



STYCAST 2651-40 FR

Flame Retardant, General Purpose Epoxy Encapsulant

Key Feature:	Benefit:
<ul style="list-style-type: none"> Meets UL 94 V-0 	<ul style="list-style-type: none"> Recognized flame retardancy
<ul style="list-style-type: none"> Excellent dielectric properties 	<ul style="list-style-type: none"> Reliable electronic assemblies
<ul style="list-style-type: none"> General purpose 	<ul style="list-style-type: none"> Used in a wide variety of applications

Product Description:

STYCAST 2651-40 FR is a filled, general purpose, dielectric grade epoxy encapsulant. It features excellent dielectric properties, low viscosity and is Underwriter's Laboratories approved for UL 94 V-0 when used with catalyst 9 or 11. STYCAST 2651-40 FR is the flame retardant version of STYCAST 2651-40.

Applications:

STYCAST 2651-40 FR is designed for the general purpose potting of most electrical devices especially those that require flame retardancy.

Instructions For Use:

Thoroughly read the information concerning health and safety contained in this bulletin before using. Observe all precautionary statements that appear on the product label and/or contained in individual Material Safety Data Sheets (MSDS).

To ensure the long term performance of the potted or encapsulated electrical / electronic assembly, complete cleaning of components and substrates should be performed to remove contamination such as dust, moisture, salt, and oils which can cause electrical failure, poor adhesion or corrosion in an embedded part.

Some filler settling is common during shipping and storage. For this reason, it is recommended that the contents of the shipping container be thoroughly mixed prior to use. Power mixing is preferred to ensure a homogeneous product.

Accurately weigh resin and hardener into a clean container in the recommended ratio. Weighing apparatus having an accuracy in proportion to the amounts being weighed should be used.

Blend components by hand, using a kneading motion, for 2-3 minutes. Scrape the bottom and sides of the mixing container frequently to produce a uniform mixture. If possible, power mix for an additional 2-3 minutes. Avoid high mixing speeds which could entrap excessive amounts of air or cause overheating of the mixture resulting in reduced working life.

To ensure a void-free embedment, vacuum deairing or degassing should be performed to remove any entrapped air introduced during the mixing operation. Pump-down or pull vacuum on the mixture to achieve an ultimate vacuum or absolute pressure of 1-5 torr or mm Hg. The foam will rise several times the liquid height and then subside. Continue vacuum deairing until most of the bubbling has ceased. This usually requires 3-10 minutes.

To facilitate deairing in difficult to deair materials, add 1-3 drops of an air release agent, such as ANTIFOAM 88, into 100 grams of mixture. Gentle warming will also help, but working life will be shortened.

Pour mixture into cavity or mold. Gentle warming of the mold or assembly reduces the viscosity. This improves the flow of the material into the unit having intricate shapes or tightly packed coils or components. Further vacuum deairing in the mold may be required for critical applications.

Properties of Material As Supplied:

Property	Test Method	Unit	Value
Chemical Type			Epoxy
Appearance	Visual		Black liquid
Density	TP-13	g/cm ³	1.55
Brookfield Viscosity	TP-10 or TP-11	Pa.s cP	30 30,000

TPs are internal test procedures, typically derived from ASTM or other norms. Copies of these test procedures can be obtained upon request.

Properties of Material As Mixed:

Property	Test Method	Unit	Value		
			Catalyst 9	Catalyst 11	Catalyst 24LV
Mix Ratio - Amount of Catalyst per 100 parts of STYCAST 2651-40 FR		By Weight By Volume	9 12	9.5 13	16
Working Life (100 g @ 25°C)	ERF 13-70		45 minutes	>4 hours	60 min
Density	TP-13	g/cm ³	1.49	1.50	1.44
Brookfield Viscosity	TP-10 or TP-11	Pa.s cP	8 8,000	4.8 4,800	1.2 1,200

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Choice of Curing Agents			
Curing agent	Catalyst 9	Catalyst 11	Catalyst 24 LV
Description	General purpose with good chemical resistance and physical strength.	Long pot life, excellent chemical resistance, good physical and chemical properties at elevated temperatures.	Excellent low temperature performance properties.
Type of cure	Room or heat	Heat	Room or heat
Viscosity	Pa.s cP	0.080 to 0.105 80 to 105	0.035 to 0.060 @ 65 °C 35 to 60 @ 65 °C
			10-25

Cure Schedule

Cure at any one of the recommended cure schedules. For optimum performance, follow the initial cure with a post cure of 2 - 4 hours at the highest expected use temperature.

Temperature °C	Cure Time		
	Catalyst 9	Catalyst 11	Catalyst 24LV
25	16-24 hrs		8-16 hrs
45	4-6 hrs		
65	1-2 hrs		2 hrs
80		8-16 hrs	
100		2-4 hrs	
120		30-60 mins	

Properties of Material After Application:

Property	Test Method	Unit	Value		
			Catalyst 9	Catalyst 11	Catalyst 24LV
Hardness	TP-311	Shore D	87	88	88
Compressive Strength	TP-207	mPa psi		107 15,500	
Water Absorption	Water boil	%		0.1	.92
Coefficient of Thermal Expansion	TMA	10 ⁻⁶ /°C		56	64
Glass transition temperature	TMA	°C			58
Thermal Conductivity	ASTM-D-2214	W/m.K Btu-in/hr-ft ² -°F	0.55 3.8	0.55 3.8	
Temperature Range of Use		°C	-40 to +130	-55 to +155	-65 to 105
Fire Resistance	UL 94	-	V-0 (6.4 mm)	V-0 (6.4 mm) V-1 (3.0 mm)	
Dielectric Strength	TP-297	kV/mm V/mil	17.7 450	17.7 450	
Dielectric Constant @ 1 mHz	TP-184	-		3.8	4.27
Dissipation Factor @ 1 mHz	TP-184	-		0.02	0.03
Volume Resistivity @ 25°C	TP-183	Ohm-cm	>10 ¹⁴	>10 ¹⁴	>10 ¹⁴

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Note

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Americas
+1.888.943.6535

Europe
+44.1442.278.000

Asia
+86.21.3898.4800



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