HYPRO® 1300X13 CTBN & 1300X13F CTBN Carboxyl-Terminated Butadiene-Acrylonitrile

Product Description

HYPRO® reactive liquid polymers (RLPs) are 100% liquid rubbers used to improve toughness, flexibility, adhesion and impact resistance of thermoset resin systems including epoxies, vinyl esters, unsaturated polyesters, acrylics and urethanes.

HYPRO® 1300X13 CTBN is a carboxyl-terminated butadiene-acrylonitrile copolymer used predominantly as a reactant with a base thermoset resin to gain product performance improvements. These adducts can be incorporated at various levels to suit the needs of your specific formulation. HYPRO® 1300X13F CTBN is very similar to HYPRO® 1300x13 CTBN in its physical characteristics and performance and meets requirements for food contact applications as cited in 21 CFR 175.300 for resinous and polymeric coatings.

Applications

- Film and paste adhesives (structural and semi-structural applications)
- Coatings (solution, powder, waterborne)
- Polymeric intermediate for epoxies, vinyl esters, epoxy acrylates and phenolics
- End uses include aerospace, automotive, electrical/electronics, industrial, marine and construction applications

Benefits & Features

- Enhances the toughness and flexibility of thermoset resins
- Improves adhesion to substrates that are difficult to bond to
- Increases impact and crack resistance
- Improves durability (fatigue resistance)
- Increases low-temperature mechanical properties
- FDA version available

Typical Properties

Property	1300X13 CTBN & 1300X13F CTBN
Appearance	Viscous amber liquid (2-7 Gardner)
Actives Level, %	100
Brookfield Viscosity, cP at 27 ºC	500,000
Bound Acrylonitrile Content, %	23.5 – 27.50
Carboxyl Content (Equivalents Per Hundred)	0.050 – 0.064

HYPRO CTB, CTBN and CTBNX Standard Line of Products — Typical Properties

HYPRO Polymers	2000X162 CTB	1300X31 CTBN	1300X8* CTBN	**1300X13 CTBN**	**1300X13F CTBN**	1300X9 CTBNX	1300X18 CTBNX
Acrylonitrile Content, %	0	10	18	26	26	18	21.5
Carboxyl Content							
Acid Number	25	28	29	32	32	38	39
EPHR**	0.045	0.050	0.052	0.057	0.057	0.067	0.070
Brookfield Viscosity, cP at 27ºC (81ºF)	60,000	60,000	135,000	500,000	500,000	160,000	350,000
Solubility Parameter, cal/cm^3 ^	8.14	8.46	8.82	9.15	9.15	8.87	8.99
Specific Gravity at 25ºC (77ºF)	0.907	0.924	0.948	0.960	0.960	0.955	0.961
Functionality	1.9	1.9	1.8	1.8	1.8	2.4	2.4
Molecular Weight, Mn	4,200	3,800	3,550	3,150	3,150	3,600	3,400
Glass Transition Temp. ºF (ºC)	-106.6 (-77)	-86.8 (-66)	-61.6 (-52)	-38.2 (-39)	-38.2 (-39)	-61.6 (-52)	-50.8 (-46)

*An FDA version of this polymer is also available.
**Equivalents per hundred rubber.
^Calculations based on molar attraction constants.
†Measured via DSC (differential scanning calorimeter).

Example Formulations with HYPRO CTB, CTBN and CTBNX Standard Line of Products

Formulation	A	B	C	D
DGEBA Liquid	100	92.5	87.5	77.5
Epoxy/CTBN 1300X13 Adduct (HyPox® RA 1340‡)	–	12.5	25	37.5
HYPRO 1300X13 CTBN	–	5	10	15
Tabular Alumina	40	40	40	40
OMICURE® DDA10	6	6	6	6
OMICURE® U-405	2	2	2	2
Cabot CAB-O-SIL® TS-720	3.5	3.5	3.5	3.5
Cured property				
Fracture Energy GIc, J/m² §	291	416	453	742
Modulus, Ksi (MPa)	509.4 (3,513)	470.2 (3,243)	412.5 (2,845)	317.0 (2,186)
Tg, ºF (ºC)	275 (135)	266 (130)	264 (129)	264 (129)
T-Peel pli (N/mm) §§	7 (1.2)	10 (1.8)	17 (3.0)	25 (4.4)

‡ 1300X13 CTBN adduct in DGEBA resin = 40%.
§ GIc is a measure of the energy required to fracture a material.
§§ Cure: 20 minutes at 177 ºC; Substrates: oily cold rolled steel.

Storage

HYPRO® 1300X13 CTBN material 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 **12 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.

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FOR PROFESSIONAL AND INDUSTRIAL USE ONLY

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Customer Support Center:

Huntsman Corporation
10003 Woodloch Forest Dr
The Woodlands, TX 77380
Tel: +1 (888) 564-9318
Fax: +1 (281) 719-6416
www.huntsman.com