



Scotch-Weld™

Structural Void Filling Compound

3550 B/A FST

Technical Datasheet

March 2009

Product Description

3M™ Scotch-Weld™ Structural Void Filling Compound 3550 B/A FST (Fire Smoke Toxicity) is a two-part, low-density, flame-retardant epoxy compound that can be stored, applied, and cured at room temperature. Scotch-Weld 3550 B/A FST Compound can be used for void-filling, edge-sealing, and complex gap-filling. The cured material has meets FAR 25.853 (a) (d) and offers excellent water and chemical resistance. It is designed for both metal and non metal honeycomb sandwich constructions which are typically found in aircraft interior structures such as galley structures, luggage bins, partition walls, lavatory structures, crew rest compartments, seating structures, ceiling panels, doghouses, sidewall panels, cargo bay panels, bar units, coatrooms and passenger doors. In these applications the Scotch-Weld 3550 B/A FST Compound is used for honeycomb sandwich structures as edge close-out, corner reinforcement, and local reinforcement for mechanical fixation or complex gap-filling.

Material is available in 15L and 60L kits for use with bulk pumping equipment, and also comes in cartridge form for gap-filling.

Features

- 100% solids
- Base is brown with black spots; accelerator is off-white
- Meets the flammability requirements of J.A.R./F.A.R. 25.853 (a) (d)
- Meets stand alone FST requirement
- Availability in duo-pack cartridges with static mixing nozzle or in bulk pumpable kits
- Thixotropic properties for ease of application
- Good sag resistance
- Sandable & machinable within twelve hours at 75°F (23°C) of mixing or 1/2 hour at 175°F (80°C)
- Cures to a strong, low-density material within 48 hours at 75°F (24°C) or one hour at 175°F (80°C)
- Service temperature of -65°F to 212°F (-55°C to 100°C)
- Seals honeycomb panel edges and provides impact resistance to panel
- Paintable

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Product Description & Properties

| | Scotch-Weld 3550 B/A FST Part B or Brown with black spots Part B (Base) | Scotch-Weld 3550 B/A FST Part A or Off-white Part A (Accelerator) |
|---|--|--|
| Chemistry | epoxy | modified amine |
| Color | brown with black spots | off- white |
| Typical Uncured Density | 0.57 ± 0.03 g/cc | 0.59 ± 0.03 g/cc |
| Consistency | thixotropic paste | |
| Mix Ratio | 100:50cc by volume; 100:52g by weight | |
| Solid Content | 100% | |
| Application Method | automatic / manual | |
| Typical Mixed Pot Life | 120 min @ 73°F (23°C) | |
| Curing Process | Room temperature 73°F (23°C); max. 176°F (80°C) | |
| Form Stability (10g mixture) | 9h @ 73°F (23°C), or 0.5h @ 176°F (80°C) | |
| Final Strength (10g mixture) | 48h @ 73°F (23°C), or 1h @ 176°F (80°C) | |
| Volatile Loss on Cure | less than 0.1% | |
| Slump/Sag (AITM 2-0033) | less than 0.02" (0.5mm) | |
| Service Temperature Range | -67°F to 212°F (-55°C to 100°C) | |
| Ejection Test (MSRR9903 n°6) @ 73°F (23°C) | 940 PSI (6.5 MPa) | |
| Packaging Units | 400 ml duopack cartridge, 15l Kit, 60l Kit | |

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Typical Product Performance

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes. The following mechanical and physical data is based on Scotch-Weld 3550 B/A FST Compound.

Physical Properties

Thermal expansion:

The low-density void-filler was manually mixed and carefully filled into mold with inner dimensions of approximately 2" x 2" x 8" (50 x 50 x 200 mm). Filler block was cured 14 days at 74°F (23 ± 2°C). The block was machine milled into 20 individual specimens of dimensions 0.3" x 0.3" x 0.6" (7 x 7 x 15 mm) with a tolerance of ± 0.004" (± 0.1 mm). The coefficient of thermal expansion (C.T.E.) was then determined per ASTM E-831 test method using a PerkinElmer® thermo-mechanical analyzer (PerkinElmer, Waltham, MA)* After cold stabilization at -40°F (-40°C), three specimens of each lot were scanned at a rate of 2°C/min from -40°F to 392°F (-40°C to 200°C). The coefficient of thermal expansion was determined on the two linear portions of the curve below and above the glass transition temperature of the product.

Exothermicity:

Round cups were filled with approximately 3.5 oz (100 grams) of the void-filler. A thermocouple was placed in the center of the void-filler. Cure cycle is 74°F (23 ± 2°C) during 14 hours.

Cured density:

The cured density was determined on individual specimens cut from a cured block of void-filler with a band saw. The density was calculated by dividing the mass of the specimen by its measured volume. The density was expressed in g/cc.

Volatiles test:

Approximately 1 oz (30 grams) of the void-filler was spread onto a circular surface of a metal pan having a diameter of about 3.3" or 85 mm. After weighing the specimens, they were cured 48h @ 74°F (23 ± 2°C) and then reweighed.

| Properties | Test Method | Average |
|-------------------|-------------------------------|--|
| Thermal Expansion | ASTM E-831 | 1.1E-04 /°C @ 14 to 176°F (-10 to 80°C) |
| | | 1.4E-04 /°C @ 176 to 410°F (80 to 210°C) |
| Extrudability | AITM 7-0003 (B) (see 4.3.8.6) | 3.0 oz/min (85 g/min) |
| Exothermicity | AIMS 10-03-000 (4.2.8.3) ΔT | 7.5°F (4.5°C) |
| Cured Density | ISO 1183 | 0.57 ± 0.05 g/cc |
| Volatile Content | AIMS 10-03-000 (4.2.8.1) | 0.03 % |

DSC Scan:

Tooling

- DSC Q2000 from TA Instruments with auto sampler and RCS cooling system.
- Two point calibration with Indium and water.
- The sample head was flushed with nitrogen gas, 25ml/min purge rate.

Sample Preparation

For the measurement of the fresh mixed sample: part of the fresh mixed paste was weighed into a hermetic Al pan. The rest of the mixed paste was stored at RT in the lab and used for the measurement after 2 days & 7 days. For these samples: parts of the hard brittle material was cut out and weighed on an Al pan with holes in the lid.

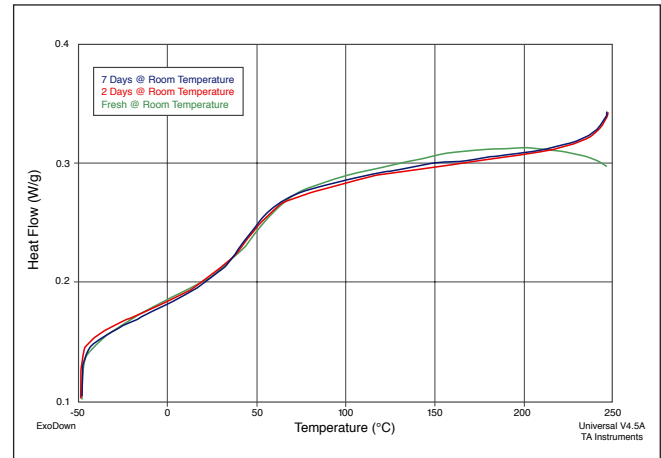
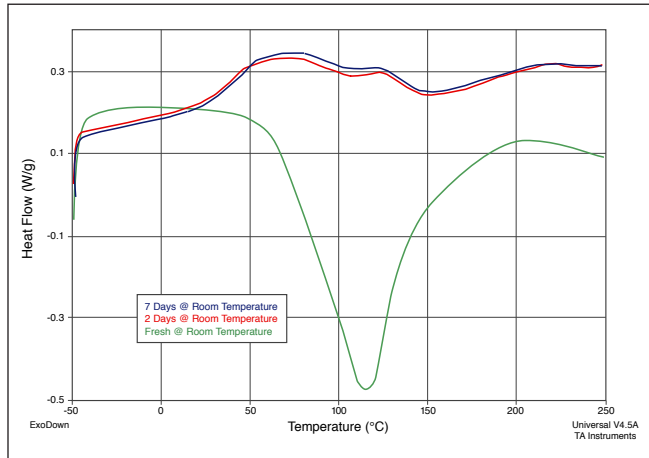
Program Steps

- (1) Equilibrate at -50°C
- (2) Ramp 10°C/min to 250°C
- (3) Mark end of cycle 0
- (4) Ramp 20°C/min to -50°C
- (5) Isothermal for 10 min
- (6) Mark end of cycle 1
- (7) Ramp 10°C/min to 250°C
- (8) Mark end of cycle 2

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Typical Product Performance *(continued)*

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes. The following mechanical and physical data is based on Scotch-Weld 3550 B/A FST Compound.



| Sample | Weight (mg) | Enthalpy ΔH | Onset | Peak max | 1st glass Transition (half height) | 1st glass Transition (onset) | 2nd glass Transition (half height) | 2nd glass Transition (onset) |
|-------------|-------------|---------------------|-------|----------|------------------------------------|------------------------------|------------------------------------|------------------------------|
| Fresh | 6.548 | 218 J/g | 69°C | 116°C | 126°F (52°C) | 97°F (36°C) | – | – |
| 2 days @ RT | 12.367 | 18 - 36 J/g | n.a. | n.a. | 113°F (45°C) | 86°F (30°C) | 232°F (111°C) | 228°F (109°C) |
| 7 days @ RT | 13.643 | 19 - 32 J/g | n.a. | n.a. | 113°F (45°C) | 84°F (29°C) | 257°F (125°C) | 255°F (124°C) |

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Typical Product Performance (*continued*)

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes. The following mechanical and physical data is based on Scotch-Weld 3550 B/A FST Compound.

Mechanical Properties

Compressive strength - General

A block was prepared from approximately 7 oz (200 grams) of manually mixed low density void-filler, which was carefully introduced into a mold with inner dimensions of approximately 2" x 2" x 8" (50 x 50 x 200 mm). Filler block was cured 14 days at 73°F (23 ± 2°C). Individual specimens of the dimensions of 0.5" x 0.5" x 1.0" (12.5 x 12.5 x 25.0 mm) were cut from a cured block of void-filler with an accuracy of + 0.008" (+ 0.2 mm) on each dimension. Compression strength tests were performed. See data below.

All test temperatures were measured with a thermocouple on compression plate close to specimen (not in direct contact on specimen due to the low thermal conductivity of the void-filler material) with an accuracy of ± 2°C. For all test temperatures except for ambient, a minimum soak time of 10 minutes was employed before compression testing was initiated. All compression strength tests were performed using a crosshead displacement rate of 0.02 inch/min (0.5 mm/min). All specimens were loaded with force applied to the 0.5" (12.5 mm) square surface.

| Properties | Test Method | Test Temperature | Cure Cycle of 15 days @ Room Temperature |
|----------------------------------|--------------|-------------------|--|
| Typical Compressive Strength | ISO 604 | -67°F (-55 ± 2°C) | 6,200 psi (42.9 Mpa) |
| | | 73°F (23 ± 2°C) | 3,500 psi (24.3 Mpa) |
| | | 176°F (80 ± 2°C) | 780 psi (5.4 Mpa) |
| | | 223°F (106 ± 2°C) | 725 psi (5.28 Mpa) |
| Typical Compressive Modulus | ISO 604 | -67°F (-55 ± 2°C) | 180,000 psi (1,228 Mpa) |
| | | 73°F (23 ± 2°C) | 125,000 psi (862 Mpa) |
| | | 176°F (80 ± 2°C) | 13,100psi (91 Mpa) |
| | | 223°F (106 ± 2°C) | 13,800 psi (95 Mpa) |
| Filler Strength / Shear Strength | AITM 1-00046 | 73°F (23 ± 2°C) | 480 lbf (2,145 N) |

Aged Mechanical Properties Definitions:

Compressive strength after humidity and fluid immersion aging

Specimens were wiped with a paper cloth after removal from the hot wet chamber/fluid and loaded within 30 minutes.

Compressive modulus - Wet

See above for modulus calculation. Specimens were wiped with a paper cloth after removal from the hot wet chamber/fluid and loaded within 30 minutes.

Compressive strength

Specimens were exposed to each of the required environments for a period of 48, 1000 and 2000 hours for the "hot wet" conditioned at 158°F (70°C), 85% relative humidity. The specimens were then removed from the aging environments, and wiped with a paper cloth prior to loading within the next 30 minutes.

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Aged Mechanical Properties Definitions: *(continued)*

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes. The following mechanical and physical data is based on Scotch-Weld 3550 B/A FST Compound.

Shear strength by ejection

The test was performed according to test method AITM 1-00046. Specimens were tested at 73°F (23 ± 2°C) with a crosshead displacement rate of 0.02 inch/ min (0.5 mm/min).

Fluid absorption

Specimens were exposed for a period of 48 hours and 1000 hours under the conditions shown in the table below and also 200 hours for humidity exposure. The mass uptakes were followed measuring the total mass of each specimen before and after exposures.

Weighing was performed 15+/-5 minutes @ 73°F (23 ± 2°C) after removal from the environment.

Data:

| Properties | Environmental Condition | Test Method | Test Temperature | Average |
|---|--------------------------------|-------------|------------------|----------------------|
| Compressive strength after 2000h | 158°F (70°C), 85% RH | ISO 604 | 73°F (23 ± 2°C) | 2,760 PSI (19.1 Mpa) |
| | | | 176°F (80 ± 2°C) | 790 PSI (5.4 Mpa) |
| Compressive modulus after 2000h | 158°F (70°C), 85% RH | ISO 604 | 73°F (23 ± 2°C) | 88,470 PSI (610 Mpa) |
| | | | 176°F (80 ± 2°C) | 13,490 PSI (93 Mpa) |
| Fluid absorption after 2000h | 158°F (70°C), 85% RH | EN 3615 | 73°F (23 ± 2°C) | 210 PSI (1.4 Mpa) |
| Compressive strength after 48h at condition | 176°F (80°C) dry | ISO 604 | 73°F (23 ± 2°C) | 3,700 PSI (25.5 Mpa) |
| | 223°F (106°C) dry | | | 4,000 PSI (27.6 Mpa) |
| | 158°F (70°C), 85% RH | | | 2,690 PSI (18.5 Mpa) |
| | 73°F (23°C) Water | | | 2,550 PSI (17.5 Mpa) |
| | 73°F (23°C) Fuel F34 | | | 3,660 PSI (25.3 Mpa) |
| | 73°F (23°C) Hydraulic Fluid | | | 3,570 PSI (24.6 Mpa) |
| Fluid absorption after 48h @ RT | Water via 85% RH @ 73°F (23°C) | EN 3615 | 73°F (23 ± 2°C) | 1% |
| | Water @ 73°F (23°C) | EN 2489 | | 4% |
| | F34 @ 73°F (23°C) | | | 2% |
| | Hydraulic Fluid @ 73°F (23°C) | | | 3% |
| Compressive strength after 1000h at condition | 176°F (80°C) dry | ISO 604 | 73°F (23 ± 2°C) | 3,830 PSI (26.4 Mpa) |
| | 158°F (70°C), Water via 85% RH | | | 2,390 PSI (16.5 Mpa) |
| | 73°F (23°C) Water | | | 720 PSI (4.95 Mpa) |
| | 73°F (23°C) Fuel F34 | | | 3,350 PSI (23.1 Mpa) |
| | 73°F (23°C) hydraulic Fluid | | | 3,460 PSI (23.8 Mpa) |
| Fluid absorption | Water 85% RH @ 73°F (23°C) | EN 3615 | 73°F (23 ± 2°C) | 2% |
| | Water @ 73°F (23°C) | EN 2489 | | 17% |
| | Fuel F34 @73°F (23°C) | | | 1.5% |
| | Hydraulic Fluid @ 73°F (23°C) | | | 2.7% |

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Typical Product Performance (*continued*)

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Flammability Properties

Tested according to vertical mode to F.A.R. 25.853 (a) and (d).

| Properties | Test Method | Condition | Average | Target Maximum (JAR /FAR 25.853(a)(d) App. F Part I, V) |
|---|--|-----------------------------------|-----------------|---|
| Flammability 12sec vertical | FAR/JAR/CS 25.853(a) App F, part I(a)(1)(ii) | burn length | 0.93" (23.5 mm) | 6 inches |
| | | after flame | 0 sec | 15 sec |
| | | drips time | 0 sec | 3 sec |
| Flammability 60sec vertical | FAR/JAR/CS 25.853(a) App F, part I(a)(1)(ii) | burn length | 2.5" (63.4 mm) | 6 inches |
| | | after flame | 0 sec | 15 sec |
| | | drips time | 0 sec | 3 sec |
| Optical smoke density Ds (4 min flaming mode) | FAR/JAR/CS 25.853(d) App F, part V(b) | | 102.4 Ds max | 200 Ds |
| Toxic gases emission (flaming mode) | Airbus ABD0031 Boeing D6-51377 | HF | < 1 ppm | 100 ppm |
| | | HCl | < 1 ppm | 150 ppm |
| | | HCN | 13.0 ppm | 1,000 ppm |
| | | SO ₂ +H ₂ S | < 10 ppm | 100 ppm |
| | | CO | 213.3 ppm | 1,000 ppm |
| | | NO+NO ₂ | 8.3 ppm | 100 ppm |

Product Application

Surface Preparation:

A cleaned, dry, grease free surface is essential for maximum performance. For repeatable results the void-filler and the surfaces should have a temperature between 68-77°F (20-25°C).

Mixing

Scotch-Weld 3550 B/A FST Compound can be mixed manually or automatically (using static mixer, minimum 18 elements, 13mm id). For repeatable performance keep mixing ratio in a range of ± 5% (100:50cc/100:52g). Dual Cartridge application provides maximum accuracy and easy handling. Scrap the first 2 cc when using a new mixer. For manual mixing, mix the compound until visually homogenous. From the start of mixing the work life is 120 min (3.5 oz or 100g mixture) at 73°F (23°C). For ease of extrudability the product can be raised to a temperature of 75°F (25°C) but not greater than 110°F (43°C). Bulk pumping & mixing equipment recommendations are available upon request.

Curing Conditions

A minimum cure time of 48 hours at room temperature is recommended to obtain the optimum mechanical properties of the product. Heat application accelerates the curing cycle.

Clean up of Void-Filler:

Uncured void-filler can be wiped with solvent e.g. Methyl-ethyl-ketone (M.E.K). Cured material can be cleanly removed mechanically.

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Storage Storage Stability - Store product at 77°F (25°C) or below. Rotate stock on “first in - first out” basis.

Shelf Life Standard shelf life for 3M™ Scotch-Weld™ Void Filling and Edge Sealing Compound SW-3550 B/A FST is 12 months from date of manufacture when stored @ 77°F (25°C) or below.

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, please visit www.3M.com/msds or call 1-800-364-3577 or (651) 737-6501.

For Additional Information In the U.S., call toll free 1-800-235-2376, or fax 1-800-435-3082 or 651-737-2171. For U.S. Military, call 1-866-556-5714. If you are outside of the U.S., please contact your nearest 3M office or one of the following branches:

| | | | |
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