Technical Data Sheet

3M™ Scotch-Weld™ Aesthetic Structural Material AS402

Product Description

3M™ Scotch-Weld™ Aesthetic Structural Material AS402 is a one-part, color-customizable epoxy exhibiting a low temperature cure with long room-temperature pot life. AS402 has excellent adhesion to metals and plastics and is toughened for impact performance. Specific product colors are indicated by an attached color code, e.g., AS402GG01 for "Galactic Gray".

Product Features

- One-part, machinable, color-customizable epoxy
- Long room-temperature stability
- Low temperature cure
- Excellent adhesion to metals and plastics
- Good impact resistance
- Resistant to staining
- Chemically resistant

Technical Information Note

The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Typical Uncured Physical Properties

Attribute Name	Test Method	Temperature	Value
Color			Customizable
Density - Liquid	ASTM D4892	23 °C (73 °F)	1.27 (may vary by color) g/mL [1]
Components			1-Part
UV Tracer			No
Pot Life	ASTM D7867		3 weeks [2]

[1] Measured by Helium gas pycnometer

[2] Defined as half the time to double viscosity at 10/s when stored at 23°C

Temperature: 25 °C
Test Method: ASTM D7867

Attribute Name	Test Condition	Value
Viscosity - Cone and Plate	0.1 Hz	11 Pa·s [1]
Viscosity - Cone and Plate	1 Hz	11 Pa·s [1]
Viscosity - Cone and Plate	10 Hz	10 Pa·s [1]
Thixotropic Index	0.1 Hz / 1 Hz	1 [1]
Thixotropic Index	1 Hz / 10 Hz	1 [1]

[1] 40mm, 2.0°, 50um truncation cone and Peltier plate. 60s pre-shear at 100 Hz. 5 min flow ramp form 0.01 to 100 Hz @ 25°C

Typical Cure Profiles

Times represent ideal heat transfer in laboratory eqiupment. Verify cure time for your specific application.

Temperature: 75 °C
Test Condition: 1 Hz
Test Method: ASTM D4473

Attribute Name	Value
Time to Double Complex Viscosity	0.6 min [1]
Time to 1,000 Pa.s Complex Viscosity	1.3 min [1]
Time to 0.1 MPa Storage Modulus	1.5 MPa [1]
Time to 1 MPa Storage Modulus	1.7 min [1]
Time to 80% Storage Modulus Max	2.5 min [1]

[1] Parallel Plate Rheometer: Isothermal - 25mm parallel plate

Verify cure time for your specific application.

Substrate: Etched Aluminum
Temperature: 75 °C
Test Condition: 23 °C
Test Method: ASTM D1002, ISO 4587

Attribute Name	Dwell Time	Value
Time to Handling Strength		<5 min [1]
Time to Cure		10 min [2]
Overlap Shear Strength	5 min	12 MPa [3]
Overlap Shear Strength	10 min	22 MPa [3]
Overlap Shear Strength	20 min	25 MPa [3]

[1] 2mm thick substrate. Bond dimensions: 12.7 mm x 25.4 mm x 0.15 mm. Dwell time refers to time coupons are exposed to condition in oven. Time to consistent >50 psi (0.34 MPa) overlap shear strength. Tested 5±1 minutes out of oven.

[2] 2mm thick substrate. Bond dimensions: 12.7 mm x 25.4 mm x 0.15 mm. Dwell time refers to time coupons are exposed to condition in oven. Time to 80% overlap shear full strength

[3] 2mm thick substrate. Bond dimensions: 12.7 mm x 25.4 mm x 0.15 mm. Temperature refers to dwell time coupons are exposed to condition in oven. Coupons are tested 5±1 minutes after removing from oven. Pull rate 10 mm/min.

Typical Cured Characteristics

Temperature: 23 °C (73 °F)

Attribute Name	Test Method	Value
Density - Cured Solid	ASTM D4892	1.33 (may vary by color) g/mL [1]
Volume Shrinkage	ASTM D4892	4.5 (may vary by color) %
Shore D Hardness	ASTM D2240	78
Notched Izod Impact	ASTM D256-10	55 J/m [2]
Peak Stress	ASTM D638, ISO 527	42 MPa [3]
Strain at Break	ASTM D638, ISO 527	14 %
Young's Modulus	ASTM D638, ISO 527	2,300 MPa [3]

[1] Measured by Helium gas pycnometer

[2] 3 mm thick sample

[3] 0.5mm film cured at 75°C for 1 hour. Conditioned for >5 days in 23°C/50%RH. Die cut type IV dog bone. 100mm/min pull rate. Digital Image Correlation (DIC) used for strain measurements.

Test Condition: 1 Hz
Test Method: ASTM D7028

Attribute Name	Temperature	Value
Tg: DMA Temp Ramp		68 °C [1]
Storage Modulus: DMA Temp Ramp	-20 °C (-4 °F)	2,800 MPa [1]
Storage Modulus: DMA Temp Ramp		2,600 MPa [1]
Storage Modulus: DMA Temp Ramp	25 °C	2,300 MPa [1]
Storage Modulus: DMA Temp Ramp	45 °C	2,000 MPa [1]
Storage Modulus: DMA Temp Ramp	65 °C	200 MPa [1]
Storage Modulus: DMA Temp Ramp	85 °C	25 MPa [1]

[1] 0.5mm film cured at 75°C for 1 hour. Conditioned for >5 days in 23°C/50%RH (CTH). 1Hz film tension DMA Heat from -20°C to 100°C at 3°C/min. Tg reported as peak of Tan Delta.

Typical Performance Characteristics

Overlap Shear Strength

Temperature: 23 °C
Test Condition: 1 hr at 75 °C + 24 hr at 23 °C
Test Method: ASTM D1002, ISO 4587

Substrate	Surface Prep	Value
Aluminum	Grit blasting and 3M AC130-2 Surface Treatment Solution	27 MPa [1]
Stainless Steel	Grit blasting and 3M AC130-2 Surface Treatment Solution	32 MPa [1]
Titanium	Grit blasting and 3M AC130-2 Surface Treatment Solution	32 MPa [1]
Glass		>13 (substrate failure) MPa [2]
PC/ABS	Plasma treated	>9 (substrate failure) MPa [2]
ABS	Plasma treated	≥9 (>50% substrate failure) MPa [2]
PBT	Plasma treated	>16 (substrate failure) MPa [2]

[1] Bond dimensions: 12.7 mm x 25.4 mm x 0.15 mm. Pull rate: 10 mm/min.

[2] Bond dimensions: 6.35 mm x 25.4 mm x 0.15 mm. Pull rate: 10 mm/min.

Electrical and Thermal Properties

Attribute Name	Test Method	Temperature	Test Condition	Value
Coefficient of Thermal Expansion (CTE), Alpha 1	ASTM E831	25 °C		95 ppm/°C [1]
Coefficient of Thermal Expansion (CTE), Alpha 2	ASTM E831	25 °C		180 ppm/°C [1]
Dielectric Constant (Dk)	ASTM D2520	23 °C (73 °F)	2.5 GHz	3.4 (may vary by color)
Dissipation Factor (Df)	ASTM D2520	23 °C (73 °F)	2.5 GHz	0.03 (may vary by color)

[1] 0.5mm film cured at 75°C for 1 hour. Conditioned for >5 days in 23°C/50%RH. TA Instruments Q400 TMA. Temperature Range: -40°C to 90°C 2°C/min. 2 heats. Data reported from second heat.

Handling/Application Information

Directions for Use

For a 55 mL cartridge, thaw for a minimum of two hours at room temperature before using. For a 591 mL cartridge, thaw for a minimum of four hours at room temperature before using. Verify thawing times for your specific conditions. Do not apply heat when thawing.

Application Techniques

- Dispensing
- Molding

Application Examples

- Mobile device bonding
- Wearable electronic device bonding
- Electronic Assembly
- Encapsulation

Storage and Shelf Life

Store product at -20°C (-4°F) in the original, unopened packaging. For best performance, use this product within 12 months from date of manufacture.

Available Sizes

Attribute Name	Value
Packaging	55 mL cartridge, 591 mL (20oz) cartridge

Certificate of Analysis (COA)

The 3M Certificate of Analysis (COA) for this product is established when the product is commercially available from 3M. The commercially available product will have a COA specification established. The COA contains the 3M specifications and test methods for the products performance limits that the product will be supplied against. The 3M product is supplied to 3M COA test specifications and the COA test methods. Contact your local 3M representative for this product's COA.

This technical data sheet may contain preliminary data and may not match the COA specification limits and/or test methods that may be used for COA purposes.

Automotive Disclaimer

Select Automotive Applications:
This product is an industrial product and has not been designed or tested for use in certain automotive applications, such as automotive electric powertrain battery or high voltage applications, which may require the product to be manufactured in a IATF certified facility, meet a Ppk of 1.33 for all properties, undergo an automotive production part approval process (PPAP), or fully adhere to automotive design or quality system requirements (e.g., IATF 16949 or VDA 6.3). Customer assumes all responsibility and risk if customer chooses to use this product in these applications.

Information

Precautionary Information: Refer to Product Label and Material Safety Data Sheet for health and safety information before using this product. For additional health and safety information, call 1-800-364-3577

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