

1 SCOPE

- a. This specification establishes the requirements for nonvolatile thermosetting epoxy film adhesives used for autoclave bonding of high temperature resistant (T 350 F) epoxy structural fiberglass assemblies.
- b. This specification requires qualified products.

WARNING

WARNINGS may be included throughout this specification. Do not take these WARNINGS to be all inclusive, nor to completely describe hazards or precautionary measures applicable to specific procedures or operating environments. Non-Boeing personnel must refer to their employer's safety instructions for information concerning hazards which may occur during operations described in this specification.

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Authorizing Signatures on File

HIGH TEMPERATURE RESISTANT EPOXY
ADHESIVE FILM GLASS FABRIC
REINFORCED PLASTIC SANDWICH
ASSEMBLIES

BMS8-145H

CAGE CODE 81205

BOEING MATERIAL SPECIFICATION

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2 CLASSIFICATION

This specification consists of the following types:

- a. TYPE I
A non-volatile, thermosetting high temperature resistant epoxy film adhesive.
- b. TYPE II
Reserved for future use.

3 REFERENCES

The issue of the following references in effect on the date of invitation for bid forms a part of this specification to the extent indicated herein.

- a. [ASME B46.1](#) - Surface Texture (Surface Roughness, Waviness, and Lay)
- b. [BAC5317](#) - Fiber Reinforced Composite Parts
- c. [BAC5317-3](#) - Manufacture of High Temperature Resistant Epoxy Structural Parts
- d. [BAC5765](#) - Cleaning and Deoxidizing Aluminum Alloys

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REFERENCES (Continued)

- e. [BSS7061](#) - Requirement for Time and Temperature Recorders Used with Time and Temperature Sensitive (TATS) Materials
- f. [BSS7101](#) - Requirements for PCD System for Suppliers of BMS Materials
- g. [BSS7202](#) - Shear, Lap, Adhesive Bond
- h. [BSS7286](#) - Statistical Process Control of Designated Engineering Characteristics
- i. [D1-4426](#) - Approved Process Sources
- j. SAE-AMS-STD-401 - Sandwich Construction and Core Materials, General Test Methods
- k. 29CFR 1910.1200 - Hazard Communication Standard

4

DEFINITIONS

The following definitions apply to terms that are uncommon or have special meaning as used in this specification.

Auxiliary storage facility - A facility external to the supplier's manufacturing location where material is stored under the control of the supplier.

Batch - A batch shall consist a homogeneous amount of finished adhesive of the same formulation manufactured under controlled conditions in a single manufacturing run.

Date of Manufacture (DOM) - The date that all filming operations on a batch of film adhesive have been completed.

Date of Shipment (DOS) - The date that a lot of material has been shipped from the supplier's manufacturing location, an authorized distributor, an authorized re-packager, or an authorized auxiliary storage location to the purchaser, whichever occurs later.

Distributor - An intermediate between the supplier and the purchaser who handles, stores, and allocates material without compromising the individual unit packaging.

Key Characteristic - A feature whose variation has a substantial impact on the fit, performance, service life, or manufacturability of the finish product from the perspective of the customer.

Key Process Parameter - A process input that is controllable and that has a useful statistical correlation with the variation in a key characteristic. Key process parameters are most effectively determined by the use of designated experiments.

Lot - A lot shall consist of all of the adhesive from one adhesive batch received on one shipment.

Lot size - Lot size refers to the total number of units in any one lot irrespective of the volume of the container or length of the roll.

Process Control Document (PCD) - A document that describes the qualified materials, manufacturing processes, in-process testing, and alternate test methods used to document, and control variation of a supplier's product.

4 DEFINITIONS (Continued)

Re-packager - An intermediate between the supplier and the purchaser, who handles, re-packages, stores, and allocates materials.

Statistical Process Control (SPC) - A systematic method of tracking, predicting, and minimizing variation over time. It shall include tools to monitor the stability of a process over time, and have means to establish the ability of the process to conform to applicable tolerance limits. This involves the use of control charts and capability indices.

Supplier Inventory Life (SIL) - The length of time that occurs between Date of Manufacture and Date of Shipment. Supplier Inventory Life begins on DOM and ends on DOS from the supplier's manufacturing location, an authorized distributor, an authorized re-packager, or an authorized auxiliary storage location.

Supplier Out-time - The time that Type I primers are exposed to temperatures above 55 F and below 90 F, and Type II film adhesives are exposed to temperatures above 0 F and below 90 F at the supplier's manufacturing facility prior to shipping.

Unit - A unit refers to the smallest, single portion of adhesive received in any one lot, i.e., a single roll of adhesive.

5 MATERIAL REQUIREMENTS

The adhesive shall be uniform in quality, condition, and color, free of foreign materials and have no wrinkles, creases, tears, bubbles or other permanent defects which are detrimental to fabrication, appearance or performance.

5.1 PHYSICAL AND MECHANICAL PROPERTIES

Type I adhesive shall:

- a. meet the physical requirements of [Table I](#)

TABLE I - PHYSICAL REQUIREMENTS

	LB./SQ. FT.	NOMINAL THICKNESS	TEST PROCEDURE SECTION
Type I	0.075 ± 0.005 FL 1	0.0125 ± 0.0025 inch	8.1

FL 1 Key characteristics - SPC required

- b. meet all the mechanical test requirements of [Table II](#) when processed in accordance with [Section 8.2](#).

TABLE II - MECHANICAL PROPERTY REQUIREMENTS

TEST	TEST NO.	NO. OF SPECIMENS		EXPOSURE AGING CONDITION	TEST TEMPERATURE (F)	TEST PROCEDURE FL 1	MINIMUM REQUIREMENT	
		PANEL NO. 1	PANEL NO. 2				AVERAGE FL 2	INDIVIDUAL FL 3
							LB. IN. / 3 INCH WIDTH	
Honeycomb Sandwich Peel	1A	2	3	Unaged (Control)	75 ±5	8.2.2.2	9.5	9.0
	1B	3	2	Aged 100 hrs @ 350 F	75 ± 5		9.5	9.0
	1C	2	3	Aged 500 hrs @ 350 F	75 ± 5		9.5	9.0

5.1

PHYSICAL AND MECHANICAL PROPERTIES (Continued)**TABLE II - MECHANICAL PROPERTY REQUIREMENTS (Continued)**

TEST	TEST NO.	NO. OF SPECIMENS		EXPOSURE AGING CONDITION	TEST TEMPERATURE (F)	TEST PROCEDURE FL 1	MINIMUM REQUIREMENT	
		PANEL NO. 1	PANEL NO. 2				AVERAGE FL 2	INDIVIDUAL FL 3
							LB. IN. / 3 INCH WIDTH	
							ULTIMATE PSI	
Honeycomb Sandwich Flatwise-Tensile	2A	3	2	Unaged (Control)	75 ± 5	8.2.2.3	875	800
	2B	2	3	Aged 100 hrs @ 350 F	350 ± 10		500	400
	2C	3	2	Aged 500 hrs @ 350 F	350 ± 10		500	400
Lap Bond Shear	3A	4	4	Unaged (Control)	75 ± 5	Section 8.2.3.2	2000	1800
	3B	3	3	Aged 30 min @ -67 F	-67 ± 2		1800	1600
	3C	3	3	Aged 30 min @ 350 F	350 ± 10		1400	1300

FL 1 Test Method and Specimen Preparation**FL 2** Minimum Acceptable Value for the Average of All Specimens Tested**FL 3** Minimum Acceptable Value for Any Individual Specimen Tested

- c. meet all test requirements of [Table II](#) using all qualified [BMS8-139](#) epoxy prepreg unless otherwise noted in the QPL.

5.2

STORAGE LIFE

The adhesive, when stored in an airtight polyethylene bag at 0 F or below shall meet all requirements of [Section 5](#) for 6 months after date of receipt.

6

QUALIFICATION

Products qualifying to this specification shall meet all requirements given in [Section 5](#).

Direct all requests for qualification to a Supplier Management (SM) organization of The Boeing Company. SM coordinates all communication between material suppliers and Boeing Engineering.

- a. Prior to submitting a material for qualification to this specification, the material supplier shall provide a Material Safety Data Sheet (MSDS) for the candidate material. Prior to completing qualification, the material supplier shall provide the detailed chemical formulation, percent composition, and CAS (Chemical Abstracts Service) numbers for the candidate material. Agreements for non-disclosure and control of proprietary information shall be considered and executed as appropriate. The information provided shall be submitted to the appropriate Boeing Environment, Health, and Safety (EHS) organizations to perform a health hazard evaluation. These organizations determine whether the information as supplied is adequate (or alternatively, whether additional information is necessary) to identify and document appropriate precautions for the material's use.

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QUALIFICATION (Continued)

- b. Upon receipt of written authorization by a Boeing SM organization, the supplier shall submit a representative production roll of not less than 20 square yards of adhesive and a certified test report that contains the following information and test data: Supplier material designation, manufacturing facility location, date the material was manufactured, batch number, roll number, and all test data performed (individual and average values shall be included for [Table I](#) and [Table II](#) tests). This test data shall show that the samples meet the requirements of this specification.
- c. Boeing Engineering shall verify the adequacy of all test facilities and test procedures. As a condition of Qualification, Engineering must verify that either (a) The material supplier has testing facilities which are capable of performing product acceptance testing in accordance with [Section 7.1](#) of this specification - or - (b) The material supplier identifies a testing facility capable of performing product acceptance testing in accordance with [Section 7.1](#) of this specification.
- d. The Boeing Company has the right to conduct any tests deemed necessary prior to qualification, including a manufacturing feasibility test.
- e. Qualified products are listed in the Qualified Products List (QPL).
- f. An adhesive shall be approved only for the formulation of which the qualification tests are made.
- g. No changes in approved product formulation, raw materials, basic methods of manufacture, or plant site, for a material qualified to this specification shall be made without notification and prior approval in writing from The Boeing Company. It may be necessary to requalify material manufactured with the proposed change at Boeing's discretion and a revised product designation may be required, also at Boeing's discretion.
- h. Suppliers seeking qualification to this specification shall agree to the following:
 - (1) The supplier shall submit to an audit of their product manufacturing operations, Quality Assurance system, raw material accountability system, product traceability, process records, product out time control, test procedures and results, and quality assurance records.
 - (2) The Boeing Company shall have the right to audit the production of any orders subsequent to qualification.
 - (3) The supplier shall prepare a Process Control Document (PCD) in accordance with [BSS7101](#) detailing the manufacture of material qualified to this specification. Prior to qualification, the PCD shall be prepared and made available to The Boeing Company for review and approval. After qualification, the PCD shall be maintained by the supplier. The document shall be available for review by The Boeing Company upon request and an audit may be conducted by The Boeing Company to verify compliance with the document at any time after qualification during manufacture of Boeing orders.
 - (4) The PCD shall document a statistical process control (SPC) program as specified
- i. The Supplier shall maintain a revision controlled list of all authorized distributors, re-packagers, and auxiliary material storage locations (foreign and domestic) for their qualified products. This list shall be either documented as part of the PCD or referenced within the PCD, and shall be made available to purchasers upon request.

6

QUALIFICATION (Continued)

- j. The Supplier shall have a process for granting and maintaining authorized distributor, re-packager, or auxiliary storage location status documented or referenced in their PCD. This process shall include documentation of all time and temperature exposures during shipping between and storage at authorized distributors, re-packagers, or auxiliary storage locations. In addition, the process shall include a method to ensure that supplier inventory life is not exceeded when the material is handled by an authorized distributor, re-packager, or auxiliary storage location prior to shipment to a purchaser.
- k. All qualification data, production records, and test data shall be kept on file for a minimum of seven years and shall be readily available for review.
- l. Supplier Inventory Life for each type and class of material shall be established by the Supplier and documented in their PCD.
- m. Supplier out-time for each type and class of material shall be established by the supplier based on supporting data and documented in their PCD.
- n. The Boeing Company has the right to conduct any test deemed necessary as part of qualification. The Boeing Company shall evaluate the supplier's material for workability and processing under production conditions. The results of the evaluation shall be reported to the specification custodian.
- o. After review of supplier data and completion of Boeing tests, the supplier will be advised of qualification status.
- p. Production material shall be capable of meeting all qualification requirements.
- q. Qualification shall be based upon the manufacture and successful testing of three batches of the material. All material properties shall meet the requirements of [Section 5](#).
- r. Materials submitted for qualification shall be tested against the requirements of this specification both as received and after exposure to the maximum storage/work life periods and shall also be evaluated for manufacturing suitability.

7

QUALITY CONTROL

All materials submitted to this specification shall be subjected to both supplier and purchaser inspection to determine compliance with the requirements of this specification.

7.1

SUPPLIER QUALITY CONTROL

- a. The supplier shall verify that each production batch has been manufactured in accordance with their approved PCD. Verify that each lot of adhesive is shipped within the supplier inventory life documented in the PCD. If a lot of material will be handled by an authorized distributor, re-packager, or auxiliary storage facility, ensure that sufficient Supplier Inventory Life is retained until DOS.

7.1 SUPPLIER QUALITY CONTROL (Continued)

- b. Each production shipment of adhesive shall be accompanied by a certified test report that contains all test data for each batch tested in accordance with [Section 8.1.b.](#) and [Section 8.2](#), to the requirements of [Table II](#), Tests 3A and 3C. The suppliers shall furnish actual test data shall be comprised of the average and individual values showing conformance with the above requirements for each shipment and shall identify such data with the specification revision letter in effect, the rolls of material used in determining the data, and the test facility that generated the data. A copy of the test report shall be retained in the supplier files.

7.1.1 STATISTICAL PROCESS CONTROL (SPC)

- a. The supplier shall establish and maintain procedures and requirements for an SPC system based on Key Characteristics (KC) and Key Process Parameters (KPP) in accordance with the requirements of this specification and [BSS7286](#).
- b. KCs are specified in [Table I](#), and are average values only.
- c. The process for selecting and documenting KPPs is described in [Section 7.1.1.1](#).

7.1.1.1 Key Process Parameters (KPP)

- a. The selection of KPPs shall be primarily the responsibility of the supplier and shall be documented in the PCD.
- b. KPPs shall include those parameters which have been demonstrated to have the greatest affect on the KCs and the performance of the adhesive or primer materials.
- c. The supplier shall establish the nominal target value and tolerance limits for each KPP. The inspection and SPC method for monitoring each KPP shall be documented in the PCD.

7.1.1.2 Analysis and Review of KCs and KPPs

- a. The supplier shall conduct SPC analysis of all KCs and KPPs in accordance with [BSS7286](#).
- b. The procedures used to establish and calculate control limits shall be documented in the PCD. A minimum of the most recent and consecutive twenty batches of each Type, Class, Grade, or Style shall be used to establish the control limits.
- c. If statistical analysis determines that a KC or KPP is out of control the supplier shall
 - (1) investigate the cause(s)
 - (2) eliminate any special causes of variation and re-establish control
- d. If a KC is not capable, the supplier shall take corrective action to establish capability in accordance with [BSS7286](#).

7.1.1.3 Reporting of Data

Suppliers shall provide Boeing SM summary reports of SPC data including control charts, nominal value, standard deviation, number of batches, and Cpk for each KC. SPC data must be submitted biannually. If the control limits differ from a previous report, suppliers shall report both the previous and the current control limits.

7.2

PURCHASER QUALITY CONTROL

- a. Check the packaging, marking, and paperwork to ensure compliance with the appropriate sections of this specification and to ensure that the material was purchased from a QPL designated supplier or an authorized distributor, re-packager, or auxiliary storage facility of a QPL designated supplier.
- b. Verify that all records of shipping and storage times and temperatures have been received with each shipment, and that the material meets the shipping requirements of Section 10.3 from the date the material was shipped from the supplier's manufacturing facility.
- c. Purchaser Quality Control shall review all supplier test data submitted with shipment and perform any additional inspection or testing necessary to assure that the production material meets all requirements specified herein.
- d. For every one in five batches of adhesive, one sandwich assembly shall be fabricated in accordance with [Figure 1](#) and [Section 8.2.2.1](#). Test 5 honeycomb peel specimens in accordance with [Section 8.2.2.2](#) and [Table II](#), Test 1A. These tests must be performed as stated unless purchaser testing requirements have been eliminated for this product in accordance with [Section 7.2.e](#).
- e. When a supplier has demonstrated consistent conformance to required testing in accordance with [Section 7.1](#), Boeing SM may remove purchaser testing as a requirement for material procurement from that supplier. Boeing Quality Assurance documentation such as the appropriate [D1-4426](#) Supplier Code will indicate which products are exempt from the purchaser testing requirement.
- f. When consistent conformance to specification acceptance (receiving) requirements has been demonstrated, and purchaser testing has not been eliminated in accordance with [Section 7.2.e](#), Quality Assurance may implement reduced testing in accordance with a suitable sampling plan. Authorization of a reduced testing plan shall be approved by Boeing Quality Assurance.

8

MATERIAL TEST METHODS

WARNING

This specification involves the use of chemical substances which are hazardous. Boeing personnel shall refer to the work area Hazard Communication Handbook for health effect and control measure information contained in the HazCom Info Sheets and Material Safety Data Sheets. For disposition of hazardous waste materials, consult site environmental engineers for proper disposal methods. Non-Boeing personnel should refer to manufacturer's Material Safety Data Sheet(s) and their employer's safety instructions.

8.1

FILM THICKNESS/WEIGHT TEST

- a. Determine the thickness by a suitable micrometer or Beta Gauge on at least ten random samples of the adhesive taken over the length of the production roll.
- b. Cut three specimens of adhesive approximately 6.0 x 6.0 in (15.24 x 15.24 cm). Determine the area to the nearest 0.1 in² (0.65 cm²). Remove the separator sheets from the film and weigh the adhesive film to the nearest 0.001 grams. Report the average weights to the nearest 0.001 lb/ft² (0.005 kg/m²) and document according to the requirements for a key characteristic as specified in [Section 7.1.1](#).

8.2 MECHANICAL PROPERTY TESTS

8.2.1 GENERAL

- a. Identify each test specimen with the batch and roll of adhesive being tested and the test panel from which it is cut.
- b. [Table II](#) governs the temperature of the test specimens during environmental conditioning and testing.
 - (1) Aged specimens are to be exposed horizontally in an air circulating oven.
 - (2) Provide a suitable chamber with a thermocouple monitor for maintaining an atmosphere around the specimens before the high and low temperature tests. Remove specimen from the environmental condition and immediately subject to the required test.

8.2.2 HONEYCOMB SANDWICH TESTS

8.2.2.1 Fabrication of Honeycomb Sandwich Test Panel

- a. Fabrication of the Sandwich Test Panel shall be in accordance with [Figure 1](#) and the procedures given below.

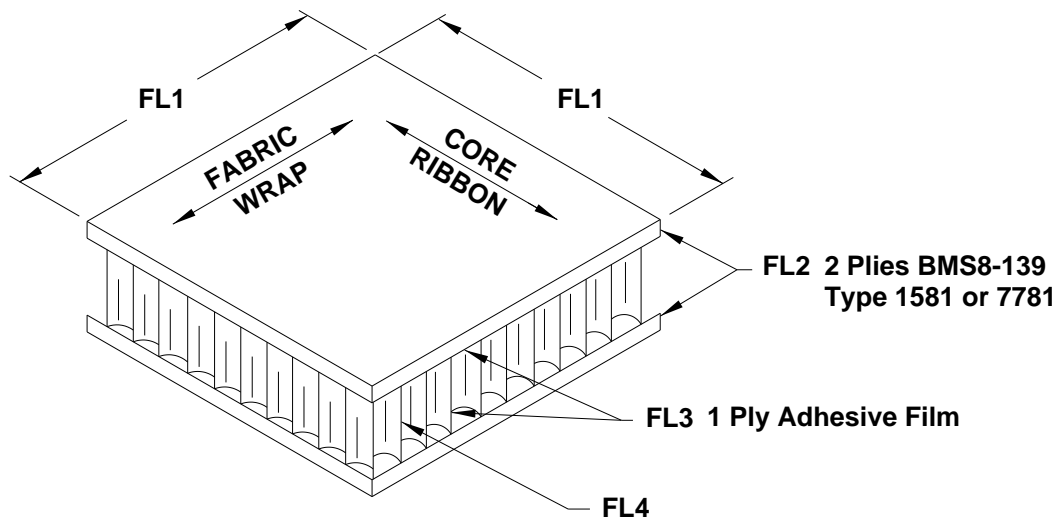


FIGURE 1 - PLASTIC HONEYCOMB SANDWICH PANELS FOR BMS8-145 TESTING

FL 1 Types of panels, dimensions, and number required:

- a) Qualification Testing:
 - 15 x 27 inches, with the 27 inches in the fabric warp direction. Two (2) panels required for honeycomb sandwich peel specimens ([Section 6.b.](#)).
 - 12 x 7 inches, with the 7 inches in the fabric warp direction. Two (2) panels required for honeycomb sandwich flatwise-tensile specimens ([Section 6.b.](#)).
- b) Purchaser Testing - 18 x 15 inches, with the 15 inches in the fabric warp direction, one (1) panel required ([Section 7.2.d.](#)).

8.2.2.1 Fabrication of Honeycomb Sandwich Test Panel (Continued)

FL 2 The prepreg shall be oriented so that the warp face of the fabric is against the adhesive on both sides of the core.

FL 3 The Type I adhesive film shall be placed so that the side against the polyethylene film separator is against the core.

FL 4 [BMS8-124](#), Class 1, type I, Grade 4, 0.500 ± 0.006 inch thick. Optional [BMS8-124](#), Class 1, Type I, Grade 8, 0.500 ± 0.006 inch thick honeycomb core may be used for flatwise-tensile sandwich panels. Use of Grade 8 honeycomb core will reduce the chance of failure within the core layer during flat-wise tensile testing.

b. Fabrication of Sandwich Panel

(1) Apply a parting agent (mold release) to the tool surface. All aluminum tooling shall either have a permanent Teflon release coating or an FEP or equivalent parting film may be used between tool surface and lay-up.

NOTE: The [BMS8-139](#) prepreg catalyst system is inhibited by contact with aluminum tool surfaces.

(2) Lay up the sandwich panel(s) and cure and postcure in accordance with [BAC5317](#) and [BAC5317-3](#).

c. The Sandwich Panel shall have no voids in the laminated skins over the honeycomb area of the panel in compliance with [BAC5317-3](#).

d. Trim at least 1/2 inch from all sides of the test panel. Then cut the required specimens from the panel in such a manner that all the cuts are straight, parallel, and accomplished to avoid overheating or mechanical damage to the bond lines.

8.2.2.2 Climbing Drum Peel Test

a. Cut five specimens $3.00 \pm 0.03 \times 12.00 \pm 0.03$ inches with the 12-inch dimensions parallel to the fabric warp for each condition of [Table II](#) being tested.

b. Environmentally age specimens in accordance with [Table II](#).

c. Test in accordance with SAE-AMS-STD-401 Sandwich Peel Test.

d. Peel all specimens on the bag side.

8.2.2.3 Flatwise Tensile Test

a. Cut fifteen $2.00 \pm 0.03 \times 2.00 \pm 0.03$ inch specimens from the sandwich panels prepared in accordance with [Section 8.2.2.1](#).

b. Expose specimens to aging temperature in accordance with [Table II](#).

c. Remove the specimens from the aging temperature. Sand the surface to remove the surface glaze using sandpaper or Scotchbrite. Remove the sanding dust and solvent wipe with methyl ethyl ketone (MEK). Air dry the specimens.

d. Bond specimens to heavy metal loading blocks using an epoxy resin adhesive in accordance with SAE-AMS-STD-401 Sandwich Tension Test except for cure temperature.

8.2.2.3 Flatwise Tensile Test (Continued)

BOEING RECOMMENDATION

R.T. Test - [BMS5-25](#), Grade 1, Cure 24 hrs., min @ R.T.,
or 2 hrs, min @ 125 ± 10 F

350 F Test - [BMS5-17](#) Cure 1 hr., max @ 350 ± 10 F

- e. Expose specimens to test temperature in accordance with [Table II](#) for one-half hour prior to test.
- f. Determine tensile strength values for both individual and the averages of the test specimens in accordance with SAE-AMS-STD-401, except for the specimens size noted in [Section 8.2.2.3.a](#).

8.2.3 TESTING OF METAL-TO-METAL ASSEMBLIES

8.2.3.1 Preparation of Test Panel

- a. Make four test assemblies conforming to [Figure 2](#).
 - (1) Cut each standard test panel from 0.063 inch thick 2024-T3 alclad aluminum alloy ([AMS-QQ-A-250/5](#)). The panels should be flat (the maximum warp for either length or width shall not exceed 0.010 inch).
 - (2) Mill the overlapping edge to RHR 125 (maximum) in accordance with [ASME B46.1](#) to the net dimensions and remove all burrs. The radius of chamfer remaining after removal shall not exceed 0.010 inch.
 - (3) Clean panels before bonding in accordance with [BAC5765](#), Method 2.
 - (4) After cleaning, lay a strip of BMS8-145 adhesive approximately 0.6 inch wide by 6.5 inches long to the faying edge of one test panel and adjacent to the 6-inch milled edge.
 - (5) Join the adhesive-coated test panel to the uncoated test panel having a lap joint with a 0.50 ± 0.03 inch overlap as shown in [Figure 2](#).
 - (6) Trim the adhesive along the edges of the test panel so that approximately 0.1 inch excess adhesive extends beyond the lap joint.
- b. Cure in accordance with [BAC5317-3](#).

8.2.3.2 Lap Bond Shear Test

- a. Cut lap shear test assemblies in accordance with [Figure 2](#).
- b. Select two lap shear specimens from each test assembly as room temperature (75 ± 5 F) controls ([Table II](#), Test No. 3A).

8.2.3.2

Lap Bond Shear Test (Continued)

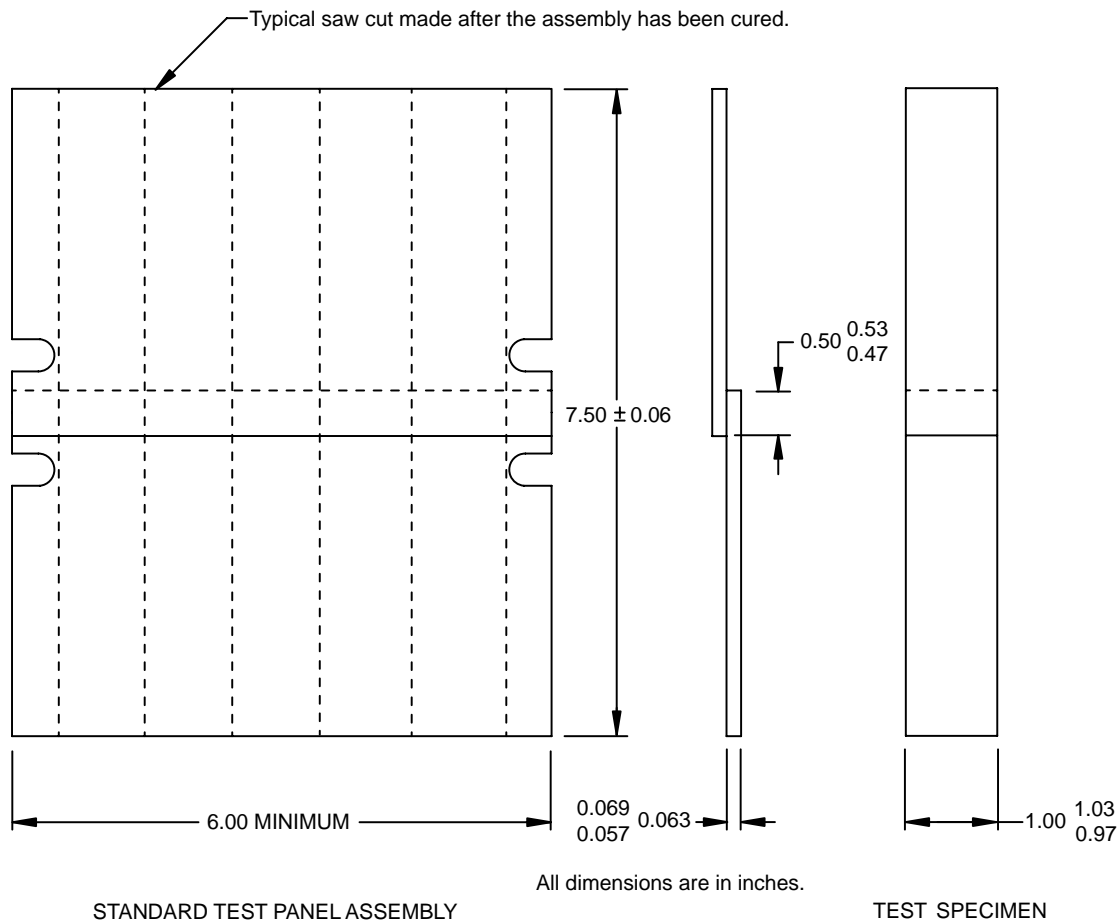


FIGURE 2 - LAP BOND SHEAR TEST

- c. Select in a random manner, six test specimens for each environmental condition ([Table II](#), Test No. 3B and 3C) from the remaining 12 specimens.
- d. Specimens for Test No. 3A (Unaged) of [Table II](#).

Test at 75 ± 5 F in accordance with [BSS7202](#), Type I. Maintain this temperature at least one-half hour before testing and during test.

- e. Specimens for Test No. 3B (Aged 30 minutes at -67 F) of [Table II](#).

Subject specimen to -67 ± 2 F for 30 minutes (minimum) before the specimen is stressed and while under stress until the specimen is broken. Use a thermocouple for temperature control. Test at -67 ± 2 F in accordance with [BSS7202](#), Type I.

- (1) Prepare a control specimen approximately 8 hours prior to testing. Mount a thermocouple in the same position as for test and check recorded temperature.
- (2) During calibration, measure the temperature of the specimen with a control thermocouple mounted outside the bond line of the calibration specimen. Calibrate the control thermocouple against the thermocouple in the standard calibration specimen so that the temperature indicated by the control thermocouple is equivalent to the temperature of the metal at the bond line. [FL 1](#)

8.2.3.2 Lap Bond Shear Test (Continued)

During the actual low temperatures test, mount a control thermocouple in the same position on the test specimen that it was on the calibration specimen. Maintain at the temperature recorded during calibration by the control thermocouple.

FL 1 That temperature indicated by an iron-constant thermocouple mounted in a standard calibration specimen when the standard calibration specimen is occupying the same position within the test apparatus as the test specimen will have when it is tested.

- f. Specimens for Test No. 3C (Elevated Temperature) of [Table II](#).

A temperature of 350 ± 10 F at the bond line shall be reached within 3 to 10 minutes after subjecting specimen to that temperature. Maintain this temperature 30 ± 1 minute before stress is applied. Upon removal from the oven, immediately place specimen in test jig and reheat bond line to 350 ± 10 F. Maintain this temperature 2 to 3 minutes before stress is applied and until specimen is broken. Test at 350 ± 10 F in accordance with [BSS7202](#), Type I.

Use thermocouples and an accurate recorder to maintain required temperature.

9 MATERIAL IDENTIFICATION

Each roll of material shall be legibly identified and labelled with the items of information listed below.

- a. BMS8-145 (including the latest revision letter), Type and Grade of Adhesive
- b. Supplier's Name and Address
- c. Supplier's Batch Number
- d. Date of Manufacture
- e. Unit Number of Container or Roll
- f. Supplier's Product Designation
- g. Storage Temperature

10 PACKAGING, MARKING AND SHIPPING

10.1 PACKAGING

- a. Separator sheets shall be polyethylene and polyethylene coated paper which have contrasting colors and do not require adhesive chilling to remove.
- b. Adhesive shall be packaged in clean, airtight wrappers or containers.
- c. The exterior packaging shall be of such a nature as to prevent physical damage or contamination by foreign substances. Each package shall be suitably insulated and refrigerated, when necessary, to insure maintenance of the shipping temperature requirements.
- d. Packaging shall be accomplished in such a manner as to assure delivery of material capable of meeting the requirements of this specification.

10.2 MARKING

Both ends of each exterior (shipping) package shall be legibly marked on the outside with the following information.

- a. BMS8-145 (including the latest revision letter), Type and Grade of Adhesive
- b. Supplier's Name, Address, and Product Designation
- c. Supplier's Batch Number
- d. Date of Manufacture
- e. Unit Number of Container or Roll
- f. Quantity in the Shipment
- g. Quantity in this Package
- h. Refrigeration Requirement. (State temperature limitations both shipping and storage when refrigeration is required.)
- i. Name and address of distributor, re-packager, or auxiliary storage facility if applicable.
- j. Date of Shipment from supplier, distributor, re-packager, or auxiliary storage facility if applicable, whichever occurred later
- k. All labeling shall conform to 29CFR 1910.1200.

10.3 SHIPPING

- a. The shipping and storage temperature shall be below 0 F.
- b. Temperature recorders are required with each lot of adhesive to be shipped from the supplier's manufacturing facility or from a supplier authorized distributor, re-packager, or auxiliary warehouse. Include sufficient temperature recorders with each lot shipped to ensure that all temperature excursions above the ranges noted in this section are recorded.
- c. The use and placement of temperature recorders shall be in accordance with [BSS7061](#).
- d. A system for material out-time tracking and control shall be implemented and maintained at all supplier authorized distributors, re-packagers, and auxiliary warehouses. This system must be capable of recording all out-time consumed at each facility for each lot of adhesive or primer stored or shipped.
- e. During shipment and handling at authorized distributors, re-packagers, or auxiliary storage facilities, the material is allowed to accumulate a total of 16 hours of exposure at temperatures above 0 F and below 90 F.