

**Advanced Materials****XD 4700 Resin / XD 4710 Hardener Adhesive**

## CLEAR POLYURETHANE ADHESIVE

**DESCRIPTION :**

XD 4700 resin / XD 4710 Hardener polyurethane adhesive is a clear/transparent, two-component system that cures at room temperature. It is well suited for bonding of selected thermoplastics and thermoset composites as well as dissimilar substrates including plastics to metal and glass.

**APPLICATIONS :**

- Thermoplastics
- Composites
- Metals
- Glass

**ADVANTAGES :**

- Transparent – water clear
- Flexible
- Room temperature curing
- Bonds well to most thermoplastics, metals and glass

**TYPICAL PROPERTIES :**

<u>Property</u>	<u>Test Method</u>	<u>Test Values</u> <sup>(1)</sup>	
		<u>Resin</u>	<u>Hardener</u>
Color/appearance	Visual	Transparent liquid	Transparent liquid
Specific Gravity	ASTM D-792	1.10	1.10
Viscosity (cP) @ 77 °F (25 °C)	ASTM D-2393	15,000	9,000

**TYPICAL MIXED PROPERTIES :**

<u>Property</u>	<u>Test Method</u>	<u>Test Values</u> <sup>(1)</sup>
Reaction Ratio (by weight)		100R/100H
Reaction Ratio (by volume)		100R/100H
Pot Life, minutes @ 77 °F (25 °C), 4 fl. oz. mass	ASTM D-2471	3 – 4
Mixed viscosity (cP) @ 77 °F (25 °C)	ASTM D-2393	10,000

<sup>(1)</sup> Tested @ 77 °F (25 °C)

**RECOMMENDED CURE SCHEDULES :**

**Temperature**

50 °F (10 °C)  
 59 °F (15 °C)  
 77 °F (25 °C)  
 104 °F (40 °C)  
 140 °F (60 °C)  
 212 °F (100 °C)

**Handling Strength**

4 hours  
 2.5 hours  
 1 hour  
 15 minutes  
 6 minutes  
 2 minutes

**Minimum Cure Time**

60 hours  
 15 hours  
 8 hours  
 4 hours  
 30 minutes  
 12 minutes

**TYPICAL CURED PROPERTIES :****Application of Adhesive**

The resin/hardener mix is applied with a spatula to the pretreated and dry joint surfaces.

A layer of adhesive 0.002 to 0.004-inches (0.05 to 0.10-mm) thick will normally impart the greatest lap shear strength to a joint.

The joint components should be assembled and clamped as soon as the adhesive has been applied. Even contact throughout suffices to ensure proper cure.

**Standard Test Specimens**

Unless otherwise stated, the figures given below were all determined by testing standard specimens made up by lap-jointing 4-inch x 1-inch x 0.06-inch (10-cm x 2.5-cm x 1.5-mm) strips of aluminum. The joint area was 0.5 x 1 inch (12.5 mm x 2.5 cm) in each case.

**Property**

**Lap Shear Strength, psi (MPa)**

***Tested on Metal Substrates***

(Cured 16 hours @ 104 °F (40 °C))

**Metal**

Aluminum  
 Carbon Steel  
 Stainless Steel  
 Galvanized Steel<sup>2</sup>  
 Copper  
 Brass

**Test Method**

ASTM D-1002

**Substrate Thickness**

**(in./mm)**

0.039/1.0  
 0.039/1.0  
 0.039/1.0  
 0.06/1.5  
 0.06/1.5  
 0.06/1.5

**Test Values <sup>(1)</sup>**

3050 (21)  
 2325 (16)  
 3350 (23.1)  
 1150 (7.9)  
 3475 (23.9)  
 2600 (17.9)

***Tested on Plastic Substrates, psi (MPa)***

Cured 16 hours @ 140 °F (40 °C)

**Plastics**

SMC  
 ABS  
 Polycarbonate  
 Acrylic  
 GRP  
 Nylon  
 Glass

**Test Values <sup>(1)</sup>**

1150 (7.9)  
 875 (6)  
 875 (6)  
 725 (5)  
 1150 (7.9)  
 450 (3.1)  
 1025 (7)

**Effect of Test Temperature, psi (MPa)**

(Load applied 10 minutes after specimens reach test temperature.)

**Cure Cycle**

7 days @ 77 °F (25 °C)

**Test Temp.**

-58 °F (-50 °C)	2050 (14.1)
-22 °F (-30 °C)	2250 (15.5)
-4 °F (-20 °C)	2600 (17.9)
32 °F (0°C)	3325 (22.9)
68 °F (20 °C)	2900 (20)
104 °F (40 °C)	1150 (7.9)
140 °F (60 °C)	600 (4.1)
176 °F (80 °C)	450 (3.1)
212 °F (100 °C)	300 (2)
-58 °F (-50 °C)	2600 (17.9)
-22 °F (-30 °C)	2750 (18.9)
-4 °F (-20 °C)	2850 (19.6)
32 °F (0°C)	3625 (25)
68 °F (20 °C)	2900 (20)
104 °F (40 °C)	1450 (10)
140 °F (60 °C)	650 (4.5)
176 °F (80 °C)	450 (3.1)
212 °F (100 °C)	300 (2)

24 hours @ 77 °F (25 °C) +  
30 minutes @ 176 °F (80 °C)<sup>(1)</sup> Tested @ 77 °F (25 °C)**Property****Lap Shear Strength on aluminum, psi (MPa)****Effect of Immersion**

(Cured 16 hours @ 104 °F (40 °C). Immersion for 90 days in media listed.)

**Media**

Standard – As prepared  
 Gasoline  
 Ethyl Acetone  
 Acetic Acid 10% - 30 days immersion  
 Xylene  
 Lubricating Oil – HD30  
 Paraffin  
 Water @ 68 °F (20 °C)  
 Water @ 68 °F (20 °C) – 30 days immersion  
 Water @ 140 °F (60 °C)  
 Water @ 194 °F (90 °C) – 30 days immersion

**Test Values <sup>(1)</sup>**

2900 (20)  
 2475 (17)  
 1825 (12.6)  
 1825 (12.6)  
 2325 (16)  
 2900 (20)  
 2550 (17.6)  
 1150 (7.9)  
 2325 (16)  
 600 (4.1)  
 875 (6)

**Effect of Tropical Exposure, psi (MPa)**

(104 °F (40 °C) / 92 % R.H.)

**On Aluminum****Cure Cycle**

16 hrs @ 104 °F (40 °C)

**Exposure Time**

0 day  
 30 days  
 60 days  
 90 days

**Test Values <sup>(1)</sup>**

3050 (21)  
 1200 (8.3)  
 900 (6.2)  
 900 (6.2)

**On Polycarbonate****Cure Cycle**

16 hrs @ 104 °F (40 °C)

**Exposure Time**0 day  
30 days  
60 days  
90 days**Test Values <sup>(1)</sup>**900 (6.2)  
725 (5)  
725 (5)  
425 (2.9)***Effect of heat Aging***

(Cured 16 days @ 104 °F (40 °C))

**Aging Temperature**

158 °F (70 °C)

**Exposure Time**0 day  
30 days  
60 days  
90 days**Test Values <sup>(1)</sup>**3050 (21)  
3625 (25)  
3625 (25)  
3775 (26)**Property**Elongation (%)  
Tensile strength, psi (MPa)  
Roller peel test, pli (N/mm)  
Glass transition temperature, °F (°C)  
Thermal cycling – 100 cycles of 6 hours duration  
from -22 °F to 158 °F (-30 °C to 70 °C), psi (MPa)**Test Method**ASTM D-638  
ISO R527  
ISO 4578  
ASTM D-4065**Test Values <sup>(1)</sup>**50  
2600 (17.9)  
45 (7.9)  
68 (20)  
2600 (17.9)<sup>(1)</sup> Tested @ 77 °F (25 °C)<sup>(2)</sup> Surface degreased only, not roughened.

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**FIRST AID :**

Eyes and skin : Flush eyes with water for 15 minutes. Contact a physician if irritation persists. Wash skin thoroughly with soap and water. Remove and wash contaminated clothing before reuse.

Inhalation : Remove subject to fresh air.

Swallowing : Dilute by giving water to drink and contact a physician promptly. Never give anything to drink to an unconscious person.

**KEEP OUT OF REACH OF CHILDREN  
FOR PROFESSIONAL AND INDUSTRIAL USE ONLY**

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