



CERTIFICATE NUMBER  
17-HS1596958-PDA

DATE  
09 Nov 2017

ABS TECHNICAL OFFICE  
Global Engineering

# CERTIFICATE OF DESIGN ASSESSMENT

This is to certify that a representative of this Bureau did, at the request of

## **ITW POLYMERS ADHESIVES NORTH AMERICA**

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product: **Adhesives**

Model: **MA425 MA530 MA550 MA560-1 MA590 MA2045 MA2090 MA2245**

This Product Design Assessment (PDA) Certificate 17-HS1596958-PDA, dated 09/Nov/2017 remains valid until 08/Nov/2022 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA.

Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

AMERICAN BUREAU OF SHIPPING

Tim Kimble  
Engineer/Consultant

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by the terms and conditions as contained in ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010).

## ITW POLYMERS ADHESIVES NORTH AMERICA

30 ENDICOTT STREET

DANVERS MA

United States 01923

Telephone: 800-933-8266

Fax: 800-451-4563

Email: dmason@devcon.com

Web: www.devcon.com

**Tier: 2 - PDA Issued**

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**Product:** Adhesives

**Model:** MA425

MA530

MA550

MA560-1

MA590

MA2045

MA2090

MA2245

**Intended Service:**

The Plexus methyl methacrylate adhesive is intended to be used to bond structural components on fiber reinforced plastic vessels.

**Description:**

Two part structural methyl methacrylate adhesive designed for structural bonding of composite, thermoplastic, and metal assemblies.

**Rating:**

Typical Mechanical Properties:

**MA425**

Tensile Strength: 2,000 - 2,600 psi (13.8 - 17.9 MPa)

Modulus: 40,000 - 70,000 psi (276 - 482 MPa)

Stain to Failure: 110 - 150 %

Lap Shear Cohesive Strength: 1,700 - 2,600 psi (11.7 - 17.9 MPa)

**MA530**

Tensile Strength: 2,500 - 3,500 psi (17.2 - 24.1 MPa)

Modulus: 80,000 - 120,000 psi (552 - 827 MPa)

Stain to Failure: 90 - 160 %

Lap Shear Cohesive Strength: 1,700 - 2,500 psi (11.7 - 17.2 MPa)

**MA550**

Tensile Strength: 1,800 - 2,400 psi (12.4 - 16.5 MPa)

Modulus: 30,000 - 50,000 psi (206 - 345 MPa)

Stain to Failure: 40 - 80 %

**MA560-1**

Tensile Strength: 2,500 - 3,100 psi (17.2 - 21.3 MPa)

Modulus: 80,000 - 120,000 psi (552 - 827 MPa)

Stain to Failure: >130 %

Lap Shear Cohesive Strength: 1,700 - 2,500 psi (11.7 - 17.2 MPa)

**MA590**

Tensile Strength: 2,000 - 2,500 psi (13.8 - 17.2 MPa)

Modulus: 70,000 - 120,000 psi (482 - 827 MPa)

Stain to Failure: >130 %

Lap Shear Cohesive Strength: 1,500 - 2,500 psi (10.3 - 17.2 MPa)

**MA2045**

Tensile Strength: 2,200 - 2,900 psi (15.2 - 20.0 MPa)

Modulus: 60,000 - 100,000 psi (413 - 689 MPa)

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Stain to Failure: 90 - 125 %

Lap Shear Cohesive Strength: 1,600 - 2,200 psi (11.0 - 15.2 MPa)

#### MA2090

Tensile Strength: 2,200 - 2,900 psi (15.9 - 20.0 MPa)

Modulus: 60,000 - 100,000 psi (413 - 689 MPa)

Stain to Failure: 90 - 120 %

Lap Shear Cohesive Strength: 1,600 - 2,200 psi (11.0 - 15.2 MPa)

#### MA2245

Tensile Strength: 1,800 - 2,800 psi (12.4 - 17.3 MPa)

Modulus: 60,000 - 100,000 psi (413 - 689 MPa)

Stain to Failure: >60 %

Lap Shear Cohesive Strength: 1,600 - 2,200 psi (11.0 - 15.2 MPa)

Please also refer to the attached technical data sheets.

#### Service Restriction:

Unit Certification is not required for this product. For the adhesive material to be acceptable for use in structural applications, it is to comply with the following requirements:

1. Material to be stored, handled, and used in accordance with the manufacturer's recommendations.
2. Particular attention is to be given to the surface preparation and cleanliness of the surfaces to be bonded.
3. Where excessive unevenness of the faying surfaces exists, suitable gap-filling adhesive is to be used or local undulations removed by the application of additional reinforcements.
4. Where the adhesive is used to bond structural stiffeners to the plating, the members are to be effectively bonded in place for a minimum distance of 1/10 the length of the member at each end by a conventional secondary bond.
5. The elastic modulus of the adhesive is to be considerably less than that of the FRP skin to which it is being adhered.
6. The strain of failure ratio of the adhesive is to be much larger than the surrounding structure.
7. The mechanical properties of the adhesive are to be achieved rapidly, such that the use of screws or bolts will not be necessary to hold the substrates together while the adhesive cures.
8. The adhesive is to be compatible with the lamination resin.
9. Special consideration is to be used when the adhesive is proposed to be used in areas where the average temperature is in excess of 110 degrees F.
10. Adhesive not to be used in areas exposed to petroleum based products, proposed use of adhesive in tanks containing other products will need to be specially considered.

#### Comments:

The approval of this material is based on an equivalence to a conventional secondary bond between two fiber reinforced plastic substrates and the following comments:

1. The process for application of the adhesive is to be submitted for review and is to include the maximum bondline thickness, nondestructive testing methods and maximum creep, which are to be in accordance with manufacturer's recommendations.
2. Specific joints, extent of use, and substrates are to be reviewed on a case-by-case basis.
3. Details of the structural adhesive are to be specified on the Material Data Sheet and on the construction plans submitted.
4. Details concerning the handling, mixing and application of the adhesive are to form part of the Builders Process Instruction.
5. The Builders Process Description is to identify the level of training required for personnel involved in the application of structural adhesives
6. The manufacturer has provided a declaration about the control of, or lack of Asbestos in this product.

#### Notes/Drawing/Documentation:

Drawing No. ITW PO, PO, Revision: -, Pages: 1

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Drawing No. MA2045 Data Sheet\_rev09, Technical Data Sheet, Revision: 09, Pages: 2

Drawing No. MA2090 Data Sheet\_rev10, Technical Data Sheet, Revision: 10, Pages: 2

Drawing No. MA2245 Data Sheet\_rev02, Technical Data Sheet, Revision: 02, Pages: 2

Drawing No. MA425 Data Sheet\_rev07, Technical Data Sheet, Revision: 07, Pages: 2

Drawing No. MA530 Data Sheet\_rev14, Technical Data Sheet, Revision: 14, Pages: 2

Drawing No. MA550 Data Sheet\_rev09, Technical Data Sheet, Revision: 09, Pages: 2

Drawing No. MA560-1 Data Sheet\_rev10, Technical Data Sheet, Revision: 10, Pages: 2

Drawing No. MA590 Data Sheet\_rev11, Technical Data Sheet, Revision: 11, Pages: 2

Drawing No. ITW Polymers Adhesives Padna Facility Test Report L709061 dated 31 January 2017, Revision: -, Pages: 8

#### **Terms of Validity:**

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#### **STANDARDS**

##### **ABS Rules:**

2017 Steel Vessels Rules 1-1-4/7.7, 1-1-Appendix 3; 1-1-Appendix 4

2017 Materials and Welding Rules, Part 2 Aluminum and FRP 2-6-1/9 and 2-6-2/3.7;

2017 Rules for Conditions of Classification - High Speed Craft 1-1-4/11.9, 1-1-Appendix 2, 1-1-Appendix 3

##### **National:**

ASTM D1002 (2010)

ASTM D638 (2014)

##### **International:**

NA

##### **Government:**

NA

##### **EUMED:**

NA

##### **OTHERS:**

NA