

Advanced Materials**Araldite® LZ 5021* / Aradur® 5021*****PREPREG SYSTEM**

Araldite® LZ 5021 is a solvent-containing resin
 Aradur® 5021 is a hardener based on polyamine

APPLICATIONS	<ul style="list-style-type: none"> Industrial composites Recreational composites 																																													
PROPERTIES	<ul style="list-style-type: none"> Prepreg system with a very long shelf life Curing 25 min at 125 °C Very flexible system 																																													
PROCESSING	<ul style="list-style-type: none"> Prepregging Single tow process 																																													
KEY DATA	<table border="1"> <thead> <tr> <th colspan="3">Araldite® LZ 5021</th> </tr> </thead> <tbody> <tr> <td>Aspect (visual)</td> <td>clear, light yellow liquid</td> <td></td> </tr> <tr> <td>Solvent content</td> <td>47 - 49</td> <td>[%]</td> </tr> <tr> <td>Solvents used</td> <td>methylethylketone/ 1-methoxy-2-propanol, 73:27</td> <td></td> </tr> <tr> <td>Epoxy index (ISO 3001)</td> <td>2.60 - 2.90</td> <td>[eq/kg]</td> </tr> <tr> <td>Viscosity at 25 °C (ISO 12058-1)</td> <td>250 - 700</td> <td>[mPa s]</td> </tr> <tr> <td>Density at 25 °C (ISO 1675)</td> <td>0.95 - 1.05</td> <td>[g/cm³]</td> </tr> <tr> <td>Flash point (ISO 2719)</td> <td>< 5</td> <td>[°C]</td> </tr> <tr> <td>Storage temperature (see expiry date on original container)</td> <td>2 - 40</td> <td>[°C]</td> </tr> <tr> <th colspan="3">Aradur® 5021</th> </tr> <tr> <td>Aspect (visual)</td> <td>white, high viscous paste</td> <td></td> </tr> <tr> <td>Viscosity at 25 °C (ISO 12058-1)</td> <td>70000 - 90000</td> <td>[mPa s]</td> </tr> <tr> <td>Density at 25 °C (ISO 1675)</td> <td>1.0</td> <td>[g/cm³]</td> </tr> <tr> <td>Flash point (ISO 2719)</td> <td>≥ 100</td> <td>[°C]</td> </tr> <tr> <td>Storage temperature (see expiry date on original container)</td> <td>< 8</td> <td>[°C]</td> </tr> </tbody> </table>	Araldite® LZ 5021			Aspect (visual)	clear, light yellow liquid		Solvent content	47 - 49	[%]	Solvents used	methylethylketone/ 1-methoxy-2-propanol, 73:27		Epoxy index (ISO 3001)	2.60 - 2.90	[eq/kg]	Viscosity at 25 °C (ISO 12058-1)	250 - 700	[mPa s]	Density at 25 °C (ISO 1675)	0.95 - 1.05	[g/cm ³]	Flash point (ISO 2719)	< 5	[°C]	Storage temperature (see expiry date on original container)	2 - 40	[°C]	Aradur® 5021			Aspect (visual)	white, high viscous paste		Viscosity at 25 °C (ISO 12058-1)	70000 - 90000	[mPa s]	Density at 25 °C (ISO 1675)	1.0	[g/cm ³]	Flash point (ISO 2719)	≥ 100	[°C]	Storage temperature (see expiry date on original container)	< 8	[°C]
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STORAGE	<p>Provided that the products described above are stored in a dry place in their original, properly closed containers at the above mentioned storage temperatures they will have the shelf lives indicated on the labels.</p> <p>Partly emptied containers should be closed immediately after use.</p>																																													

* In addition to the brand name product denomination may show different appendices, which allows us to differentiate between our production sites: e.g., BD = Germany, US = United States, IN = India, CI = China, etc.. These appendices are in use on packaging, transport and invoicing documents. Generally the same specifications apply for all versions. Please address any additional need for clarification to the appropriate Huntsman contact.

PROCESSING DATA

MIX RATIO	<i>Components</i>	<i>Parts by weight</i>	<i>Parts by volume</i>
	Araldite® LZ 5021	100	100
	Aradur® 5021	20	20

The Aradur® 5021 should have room temperature before mixing with Araldite® LZ 5021. Stir thoroughly with a slow-speed mixer until a white homogeneous dispersion is obtained. If necessary, solvent may be added to get a reduced viscosity for the impregnation.

We recommend that the components are weighed with an accurate balance to prevent mixing inaccuracies which can affect the properties of the matrix system.

INITIAL MIX VISCOSITY	[°C]	[mPa s]
(HOEPLER, ISO 12058-1B)	at 25	300 - 800

POT LIFE	[°C]	[days]
(TECAM, 100 ML, 65 % RH)	at 25	60

GEL TIME	[°C]	[min]
(HOT PLATE)	at 120	14 - 17
	at 130	7 - 9
	at 140	4 - 5
	at 150	2 - 3
	at 160	1 - 2

The values shown are for small amounts of pure resin/hardener mix. In composite structures the gel time can differ significantly from the given values depending on the fibre content and the laminate thickness.

PREPREG PRODUCTION	[min]	[°C]	Residual enthalpy [%]
Drying conditions by air-circulating oven to get a slightly tacky, flexible prepreg.	3	at 140	83
	4	at 130	93
	10	at 110	99

PREPREG SHELF LIFE	at 23 °C	9 - 12 months
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TYPICAL CURE CYCLES	25 min 125 °C or 20 min 140 °C or 15 min 150 °C or 10 h 100 °C or 8 h 110 °C
The optimum cure cycle has to be determined case by case depending on the processing and the economic requirements.	

PROPERTIES OF THE CURED, NEAT FORMULATION

GLASS TRANSITION TEMPERATURE (T_G)	<i>Cure: after drying 3 min 140 °C</i>	[°C]
(IEC 1006, DSC, 10 K/MIN)	25 min	125 °C
	20 min	140 °C
	15 min	150 °C
	6 hours	100 °C
	10 hours	100 °C
	4 hours	110 °C
	8 hours	110 °C

TENSILE TEST	<i>Cure:</i>	<i>25 min 125 °C</i>
(ISO 527)	Tensile strength	[MPa] 78 - 82
	Elongation at tensile strength	[%] 3.7 - 4.1
	Ultimate strength	[MPa] 67 - 75
	Ultimate elongation	[%] 5.0 - 8.5
	Tensile modulus	[MPa] 3300 - 3400

FLEXURAL TEST	<i>Cure:</i>	<i>25 min 125 °C</i>
(ISO 178)	Flexural strength	[MPa] 118 - 120
	Elongation at flexural strength	[%] 4 - 7
	Ultimate strength	[MPa] 63 - 77
	Ultimate elongation	[%] 13 - 16
	Flexural modulus	[MPa] 3100 - 3200

SAMPLES Test probes:
 12 layers of Interglas 92146-I 550 cloth
 Drying: 3 min 140°C
 Cure: 25 min 125°C
 Laminate thickness: 3.3 mm

GLASS TRANSITION TEMPERATURE	T _G	[°C]	120 - 125
(IEC 1006, DSC, 10 K/MIN)			

TORSIONAL TEST	T _G	[°C]	135 - 139
(ISO 6721, DMA, 2 K/MIN)			

FLEXURAL TEST	Flexural strength	[MPa]	1000 - 1300
(ISO 178)	Elongation at flexural strength	[%]	2.5 - 4.0
	Flexural modulus	[MPa]	35000 - 45000

INTERLAMINAR SHEAR STRENGTH	Shear strength	[MPa]	
(ASTM D 2344)	Initial value		68 - 76
	After 1 hour in boiling water		64 - 74

**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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