

**Advanced Materials****Araldite® LY 1556\* / Aradur® 1571\* / Accelerator 1573\*  
Hardener XB 3403\*****PREPREG SYSTEM BASED ON CHEMICAL B-STAGE**

Araldite® LY 1556 (Epoxy resin)  
 Aradur® 1571 (Hardener paste)  
 Accelerator 1573 (Accelerator paste)  
 Hardener XB 3403 (Hardener based on polyamine)

|                     |   |                           |                      |
|---------------------|---|---------------------------|----------------------|
| <b>APPLICATIONS</b> | Industrial composites   |                           |                      |
| <b>PROPERTIES</b>   | Prepreg system with a long shelf life and curable from 80 °C on   |                           |                      |
| <b>PROCESSING</b>   | Prepregging   |                           |                      |
| <b>PRODUCT DATA</b> | <b>Araldite® LY 1556</b>  |                           |                      |
|                     | Aspect (visual)   | clear, pale yellow liquid |                      |
|                     | Viscosity at 25 °C (ISO 12058)  | 9500 - 12000**            | [mPa s]              |
|                     | Density at 25 °C (ISO 1675)   | 1.15 - 1.20               | [g/cm <sup>3</sup> ] |
|                     | Epoxy index (ISO 3001)  | 5.1 - 5.3**               | [Eq/kg]              |
|                     | <b>Aradur® 1571</b>   |                           |                      |
|                     | Aspect (visual)   | White viscous paste       |                      |
|                     | Viscosity at 25 °C  | 28000 - 40000             | [mPa s]              |
|                     | Density at 25 °C (ISO 1675)   | 1.2                       | [g/cm <sup>3</sup> ] |
|                     | <b>Accelerator 1573</b>   |                           |                      |
|                     | Aspect (visual)   | White viscous paste       |                      |
|                     | Viscosity at 25 °C  | 60000 - 90000             | [mPa s]              |
|                     | Density at 25 °C (ISO 1675)   | 1.08                      | [g/cm <sup>3</sup> ] |
|                     | <b>Hardener XB 3403</b>   |                           |                      |
|                     | Aspect (visual)   | clear liquid              |                      |
|                     | Viscosity at 25 °C  | 5 - 20                    | [mPa s]              |
|                     | Density at 25 °C (ISO 1675)   | 1.0                       | [g/cm <sup>3</sup> ] |
| <b>STORAGE</b>      | Provided that Araldite® LY 1556 and Aradur® 1571, Aradur® 1573 or XB 3403 are stored in a dry place in their original, properly closed containers at the storage temperatures mentioned in the MSDS they will have the shelf lives indicated on the labels. Partly emptied containers should be closed immediately after use. |                           |                      |

\*\* 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.

\* 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.

## TYPICAL SYSTEM DATA

### PROCESSING DATA

| MIX RATIO | <i>Components, parts by weight</i> | System 1          | System 2 | System 3 |
|-----------|------------------------------------|-------------------|----------|----------|
|           |                                    | Araldite® LY 1556 | 100      | 100      |
|           | Aradur 1571                        | 23                | 23       | 23       |
|           | Accelerator 1573                   | 3                 | 5        | 7        |
|           | Hardener XB 3403                   | 12                | 12       | 12       |

Mix Aradur 1571 with Accelerator 1573 to get homogeneous paste, this pre-mix has a long shelf life at RT and can be used within 2 weeks at room temperature.

The premix Aradur 1571/Accelerator 1573 is blended into the resin Araldite LY 1556. Add the hardener XB 3403 and mix homogeneously just before the prepregging process.

The prepreg tackiness can be adjusted by the amount of the hardener XB 3403.

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.

| INITIAL MIX VISCOSITY                   | at 25 °C | <i>[mPas ]</i> | System 1    | System 2    | System 3    |         |
|---|----------|----------------|-------------|-------------|-------------|---------|
|   |          |                | 4000 – 6000 | 4000 - 6000 | 4000 - 6000 |         |
| POT LIFE<br>(TECAM, 100 ML,<br>65 % RH) |          | <i>[min]</i>   | System 1    | System 2    | System 3    |         |
|   |          |                | 450 - 550   | 450 - 550   | 450 - 550   |         |
| GEL TIME<br>(HOT PLATE)                 |          | <i>[min]</i>   | System 1    | System 2    | System 3    |         |
|   |          |                | at 110 °C   | 17 - 20     | 13 - 15     | 12 - 14 |
|   |          |                | at 120 °C   | 9 - 11      | 7 - 9       | 6 - 7   |
|   |          |                | at 130 °C   | 5 - 6       | 3 - 5       | 3 - 4   |

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 | Impregnation bath temperature | 25 - 30 °C |
|--------------------|-------------------------------|------------|
|--------------------|-------------------------------|------------|

| B-STAGING<br>(PRE REACTION) | For all the systems<br>24-48h at 23-25°C |
|-----------------------------|--|
|-----------------------------|--|

| PREPREG SHELF LIFE | at 23 °C | System 1  | System 2  | System 3  |
|--------------------|----------|-----------|-----------|-----------|
|                    |          | > 6 weeks | > 6 weeks | > 6 weeks |

**PROPERTIES OF THE CURED, NEAT FORMULATION**

| <b>GLASS TRANSITION TEMPERATURE</b><br>(ISO 11357-2<br>DSC, 10 K/MIN) | <i>Cure: after B-Stage</i> |  | System 1   | System 2   | System 3   |
|---|----------------------------|--|------------|------------|------------|
|   |                            |  | $T_g$ [°C] | $T_g$ [°C] | $T_g$ [°C] |
|   | 4 h 90 °C                  |  | 75 - 85    | 95 - 100   | 90 - 100   |
|   | 6 h 100 °C                 |  | 105 - 110  | 110 - 115  | 110 - 115  |
|   | 2 h 120 °C                 |  | 105 - 110  | 110 - 115  | 110 - 115  |

| <b>FLEXURAL TEST</b><br>(ISO 178) | Cure cycle 2h 120°C | Tested at 23°C | System 1                | System 2    | System 3    |
|-----------------------------------|---------------------|----------------|-------------------------|-------------|-------------|
|                                   |                     |                | Flexural strength [MPa] | 125 - 135   | 127 - 137   |
| Ultimate elongation [%]           |                     |                | 7 - 10                  | 7 - 9       | 7 - 9       |
| Flexural modulus [MPa]            |                     |                | 2900 - 3100             | 2950 - 3150 | 3000 - 3200 |

| <b>FRACTURE PROPERTIES BEND NOTCH TEST</b><br>(ISO 13586) | Cure cycle 2h 120°C | Tested at 23°C | System 1                            | System 2    | System 3    |
|---|---------------------|----------------|-------------------------------------|-------------|-------------|
|   |                     |                | Fracture toughness $K_{1C}$ [MPa√m] | 0.70 - 0.80 | 0.75 - 0.85 |
| Fracture energy $G_{1C}$ [J/m <sup>2</sup> ]              |                     |                | 130 - 170                           | 210 - 250   | 130 - 170   |

**PROPERTIES OF THE CURED, REINFORCED FORMULATION**Samples: 12 layers of unidirectional E-glass fabric (425 g/m<sup>2</sup>)

Laminate thickness: 3.1 - 3.3 mm

Cure cycle 2h at 120°C

| <b>INTERLAMINAR SHEAR TEST</b><br>(ASTM D 2344) |  | Tested at 23°C | System 1             | System 2 | System 3 |
|---|--|----------------|----------------------|----------|----------|
|   |  |                | Shear strength [MPa] | 55 - 65  | 55 - 65  |

**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.

**Huntsman Advanced Materials**  
(Switzerland) GmbH  
Klybeckstrasse 200  
4057 Basel  
Switzerland

Tel: +41 (0)61 299 11 11  
Fax: +41 (0)61 299 11 12

[www.huntsman.com/advanced\\_materials](http://www.huntsman.com/advanced_materials)  
Email: [advanced\\_materials@huntsman.co](mailto:advanced_materials@huntsman.co)



Huntsman Advanced Materials warrants only that its products meet the specifications agreed with the user. Specified data are analysed on a regular basis. Data which is described in this document as 'typical' or 'guideline' 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. The manufacture of materials is the subject of granted patents and patent applications; freedom to operate patented processes is not implied by this publication. While all the information and recommendations in this publication are, to the best of Huntsman Advanced Material's knowledge, information and belief, accurate at the date of publication, nothing herein is to be construed as a warranty, whether express or implied, including but without limitation, as to merchantability or fitness for a particular purpose. In all cases, it is the responsibility of the user to determine the applicability of such information and recommendations and the suitability of any product for its own particular purpose. The behaviour of the products referred to in this publication in manufacturing processes and their suitability in any given end-use environment are dependent upon various conditions such as chemical compatibility, temperature, and other variables, which are not known to Huntsman Advanced Materials. It is the responsibility of the user to evaluate the manufacturing circumstances and the final product under actual end-use requirements and to adequately advise and warn purchasers and users thereof. Products may be toxic and require special precautions in handling. The user should obtain Safety Data Sheets from Huntsman Advanced Materials containing detailed information on toxicity, together with proper shipping, handling and storage procedures, and should comply with all applicable safety and environmental standards. Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent on manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users. Except where explicitly agreed otherwise, the sale of products referred to in this publication is subject to the general terms and conditions of sale of Huntsman Advanced Materials LLC or of its affiliated companies including without limitation, Huntsman Advanced Materials (Europe) BVBA, Huntsman Advanced Materials Americas Inc., Huntsman Advanced Materials (UAE) FZE, Huntsman Advanced Materials (Guangdong) Company Limited, and Huntsman Advanced Materials (Hong Kong) Ltd. Huntsman Advanced Materials is an international business unit of Huntsman Corporation. Huntsman Advanced Materials trades through Huntsman affiliated companies in different countries including but not limited to Huntsman Advanced Materials LLC in the USA and Huntsman Advanced Materials (Europe) BVBA in Europe.

All trademarks mentioned are either property of or licensed to Huntsman Corporation or an affiliate thereof in one or more, but not all, countries.  
Copyright © 2012 Huntsman Corporation or an affiliate thereof. All rights reserved.