



Enriching lives through innovation

## HUNTSMAN ADVANCED MATERIALS

### Adhesive Technical Support Europe

#### Comparison of ARALDITE® AV 138 M-1 / HV 998-1 & ARALDITE® AV 138 M-2 / HV 998-1

#### NEW PRODUCT DEVELOPMENT REPORT

**PREPARED BY**

Duncan HOWLAND  
HUNTSMAN ADVANCED MATERIALS  
Klybeckstrasse 200  
4057 BASEL  
Switzerland

#### INTRODUCTION

ARALDITE® AV 138 M-2 / HV 998-1 is a new adhesive which has been developed to replace ARALDITE® AV 138 M-1 / HV 998-1. This is due to a change in hazard classification of a raw material used in the resin component (AV 138 M-1). The characteristics and properties of the ARALDITE® AV 138 M-2 remain similar to the existing ARALDITE® AV 138 M-1.

The following comparative report shows data obtained from laboratory testing of the new ARALDITE® AV 138 M-2 / HV 998-1 adhesive system against the existing ARALDITE® AV 138 M-1 / HV 998-1 system.

## TEST RESULTS

Unless otherwise stated, the figures given below were determined by testing standard specimens made by lap-jointing 100 x 25 x 1.6 mm strips of sandblasted aluminium alloy. The bond area was 12.5 x 25 mm, with bonded specimens cured under light clamping pressure. Lap shear testing was carried out at 23°C at 10mm/min unless indicated otherwise.

### Liquid properties

|                                     | ARALDITE® AV 138 M-1 / HV 998-1      | ARALDITE® AV 138 M-2 / HV 998-1      |
|-------------------------------------|--------------------------------------|--------------------------------------|
| <b>Mix Ratio (resin : hardener)</b> | 100:40 by weight<br>100:40 by volume | 100:40 by weight<br>100:40 by volume |
| <b>Appearance (mix)</b>             | Dark grey paste                      | Dark grey paste                      |
| <b>Viscosity (mix)</b>              | Thixotropic                          | Thixotropic                          |
| <b>Working time (10g) 23°C</b>      | 65 minutes                           | 75 minutes                           |

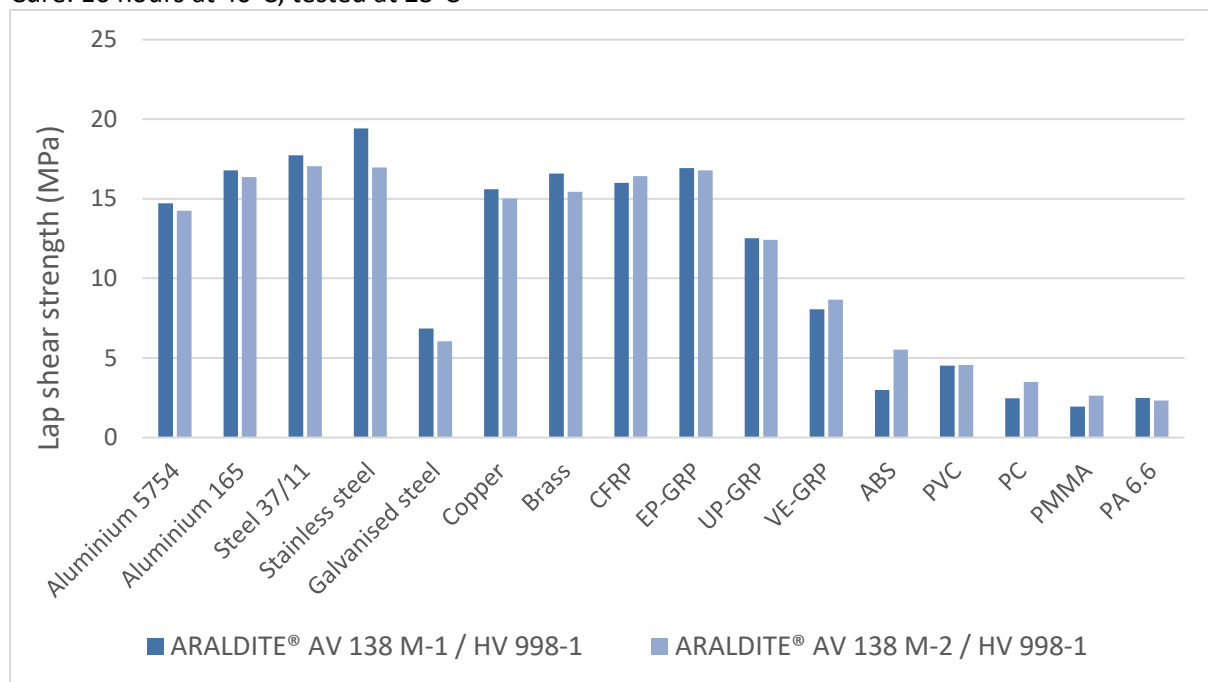
### Handling/working strength

Time to reach handling strength (1 MPa) and working strength (10 MPa) on bonded specimens cured at different temperatures.

| Cure temperature | Time to reach lap shear strength | ARALDITE® AV 138 M-1 / HV 998-1 | ARALDITE® AV 138 M-2 / HV 998-1 |
|------------------|----------------------------------|---------------------------------|---------------------------------|
| Curing at 15°C   | Time to 1 MPa                    | 7 hours                         | 8 hours                         |
|                  | Time to 10 MPa                   | 14 hours                        | 14 hours                        |
| Curing at 23°C   | Time to 1 MPa                    | 4 hours                         | 5 hours                         |
|                  | Time to 10 MPa                   | 6 hours                         | 7 hours                         |
| Curing at 40°C   | Time to 1 MPa                    | 1 hour                          | 1 hour                          |
|                  | Time to 10 MPa                   | 1.5 hours                       | 1.5 hours                       |

## Lap shear strength (LSS) on different materials (ISO 4587)

Cure: 16 hours at 40°C, tested at 23°C

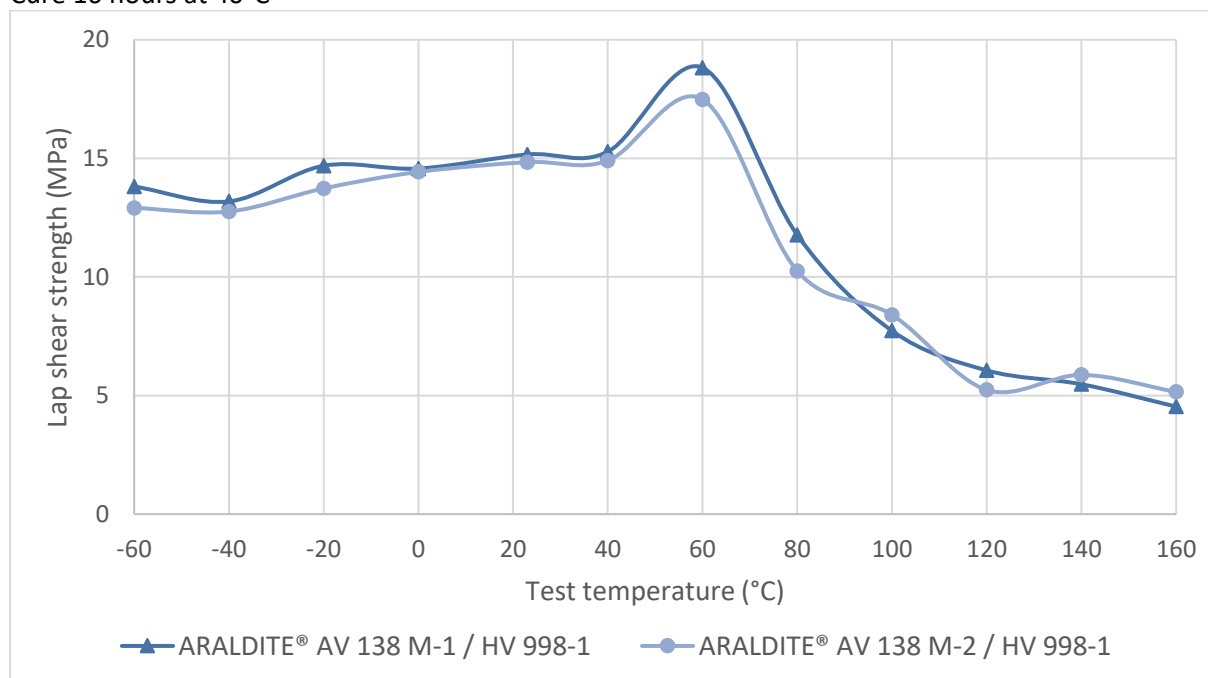


*Metal substrates: sandblasted & degreased with acetone (galvanised steel – acetone degrease only)*

*Plastic substrates: abraded & degreased with isopropanol*

## Lap shear strength versus temperature (ISO 4587)

Cure 16 hours at 40°C



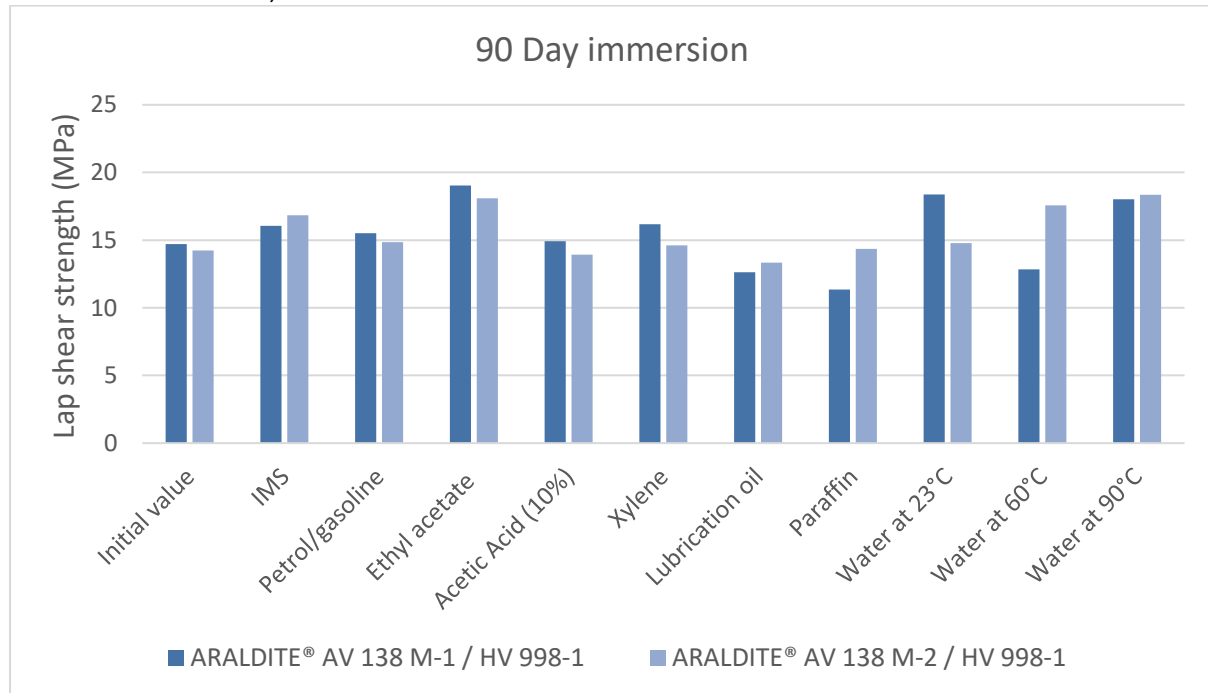
### DMA measurement (ISO 6721)

Cure 16 hours at 40°C

|                       | ARALDITE® AV 138 M-1 / HV 998-1 | ARALDITE® AV 138 M-2 / HV 998-1 |
|-----------------------|---------------------------------|---------------------------------|
| T <sub>g</sub> (Tanδ) | 70°C                            | 69°C                            |
| Shear modulus (23°C)  | 1750 MPa                        | 1910 MPa                        |

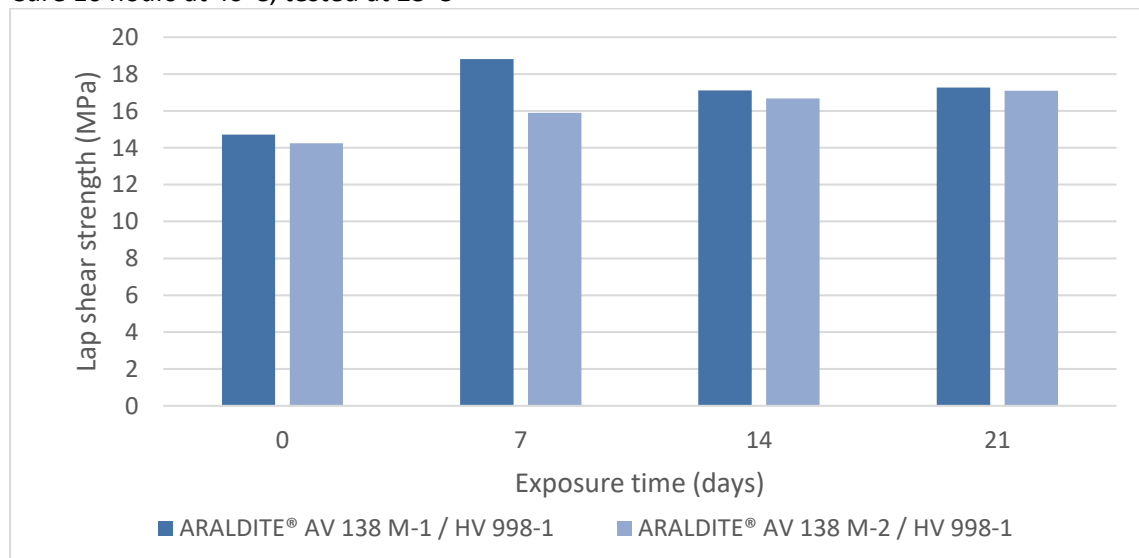
### Chemical aging - immersion in different media

Cure 16 hours at 40°C, tested at 23°C



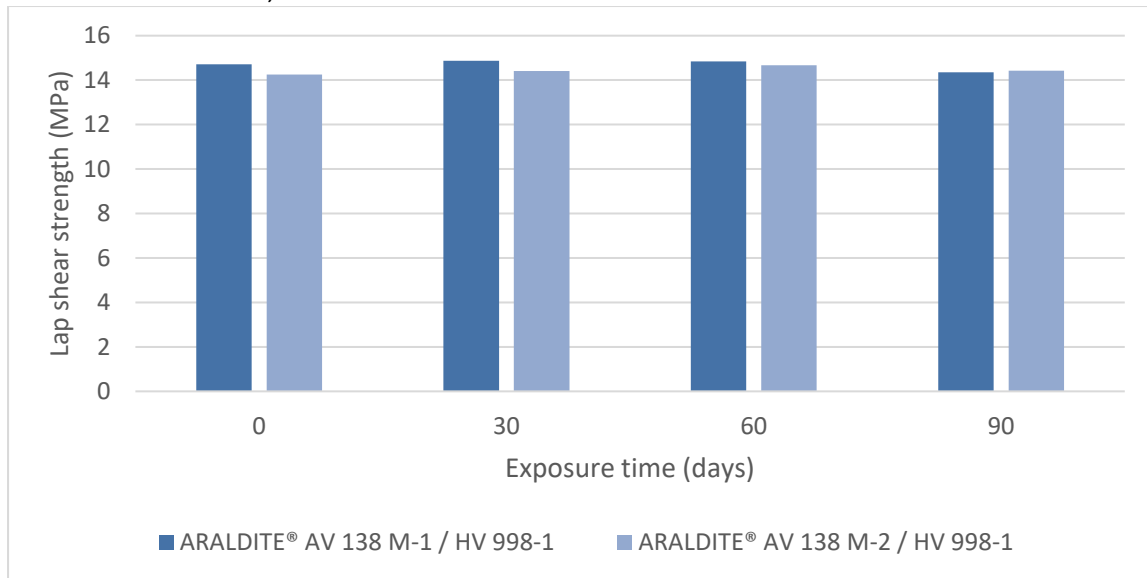
### Cataplasma aging (ISO 9142 E2)

Cure 16 hours at 40°C, tested at 23°C



### Heat aging at 70°C

Cure 16 hours at 40°C, tested at 23°C



### Tensile properties (ISO 527)

Cure 16 hours at 40°C, tested at 23°C

|                                 | Tensile modulus (MPa) | Tensile strength (MPa) | Elongation at break (%) |
|---------------------------------|-----------------------|------------------------|-------------------------|
| ARALDITE® AV 138 M-1 / HV 998-1 | 4474                  | 42                     | 1.1                     |
| ARALDITE® AV 138 M-2 / HV 998-1 | 4828                  | 43                     | 1.1                     |

---

## CONCLUSION

Testing indicates that the ARALDITE® AV 138 M-2 / HV 998-1 offers similar handling and properties to the ARALDITE® AV 138 M-1 / HV 998-1. For many applications, it may be possible to replace ARALDITE® AV 138 M-1 / HV 998-1 with ARALDITE® AV 138 M-2 / HV 998-1 without a change of process conditions or part design. However, it is always recommended to check the suitability of the product for the intended application.

---

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 © 2025 Huntsman Corporation or an affiliate thereof. All rights reserved

**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.aralditeadhesives.com](http://www.aralditeadhesives.com)