

HYPOX[®] RF928 CTBN-Toughened EPN Adduct

Product Description

HYPOX[®] RF928 adduct is an epoxy phenol novolac resin toughened with a CTBN (carboxyl-terminated butadiene-acrylonitrile) co-polymer. HYPOX[®] RF928 adduct 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 T_g. Formulations incorporating HYPOX[®] RF928 adduct 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 adduct, due to its higher functionality, should provide improved chemical and heat resistance compared to DGEBA toughened at an equal rubber level.

The tables in the Performance Data section present the effects of the incorporation of liquid rubber on some cured properties of an EPALLOY[®] 8240 EPN/dicyandiamide formulation. The use of alternate curing agents, in one- or two-part formulations, can be expected to produce different results.

HYPOX[®] RF928 adduct 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 adduct should be determined empirically. Typical applications generally incorporate 5-15 phr (parts per hundred parts resin) rubber to achieve optimal toughness; higher concentrations increase flexibility.

Applications

- Adhesives
- Laminating
- Impact resistance coatings
- Reinforcements
- Filament winding
- Molding compounds

Typical Properties

Property	HYPOX® RA1340
Appearance	Clear, Clean
Viscosity at 25°C, cP	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, lb.	9.5 + 0.1
CTBN content, %	20% HYPRO® 1300X13

Performance Data

Formulation, pbw	1	2	3	4
EPALLOY® 8240 EPN	100	60	40	20
HYPOX® RF928	–	50	75	100
OMICURE® DDA 10	6	6	6	6
OMICURE® U-52M	0.5	0.5	0.5	0.5
Rubber content, phr	0	10	15	20

Cured Properties - Mechanical Properties of CTBN-Toughened Epoxidized Phenol Novolac Resin

Tensile at 25 °C	1	2	3	4
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 at 25 °C	1	2	3	4
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 at 25 °C	1	2	3	4
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	1	2	3	4
Tg, °C (DSC)	137	127	121	123
Dynamic Mechanical Analysis* Loss Modulus, G'', Low Temperature Transition Peak, °C	No Peak	-35	NT	-25
Thermal Tg, °C	146	134	NT	132

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

NT = not tested

Storage

HYPOX® RF-928 adduct should be stored in a dry place, in the sealed original containers, at temperatures between **+2°C and +40°C (+35.6°F and +104°F)**. Under these storage conditions, the product has a shelf life of **24 months** (from date of manufacture). The products should not be exposed to direct sunlight.

Precautionary Statement

Huntsman Advanced Materials Americas LLC maintains up-to-date Safety Data Sheets (SDS) on all of its products. These sheets contain pertinent information that you may need to protect your employees and customers against any known health or safety hazards associated with our products. Users should review the latest SDS to determine possible health hazards and appropriate precautions to implement prior to using this material.

First Aid!

Refer to SDS as mentioned above.

KEEP OUT OF REACH OF CHILDREN

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