

ARALDITE® 2053-05 Structural Adhesive

Product Description

ARALDITE® 2053-05 structural adhesive is a two-part toughened methacrylate adhesive designed for structural bonding. This fast-curing adhesive combines a high elongation at break with an excellent resistance to ageing and weathering. It is the right choice for the transportation industry to bond metals, composites, and plastics.

Features

- * Five-minute open time
- * >50% Elongation at break
- * Excellent ageing and weathering resistance
- * Resistant to temperatures up to 212°F (100°C)
- * Withstands the e-coat post-cure up to 392°F (200°C)
- * Minimal substrate pre-treatment needed

Typical Properties

Property	ARALDITE® 2053-05 A	ARALDITE® 2053-05 B	Mixed Adhesive
Color (visual)	Off-White	Black	Dark grey
Specific gravity	ca. 1.04	ca. 1.2	ca. 1.1
Viscosity at 77°F (25°C), cP	100,000	100,000	non-sagging
Pot life, 20g at 77°F (25°C), minutes	-	-	6 - 10
Open time at 77°F (25°C), minutes			5
Lap shear strength at 77°F (25°C) (A501)*, psi			> 2,175
Time to peak exotherm (20g) (A159)*, min	-	-	5 - 18

* Specified data are on a regular basis analyzed. Data which is described in this document as 'typical' is not analyzed on a regular basis and is given for information purposes only. Data values are not guaranteed or warranted unless if specifically mentioned.

Processing

Mix ratio

Product	Parts by weight	Parts by volume
ARALDITE® 2053-05 A	100	100
ARALDITE® 2053-05 B	13	10

Pretreatment

The strength and durability of a bonded joint are dependent on proper pretreatment of the surfaces to be bonded, however the methacrylate adhesives can be used effectively with little surface preparation. Ideally joint surfaces should be cleaned with a good degreasing agent such as acetone, iso-propanol (for plastics) or other proprietary degreasing agents in order to remove all traces of oil, grease and dirt. Low grade alcohol, gasoline (petrol) or paint thinners should never be used. The strongest and most durable joints are obtained by either mechanically abrading or chemically etching (“pickling”) the degreased surfaces.

Application of adhesive

This system is available in cartridges incorporating mixers and can be applied as ready to use adhesive with the aid of the tool recommended by Huntsman Advanced Materials.

The resin/hardener mix may be applied manually or robotically to the pretreated and dry joint surfaces. Huntsman's technical support group can assist the user in the selection of a suitable application method as well as suggest a variety of reputable companies that manufacture and service adhesive dispensing equipment. A layer of adhesive 0.25 mm thick will normally impart the greatest lap shear strength to the joint. The joint components should be assembled and secured in a fixed position as soon as the adhesive has been applied. For more detailed explanations regarding surface preparation and pretreatment, adhesive joint design, and the dual cartridge dispensing system, visit www.aralditeadhesives.com.

Temperature of application: the recommended temperature application range is 50°F to 104°F.

Warning: the cure reaction can generate a high amount of heat, it is not recommended to mix large amounts of material at room temperature.

Equipment maintenance

All tools should be cleaned with hot water and soap before adhesives residues have had time to cure. The removal of cured residues is a difficult and time-consuming operation. If solvents such as MEK are used for cleaning, operatives should take the appropriate precautions and, in addition, avoid skin and eye contact.

Typical times to minimum shear strength on sandblasted aluminum / contact pressure

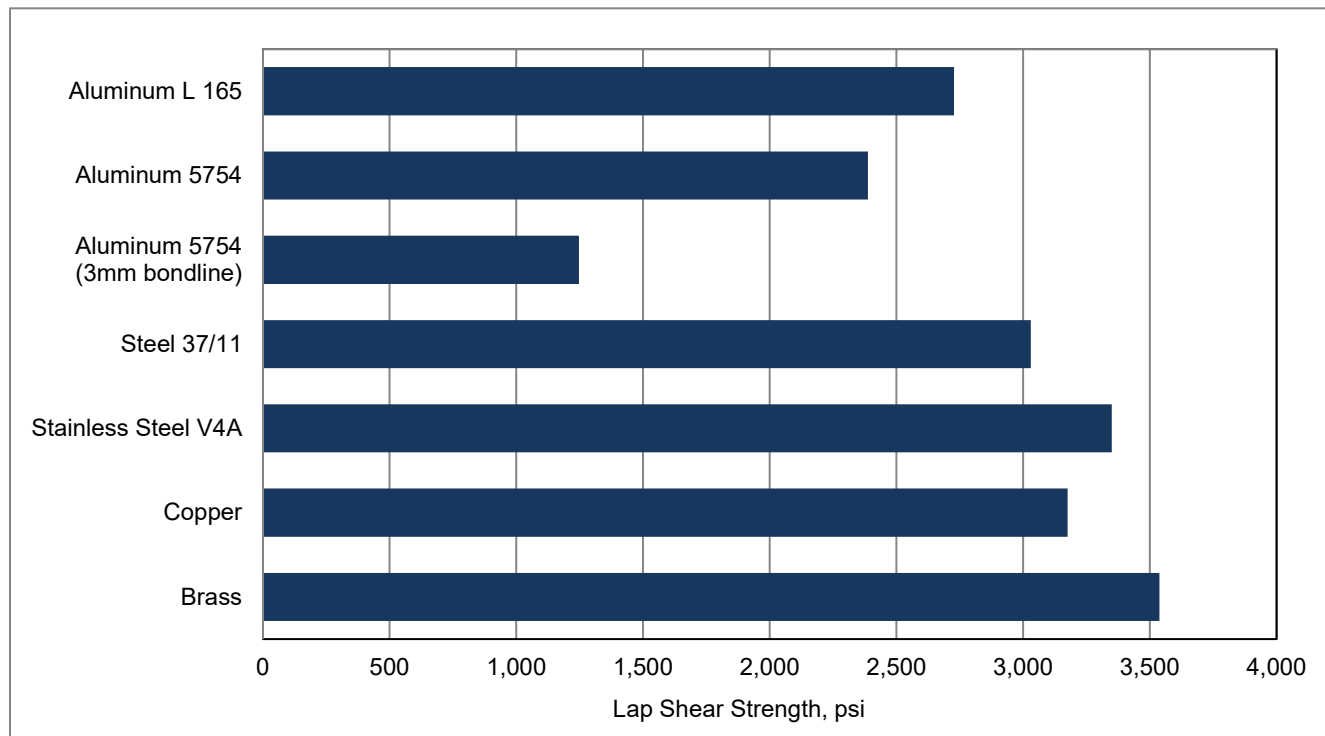
Temperature	10°C (50°F)	23°C (73°F)	30°C (86°F)	40°C (104°F)
Cure time (min) to reach LSS > 145 psi (1MPa)	40	20	10	3
Cure time (min) to reach LSS > 1450 psi (10MPa)	60	30	15	6

Typical Physical Properties

Unless otherwise stated, the figures given below were all determined by testing standard specimens made by lap-jointing 114 x 25 x 1.6 mm strips of aluminum alloy. The joint area was 12.5 x 25 mm in each case. The figures were determined with typical production batches using standard testing methods. They are provided solely as technical information and do not constitute a product specification.

Average lap shear strengths of typical metal-to-metal joints (ISO 4587) (typical average values)

Cured for 7 days at RT and tested at 73°F. Substrates sandblasted and degreased with acetone. They are typical values only, and do not constitute a product specification.

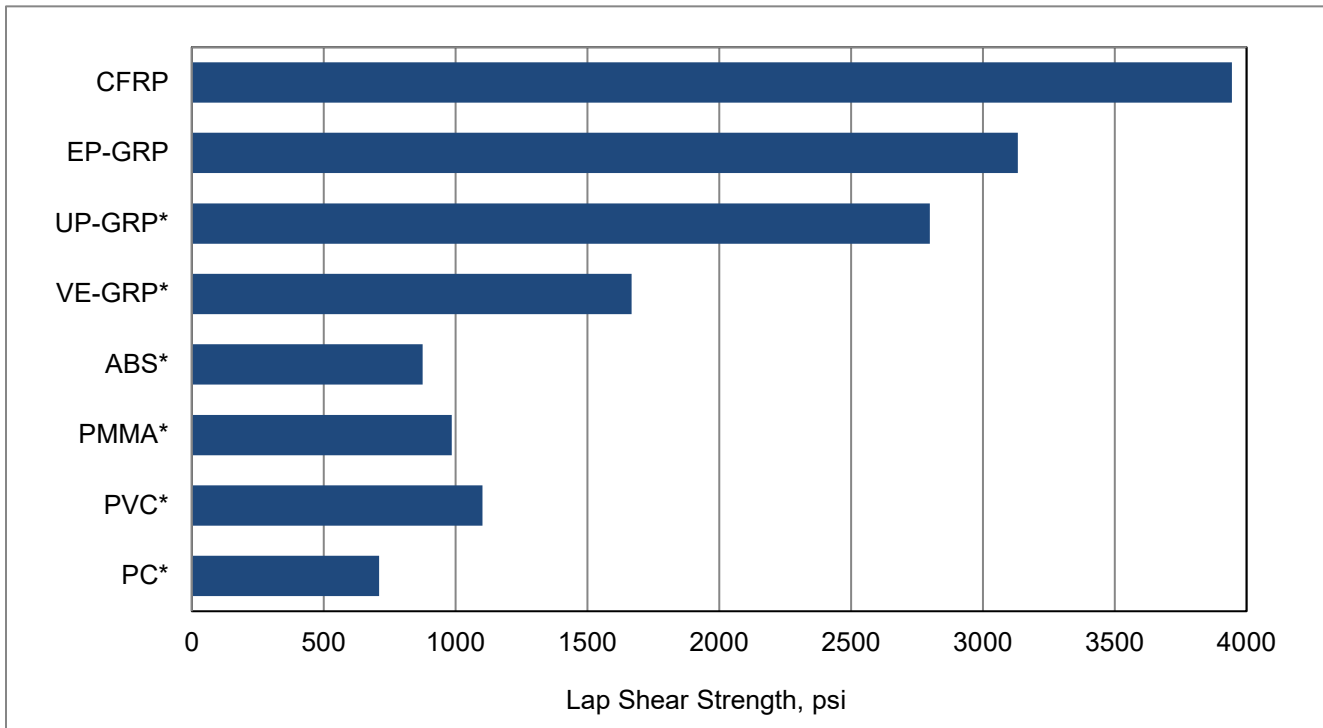


Notes: ARALDITE® 2053-05 is not suitable for galvanized steel - ARALDITE® 2047-1 or ARALDITE® 2051 can be used instead.

Property	Test Method	Value
Glass Transition Temperature (midpoint)	DMA	115°C (239°F)
Tensile Strength (psi)	ISO 527	2,900
Tensile Modulus (psi)	ISO 527	145,000
Roller Peel Strength, pli	ASTM D3167	48.5
Elongation at break	ISO 527	50%

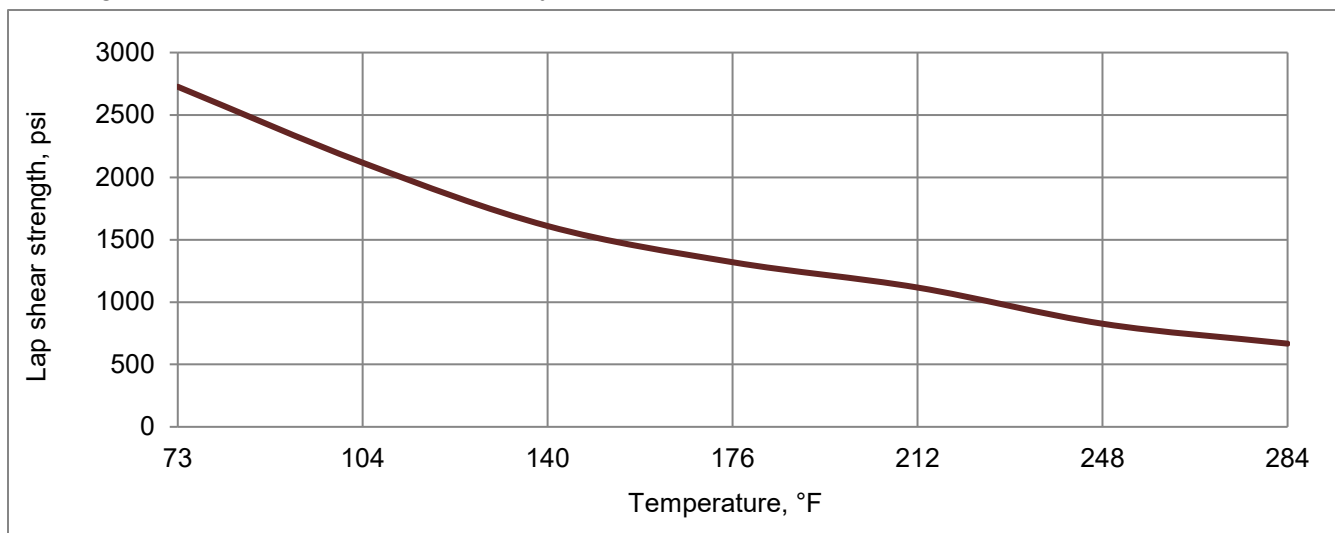
*Cured 7 days at RT

Average lap shear strengths of typical plastic-to-plastic joints (ISO 4587) (typical average values). Cured for 7 days at RT and tested at 73°F. Substrates abraded and degreased with isopropanol.



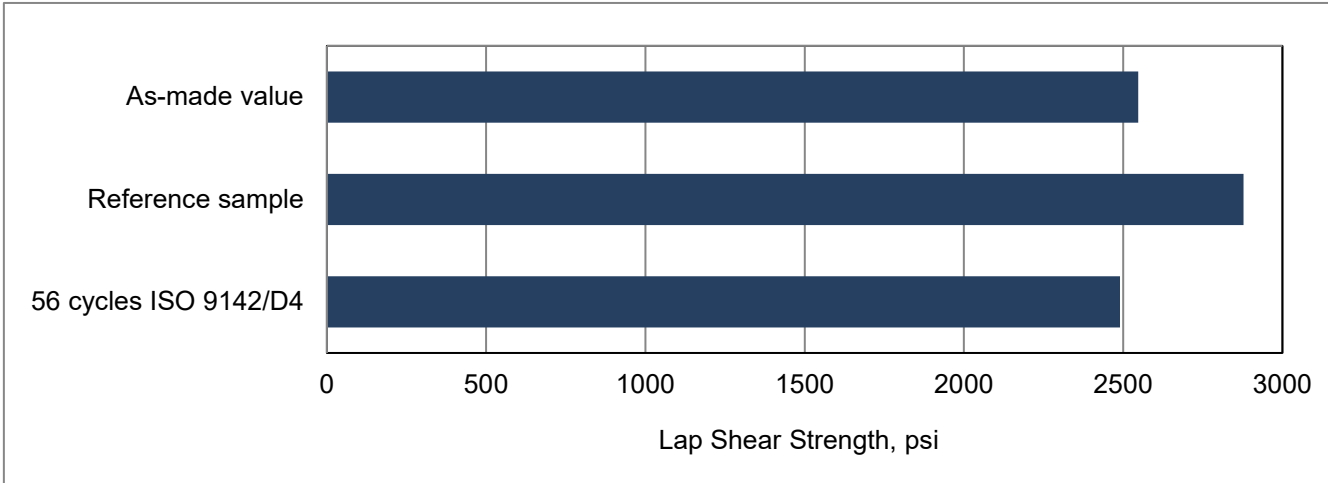
* UP-GRP, SMC, ABS, substrate failure or substrate's delamination failure observed.

Lap shear strength versus temperature (ISO 4587) (typical average values). Substrates sandblasted and degreased with acetone. Cured 7 days at RT.



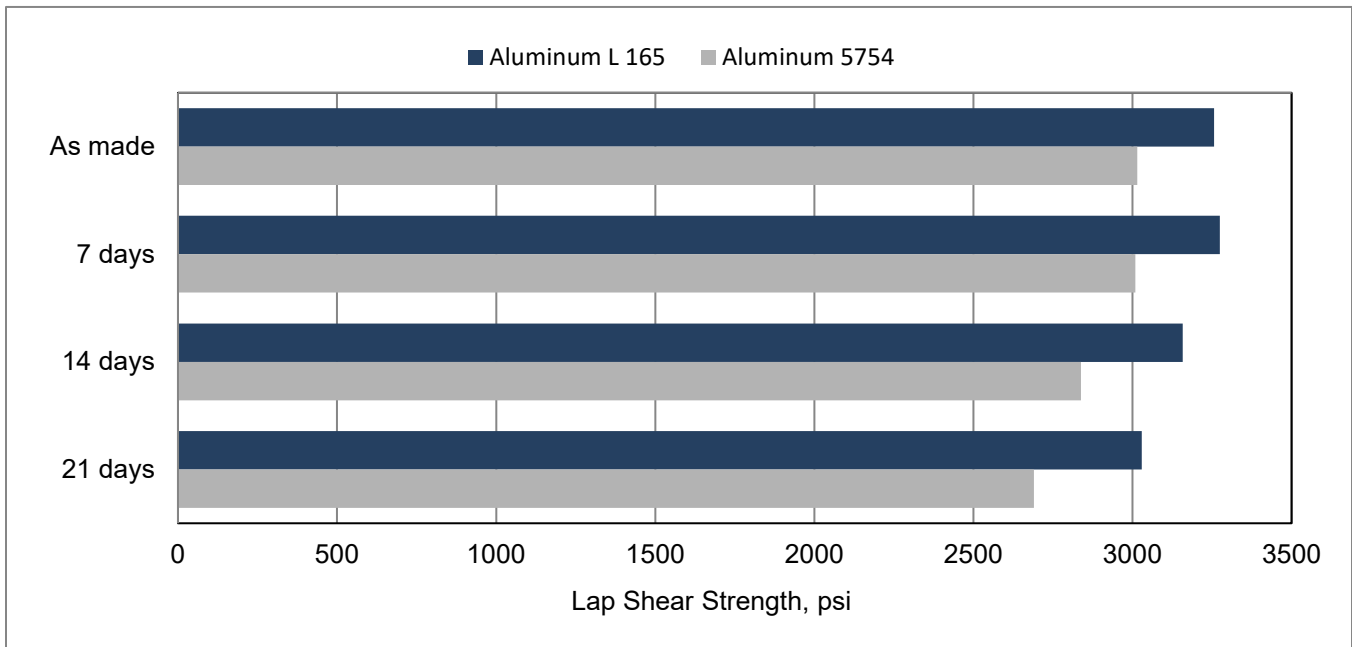
Lap shear after cycling ageing (typical average values)

Cured for 7 days at RT and tested at 73°F. Reference sample: 28 days at 73°F / 50% relative humidity Humid-heat and cold (158°F 90% RH and -40°F) for 56 cycles (over 28 days) per ISO 9142/D4



Lap shear strength versus Cataplasma ageing (typical average values)

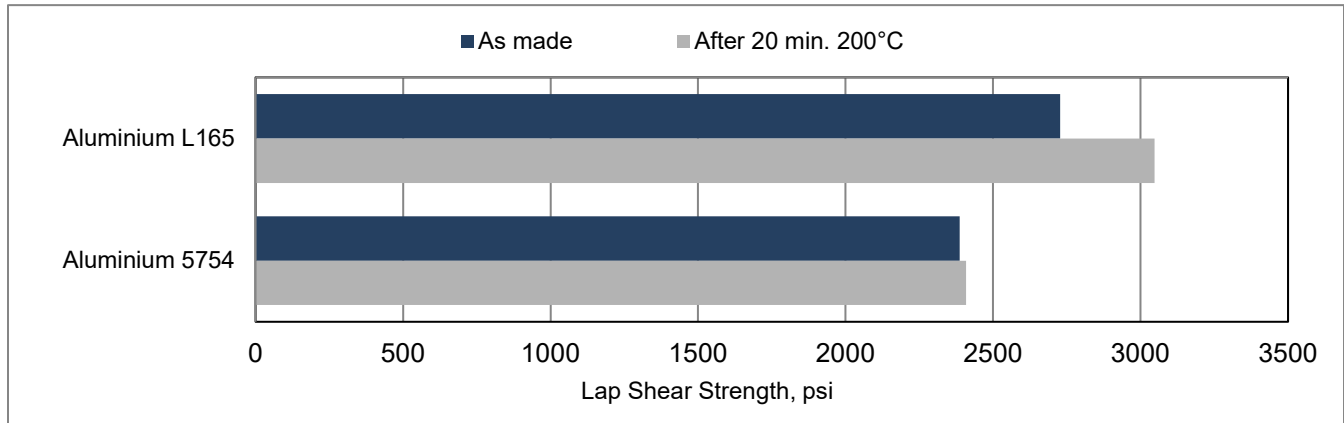
Cured for 7 days at RT, then Cataplasma aged per ISO 9142/E2 on Aluminum L 165. Tested at 73°F.



Lap shear strength after coating post-cure cycle at 200°C (typical average values)

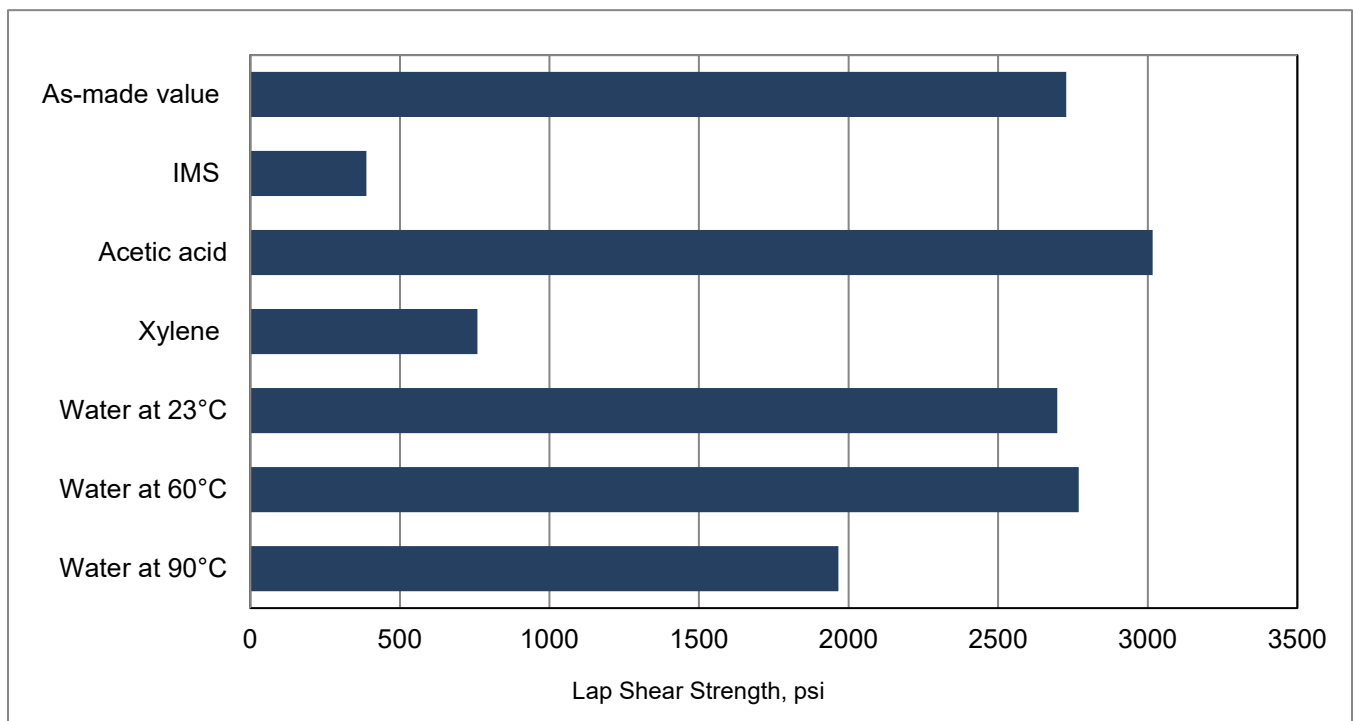
Cured 7 days at RT and tested at 23°C. Substrates sandblasted and degreased with acetone.

Ageing with a simulated coating post-cure cycle of 20 minutes at 200°C in an oven. Test performed at 23°C



Lap shear strength versus immersion in various media (ISO4587) (typical average values)

On Aluminum L165, pretreatment: sandblasting. Cure: 7 days at RT. Tested at 23°C. LSS was determined after immersion for 30 days at 23C.



Storage

ARALDITE® 2053-05 Structural Adhesive should be stored in a dry place, in the original sealed containers, at temperatures between **2°C and 8°C (36°F and 46°F)**. Under these storage conditions, the product has a shelf life of **24 months** (from date of manufacture). The product should not be exposed to direct sunlight. The product may be placed at room temperature before use, but the total time at room temperature should not exceed **9 months**. Long term exposure above 25°C (77°F) will reduce the shelf life of the product.

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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Main Offices:

Huntsman Corporation
10003 Woodloch Forest Dr
The Woodlands, TX 77380
888-564-9318

Huntsman Advanced Technology Center
8600 Gosling Rd.
The Woodlands, TX 77381
281-719-7400