CVC Thermoset Specialties

An Emerald Performance Materials Company

TECHNICAL BULLETIN

OMICURE® 24EMI
2-Ethyl-4-Methyl Imidazole
Accelerator for High Temperature Epoxy Resins

DESCRIPTION

OMICURE 24EMI is a liquid high temperature performance 2-Ethyl-4-Methyl Imidazole for use in filament winding, electrical laminates, coatings and laminating adhesives. Unlike other grades of EMI, OMICURE 24EMI is non-crystallizing and significantly lower in irritation allowing for easier, safer handling. Because no heat is required for mixing, longer pot lives are achieved. OMICURE 24EMI is typically used at 1-3% as an accelerator for anhydrides or from 2-5% as the sole hardener for catalytic cures. This yields cured resins with better oxidation, aging and improved high temperature performance versus MDA.

FEATURES	BENEFITS
• Non-crystallizing low viscosity liquid	Easier handling, lower product losses. No heat is required to achieve uniform mixing with excellent pot life vs. solid systems. Well suited to casting and impregnation systems for maximum fiber contact.
• Low toxicity/less irritating	Significantly lower toxicity than most aromatic amines and lower dermatitis potential than other imidazoles results in safer operations.
• High EDT with low volatility	Excellent HDT with low weight loss and shrinkage vs. other curing systems. Results are reduced stress and higher tensile strength. Can yield HDTs higher than cure temperature.
• Lower cure temperature required	Achieves maximum mechanical properties at lower temperatures. Especially useful in induction curing and filament winding.

TYPICAL PROPERTIES

Physical State @ 25°C	Dark Amber Liquid
Specific Gravity	0.98
Boiling point @ 760 mm Hg	292—295°C
Color (Gardner)	13—16
% Activity	85% min. 2-Ethyl-4-Methyl Imidazole
% Moisture	0.5% max
Solubility	Soluble in water, alcohols, acids, ketones and most hydrocarbons

PACKAGING & AVAILABILITY

OMICURE 24EMI is available in 1 and 5 gallon steel open head containers and 55 gallon closed head steel drums. All are shipped FOB Maple Shade, NJ. 1 and 5 gallon containers are shipped UPS.

CVC Thermoset Specialties
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APPLICATIONS

• Filament winding/impregnation systems	Long pot life of impregnation resin system, low cure temperatures for maximum properties and high HDT achievable.
• Adhesives	Ideally suited for short baked cures at lower temperatures. Excellent adhesion to metal and glass. Good dimensional stability of cured system, even at higher service temperatures.
• Electrical/Electronics	Effective with anhydrides to accelerate B-stage cure times. Excellent retention of electrical properties.
• Coatings	Longer shelf stability for solvent based coatings. Excellent for high chemical & heat resistance in baked systems, including pipe and foundry coatings. Effective in high temperature service environments versus MDA.

PERFORMANCE DATA

Pot Life and Cure Conditions

1. Effect of concentration on cure rate/pot life with Bisphenol A Epoxy (EEW 190)

Concentration 24 EMI (PPR)	Pot life @ 30°C (Hours)	Time to peak exotherm @ 70°C (Minutes)
1	68	160
3	36	44
5	17	29
10	10	13

Resin and OMICURE 24EMI mixed for 10 minutes at RT and cast in 10 gram molds for pot life studies and 60 grams molds for cure studies.

MECHANICAL PROPERTIES OF CURED RESIN SYSTEMS

II. Effect of cure schedule on HDT of Bisphenol A Epoxy resin (EEW 190) with OMICURE 24EMI

		HDT at Alternate Cure Schedules						
		Cure Temperature °C						
Concentration of OMICURE 24 EMI (PPR)	Initial Cure Post Cure	30 93	30 150	30 200	70 70	70 93	70 150	70 200
1		108	157	187	97	120	160	163
3		132	153	181	111	132	163	157
5		142	148	163	126	132	142	138
7		139	130	138	124	128	121	128
10		130	--	--	122	120	105	120

Note: All initial cures are to gellation. Post cures are for 4 hrs.

III. Effect of concentration of OMICURE 24EMI on mechanical properties of an unfilled Bisphenol A – Epoxy Resin System (EEW 190)

	Performance vs. Post Cure Temperature					
Concentration of OMICURE 24EMI (PPR)	Flexural Strength (psi)		Tensile Strength (psi)		Ultimate Compressive Strength (psi)	
	@ 93°	@ 150°	@ 93°	@ 150°	@ 93°	@ 150°
1	4,200	5,800	3,500	3,000	20,000	24,200
3	6,500	6,000	7,000	6,100	25,000	24,200
5	10,100	9,200	6,800	8,300	27,000	26,200
7	9,000	9,500	10,400	10,000	--	--

Note: Initial cure was 70°C to gellation

IV. Effect of post cure temperature on HDT of Phenol Novolac Epoxy Resin and OMICURE 24EMI at 2 ppr cured initially at 80 °C

Post Cure Temperature	HDT after 24 hr. post cure
150	159
200	260
260	170

V. Thermal/Oxidation Stability of OMICURE 24EMI cured Bisphenol A Epoxy Systems

Concentration of OMICURE 24EMI (PHR)	Post Cure and Loading temperature	HDT after holding time (days) 1	2	4	7	14	18
1	260	160	157	160	154	142	137
2	150	139	140	146	145	149	152
2	200	189	186	189	167	166	170
4	93	126	134	136	137	134	138

- All samples submitted to initial cure at 70°C to gellation.
- Holding times are at the post cure temperature indicated.

Concentration of OMICURE 24EMI (PPR)	Post Cure (°C)	Tensile Strength after holding time (days) at post cure temperatures 1	4	7
2	150	5,000	5,300	5,500
	200	6,300	5,700	6,700
	260	6,000	5,300	--
4	150	6,100	6,700	6,700
	200	7,600	6,800	7,900
	260	6,500	5,000	--

- (1) samples tested after 3 days.
- All samples cured initially at 70°C to gellation.

STORAGE & HANDLING

Containers should be kept away from heat and open flames during storage. All containers should be tightly sealed after use. Use adequate ventilation and protective gloves and splash glasses when handling OMICURE 24EMI. OMICURE 24EMI is not a primary skin irritant but can cause irritation if in contact with skin for extended periods. It is a severe eye irritant and special precautions should be taken to avoid any eye contact.

For skin contact: **Wash with large quantities of soap and water.**

For eye contact: **Immediately flush large quantities of water for a minimum of 15 minutes. Seek immediate medical attention to prevent eye damage.**

Refer to **CVC Thermoset Specialties** Material Safety Data Sheet for additional safety and handling information. The MSDS is revised as new data becomes available.

DISCLAIMER

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