

**Advanced Materials****Araldite® LY 1564\* / Aradur® 3474\*****WARM TO HOT CURING EPOXY SYSTEM**

Araldite® LY 1564 is a low viscosity epoxy resin  
 Aradur® 3474 is a formulated amine hardener

<b>APPLICATIONS</b>	<ul style="list-style-type: none"> <li>• Industrial composites</li> <li>• Structural composites</li> </ul>																					
<b>PROPERTIES</b>	Amine-cured laminating system showing excellent flexibility and high reactivity.																					
<b>PROCESSING</b>	<ul style="list-style-type: none"> <li>• Wet lay-up</li> <li>• Filament Winding</li> <li>• Pressure Moulding</li> <li>• Resin Transfer Moulding (RTM)</li> <li>• Pultrusion</li> </ul>																					
<b>PRODUCT DATA</b>	<p><b>Araldite® LY 1564</b></p> <table border="1"> <tr> <td>Aspect (visual)</td> <td>clear yellowish liquid</td> <td></td> </tr> <tr> <td>Viscosity at 25 °C (ISO 12058-1)</td> <td>1200 – 1400 *</td> <td>[mPa s]</td> </tr> <tr> <td>Density at 25 °C (ISO 1675)</td> <td>1.10 - 1.20</td> <td>[g/cm<sup>3</sup>]</td> </tr> <tr> <td>Epoxy Index (ISO 3001)</td> <td>5.80 – 6.05 *</td> <td>[eq/kg]</td> </tr> </table> <p><b>Aradur® 3474</b></p> <table border="1"> <tr> <td>Aspect (visual)</td> <td>Colourless to pale yellow liquid</td> <td></td> </tr> <tr> <td>Viscosity at 25 °C (ISO 2555)</td> <td>10 – 30*</td> <td>[mPa s]</td> </tr> <tr> <td>Gel time at 80 °C (ISO 9396)</td> <td>7 – 11</td> <td>[min]</td> </tr> </table>	Aspect (visual)	clear yellowish liquid		Viscosity at 25 °C (ISO 12058-1)	1200 – 1400 *	[mPa s]	Density at 25 °C (ISO 1675)	1.10 - 1.20	[g/cm <sup>3</sup> ]	Epoxy Index (ISO 3001)	5.80 – 6.05 *	[eq/kg]	Aspect (visual)	Colourless to pale yellow liquid		Viscosity at 25 °C (ISO 2555)	10 – 30*	[mPa s]	Gel time at 80 °C (ISO 9396)	7 – 11	[min]
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\* Specified data are on a regular basis analysed. Data which is described in this document as 'typical' is not analysed on a regular basis and is given for information purposes only. Data values are not guaranteed or warranted unless if specifically mentioned.

<b>STORAGE</b>	<p>Provided that Araldite® LY 1564 and Aradur® 3474 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>
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\* 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

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**TYPICAL SYSTEM DATA**

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**PROCESSING DATA**

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<b>MIX RATIO</b>	<i>Components</i>	<i>Parts by weight</i>	<i>Parts by volume</i>
	Araldite <sup>®</sup> LY 1564	100	100
	Aradur <sup>®</sup> 3474	26	32

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We recommend that the components are weighed with an accurate balance to prevent mixing inaccuracies which can affect the properties of the matrix system. The components should be mixed thoroughly to ensure homogeneity. It is important that the side and the bottom of the vessel are incorporated into the mixing process.

When processing large quantities of mixture the pot life will decrease due to exothermic reaction. It is advisable to divide large mixes into several smaller containers.

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<b>INITIAL MIX VISCOSITY</b> (HOEPLER, ISO 12058- 1B)	<i>[°C]</i>	<i>[mPa s]</i>
	at 25	350 - 450
	at 30	230 - 290
	at 40	90 - 130

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<b>POT LIFE</b> (TECAM, 100 ML, 65 % RH)	<i>[°C]</i>	<i>[min]</i>
	at 23	260 - 280
	at 40	60 - 70

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<b>GEL TIME</b> (HOT PLATE)	<i>[°C]</i>	<i>[min]</i>
	at 80	25 - 35
	at 100	10 - 14
	at 120	4 - 6

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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.

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**TYPICAL CURE CYCLES**      1 h 80 °C + 4 h 120 °C

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The optimum cure cycle has to be determined case by case depending on the processing and the economic requirements.

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## PROPERTIES OF THE CURED, NEAT FORMULATION

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<b>GLASS TRANSITION TEMPERATURE</b>	<i>Cure:</i>		$T_G$ [°C]
(ISO 11357-2, DSC, 10 K/MIN)	1 h 80 °C + 4 h 120 °C		115 - 120
<b>TENSILE TEST</b>		<i>Cure:</i>	1 h 80 °C + 4 h 120 °C
(ISO 527)	Tensile strength	[MPa]	75 – 80
	Ultimate elongation	[%]	5.0 – 6.5
	Tensile modulus	[MPa]	2750 – 2900
<b>FLEXURAL TEST</b>		<i>Cure:</i>	1 h 80 °C + 4 h 120 °C
(ISO 178)	Flexural strength	[MPa]	120 - 130
	Ultimate elongation	[%]	8.0 – 9.0
	Flexural modulus	[MPa]	2750 - 2900
<b>FRACTURE PROPERTIES</b>		<i>Cure:</i>	1 h 80 °C + 4 h 120 °C
<b>BEND NOTCH TEST</b>	Fracture toughness $K_{1C}$	[MPa√m]	0.70 - 0.90
(ISO 13586)	Fracture energy $G_{1C}$	[J/m <sup>2</sup> ]	200 - 240
<b>WATER ABSORPTION</b>	<i>Immersion:</i>	<i>Cure:</i>	1 h 80 °C + 4 h 120 °C
(ISO 62)	3 days H <sub>2</sub> O 23 °C	[%]	0.30 – 0.35
	7 days H <sub>2</sub> O 23 °C	[%]	0.45 – 0.55
	10 days H <sub>2</sub> O 23 °C	[%]	0.55 – 0.65

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## PROPERTIES OF THE CURED, REINFORCED FORMULATION

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<b>INTERLAMINAR SHEAR STRENGTH</b>	Samples: 12 layers E-glass fabrics UD (425 g/m <sup>2</sup> )		
(ASTM D 2344)	Laminate thickness = 3.1 - 3.25 mm		
	Fibre volume content: 59 - 63 %		
	<i>Cure:</i> 1 h 80 °C + 4 h 120 °C		
	Shear strength	[MPa]	58 - 62

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## 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

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*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

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*Disposal of spillage*

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

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*Ventilation*

of workshop

Renew air 3 to 5 times an hour

of workplaces

Exhaust fans. Operatives should avoid inhaling vapours

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**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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