

Advanced Materials**Aradur[®] 9664-1*****SOLID AROMATIC AMINE HARDENER**

GENERAL	Aradur [®] 9664-1 is a micropulverized version of the Aradur [®] 976-1, which is also referred to as Eporal 'DDS' or 'DAPS'. It is a high performance hardener used with Araldite [®] epoxy resins.	
CHEMICAL DESCRIPTION	4,4'-Diaminodiphenyl sulfone	
APPLICATIONS	<ul style="list-style-type: none">• Adhesives• Castings• Printed circuit board laminates• High temperature laminates• Prepregs• Composites/Advanced composites• Coatings/high performance	
ADVANTAGES	<ul style="list-style-type: none">• Excellent thermal stability• Outstanding chemical resistance• Excellent high temperature properties	
TYPICAL PROPERTIES	Visual appearance	white to off- white
	Melting point	176 - 185 °C
	Amine content	99 - 100 %
	Water content	0.0 - 0.15 %
	Particle size, less than 50 µm	99 - 100 %
PACKAGING & STORAGE	Aradur [®] 9664-1 is supplied in 15 kg drums. This product has a minimum shelf life of one year when stored away from excessive heat and humidity.	

FORMULATIONS**Casting Application 1**

When using a liquid resin and Hardener HT 9664-1, the following procedure is suggested:

Product	Parts by weight
Araldite® GY 6005	100
Aradur® 9664-1	36

Procedure

Heat the resin to 135 °C (275 °F) and then add the Aradur® 9664-1 while stirring. Continue stirring until a homogeneous mixture is obtained. Cool the solution to 120 °C (248 °F), then pour into the mold.

When using Hardener HT 9664-1/liquid resin/accelerator, the following procedure is suggested:

Product	Parts by weight
Araldite® GY 6005	100
Aradur® 9664-1	36
BF ₃ MEA	0.5-1.0

Procedure

Heat the resin to 135 °C (275 °F) and add the Hardener

Aradur® 9664-1 while stirring until a homogeneous mixture is obtained. Cool the resin/hardener mixture to 100 °C (212 °F), then add the accelerator and stir until the mixture is again uniform.

Gel Time (30 gram mass) at Various Temperatures

	pbw	100 °C	120 °C	140 °C
Araldite® GY 6005	100			
Aradur® 9664-1	36	180 min	130 min	75 min
Araldite® GY 6005	100			
Aradur® 9664-1	36			
BF ₃ MEA	0.5	180 min	116 min	50 min
Araldite® GY 6005	100			
Aradur® 9664-1	36			
BF ₃ MEA	1	30 min	21 min	11 min

Cured Properties

System: Araldite® GY 6005/Aradur® 9664-1(100/36)

Cure: 24 hrs @ 120°C (248 °F) + 4 hrs @ 175°C (350 °F)

Physical Properties @ 25°C (77°F)

Tensile strength, psi	8550
Tensile modulus, psi	3.4 x 10 ⁵
Elongation at break, %	3.3
Water absorption, 2 hr boil, %	0.6

Electrical Properties

Volume resistivity (ohm-cm)

@ 25°C (77 °F) 7.1 x 10¹⁶

@ 150°C (302 °F) 1.6 x 10¹³

Dielectric constant, 60 Hz

@ 20°C (68°F) 4.4

@ 100°C (212°F) 4.5

@ 130°C (265°F) 4.5

@ 150°C (302°F) 4.6

**FORMULATION
(CONTINUED)**

Dielectric factor, 60 Hz	
@ 20°C (68 °F)	0.008
@ 100°C (212 °F)	0.004
Dielectric factor, 60 Hz	
@ 20°C (68 °F)	0.008
@ 100°C (212 °F)	0.004
@ 130°C (265 °F)	0.007
@ 150°C (302 °F)	0.015

Casting Application 2

When using Araldite[®] MY 720 and Aradur[®] 9664-1 to produce an unfilled casting, the following procedure is suggested:

Parts by weight

Araldite [®] MY 720	100
Aradur [®] 9664-1	44

Procedure

Carefully heat the Araldite[®] MY 720 to 135 °C (275 °F) and slowly stir in the Aradur[®] 9664-1 until a clear mixture is obtained. (The total mass is 500 g.) Maintain a temperature of 135 °C and degas the mixture for 20 minutes at 30 inches of mercury. Then pour the material into molds and cure at the cure schedule below.

For larger quantities up to 5 kg, the temperature should not be allowed to go above 125 °C (256 °F) because a violent exotherm may result.

Unfilled batches scaled-up to >5 kg should be carefully investigated by the user for possible exotherms. In all cases, hot spots should be avoided when heating.

Accelerators are not recommended in the formulation where no solvents or fillers are used. If accelerators are evaluated, extreme caution should be exercised.

Cured Properties

	Tested @	
	25°C	150°C
Tensile strength, psi	8540	6460
Tensile modulus, psi	5.4 x 10 ⁵	3.8 x 10 ⁵
Tensile elongation, %	1.8	1.9
Flexural strength, psi	13.000	12.300
Flexural modulus, psi	5.0 x 10 ⁵	3.9 x 10 ⁵
Ultimate compressive strength, psi	34.000	
Compressive yield strength, psi	29.000	
Compressive modulus, psi	2.8 x 10 ⁵	
Charpy impact, unnotched, ft-lb	5.7	
Heat deflection temperature, °C (°F)	238 (460)	
Tg, °C (°F)	177 (350)	
Cure	2 hrs @ 80 °C (176 °F) + 1 hr @ 100 °C (212 °F) + 4 hrs @ 150 °C (302 °F) + 7 hrs @ 200 °C (392 °F)	

**HANDLING
PRECAUTIONS****Personal hygiene***Safety precautions at workplace*

protective clothing	yes
gloves	essential
arm protectors	recommended when skin contact likely
goggles/safety glasses	yes

Skin protection

before starting work	Apply barrier cream to exposed skin
after washing	Apply barrier or nourishing cream

Cleansing of contaminated skin

Dab off with absorbent paper, wash with warm water and alkali-free soap, then dry with disposable towels. Do not use solvents

Disposal of spillage

Soak up with sawdust or cotton waste and deposit in plastic-lined bin

Ventilation

of workshop	Renew air 3 to 5 times an hour
of workplaces	Exhaust fans. Operatives should avoid inhaling vapours

FIRST AID

Contamination of the eyes by resin, hardener or mix should be treated immediately by flushing with clean, running water for 10 to 15 minutes. A doctor should then be consulted.

Material smeared or splashed on the skin should be dabbed off, and the contaminated area then washed and treated with a cleansing cream (see above). A doctor should be consulted in the event of severe irritation or burns. Contaminated clothing should be changed immediately.

Anyone taken ill after *inhaling* vapours should be moved out of doors immediately.

In all cases of doubt call for medical assistance.

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