

Advanced Materials**XD 4662 Resin / Hardener 4662 Adhesive**

TOUGHENED METHACRYLATE ADHESIVE

DESCRIPTION :

XD 4662 resin/Hardener 4662 methacrylate adhesive is a two-component system that cures quickly at room temperature. It is well suited for rapid joining of a wide range of substrates including those that can be “difficult to bond”.

APPLICATIONS :

- Metal
- Composites
- Plastics

ADVANTAGES :

- Excellent resistance to gasoline and oil exposure
- Tolerant of “less than ideal” pretreatment
- Rapid curing
- Bonds well to a wide range of metals, composites and plastics
- Gap filling to 0.150 in. (3.8 mm)

TYPICAL PROPERTIES :

<u>Property</u>	<u>Test Method</u>	<u>Test Values</u> ⁽¹⁾	
		<u>Resin</u>	<u>Hardener</u>
Color/appearance	Visual	Off White liquid	Beige/Yellow Liquid
Specific Gravity	ASTM D-792	1.03	1.00
Viscosity (cP) @ 77 °F (25 °C)	ASTM D-2393	70,000	45,000

TYPICAL MIXED PROPERTIES :

<u>Property</u>	<u>Test Method</u>	<u>Test Values</u> ⁽¹⁾
Reaction Ratio (by weight)		100R/90H
Reaction Ratio (by volume)		100R/100H
Pot Life, minutes @ 77 °F (25 °C), 4 fl. oz. mass	ASTM D-2471	10
Mixed viscosity (cP) @ 77 °F (25 °C)	ASTM D-2393	60,000

⁽¹⁾ Tested @ 77 °F (25 °C)

RECOMMENDED CURE SCHEDULES :

<u>Temperature</u>	<u>Handling Strength</u>	<u>Minimum Cure Time</u>
50 °F (10 °C)	60 minutes	90 minutes
59 °F (15 °C)	25 minutes	45 minutes
77 °F (25 °C)	18 minutes	30 minutes
104 °F (40 °C)	15 minutes	20 minutes
140 °F (60 °C)	9 minutes	12 minutes
212 °F (100 °C)	1 minute	2 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 0.004 to 0.008-inches (0.10 to 0.20-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.

<u>Property</u>	<u>Test Method</u>	
Lap Shear Strength , psi (MPa)	ISO 4587	
Effects of Test temperature (Load applied 10 minutes after specimens reach test temperature.)		
<u>Cure Cycle</u>	<u>Test Temp.</u>	<u>Test Values</u> ⁽¹⁾
7 days @ 77 °F (25 °C)	-76 °F (-60 °C)	1450 (10)
	-40 °F (-40 °C)	1750 (12)
	-4 °F (-20 °C)	2175 (15)
	32 °F (0 °C)	2625 (18)
	68 °F (20 °C)	3050 (21)
	104 °F (40 °C)	2900 (20)
	140 °F (60 °C)	2050 (14)
	176 °F (80 °C)	1300 (8.9)
	212 °F (100 °C)	725 (5)

⁽¹⁾ Tested @ 77 °F (25 °C)

Property**Lap Shear Strength**, psi (MPa)**Tested on Metal Substrates**, psi (MPa)

Cured 7 days @ 77 °F (25 °C)

Metal

Aluminum L165
 Carbon Steel
 Stainless Steel
 Galvanized Steel
 Copper
 Brass

⁽¹⁾ Tested @ 77 °F (25 °C)⁽²⁾ Surface degreased only, not roughened.**Test Method**

ISO 4587

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 ⁽¹⁾

3625 (25)
 3050 (21)
 2600 (17.9)
 2175 (15)
 1875 (12.9)
 2175 (15)

Property**Lap Shear Strength**, psi (MPa)**Tested on Plastic Substrates**⁽¹⁾, psi (MPa)

Cured 7 days @ 77 °F (25 °C)

Plastics

SMC
 Polycarbonate
 ABS
 Perspex
 PVC
 Polyamide (nylon 6)
 GRP
 GRE

⁽¹⁾ Surface lightly abraded and degreased.**Test Method**

ISO 4587

Test Values ⁽¹⁾

1150 (7.9)
 750 (5.2)
 950 (6.5)
 1150 (7.9)
 950 (6.5)
 300 (2)
 950 (6.5)
 1750 (12)

Property**Lap Shear Strength on aluminum**, psi (MPa)**Effect of Immersion**

(Cure cycle 7 days @ 77 °F (25 °C). Immersion for 90 days in media listed.)

Media

Standard – As prepared
 IMS
 IMS – 30 days immersion
 Gasoline
 Acetic Acid 10%
 Paraffin – 30 days immersion
 Lubricating Oil – HD30
 Water @ 73 °F (23 °C)
 Water @ 73 °F (23 °C) – 30 days immersion
 Water @ 194 °F (90 °C)
 Water @ 194 °F (90 °C) – 30 days immersion

Test Values ⁽¹⁾

3625 (25)
 1150 (7.9)
 2175 (15)
 2900 (20)
 3150 (21.7)
 2675 (18.4)
 2600 (17.9)
 1000 (6.9)
 1900 (13.1)
 1000 (6.9)
 1600 (11)

Property**Lap Shear Strength on polycarbonate, psi (MPa)****Effect of Immersion**

(Cure cycle 7 days @ 77 °F (25 °C). Immersion for 90 days in media listed.)

Media

Standard – As prepared
 IMS
 Gasoline
 Acetic Acid 10%
 Sodium Hydroxide 10%

Test Values ⁽¹⁾

875 (6)
 1025 (7)
 600 (4.1)
 975 (6.7)
 625 (4.3)

Property**Lap Shear Strength on PVC, psi (MPa)****Effect of Immersion**

(Cure cycle 7 days @ 77 °F (25 °C). Immersion for 90 days in media listed.)

Media

Standard – As prepared
 IMS
 Gasoline
 Acetic Acid 10%
 Sodium Hydroxide 10%

Test Values ⁽¹⁾

1075 (7.4)
 1150 (7.9)
 400 (2.8)
 1050 (7.2)
 1025 (7.0)

Property**Lap Shear Strength, psi (MPa)****Effect of Tropical Exposure**

(104 °F (40 °C) / 92 % R.H.)

Cure Cycle

7 days @ 77 °F (25 °C)

Exposure Time

0 day
 30 days
 60 days
 90 days

Test Values ⁽¹⁾

3625 (25)
 1525 (10.5)
 1150 (7.9)
 1650 (11.3)

⁽¹⁾ Tested @ 77 °F (25 °C)**Test Method**

ASTM D-1002

Lap Shear Strength, psi (MPa)**Effect of heat Aging**

(Cured 7 days @ 77 °F (23 °C))

Aging Temperature

158 °F (70 °C)

Exposure Time

0 day
 30 days
 60 days
 90 days

Test Values ⁽¹⁾

3625 (25)
 2900 (20)
 3050 (21)
 3200 (22)

Property

Elongation (%)
 Roller peel test, pli (N/mm)
 Hardness (Shore D)
 Thermal cycling – 100 cycles of 6 hours duration
 from -22 °F to 158 °F (-30 °F to 70 °C), psi (MPa)

Test Method

ASTM D-638
 ISO 4578
 ASTM D-2240

Test Values ⁽¹⁾

50 – 75
 23 (4)
 75
 2750 (18.9)

⁽¹⁾ Tested @ 77 °F (25 °C)

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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.

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