

# STYCAST<sup>®</sup> 2850 FT

## Two Component, Versatile Epoxy Encapsulant With High Thermal Conductivity

Key Feature	Benefit
High thermal conductivity	Heat dissipation from embedded components
Wide variety of catalysts	Versatility of resin system
Low coefficient of thermal expansion	Low stress on embedded components

### Product Description :

STYCAST 2850 FT is a two component, thermally conductive epoxy encapsulant that can be used with a variety of catalysts. It features a low coefficient of thermal expansion and excellent electrical insulative properties. STYCAST 2850 FT BLUE is recommended for use in high voltage applications where surface arcing or tracking is a concern.

### Applications :

STYCAST 2850 FT is designed for encapsulation of components which need heat dissipation and thermal shock properties.

### 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 or 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 should be used to remove any entrapped air introduced during the mixing operation. Vacuum deair mixture at 1-5 mm mercury. 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. Slight warming (40°C) of the resin before catalyst addition will aid pouring and fasten bubble release.

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 operations.

**Properties Of Material As Supplied :**

Property	Test Method	Unit	Typical Value
Chemistry			Epoxy
Appearance	TP-76W		Black or blue liquid
Density	TP-13W	g/cm <sup>3</sup>	2,3 - 2,5
Brookfield Viscosity	TP-10W 10 rpm # 7	Pa.s	200 - 300

**Choice Of Curing Agents :**

Curing Agent	CATALYST 9	CATALYST 24 LV	CATALYST 27-1
Description	General purpose with good chemical resistance and physical strength	Low viscosity, excellent adhesion, thermal shock and impact resistance. Excellent low temperature properties and fast cure.	Long pot life, excellent chemical resistance, good physical and chemical properties at elevated temperatures.
Type of Cure	Room	Room	Heat
Viscosity (Pa.s) TP-10W	0,080 to 0,105	0,030 – 0,040	0,250 – 0,350
Density (g/cm <sup>3</sup> ) TP-13W	0,95 – 1,05	1,00 – 1,05	1,00 – 1,10

**Properties Of Material As Mixed:**

Property	Test Method	Unit	Typical Value		
			CATALYST 9	CATALYST 24 LV	CATALYST 27-1
Mix Ratio – Amount of Catalyst per 100 parts of STYCAST 2850 FT		By Weight	4	8	7,0
		By Volume	8,5	17,5	16,5
Working Life (100 g @ 25°C)			45 minutes	30 minutes	2 hours

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### Cure Schedule :

Cure at any 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. Alternate cure schedules may also be possible. Contact your local Emerson & Cuming Technical Representative for further information.

Temperature (°C)	Cure Time		
	CATALYST 9	CATALYST 24 LV	CATALYST 27-1
25	16 – 24 h	8 – 16 h	
45	4 – 6 h	4 – 6 h	
65	2 h	2 h	
80			
100			
120			4 h

### Physical Properties Of Material After Application :

Property	Test Method	Unit	Typical Value		
			CATALYST 9	CATALYST 24 LV	CATALYST 27-1
Hardness	TP-49W	Shore D	93	92	94
TMA	TP-525W				
	Tg	°C	67	39	90
	CTE 1	10 <sup>-6</sup> K <sup>-1</sup>	39	47	42
	CTE 2	10 <sup>-6</sup> K <sup>-1</sup>	98	120	120
DMA – 1	TP-526W				
	Tg at tan δ	°C	108	75	132
DMA – 2	TP-526W				
	Tg at onset point	°C	83	63	114
E-Modulus	TP-526W	MPa			
	at 35°C		8645	5314	6413
	at 50°C		8368	5080	6266
	at 100°C		1427	95	4898
	at 150°C		215	110	85
Weight Loss	TP-506W	%			
	at 150°C		0,23	-	-
	at 200°C		0,26	0,02	0,04
	at 250°C		0,33	0,05	0,14
	at 300°C		0,59	0,18	0,26
	at 700°C		26,4	28,0	27,5
Thermal Conductivity		W/m.K	1,119	1,0144	1,0661
Linear Shrinkage	TP-547W	%	0,18	0,51	0,23
Water Absorption	TP-546W	%			
	after 1 day at RT		0,02	0,14	0,06
	after 7 days at RT		0,07	0,36	0,08
	after 1 h at 100°C		0,17	0,55	0,12

**Electrical Properties Of Material After Application :**

Property	Test Method	Unit	Typical Value		
			CATALYST 9	CATALYST 24 LV	CATALYST 27-1
Surface Resistivity	TP-544W	Ohm	1,5 x 10E15	7,2 x 10E15	7,4 x 10E16
Volume Resistivity	TP-544W	Ohm.cm	5,6 x 10E14	2,0 x 10E14	2,5 x 10E15
Dielectric Constant	TP-545W at 50 Hz at 1 kHz at 1 MHz		6,4	7,7	5,8
			6,4	7,0	5,6
			5,7	6,0	5,2
Dissipation Factor	TP-545W at 50 Hz at 1 kHz at 1 MHz		0,048	0,048	0,022
			0,025	0,035	0,016
			0,025	0,037	0,029
Service Temperature	Continuous	°C	120	90	175
	Intermittent	°C	150	120	200

**Storage And Handling :**

The shelf life of STYCAST 2850 FT is 12 months when stored between 18°C and 25°C. For best results, store in original, tightly covered containers. Storage in cool, clean and dry areas is recommended. Usable shelf life may vary depending on method of application and storage temperature. Certain resins and hardeners are prone to crystallisation. If crystallisation does occur, warm the contents of the shipping container to 50-60°C until all crystals have dissolved. Be sure the shipping container is loosely covered during the warming stage to prevent any pressure build-up. Allow contents to cool to room temperature before continuing.

Storage Temperature (°C)	Usable Shelf Life
18 to 25	1 year

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### Health & Safety :

It is recommended to consult the Emerson & Cuming product literature, including material safety data sheets, prior to using Emerson & Cuming products. These may be obtained from your local sales office.

### Note :

Please note that Technical Data Sheets may be updated from time to time. Customers are advised that the latest technical bulletins are always available upon request.

### Attention Specification Writers :

The technical information contained herein is generally consistent with the properties of the material and should not be used in the preparation of specifications, as it is intended for reference only. This technical information has been derived from one batch of material and may not exactly match the properties of each individual delivered batch. For assistance in preparing specifications, please contact your local Emerson & Cuming office for details. Please contact Emerson & Cuming Quality Assurance for test method details.

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