

XD 4460-2 / XD 4461-2 Structural Adhesive

Product Description

XD 4460-2 / XD 4461-2 Structural Adhesive is an extrudable, two-component, room temperature curing epoxy adhesive/mastic for use in the construction of Liquid Natural Gas (LNG) ships. The adhesive is easily applied by mix-metering equipment and retains bead/rope shape when applied. The product is non-sagging on vertical surfaces. Distinct coloration of each component aids identification and mixing control.

Features

- Low density
- Easy pumping
- Zero slump ropes with excellent shape retention
- Long usable life over wide temperature range
- Approved by GTT to Gaz Transport specification GT 402F
- Easy rope compression during panel fixing

Typical Properties*

Property	Test Method	XD 4460-2	XD 4461-2	Mixed Adhesive
Appearance	Visual	Grey paste	Dark blue liquid	Pale blue paste
Viscosity at 25°C, cP at 0.1 rad/s at 500 rad/s	ASTM D2196	4,686,000 38,800	3,839,000 73,500	Thixotropic
Density, g/cm ³	ASTM D891	0.96	0.86	0.94

*Properties are based on Huntsman test methods. Copies are available upon request

Processing

Mix Ratio

Product	Parts by weight	Parts by volume
XD 4460-2	100	100
XD 4461-2	26	29

Acceptable maximum tolerance ±10% of theoretical hardener addition

XD 4460-2 / XD 4461-2 increases in strength rapidly after the working time has expired and achieves a high degree of cure quickly. The adhesive mastic can be considered completely cured after 21 days at 23°C or 7 days at 40°C.

Application

Product is compatible with standard mix metering equipment. It is recommended that the resin and hardener be at a temperature of 20°C or more to ensure ease of pumping.

Slump measured after: 1 hour at 15°C: zero
 1 hour at 35°C: zero

Temperature, °C	Usable life of ropes, time to 300kg load, minutes	Usable life of ropes, time to 170kg load, minutes
10	547	388
15	508	372
23	319	252
30	191	155
25	142	109
40	102	75

The usable life of mastic in rope form depends upon the maximum load that can be applied to a box. For a standard box with a total length of mastic rope of 7532 mm the applied maximum load defined by GTT is 300 kg. The usable life with a lower compression load is also quoted as a guide in circumstances where a 300kg load is not practical. Further application tests should be carried out by the constructor to verify the exact usable life of the mastic for box installation, under local conditions.

Typical Physical Properties

Compressive properties, ISO 604; Test speed 1.0 mm/min. Sample dimensions; 1 x 1 x 3 cm. Cured 7 days at 40°C

Property	-45°C	23°C	40°C
Yield strength, ksi (MPa)	112.4	68.5	47.6
Compressive modulus, ksi (GPa)	3.4	2.8	2.4

A compression strength of 0.5 MPa (5.0 Bar) is required to support the load of erected scaffolding. XD 4460-2 / XD 4461-2 exceeds this strength after 24 hours at 10°C.

Compressive Creep

Deflection	1	2	3	4
a-b (mm)	0.06	0.06	0.07	0.09
a-c (mm)	0.05	0.04	0.05	0.04

Specific requirements: a-b = < 0.5 mm, a-c = < 0.1 mm

Shore hardness

To give an indication of cure speed and strength assumption, Shore A and Shore D hardness was measured at various temperatures for given time periods.

Shore A hardness development (mean values)

Time, hours	10°C	15°C	23°C	30°C	35°C	40°C
5	-	-	-	79	95	95
6	-	-	-	92	95	95
7	-	-	58	95	97	96
8	-	-	65	96	96	96
9	-	-	72	96	96	96
10	-	-	79	95	96	97
11	-	-	83	94	98	97
12	-	-	83	96	95	95
24	75	94	96	96	96	96

Specification requirements: 85 on Shore A scale after 24 hours.

Shore D hardness development (mean values)

Time, days	10°C	15°C	23°C	30°C	35°C	40°C
1	-	54	71	71	79	79
2	40	70	79	81	78	80
3	46	70	80	80	81	83
4	52	69	82	80	83	76
5	57	72	82	80	83	81
6	58	74	81	82	81	82
7	62	74	83	81	80	82
8	65	76	79	81	82	81
9	64	78	82	78	82	82
10	68	81	80	81	79	82
11	72	81	82	80	83	82
12	74	74	82	82	81	83
13	73	79	82	83	83	84
14	74	78	81	82	83	83
15	74	74	77	80	81	83

Specification requirements: 70 on Shore D scale at 23°C after 15 days.

Storage

XD 4460-2 / XD 4461-2 Structural Adhesive should be stored in a dry place in their original sealed containers at a temperature within 2°C and 40°C (36°F and 104°F). Tightly re-seal all containers after use to prevent contamination. Under these storage conditions, these products have a shelf life of **1 year** (from date of manufacture).

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 MSDS 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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