

Devcon® MA216

Low-Halogen Reworkable Acrylic Structural Adhesive

PRODUCT DESCRIPTION

Devcon® MA216 is a flexible, two component acrylic adhesive product designed with low halogen content for structural bonding. It is well suited for structural bonding application on various substrates, such as metal and plastics, where temperature shock, vibration resistance and mechanical impact resistance are required. The product has a work time of 3-4 min and cures rapidly to form tough, resilient bonds. Once mixed with static mixer, the two component acrylic cures at room temperature to an extent approximately 50% within 10 minutes and the cure time can be reduced with the aid of mild heat to the bonded assemblies. Typical applications include structural bonding of plastic and metal components that must withstand vibrations and impacts such as in portable electronic device and specialty vehicle markets.

PRODUCT CHARACTERISTICS

Chemical Class	Acrylic
Appearance(Part A)	Viscous white liquid
Appearance(Part B)	Viscous blue liquid
Appearance(mixed)	Blue
Components	Two component-requires mixing
Mix Ratio by Volume	Part A: Part B=10:1
Application	Bonding Solutions

Fixture Time, min	
Mild Steel, ASTM D1002	4-7
Al6061, ASTM D1002	4-7
Polycarbonate, ASTM D3163	4-6
ABS, ASTM D3163	4-6

Exotherm Profile is performed on 10 gram mass at room temperature. A typical curing exotherm curve is shown as blew Figure.

Exotherm Peak Time, min	5.5-8.5
Exotherm Peak Temperature, °C (°F)	>110(230)

TYPICAL PROPERTIES OF UNCURED MATERIALS

Part A:

Density @ 23 °C (73°F), g/cc(lbs./gal)	1.03(8.60)
Viscosity@ 25 °C (77°F) TB92, 10 rpm, Kcps	15-35
Shelf life, mos	9

Part B:

Density @ 23 °C (73°F), g/cc(lbs./gal)	1.14(9.51)
Viscosity@ 25 °C (77°F) TB92, 10 rpm, Kcps	15-35
Shelf life, mos	9

Mixed:

Mix ratio by weight, Part A : Part B	9:1
Mix ratio by Volume, Part A : Part B	10:1
Density @ 23 °C (73 °F), g/cc (lbs./gal)	1.03(8.60)
Gap Filling, mm	Up to 5
Work Time @ 23 °C, (73 °F) min	3-4

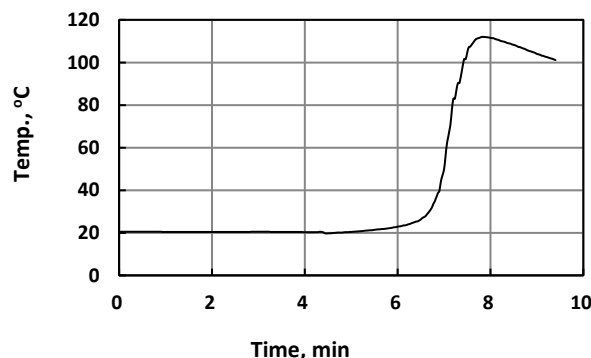
Ionic Contaminants, ppm	
Chloride	≤900
Bromine	≤900

Mix Recommendation	Cartridge 50 ml
	Nozzle of more than 18 elements

Substrates	ABS, PC, Stainless Steel,
Recommended	Carbon Steel, Aluminum, Acrylics, FRP, Polyesters, Urethanes, PVC,

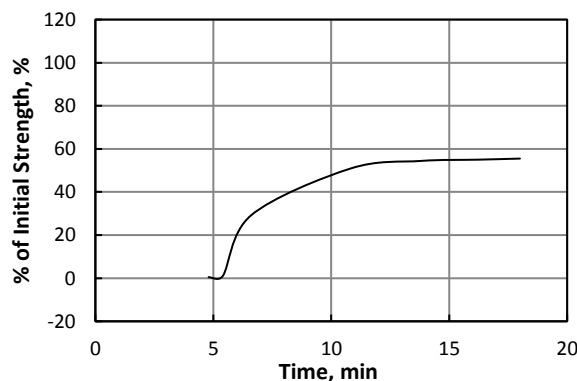
TYPICAL CURING PERFORMANCE

Fixture Time is defined as the time to develop a tensile shear strength of 0.1 MPa.

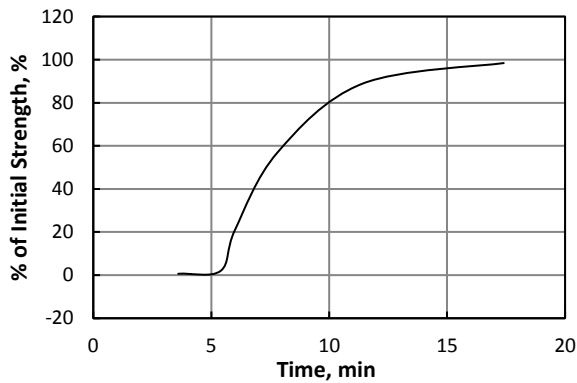


Typical Exotherm Curve for DEVCON® MA216 in 10 gm Mass at 23 °C (73 °F)

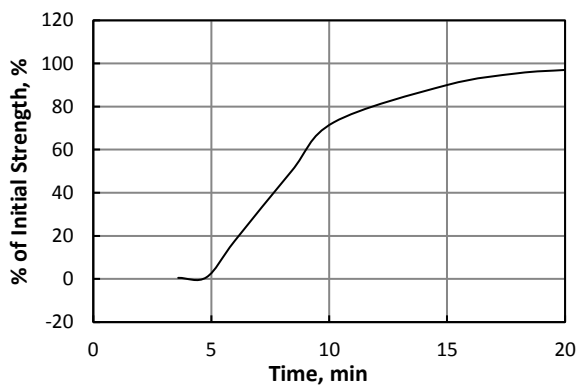
Strength Development is performed on various substrates, including Al6061, PC and ABS at RT.



Tensile Shear Strength Development on Al6061



Tensile Shear Strength Development on PC



Tensile Shear Strength Development on ABS

TYPICAL PROPERTIES OF CURED MATERIALS

Physical Properties:

Shore hardness, Durometer D	56
T _g , ASTM E1640-04, °C(°F)	75(167)
Volume Shrinkage, ISO 1675, %	11
Tensile strength, ASTM D638, MPa(psi)	9.0-11.0 (1305-1595)
Elongation at break, ASTM D638, %	100-120
Tensile Modulus, ASTM D638, MPa(psi)	23.0-35.0 (3335-5075)

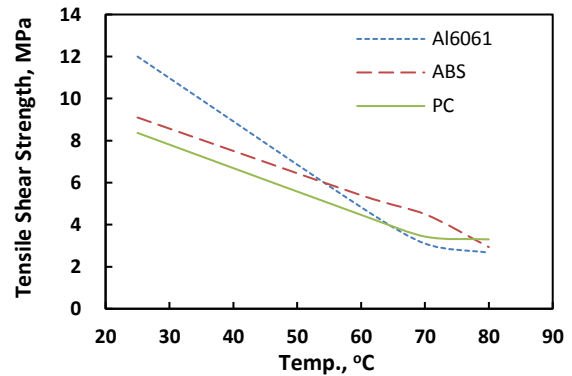
Adhesive Properties:

Tensile Shear Strength @ 23 °C(73°F), MPa(psi)	
Al6061, ASTM D1002	10.0-12.0(1885-2248)
Stainless Steel 304, ASTM D1002	9.0-11.0 (1305-1595)
Polycarbonate, ASTM D3163	9.0-11.0(1305-1595)
ABS, ASTM D3163	9.0-11.0(1305-1595)
Ink Glass & PC, ASTM D3163	6.0-8.0(870-1160)

T Peel Strength, ASTM D1876, N/cm(pli)	
ABS	20-24(12.5-13.7)

Hot strength on different substrates, MPa(psi)

@ 60 °C(140 °F)	
Al6061, ASTM D1002	4.0-6.0(580-870)
Polycarbonate, ASTM D3163	4.0-6.0(580-870)
ABS, ASTM D3163	5.0-7.0(725-1015)
@ 80 °C(176 °F)	
Al6061, ASTM D1002	2.0-4.0(290-580)
Polycarbonate, ASTM D3163	3.0-5.0(435-725)
ABS, ASTM D3163	2.0-4.0(290-580)



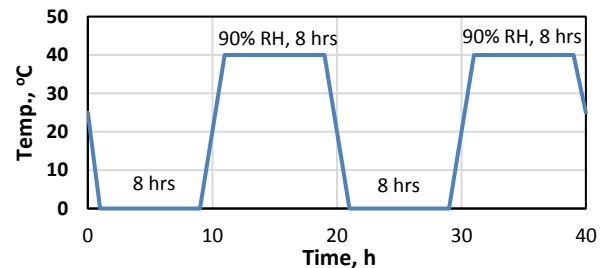
Tensile Shear Strength at Different Temperatures

CHEMICAL RESISTANCE

- Excellent Resistance to** Hydrocarbons
Acids and Bases (pH 3-10)
Salt solutions
- Susceptible to:** Polar Solvents
Strong Acids and Bases

TYPICAL ENVIRONMENTAL RESISTANCE

The bonded PC/ABS alloy and ink glass parts used for aging were allowed to cure 1 min at 60 °C (140 °F) followed by curing 24 hours at room temperature. The bonded parts were aged for 2 cycles of a typical environmental condition shown in chart below.



The bonding status after above environmental aging is tabulated in table below.

Thickness x width (mm x mm)	Bonding Status After Aged	Thickness x width (mm x mm)	Bonding Status After Aged
0.1x2	Pass	0.3x2	Pass
0.1x3	Pass	0.3x3	Pass
0.1x4	Pass	0.3x4	Pass
0.1x5	Pass	0.3x5	Pass

Thermal Shock is performed for 10 cycles of -20 °C(-4 °F) for 2 hrs and 80 °C(176 °F) for 2 hrs. Thereafter, the tensile shear strength was measured at room temperature.

OLS on PC, MPa(psi)	10.9(1580.5)
OLS retention, %	99

HANDLING AND APPLICATION PRECAUTIONS

Devcon® MA216 is flammable. Contents include Methacrylate Ester. Keep containers closed after use. Wear gloves and safety glasses to avoid skin and eye contact. Wash with soap and water after skin contact. In case of eye contact, flush with water for 15 minutes and get medical

attention. Harmful if swallowed. Keep out of reach of children. Keep away from heat, sparks, and open flames. Reference the Material Safety Data Sheet for more complete safety information prior to using this product.

DIRETION FOR USE

Devcon® MA216 may be applied manually or with all stainless steel bulk dispensing equipment. Static mixer selection is critical to the proper mixing and performance of ITW adhesives. All machines dispensing ITW should have shrouds where applicable. Stainless Steel bulk equipment is recommended. For additional information concerning meter-mix equipment, contact ITW Sales Representatives. Pre-measured cartridges are also available, as well as the hand-held guns with which to dispense the adhesive.

1. To assure maximum bond strength, remove surface contaminants such as paint, oxide films, oils, dust, mold release agents and all other surface contaminants.
2. Use gloves to minimize skin contact. DO NOT use solvents for cleaning hands.
3. **Cartridges:** To begin using a new cartridge, remove cartridge cap and dispense a small amount of adhesive, making sure both Parts A&B are extruding. Attach proper nozzle, dispense to fill in the full nozzle in 2-3 times and then dispense approximately 25 mm beads, before applying onto part(s) to be bonded. Partially used cartridges can be stored with the mixing nozzle attached. To reuse, remove and discard old nozzle, attach a new nozzle, dispense approximately 25 mm beads, before applying onto part(s) to be bonded.
4. For maximum bond strength, apply adhesive evenly to both surfaces to be assembled.
5. Application to the substrates should be made as soon as possible. Larger quantities and/or higher temperatures will reduce the work time.
6. Surfaces must be mated within the specified working time and allow to cure. Use sufficient material to ensure the joint is completely filled when parts are mated and clamped. Higher temperatures will speed up curing.
7. After indicated working time, parts must remain undisturbed until the fixture time is reached. The bond should be allowed to develop full strength before subjecting to any service load.
8. All adhesive application, part positioning, and fixture should occur before the working time of the mix has expired.
9. Clean-up is easiest before the adhesive has cured. Citrus terpene or N-methyl pyrrolidone (NMP) containing cleaners and degreasers can be used for best results. If the adhesive is already cured, careful scraping, followed by a solvent wipe may be the most effective method of clean up.

EFFECT OF TEMPERATURE

Application of adhesive at temperatures between 18 °C (65 °F) and 26 °C (80 °F) will ensure proper cure. Temperatures below 18 °C (65 °F) will slow cure speed; above 26 °C (80 °F) will increase cure speed. The viscosities of Parts A and B of

this adhesive are affected by temperature. To ensure consistent dispensing in meter-mix equipment, adhesive and activator temperatures should be held reasonably constant throughout the year.

STORAGE

Shelf life of DEVCON® MA216 adhesive (Part A) is 9 months. Shelf life of activator (Part B), including cartridges that contain activators, is 9 months. Shelf life is based on continuous storage between 12 °C (54 °F) and 23 °C (73 °F). Long term exposure above 23 °C (73 °F) will reduce the shelf life of these materials. Prolonged exposure of activators, including cartridges that contain activators, above 37 °C (98 °F) quickly diminishes the reactivity of the product and should be avoided. These products should never be frozen.

CONVERSIONS

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$	$\text{N}/\text{mm}^2 \times 145 = \text{psi}$
$\text{kV}/\text{mm} \times 25.4 = \text{V}/\text{mil}$	$\text{MPa} \times 145 = \text{psi}$
$\text{mm} / 25.4 = \text{inches}$	$\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$
$\mu\text{m} / 25.4 = \text{mil}$	$\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$
$\text{N} \times 0.225 = \text{lb}$	$\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$
$\text{N}/\text{mm} \times 5.71 = \text{lb}/\text{in}$	$\text{mPa}\cdot\text{s} = \text{cP}$

WARRANTY

ITW will only replace any material found to be defective. Because the storage, handling and application of this material are beyond our control, we can accept no liability for the results obtained.

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