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Adhesive Technical Support Europe

Comparison of ARALDITE® 2014-2 (ARALDITE® AW 139-1 / Hardener HW 5323-1) & ARALDITE® 2014-3 (ARALDITE® AW 139-2/ Hardener HW 5323-1)

NEW PRODUCT DEVELOPMENT REPORT

PREPARED BY
Duncan HOWLAND
HUNTSMAN ADVANCED MATERIALS
Klybeckstrasse 200
4057 BASEL
Switzerland

INTRODUCTION

ARALDITE® 2014-3 is a new adhesive which has been developed to replace ARALDITE® 2014-2. This is due to a change in hazard classification of a raw material used in the resin component (ARALDITE® AW 139-1). The composition, characteristics and properties of the ARALDITE® 2014-3 remain similar to the existing ARALDITE® 2014-2 product.
The ARALDITE® 2014-3 comprises a new resin component (ARALDITE® AW 139-2) together with the existing hardener component (Hardener HW 5323-1).
The following comparative report shows data obtained from laboratory testing of the new ARALDITE® 2014-3 against the existing ARALDITE® 2014-2 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 otherwise stated.

Liquid properties

	ARALDITE® 2014-2 (ARALDITE® AW 139-1 / Hardener HW 5323-1)	ARALDITE® 2014-3 (ARALDITE® AW 139-2/ Hardener HW 5323-1)
Mix Ratio (resin : hardener)	100:50 by weight 100:50 by volume	100:50 by weight 100:50 by volume
Appearance (mix)	Dark grey paste	Dark grey paste
Viscosity (mix)	Thixotropic	Thixotropic
Working time (10g) 23°C	120 min.	120 min.

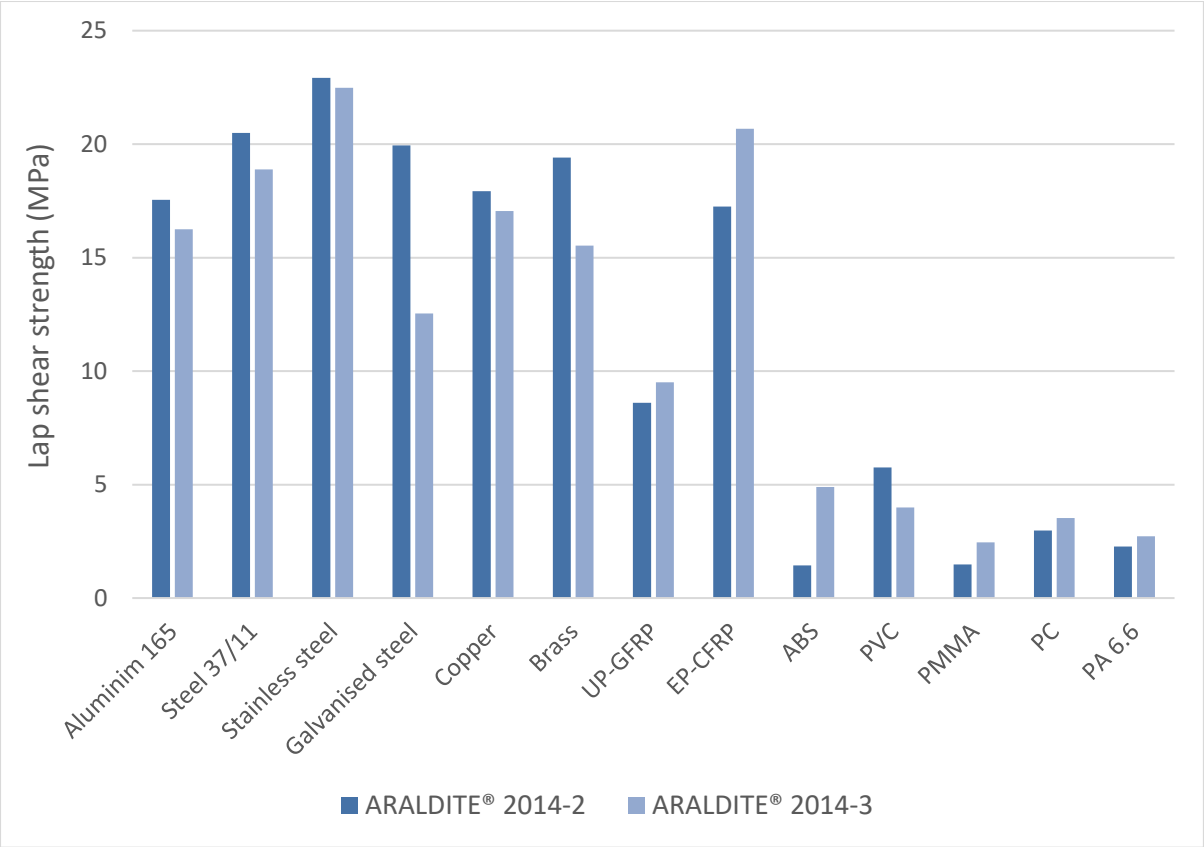
Handling/working strength

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® 2014-2	ARALDITE® 2014-3
Curing at 15°C	Time to 1 MPa	9 hours	9 hours
	Time to 10 MPa	12 hours	12 hours
Curing at 23°C	Time to 1 MPa	5 hours	4 hours
	Time to 10 MPa	7 hours	6 hours
Curing at 40°C	Time to 1 MPa	85 min.	70 min.
	Time to 10 MPa	110 min.	95 min.

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

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

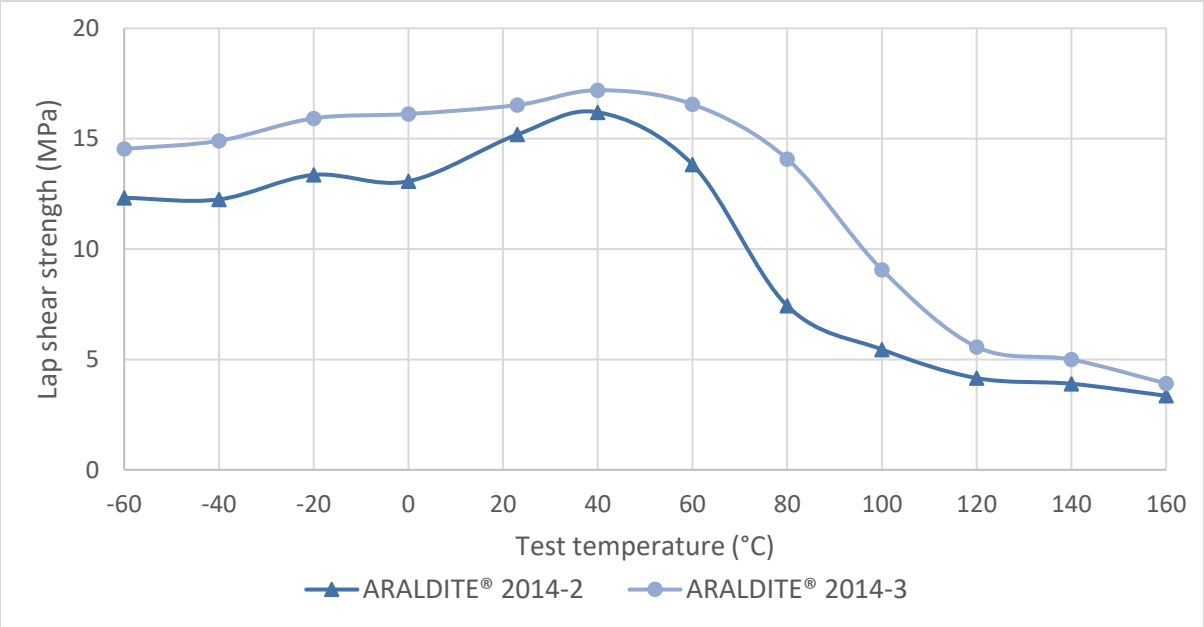


Metal substrates: sandblasted & degreased with acetone

Plastic substrates: abraded & degreased with isopropanol

Lap shear strength versus temperature (ISO 4587)

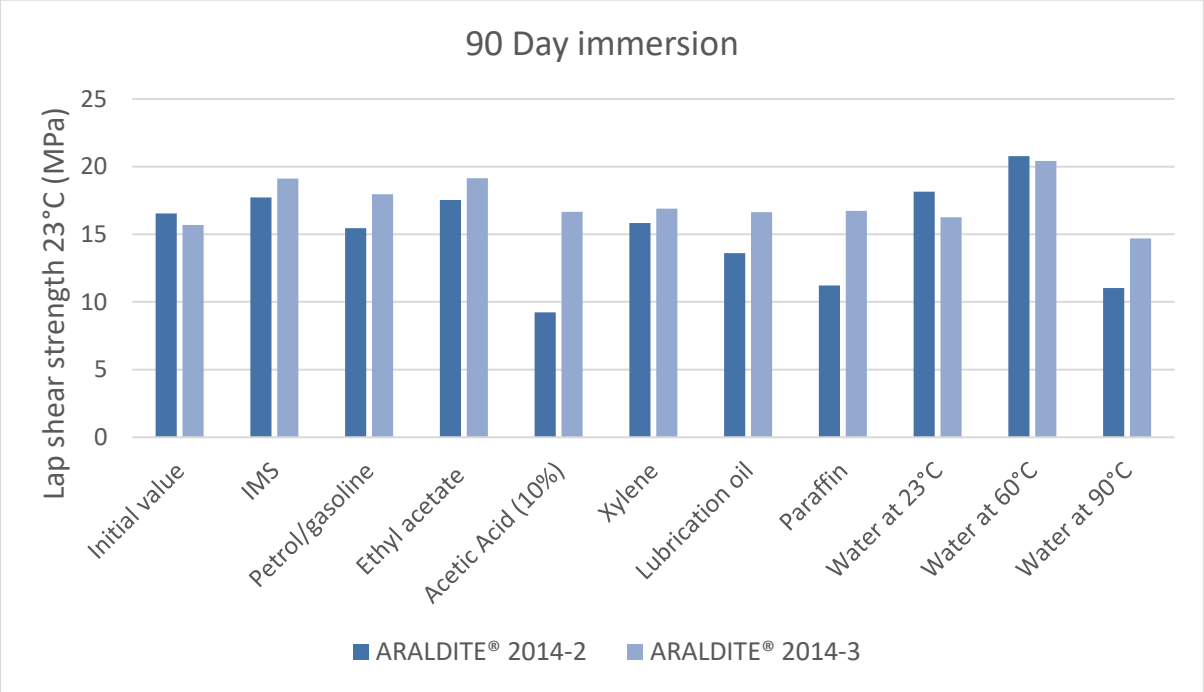
Cure 16 hours at 40°C



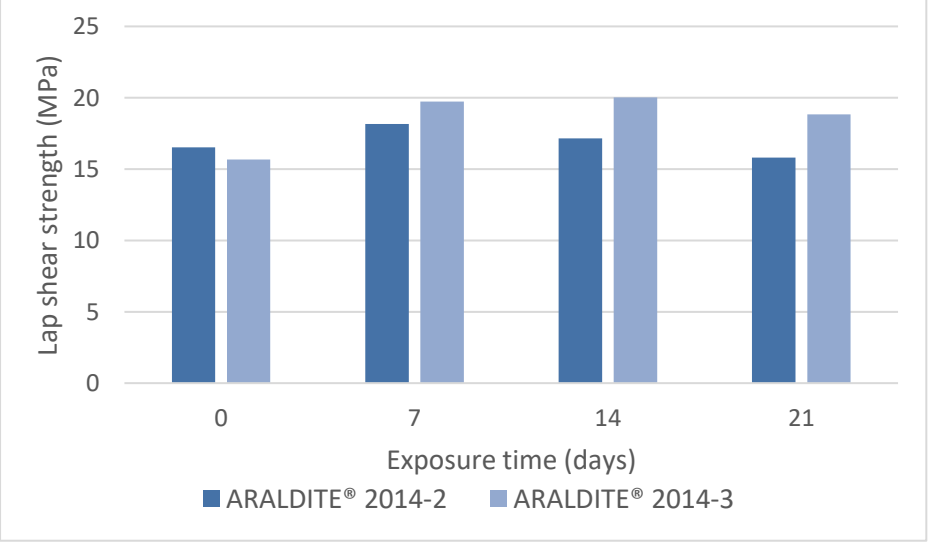
DMA measurement (ISO 6721)
Cure 16 hours at 40°C

	ARALDITE® 2014-2	ARALDITE® 2014-3
Tg (Tanδ)	69°C	69°C
Shear modulus (23°C)	1589	1667

Chemical aging - immersion in different media
Cure 16 hours at 40°C, tested at 23°C

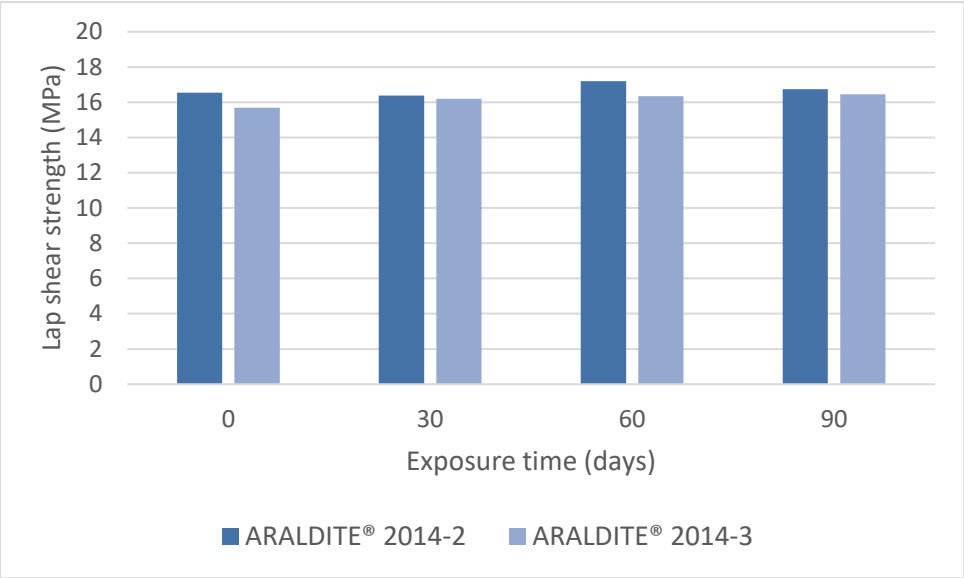


Cataplasma aging (ISO 9142 E2)
Cure 16 hours at 40°C, tested at 23°C



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® 2014-2	3706	45	1.6
ARALDITE® 2014-3	3708	45	1.6

Flexural properties (ISO 178)

Cure 16 hours at 40°C, tested at 23°C

	Flexural modulus (MPa)	Flexural strength (MPa)
ARALDITE® 2014-2	3500	60
ARALDITE® 2014-3	3200	54

CONCLUSION

Testing indicates that the ARALDITE® 2014-3 offers similar handling and properties to the ARALDITE® 2014-2. For many applications, it may be possible to replace the ARALDITE® 2014-2 with ARALDITE® 2014-3 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
(Switzerland) GmbH
Klybeckstrasse 200
4057 Basel
Switzerland

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

www.aralditeadhesives.com