CVC Thermoset Specialties

An Emerald Performance Materials Company

TECHNICAL BULLETIN

HyPox™ RF928

Epoxy Phenol Novolac Resin Modified with a Liquid Rubber

DESCRIPTION

HyPox RF928 is an Epoxy Phenol Novolac resin modified with a CTBN (carboxy terminated butadiene acrylonitrile) co-polymer. **HyPox RF928** possesses a relatively low viscosity, a functionality of 2.3 and an elastomer content of 20%. The CTBN improves the toughness of cured epoxy formulations through development of two phases during cure. The toughness improvement is achieved at a minimal sacrifice in Tg. Formulations incorporating **HyPox RF928** exhibit improvements in impact and thermal cycling resistance, peel and tensile shear strengths and low temperature mechanical properties compared to non-toughened epoxies. **HyPox RF928** , due to its higher functionality, should provide improved chemical and heat resistance compared to DGEBA modified at an equal rubber level.

The table on the back of this page presents the effects of the incorporation of liquid rubber on some cured properties of an EPALLOY 8240/dicyandiamide formulation. The use of alternate curing agents, in one or two part formulations, can be expected to produce different results.

HyPox RF928 should be considered for use as the sole resin or as a part of the resin component of your formulation. The optimum concentration of **HyPox RF928** should be determined empirically. Typical applications generally incorporate 5-15 phr* rubber to achieve optimal toughness, higher concentrations increase flexibility.
*phr – parts per hundred parts resin.

APPLICATIONS

- Adhesives
- Laminating
- Impact Resistance Coatings
- Reinforcements
- Filament Winding
- Molding Compounds

TYPICAL PROPERTIES

Appearance	Clear, Clean
Viscosity at 25°C, cps	35,000 – 75,000
Epoxide Equivalent Weight, g/eq	210 – 225
Acid Number	0.1 max
Color, Gardner	10 max
Weight per gallon at 25°C, lbs.	9.5 ± 0.1

HEALTH & SAFETY PRECAUTIONS

HyPox RF928 is not a primary skin irritant or sensitizer. However, as with any epoxy material, irritation can result from repeated or prolonged contact. The symptoms of this irritation may appear as a mild reddening or a more pronounced rash. It is, therefore, important to avoid skin contact where possible. Butyl rubber gloves, full eye protection and protective clothing are recommended. **Skin contact**: Wash well with soap & water. Remove contaminated clothing and wash thoroughly before re-using. It is recommended that resin not be removed from skin with solvents since solvents increase contact and encourage penetration. Moreover, solvents of themselves dry and crack the skin. **Eye contact**: Flush immediately with large quantities of water. Contact a physician.
Refer to **CVC Thermoset Specialties** Material Safety Data Sheet on **HyPox RF928** for additional safety and health information. The MSDS is revised as new data becomes available.

PACKAGING & AVAILABILITY

HyPox RF928 is available in 55 gal. non-returnable open head steel drums (net weight 450 lbs.) and 5 gal. plastic pails (45 lbs. net). Bulk shipments are available with adequate lead-time. Drum inventory is available at most CVC regional warehouses. Check with you local sales representative for the shipping location nearest you.

Mechanical Properties of Liquid Rubber Modified
Epoxidized Phenol Novolac Resin

FORMULATION, pbw	1	2	3	4
EPALLOY 8240	100	60	40	20
MH-9-28	--	50	75	100
OMICURE DDA-10	6- >			
OMICURE U-52M	0.5- ->			
Rubber content, phr	0	10	15	20
CURED PROPERTIES				
Tensile @ 25°C				
Strength, psi	12,900	10,400	8,920	4,710
Elongation, %	3.9	4.3	4.0	3.2
Modulus, psi x 10^5	4.7	4.0	3.3	2.4
Flexural @ 25°C				
Strength, psi	19,000	15,100	13,100	6,900
Modulus, psi x 10^5	4.9	4.0	3.3	2.3
Fracture Toughness @ 25°C				
K1c, MN/$m^{1.5}$ (Fracture Strength)	0.7	1.7	1.6	1.5
G1c, J/m^2 (Fracture Energy)	128	906	1,050	1,236
Thermal				
Tg, °C (DSC)	137	127	121	123
Dynamic Mechnical Analysis *				
Loss Modulus, G", Low Temperature Transition Peak, °C	No Peak	-35	**	-25
Thermal Tg, °C	146	134	**	132

*Thermal Sweep from
-50 to + 180°C at
1.6 Hertz (10 rads/sec)

** Not Tested

DISCLAIMER

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