristics	Encapsil-11	Encapsil-12
Pot life @ 27° C, mins	60	15
Cure Time @ 27°C, hrs	8	8

CURED PROPERTIES

(5 wt. % Catalyst CAT-04, cured for 1 week @ 25°C and 50% R.H.)

Mechanical Properties	Encapsil-11	Encapsil-12
Hardness, Shore A	25	22
Tensile Strength, MPa	3.0	3.4
Elongation, %	175	200
Tear Strength, N/mm	4.0	4.0
Shrinkage, %	0.7	0.7
Electrical Properties		
Dielectric Strength, kV/mm	20.0	20.0
Dielectric Constant @ 1000 Hz	3.0	3.0
Dissipation Factor @ 1000 Hz	0.008	0.04
Volume Resistivity, ohm-cm	1.0×10^{15}	2.0×10^{15}
Thermal Properties		
Useful Temperature Range, °C	-50 to 200	-50 to 220
Thermal Conductivity, W/m.K	0.28	0.32
Coefficient of Thermal Expansion, cm/cm, ° C	25×10^{-5}	20×10^{-5}
Specific Heat, cal/gm,	0.35	0.35

DIRECTIONS FOR USE

Blending Encapsil-11 with the catalyst

Weigh out Encapsil-11 or Encapsil-12 Part A (base compound) in a mixing container, which is 4 to 5 times larger than the volume of the material to be used. Add appropriate amount of Catalyst CAT-04 (5% by weight). This will provide a work time or pot life of about 50 mins and cure time of 8 hours. If needed, the pot life may be increased by using less catalyst.

With clean tools, thoroughly mix the base compound and the curing agent, scraping vigorously the sides and bottom of the container to produce a homogeneous mixture. When using power mixers, avoid excessive speeds which could result in air entrapment or cause overheating of the mixture, resulting in a shorter pot life.

Deaeration

It is recommended that air entrapped during mixing be removed under vacuum to eliminate voids in the final product. This process will make the mixture to expand and then collapse. A volume increase of about 4-5 times will occur during the de-aeration process. Therefore, a large container should be used to accommodate this volume change.

Expose the mixed material to a vacuum of about 10-20 mbar. The material will expand, crest, and recede to about the original level as the bubbles break. Degassing is usually complete about two minutes after frothing ceases. When using Encapsil-11 or Encapsil-12 silicone rubber compound for potting, a deaeration step may be necessary after pouring to avoid entrapped air in complex parts.

It should be also noted that prolonged application of vacuum will remove the volatiles from the mixture that can result in poor cure.

This system is sensitive to temperature and humidity and therefore can influence the cure speed. However, the final mechanical properties of the product will be attained in one week. The material will cure to a flexible rubber within 24 hours at room temperature..

Curing

Using the provided catalyst at a level of 5%, these Encasil-11 or Encapsil-12 compounds will cure in about 8 hours at 27^{o}C and 50% relative humidity to form durable, resilient rubbers. Under these conditions a pot life of about 50 minutes will typically be available for pouring and working with the catalyzed material. Pot life may be increased by refrigerating the mixed material at 0^{o}C after catalyzing. Cure times may be decreased by using mild heat up to 95^{o}C (maximum)

Deep Section Cure

If Encapsil-11 or Encapsil-12 silicone rubber compounds are to be used in deep sections at temperatures over 150^{o}C, the cured product should be properly conditioned prior to exposure to the service temperatures. After a room temperature cure of 1-3 days, a typical eight hour cycle at 50^{o}C intervals from 100^{o}C to the service temperature would be useful. Longer times at each temperature will be required for larger parts or very deep sections.

Adhesion to the substrates

If adhesion is an important application criterion, Encapsil-11 silicone rubber compounds require a primer to bond to non-silicone surfaces. Thoroughly clean the substrate with a solvent such as naphtha or methyl ethyl ketone or isopropyl alcohol and let the surface dry. Then apply a uniform thin film of a suitable silicone primer such as Sil-prime 44 available Performance Polymers. Allow the primer to air dry for about one hour or more. Finally, apply freshly catalyzed Encapsil-11 or Encapsil-12 silicone rubber compound to the primed surface and cure as recommended.

CATALYST OPTIONS

Encapsil-11 and Encapsil-12 can be cured in to elastomeric products using the following cure options:

- **CAT-16:** General purpose catalyst with long work life for relatively fast cure
- **CAT-04 :** Fast curing catalyst with short work life.

HANDLING PRECAUTIONS AND SAFETY

Encapsil-11 and Encapsil-12 contains constituents that have been found to be safe. Hence, special handling precautions except general industrial hygiene need to be followed. Catalysts contain organo-tin compound and are flammable and might cause irritation upon contact with eyes and skin. Adequate protective measures are recommended. Refer to Material safety Data Sheet (MSDS) for safe use of the product

SHELF LIFE AND STORAGE

The shelf life of Encapsil 11 and Encapsil-12 and the catalysts is 6 months from the date of manufacturing if stored below 27^{o} C in original unopened containers.

PACKING

Encapsil-11 and Encapsil-12 are available in following kit forms :

1. Kit of 5.25 kg (5 kg Part A + 250 grams of Catalyst
2. Kit of 1.05 kg (1 kg Part A + 50 grams of Catalyst

LIMITATIONS

This product is neither tested nor claimed as suitable for food contact, medical or pharmaceutical applications.

Encapsil-11 and Encapsil-12 are manufactured in India by :
Performance Polymers
B-88, 3rd Cross 3rd Main, Opp. ESI Sub-Regional Office
DDUTT, Industrial Suburb, 2nd Stage,
Yeshwantpur, Bangalore 560 022,
Phone: +91-8023379779
e-mail: ceo@performancepolymers.in
web: www.moldsil.com