1 SCOPE

a. This specification establishes the requirements for epoxy-based compounds for edge filling and potting of metal, plastic, and paper honeycomb core.

b. This specification requires qualified products.

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2 CLASSIFICATION

The following general descriptions are prepared for guidance. Cure schedules are described in Table I and property requirements are specified in Table II through Table XI.

TYPE	DENSITY (GM/CC)	CONSISTENCY	SYSTEM	GEL TIME
1	0.8	Pourable	Two Part-RT Cure	20 minutes
2	Obsolete	Use Type 19		
3	1.6	Trowelable Slumping Paste	Two Part-RT Cure	20 minutes
4	0.8	Pourable	Two Part-RT Cure	20 minutes
5 FL 1	Obsolete			
6	1.8	Pourable	Two Part-RT Cure	60 minutes
7 Cl 1	0.9	Pourable	Two Part-RT Cure	60 minutes
7 Cl 2	0.9	High viscosity	Two Part-RT Cure	60 minutes
8	Obsolete	Use Types 6		
9	0.5	Trowelable Putty	Two Part-RT Cure	60 minutes
10	0.5	Trowelable Putty	One Part Refrigerated	3 to 5 days at room temp FL 3
11	0.8	Trowelable Putty	One Part Frozen-Heat Cure	14 days FL 3
12 Cl 1	1.4	Trowelable Paste	One Part Frozen-Heat Cure	4 hours FL 3

2 CLASSIFICATION (Continued)

TYPE	DENSITY (GM/CC)	CONSISTENCY	SYSTEM	GEL TIME
12 Cl 2	1.4	Trowelable Paste	One Part Frozen-Heat Cure	4 hours FL 3
13	1.4	Trowelable Putty	One Part Frozen	18 hours FL 3
14 Cl 1 FL 2	0.75	Trowelable Putty	One Part Frozen-Heat Cure	8 hours
14 Cl 2 FL 2	0.75	Trowelable Non-slump Paste	One Part Frozen-Heat Cure	8 hours
15	0.7	Trowelable Non-slump Paste	Two Part-RT Cure	10 to 30 minutes
16	Obsolete	Use Type 18, Class 1		
17	0.7	Trowelable Non-slump Paste	Two Part-RT Cure	60 to 90 minutes
18 Cl 1 FL 2	0.7	Trowelable Non-Slump Paste	Two Part-RT Cure	12 to 25 minutes
18 Cl 2 FL 2	0.78	Trowelable Non-Slump Paste	Two Part-RT Cure	2 to 12 minutes
19	0.7	Trowelable Slumping Paste	Two Part-RT Cure	20 to 40 minutes
20	Obsolete	Use Type 18, Class 1 or Type 19		
21	Obsolete	Use Type 6		
22	Obsolete	Use Type 19		
23	Obsolete	Use Type 6		
24	0.35	Trowelable Putty	Two Part-RT Cure	60 minutes
25 FL 4	2.0	Trowelable Paste	Two Part-RT Cure	60 minutes
26 CL1	0.75	Trowelable Non-Slump Paste	Two Part-RT Cure	60 minutes
26 CL2	0.75	Trowelable Non-Slump Paste	Two Part-RT Cure	5 minutes
27	2.0	Trowelable Non-Slump Paste	One Part Frozen-Heat Cure	24 hours FL 3
28	0.5	Trowelable Putty	Two Part-RT Cure	50 minutes
29	0.8	Trowelable Paste	One Part Frozen-Heat Cure	FL 5
30	Obsolete	See Type 18, Class 1		
31 FL 6	2.0	Trowelable Paste	Two Part Heat Cured	60 minutes

FL 1 Use Type 15, 17, 18 or 26 for edge potting applications. Use Type 18 or 19 for insert potting application.

FL 2 Use Class 1 when no class is specified.

FL 3 Work Life.

FL 4 Type 25 does not have class or grade designations.

FL 5 Type 29 does not gel at room temperature.

FL 6 Type 31 is not intended for use inside the pressurized vessel.

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 herein indicated.

ASTM C 393 - Standard Test Method for Core Shear Properties of Sandwich Constructions by Beam Flexure

ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension

ASTM D 695 - Standard Test Method for Compressive Properties of Rigid Plastics

3 REFERENCES (Continued)

ASTM D 792	-	Standard Test Methods for Specific Gravity (Relative Density) and Density of Plastics by Displacement
ASTM D 1002	-	Standard Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal).
ASTM D 1622	-	Standard Test Method for Apparent Density of Rigid Cellular Plastics
ASTM D 2240	-	Standard Test Method for Rubber Property - Durometer Hardness
BAC5009	-	Bolt and Nut Installation
BAC5317-1	-	Carbon and Aramid Fiber Reinforced Composite Parts, 350 F (177 C) Cure
BAC5439	-	Ultrasonic Inspection
BAC5514	-	Common Bonding Requirements for Structural Adhesives
BAC5583	-	Process for Potting Inserts and Edges into Sandwich Panels
BSS7041	-	Radiologic Inspection, Radiography (Film)
BSS7101	-	Requirements for the Process Control Document (PCD) System for Suppliers of Raw Materials to Boeing Material Specifications
BSS7230	-	Flammability Properties of Aircraft Materials, Determination of
BSS7286	-	Statistical Process Control of Designated Engineering Characteristics
D6-49225	-	Qualification of Sources for Interior Plastic Parts
D6-53993	-	Qualification of Sources for Composite Parts
MIL-PRF-5606	-	Hydraulic Fluid, Petroleum Base, Aircraft, Missle and Ordnance
29 CFR 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.

Batch - A homogeneous unit of finished material manufactured under controlled conditions at one time.

Cracks - Fractures in the potting compound or separation from a honeycomb wall.

Gel Time - The amount of time from the start of mixing of the compound components to the point at which the material becomes non-fluid or gels.

Hold Temperature - Temperature of the external medium required to thaw frozen material.

Hold Time - The time frozen material takes to reach a usable state and is measured from the time it is placed in a medium at the hold temperature.

Room Temperature (RT) - 65 to 85 F

QPL - Qualified Products List

Temperature Tolerances - The permissible temperature range above and below the specified nominal temperature.

Thawed Material - A material is considered thawed if the temperature of the material has reached a minimum of 70 F and there are no frozen lumps remaining.

4 DEFINITIONS (Continued)

Work Life - The usable life of a material. The time starts:
- (Two Part) - from the time blending begins
- (One Part Frozen) - from the time the storage temperature begins to increase when placed in a medium at the hold temperature to the time the material is no longer useable.

5 MATERIAL REQUIREMENTS

The following nominal temperature and tolerances shall be used throughout this specification unless otherwise specified: 77 ± 2 F, 125 ±5 F, 180 ± 5 F, 260 ± 10 F, 350 ±10 F and all times shall be approximate.

5.1 GENERAL

a. Two part potting compounds shall consist of an epoxy resin, one or more inert fillers, and an amine curing agent. The compound shall be furnished as a two component system. One component shall contain the epoxy resin and inert filler(s). The other component shall contain the curing agent (filler optional).

b. One part potting compounds shall consist of an epoxy resin, one or more inert fillers, and a heat-activated curing agent. The compound shall be furnished as a one component system.

5.2 BLENDING

Suppliers shall provide blending information with two component materials. The blending ratio of the components shall be expressed as the number of parts, by weight, of hardener required to be blended with 100 parts of the resin base. The two components shall blend readily with 2 to 3 minutes of hand blending to produce a uniform product.

NOTE: Extended blending reduces gel time.

The fillers shall not settle severely or separate from the resin and shall not cake in a manner that will prohibit further use of the material. If necessary, use moderate heating, up to 120 ± 5F, to restore caked material to a workable consistency.

5.3 APPEARANCE

Both the one part compound and each component of the two part compound shall have a uniform homogeneous texture and shall be free from foreign material, lumps, coarse particles, and air bubbles.

5.4 STORAGE AND CURE

BMS5-28 compounds shall meet the requirements in Section 5.5 when blended in accordance with Section 5.2 and cured at each indicated cure temperature in the cure schedule of Table I. Material shall meet the storage requirements specified in Table I.

5.4 STORAGE AND CURE (Continued)

TABLE I - STORAGE AND CURE SCHEDULES FOR ALL TYPES

TYPE	COMPONENT STORAGE REQUIREMENTS		PROPERTIES OF BLENDED AND/OR THAWED COMPOUNDS					
	STORAGE TEMPERATURE	STORAGE TIME FL 2	GEL TIME MINIMUM	WORK LIFE MINIMUM	CURE SCHEDULE FL 3			
			77 ± 5 F	77 ± 5 F	77 ± 5 F	125 ± 5 F	260 ± 10 F	350 ± 10 F
1, 3	40 to 90 F	1 year	20 minutes	- - -	7 days	5 hours FL 1	- - -	- - -
4, 15, 17, 18, 19	40 to 90 F	6 months	See gel time in II and VII	- - -	7 days	5 hours FL 1	- - -	- - -
6 7	40 to 90 F	1 year	60 minutes	- - -	7 days	- - -	1.5 hours FL 1	1 hour FL 1
9	40 to 80 F	6 months	60 minutes	- - -	7 days	5 hours FL 1	- - -	- - -
10	FL 7	6 months	- - -	5 days	- - -	- - -	1 hour	- - -
11	Below 0 F	6 months	- - -	14 days	- - -	- - -	1 hour	- - -
12, 14	Below -20 F	3 months	- - -	Type 12 (All Classes) 4 hours, Type 14 (All Classes) 8 hours	- - -	- - -	1.5 hours	1 hour
13	-20 F or Below	3 months	- - -	18 hours	- - -	- - -	1.5 hours	1 hour
24	40 to 90 F	6 months	60 minutes	- - -	7 days	5 hours FL 1	- - -	- - -
25	40 to 90 F	1 year	60 minutes	1 hour	- - -	5 hours	1.5 hours FL 1	1 hour FL 1
26 CL 1	40 to 90 F	6 months	60 minutes	- - -	7 days	- - -	1.5 hours FL 1	1 hour FL 1
26 CL 2	40 to 90 F	6 months	5 minutes	- - -	7 days	- - -	1.5 hours	- - -
27	Below 0 F	3 months	- - -	24 hours	- - -	- - -	2 hours FL 4	1 hour
28	40 to 90 F	6 months	50 minutes	- - -	7 days	5 hours FL 1	- - -	- - -
29	Below 0 F	6 months	FL 5	10 days	- - -	- - -	1.5 hours	- - -
31	40 to 90 F	6 months	60 minutes	60 minutes	- - -	FL 6	- - -	- - -

FL 1 Material shall be gelled at room temperature prior to exposure to elevated temperatures. Material shall be heated at a rate of 3 to 7 F per minute, then held at the cure temperature for the indicated time.

FL 2 The storage time for each Type shall be determined from the date of receipt at the purchaser's facility with the exception of 12, 13, 14, and 27 which shall be determined from date of manufacture. Materials shall meet the requirements of this specification throughout storage times listed.

5.4 STORAGE AND CURE (Continued)

FL 3 All elevated cure cycles refer to the time and temperature of the material. The materials shall meet all the requirements of this specification for each cure schedule indicated. These are full-cure schedules and not processing times.

FL 4 Minimum cure is 4 days at 180 ± 5 F.

FL 5 Material does not gel at room temperature.

FL 6 2.5 hours minimum at 200 + 20/-0 F.

FL 7 Storage Temperature notes on the QPL

5.5 PROPERTIES

The products shall conform to the applicable requirements in Table II through Table XI when tested in accordance with Section 8 of this specification.

Extrudability is not required for Types 12, 13, 14, 18, 19, 25, 27 and 31 materials used in the manufacture of cured syntactic inserts.

TABLE II - PROPERTIES OF TYPES 1, 3, AND 4

PROPERTY	TYPE 1	TYPE 3	TYPE 4	TEST METHOD SECTION
Gel Time, minutes, minimum	20	20	20	8.2
Flow, inches, maximum at 77 F	- - -	2.5	- - -	8.3
Viscosity, centipoises				
maximum average	25,000	- - -	25,000	8.4
minimum average	- - -	- - -	15,000	
Density, grams/cc, maximum average	0.8	1.6	0.8	8.5
Compressive Strength, ksi, minimum average	4.5	10.0	3.5	8.6.a..
Compressive Modulus, ksi, minimum average	125	450	100	8.6.b..
Tensile Shear Strength, ksi minimum average	1.5	1.2	1.2	8.7
Fluid Immersion, percent weight gain, maximum average				8.10
TT-S-735, Type III Test Fluid	1.0	1.0	1.5	
MIL-PRF-5606 Hydraulic Fluid	1.5	1.0	1.5	
BMS3-11, Type IV, Class 1, Grade A, low-density aviation hydraulic test fluid	3.5	1.0	3.5	
Distilled Water	1.0	1.0	2.0	

TABLE III - PROPERTIES OF TYPES 6 AND 7

PROPERTY	TYPE 6	TYPE 7		TEST METHOD SECTION
		CLASS 1	CLASS 2	
Gel Time, minutes, minimum	60	60	60	8.2

5.5 PROPERTIES (Continued)

TABLE III - PROPERTIES OF TYPES 6 AND 7 (Continued)

PROPERTY	TYPE 6	TYPE 7		TEST METHOD SECTION
		CLASS 1	CLASS 2	
Viscosity, centipoises			FL 1	
Maximum average	47,000	26,000	80,000	8.4
Minimum average	25,000	11,000	50,000	
Density, grams/cc, maximum average	1.8	0.9	0.9	8.5
Compressive Strength, ksi, minimum average				8.6.a..
Room temperature, after 7 +1/-0 days at 77 F cure	8.5	8.0	8.0	
Room temperature, after 1 hour at 350 F cure	20.0	8.0	8.0	
Room temperature, after 14 days at 350 F cure	20.0	8.0	8.0	
350 ± 2 F after 14 days at 350 F cure	2.0	0.5	0.5	
350 ± 2 F after 1 hour at 350 F cure	2.0	0.5	0.5	
Compressive Modulus, ksi				8.6.b..
Room temperature, after 7 +1/-0 days at 77 F cure, minimum average	250	225	225	
Room temperature, after 1 hour at 350 F cure, minimum average	500	225	225	
Room temperature, after 14 days at 350 F cure,				
minimum average	500	200	200	
maximum average	800	500	500	
350 ± 2 F after 14 days at 350 F cure, minimum average	32	8.0	8.0	
350 ± 2 F after 1 hour at 350 F cure, minimum average	32	8.0	8.0	
Tensile Shear Strength, ksi, minimum average				8.7
Room temperature, after 7 +1/-0 days at 77 F cure	1.35	0.8	0.8	
Room temperature, after 1 hour at 350 F cure	1.95	1.8	1.8	
Room temperature, after 14 days at 350 F cure	1.95	1.8	1.8	
Flammability				
Horizontal direction				8.8
Burn Rate, inches per minute, maximum	- - -	3.0	3.0	
12 second vertical				8.9
a. Extinguishing Time, seconds, maximum	15.0	- - -	- - -	
b. Burn Length, inches, maximum	8.0	- - -	- - -	
c. Drip Extinguishing Time, seconds, maximum	5.0	- - -	- - -	
Fluid Immersion, percent weight gain, maximum average				8.10
TT-S-735, Type III Test Fluid	1.0	1.0	1.0	
MIL-PRF-5606 Hydraulic Fluid	1.0	1.0	1.0	
BMS3-11, Type IV, Class 1, Grade A, low-density aviation hydraulic test fluid	1.0	2.0	2.0	
Distilled Water	1.0	1.0	1.0	
Insert Strength				8.14
Pull-out, pounds, minimum	250	- - -	- - -	

5.5 PROPERTIES (Continued)

TABLE III - PROPERTIES OF TYPES 6 AND 7 (Continued)

PROPERTY	TYPE 6	TYPE 7		TEST METHOD SECTION
		CLASS 1	CLASS 2	
Torque, inch-pounds, minimum	60	- - -	- - -	

FL 1 Model RVF Brookfield viscometer with a number 7 spindle operating at 20 rpm.

TABLE IV - PROPERTIES OF TYPES 9 AND 10

PROPERTY	TYPE 9	TYPE 10	TEST METHOD SECTION
Gel Time, minutes, minimum	60	- - -	8.2
Density, grams/cc, maximum average	0.5		8.5
Compressive Strength, ksi, minimum average	2		8.6.a.
Compressive Modulus, ksi, minimum average	60		8.6.b.
Tensile Shear Strength, ksi, minimum average	1.0	0.75	8.7
Flammability, 12 second vertical			8.9
a. Extinguishing Time, seconds, maximum	15.0		
b. Burn length, inches, maximum	8.0		
c. Drip extinguishing time, seconds, maximum	5.0		
Fluid Immersion, percent weight gain, maximum average			8.10
TT-S-735, Type III Test Fluid	3.0	8.0	
MIL-PRF-5606 Hydraulic Fluid	4.2	6.0	
BMS3-11, Type IV, Class 1, Grade A, low-density aviation hydraulic test fluid	8.0	8.5	
Distilled Water	4.1	5.0	
Handling Properties	Satisfactory		8.12
Flexure Strength, ksi, minimum average	- - -	21.0	8.13

TABLE V - PROPERTIES OF TYPES 11, 12 AND 13

PROPERTY	TYPE 11	TYPE 12 CLASSES 1 AND 2	TYPE 13	TEST METHOD SECTION
Flow, inches, maximum				
at 77 F	- - -	0.2	0.2	8.3
at 125 F	- - -	0.2	0.2	
Density, grams/cc, maximum average	0.8	1.4	1.4	8.5
Compressive Strength, ksi, minimum average				
at 77 F	4.5	15	15	8.6.a..
at 350 ±2 F	- - -	10	10	
at 350 ± 2 F after 1 hour at 350 F	- - -	10	10	
Compressive Modulus, ksi, minimum average	125	- - -	- - -	8.6.b..
Flammability				

5.5 PROPERTIES (Continued)

TABLE V - PROPERTIES OF TYPES 11, 12 AND 13 (Continued)

PROPERTY	TYPE 11	TYPE 12 CLASSES 1 AND 2	TYPE 13	TEST METHOD SECTION
Horizontal direction				8.8
Self extinguishing	Yes	Yes	- - -	
12-second vertical	- - -	- - -	- - -	8.9
a. Extinguishing time, seconds, maximum	- - -	- - -	15.0	
b. Burn length, inches, maximum	- - -	- - -	8.0	
c. Drip extinguishing time, seconds, maximum	- - -	- - -	5.0	
Extrudability at 77 F, gm/minute, minimum	- - -	Cl 1 100 Cl 2 1000	100 FL 1	8.11

FL 1 After 18 hours.

TABLE VI - PROPERTIES OF TYPE 14

PROPERTY	TYPE 14 CLASSES 1 AND 2	TEST METHOD SECTION
Flow, inches, maximum		
at 77 F	0.2	8.3
at 125 F	0.2	
Density, grams/cc, maximum average	0.75	8.5
Compressive Strength, ksi, minimum average		
at 77 F	13	8.6.a..
at 350 ± 2 F	7	
at 350 ± 2 F after 1 hour at 350 F	7	
Tensile Shear Strength, ksi, minimum average	1	8.7
Flammability, horizontal direction self extinguishing	FL 1	8.8
Fluid Immersion, percent weight gain, maximum average		8.10
TT-S-735, Type III Test Fluid	1.5	
MIL-PRF-5606 Hydraulic Fluid	1.5	
BMS3-11, Type IV, Class 1, Grade A, low-density aviation hydraulic test fluid	1.5	
Distilled Water	1.5	
Extrudability, gm/min, minimum		8.11
Cartridge	Cl 1 600 @ 77 ± 2F Cl 2 210 @ 115 ± 5F	
Patty (32oz or 64oz)	Cl 1 & Cl 2 200 77 ± 2F	

FL 1 For each specimen tested, the flame front shall not reach the 4.0 inch mark when subjected to a 15 second flame in accordance with BSS7230, Method 4.

5.5 PROPERTIES (Continued)

TABLE VII - PROPERTIES OF TYPES 15, 17, 18, AND 19

PROPERTY	TYPE 15	TYPE 17	TYPE 18	TYPE 19	TEST METHOD SECTION
Gel Time, minutes	10 to 30	60 to 90	Class 1 12 to 25 Class 2 2 to 12	20 to 40	8.2
Flow, inches, maximum					
at 77 F	1.0	0.2	0.3	- - -	8.3
at 125 F	2.5	0.2	- - -	- - -	
Density, grams/cc maximum average	0.7	0.7	Class 1 0.70 Class 2 0.78	0.7	8.5
Compressive Strength, ksi, minimum average	5.5	4.5	4.5	5.5	8.6.a..
Compressive Modulus, ksi, minimum average	350	250	200	250	8.6.b..
Tensile Shear Strength, ksi, minimum average	0.5	1.0	1.0	1.25	8.7
Flammability					8.9
12 second vertical					
a. Extinguishing Time, seconds, maximum			15.0		
b. Burn length, inches, maximum			8.0		
c. Drip extinguishing time, seconds, maximum			5.0		
Fluid Immersion, percent weight gain, maximum average					8.10
TT-S-735, Type III Test Fluid			1.5		
MIL-PRF-5606 Hydraulic Fluid			2.6		
BMS3-11, Type IV, Class 1, Grade A, low-density aviation hydraulic test fluid			5.0		
Distilled Water			2.5		
Extrudability, gm/minute, minimum					8.11
Initial	None		Class 1 120 Class 2 None	70	
After 10 minutes	None		Class 1 90 Class 2 None	None	
Handling Properties	Satisfactory		- - -		8.12
Inset Strength, minimum					8.14
Pull-out, lbs	None		269		
Torque, in-lbs	None		60		

TABLE VIII - PROPERTIES OF TYPE 24

PROPERTY	TYPE 24	TEST METHOD SECTION
Gel Time, minutes, minimum	60	8.2
Density, grams/cc, maximum average	0.35	8.5

5.5 PROPERTIES (Continued)

TABLE VIII - PROPERTIES OF TYPE 24 (Continued)

PROPERTY	TYPE 24	TEST METHOD SECTION
Compressive Strength, ksi, minimum average	1.0	8.6.a..
Compressive Modulus, ksi, minimum average	40.0	8.6.b..
Tensile Shear Strength, ksi, minimum average	0.10	8.7
Flammability, 12 second vertical		8.9
a. Extinguishing time, seconds, maximum	15.0	
b. Burn length, inches, maximum	8.0	
c. Drip extinguishing time, seconds maximum	5.0	
Fluid Immersion, percent weight gain, maximum average		
TT-S-735, Type III Test Fluid	5	8.10
MIL-PRF-5606 Hydraulic Fluid	15	
Distilled Water	15	
Handling Properties	Satisfactory	8.12

TABLE IX - PROPERTIES OF TYPE 25

PROPERTY	TYPE 25	TEST METHOD SECTION
Gel Time, minutes, minimum	60	8.2
Flow, inches, maximum, at 77 F	2	8.3
Density, grams/cc, maximum average	2.0	8.5
Compressive Strength, ksi, minimum average		8.6.a..
Room temperature, after 7 +1/-0 days at 77 F cure	8.5	
350 ± 2 F, after 7 +1/-0 days at 77 F cure	2.1	
300 ±2 F, after 1 hour at 350 F then 14 days at 300 F cure	4.0	
Compressive Modulus, ksi, minimum average		8.6.b..
Room temperature, after 7 +1/-0 days at 77 F cure	350	
350 ± 2 F, after 7 +1/-0 days at 77 F cure	67	
300 ± 2 F, after 1 hour at 350 ± 2 F then 14 days at 300 ± 2 F cure	90	
Tensile Shear Strength, ksi, minimum average		8.7
Room temperature, after 1 hour at 350 F cure	1.7	
Room temperature, after 5 hours at 125 F cure	1.4	
Flammability, 12 second vertical		8.9
a. Extinguishing time, seconds, maximum	15.0	
b. Burn length, inches, maximum	8.0	
c. Drip extinguishing time, seconds maximum	5.0	
Fluid Immersion, percent weight gain, maximum average		8.10
TT-S-735, Type III Test Fluid	1.0	
MIL-PRF-5606 Hydraulic Fluid	1.0	
BMS3-11, Type IV, Class 1, Grade A, low-density aviation hydraulic test fluid	1.0	

5.5 PROPERTIES (Continued)

TABLE IX - PROPERTIES OF TYPE 25 (Continued)

PROPERTY	TYPE 25	TEST METHOD SECTION
Distilled Water	1.0	
Extrudability, gm/minute, minimum	90	8.11
Bolt Pull through 135 in-lbs Torque, maximum deflection at room temperature after 220 ± 5 F	0.005 inches No visible sign of bolt pulling through. No cracks in potting compound.	8.15

TABLE X - PROPERTIES OF TYPES 26, 27, 28, AND 29

PROPERTY	TYPE 26	TYPE 27	TYPE 28	TYPE 29	TEST METHOD SECTION
Gel Time, minutes, minimum	Class 1 60 Class 2 5	FL 1	50	- - -	8.2
Flow, inches, maximum, at 77 F	Class 1 0.2 Class 2 1.4	0.2	- - -	0.0	8.3
Density, grams/cc, maximum avg.	0.75	2.0	0.5	0.8	8.5
Compressive Strength, ksi, minimum average					8.6.a.
at 77 ± 2 F	- - -	20.0	2.0	5.5	
at 350 ± 2 F	- - -	2.0	- - -	- - -	
at 350 ± 2 F after 1 hour at 350 F cure	- - -	2.0	- - -	- - -	
Compressive Modulus, ksi, minimum average					8.6.b..
at 77 ± 2 F	- - -	500.0	60.0	280	
at 350 ± 2 F	- - -	50.0	- - -	- - -	
at 350 ± 2 F after 1 hour at 350 F cure	- - -	50.0	- - -	- - -	
Tensile Shear Strength, ksi, minimum average					8.7
at 77 ± 2 F	0.5	1.0	0.750	1.6	
at 180 ± 5 F	- - -	- - -	- - -	1.5	
at 325 ± 2 F	- - -	0.225	- - -	- - -	
Fluid Immersion, percent weight gain, maximum average					8.10
TT-S-735, Type III Test Fluid	3.5	0.5	3.0	- - -	
MIL-PRF-5606 Hydraulic Fluid	2.0	0.5	4.2	- - -	
BMS3-11, Type IV, Class 1, Grade A, low density aviation hydraulic test fluid	5.0	0.5	8.0	- - -	
Distilled water	6.0	0.5	4.1	- - -	
Extrudability, gm/min, min	- - -	270	- - -	90	8.11

5.5 PROPERTIES (Continued)

TABLE X - PROPERTIES OF TYPES 26, 27, 28, AND 29 (Continued)

PROPERTY	TYPE 26	TYPE 27	TYPE 28	TYPE 29	TEST METHOD SECTION
Bolt pull through 135 in-lbs Torque, maximum deflection at room temperature after 220 ± 5 F	- - -	0.005 in no visible sign of bolt pulling through	- - -	- - -	8.15
Hardness (Type D), max avg.	60	- - -	- - -	- - -	8.16
Tensile Strength, psi, min avg	450	- - -	- - -	- - -	
Elongation, percent, min avg	10	- - -	- - -	- - -	8.17
Flammability					8.18 and 8.19
60 Second Vertical					
a. Extinguishing Time, sec., max	- - -	- - -	5.0 FL 3	- - -	
b. Burn Length, in., max	- - -	- - -	4.0	- - -	
c. Drip Extinguishing Time, sec., max	- - -	- - -	3.0	- - -	
12 Second Vertical	- - -				8.9
a. Extinguishing Time, sec., max	- - -	- - -		15.0	
b. Burn Length, in., max	- - -	- - -		8.0	
c. Drip Extinguishing Time, sec., max	- - -	- - -		5.0	
Core cracking	- - -	FL 1	- - -	- - -	8.20

FL 1 Type 27 shall show no potting cracks or core wall separation.

FL 2 Work life of 24 hours is required instead of gel time.

FL 3 The edge potted floor panel extinguishing time (tested in accordance with Section 8.19) shall be 15.0 seconds maximum average, burn length shall be 4.0 in maximum, and drip extinguishing time shall be 3.0 seconds maximum.

TABLE XI - PROPERTIES OF TYPE 31

PROPERTY	TYPE 31	TEST METHOD SECTION
Gel Time, minutes, minimum	60	8.2
Density, grams/cc, maximum average	2.0	8.5
Extrudability, gm/minute, minimum	90	8.11
Compressive Strength, ksi, minimum average		8.6.a.
77 ± 2 F cure for 7 + 1/-0 days		
Test at room Temperature	15.4	
77 ± 2 F cure for 7 + 1/-0 days		
Test at 350 F	11.6	
200 ± 2 F cure for 2.5 + 0.5/-0.0 hrs		
Test at 350 F	12.1	

5.5 PROPERTIES (Continued)

TABLE XI - PROPERTIES OF TYPE 31 (Continued)

PROPERTY	TYPE 31	TEST METHOD SECTION
200 ± 2 F cure for 2.5 + 0.5/-0.0 hrs Test at room temperature	21.1	
Tensile Shear Strength, ksi, minimum average 200 ± 2 F cure for 2.5 + 0.5/-0.0 hrs Test at room temperature	0.85	8.7
Fluid Immersion, % weight gain, maximum average TT-S-735, Type III Test Fluid MIL-PRF-5606 Hydraulic Fluid BMS3-11, Type IV, Class 1, Grade a, low-density avaiation hydraulic test fluid Distilled Water	 1.0 1.0 1.0 1.0	8.10

6 QUALIFICATION

6.1 GENERAL

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

b. The material supplier shall have facilities capable of testing in accordance with this specification, or the supplier shall identify a testing facility. Boeing Engineering and Quality Assurance shall verify the adequacy of all test facilities and test procedures.

c. 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 Abstract 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.

d. 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 re-qualify material manufactured with the proposed change, and a revised product designation may be required.

e. Production material shall be capable of meeting all qualification requirements.

f. Qualified products are listed in the Qualified Product List (QPL).

6.1 GENERAL (Continued)

g. The Supplier shall have on file a Boeing approved Process Control Document (PCD) for these compounds requiring a PCD written in accordance with BSS7101, containing baseline chemical, in-process test information, and manufacturing procedures. The PCD may be written to cover a class of compounds or individual compounds.

h. Qualification testing shall be witnessed and evaluated at the discretion of Materials and Processes. The qualification data shall be based on three production batches unless deviation is authorized by Boeing Engineering. Qualification shall also be contingent upon Manufacturing acceptance of the material with respect to its in-process handling characteristics.

6.2 FIRST TIME QUALIFICATION

a. Suppliers seeking qualification to this specification for the first time shall submit to a facility audit of their product manufacturing operations, raw material traceability, process records, test procedures, and quality assurance records.

b. At least 1 month before the start of the qualification the Supplier shall submit to SM a PCD for review. The review shall be completed at least 2 weeks before the start of the qualification. Any changes shall be made and presented to the audit team at the time of the qualification audit.

6.3 REQUALIFICATION OF A REFORMULATED QUALIFIED PRODUCT, MODIFIED PROCESS, OR SITE RELOCATION

a. Supplier seeking re-qualification of an existing product for reason stated in Section 6.1.d. shall submit to Boeing SM a description of the change and a draft of the proposed PCD revision.

b. Boeing SM and Boeing Engineering will determine whether to test the reformulated product. The extent of testing will be determined by Boeing.

6.4 REQUALIFICATION OF AN INACTIVE SUPPLIER

a. Boeing may remove a supplier from the QPL if the supplier has not provided materials to this specification for Boeing or any of its subcontractors for a period of 2 years.

b. Inactive suppliers may become re-qualified by one of the following:

(1) Meeting the requirements of a first time qualification (Section 6.2).

(2) Showing, through control charts, that the product is a standard product and is in control and capable as defined by the Supplier's PCD and BSS7286.

7 QUALITY CONTROL

Materials tested in accordance with this section may be prepared using elevated temperature cure schedules in Table I.

7.1 SUPPLIER QUALITY CONTROL

a. Suppliers shall furnish actual test data for the following tests, showing conformance with Section 5, for each batch of material, and shall identify such data with the specification revision letter in effect.

7.1 SUPPLIER QUALITY CONTROL (Continued)

(1) Viscosity or Flow (Types 1, 3, 4, 6, 7, 12 through 15, 17, 25, 26 and 27)

(2) Gel Time (Types 1, 3, 4, 6, 7, 9, 15, 17 through 19, 24, 25, 26, 28 and 31)

(3) Handling Properties (Types 9, 10, 15, 17, and 24)

(4) Compressive Strength testing as specified in Table III, Table V, Table VI, and Table X (Types 6, 7, 12, 13, 14, and 27) is performed at 350 F after 1 hour cure at 350 F in accordance with Table I.

(5) Compressive Strength testing in Table II, Table IV, Table V, Table VII, Table VIII, Table X and Table XI (Types 1, 3, 4, 9, 10, 11, 15, 17, 18, 19, 24, 28, and 31) is performed at room temperature.

(6) Compressive Modulus testing as specified in Table III, and Table X (Types 6, 7, and 27) is performed at 350 F after 1 hour of cure at 350 F in accordance with Table I.

(7) Compressive Modulus testing as specified in Table II, Table IV, Table V, Table VII, and Table X (Types 1, 3, 4, 9, 10, 11, 15, 17, 18, 19, 28, and 29) is performed at room temperature.

(8) Hardness (Type 26)

(9) Tensile Shear Strength (Type 29)

(10) Initial Extrudability (Types 12, 13, 14, 18, Class 1, 19, 25, 27, 29 and 31)

(11) Extrudability, after 10 minutes (Type 18, Class 1)

b. The test data shall exhibit the calculated averages of the test values for each of the tests specified in this section. The individual test values for the number of samples or specimens specified in Section 8 shall be retained in permanent record form a minimum of 8 years from the date of manufacture unless otherwise specified in the purchase contract.

c. The supplier may request a reduction in the frequency of the tests required in Section 7.1.a. for materials showing high-margin conformance to the requirements of this specification. The Supplier shall include a proposed sampling plan and supporting data to justify the test frequency reduction.

d. If reduced testing is in place so that reporting of test results is affected, the supplier shall submit a certified test report which states the authorization for reduced testing (for example, specification provision Section 7.1.c. or PCD provision). The test report shall be easily understood and certify that the material meets the requirements of the BMS.

7.2 PURCHASER QUALITY CONTROL

a. Purchaser Quality Assurance shall verify that all BMS5-28 material is placed in storage immediately upon receipt, wherein the temperature is maintained as specified in Table I.

b. Purchaser Quality Assurance 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.

7.2 PURCHASER QUALITY CONTROL (Continued)

c. Purchaser Quality Assurance shall perform the following receiving inspection tests on each batch of material and determine conformance with Section 5.

(1) Initial Extrudability (Type 14, Classes 1 & 2 and Type 18, Class 1)

(2) Extrudability, after 10 minutes (Type 18, Class 1)

(3) Flammability (Types 6, 7, 9 through 15, 17, 18, 19, 24, 25, 28, and 29) as indicated in Table III through Table X and in accordance with the following restrictions.

(a) Purchasers who are fabricating parts to Engineering drawings that shall meet flammability test requirements (for example, who are qualified in D6-49225 Qualification of Sources for Interior Plastic Parts), shall perform flammability testing for potting compound materials used in the manufacture of those production parts.

(b) Purchasers who are fabricating parts to Engineering Drawings that do not require flammability testing (for example, qualified in D6-53993 Qualification of Sources for Composite Parts), are not required to perform flammability testing on potting compound materials used in the manufacture of those production parts.

(c) Purchasers who are fabricating parts that shall meet flammability requirements and parts that do not require flammability testing shall either perform flammability testing on all potting compound materials, or establish a Boeing-approved system to segregate inventory to assure that only material that has been tested for flammability is used for parts that shall meet flammability test requirements.

d. All test data and records shall be kept on file and readily available for review. Flammability data and records shall be maintained for a minimum of 7 years.

e. When consistent conformance to specification acceptance (receiving) requirements has been demonstrated, 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.

7.3 BOEING QUALITY ASSURANCE REDUCED FREQUENCY OF SUPPLIER TESTING

a. Boeing Quality Assurance shall review the Supplier's proposed sampling plan, supporting data, and Manufacturing Control Plan, and compare results from Supplier and Purchaser Quality Control tests on previously received batches. Boeing Quality Assurance shall coordinate the results of the review with Boeing Engineering, and jointly determine whether the material demonstrates sufficiently consistent and high-margin conformance to the requirements of this specification to be approved for reduced frequency testing.

b. For a material supplier that is approved for reduced frequency testing, Boeing Quality Assurance shall document the approved sampling plan and notify the Supplier in writing that the approval has been granted.

c. Boeing Quality Assurance monitor the material/Supplier for conformance to the documented reduced-frequency sampling plan and all other requirements of this specification.

8 MATERIAL TEST METHODS

Unless otherwise specified, all temperatures shall have tolerances as noted in Section 5 for Temperature Tolerances, and all times shall be nominal.

8.1 PREPARATION OF TEST SPECIMENS

Blend materials from which specimens are to be made in accordance with the manufacturer's instructions (Section 5.2) and cure in accordance with the requirements of Table I. A minimum of three specimens shall be tested in each case unless otherwise specified.

8.2 GEL TIME

a. Combine 50.0 +0/-1.0 grams of the resin base with the appropriate amount of hardener. Except for Type 18, Class 2, use 25.0 +0/-1.0 grams of Part A with the appropriate amount of hardener.

b. Blend the materials 2 to 3 minutes, for Type 18, Class 2, blend for 2 minutes ± 10 seconds, and allow to stand at 77 ± 2 F.

c. Report the gel time as the time elapsed from the start of blending to the initial formation of a nonfluid mass. When using more than 50 grams of resin base, gel time may be less than specified.

8.3 FLOW

a. Flow at 77 ± 2 F

(1) For single component materials, condition a total of 100.0 ± 0.1 grams of material at 77 ± 2 F for 4 hours minimum before testing.

(2) For two component materials, precondition the components at 77 ± 2 F for 4 hours minimum prior to blending then combine a total of 100.0 grams ± 1 gram of resin base and hardener. Hand blend for 2 to 3 minutes at 77 ± 2 F and allow to stand for 2.00 to 2.25 minutes.

(3) With the test fixture in a horizontal position, insert the blended compound so that the recess is filled flush with the surface of the fixture (See Figure 1).

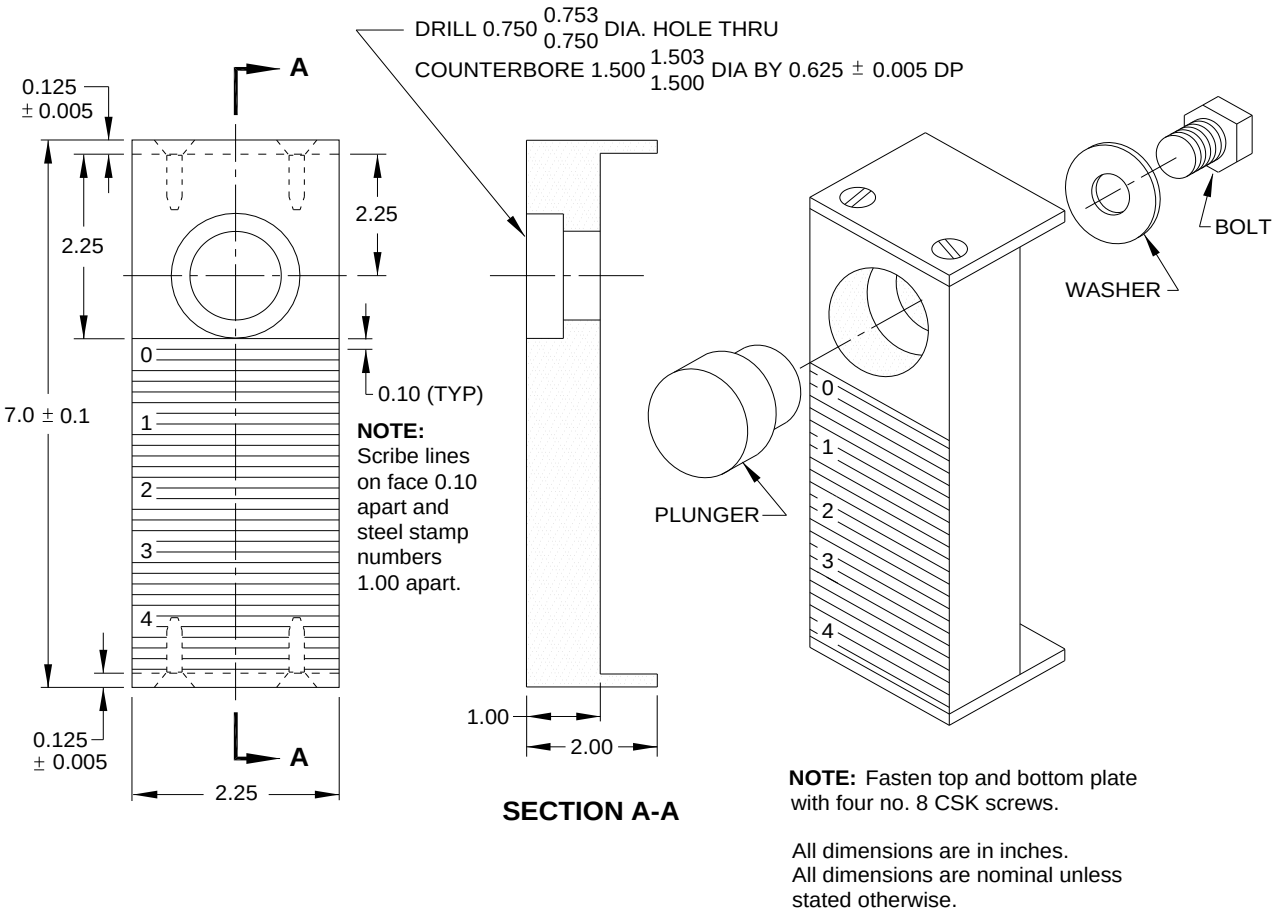
(4) Immediately place the fixture in a vertical position and push out the compound with a plunger. Retain the fixture in this position for 30 minutes minimum at 77 ± 2 F.

(5) At the end of the 30 minute minimum period, measure the maximum movement in inches of the compound from the lip of the recess to the final position. If the lowest point is not in contact with the surface of the fixture, measure the horizontal projection of the lowest point onto the plane of the fixture. The test fixture may be coated with a parting agent to aid in removal of the cured compound.

b. Flow at 125 ± 5 F

Follow the test method outlined in Section 8.3.a.. with the exception that during the 30 minute minimum test period the fixture shall be in an air circulating oven at 125 ± 5 F.

8.3 FLOW (Continued)



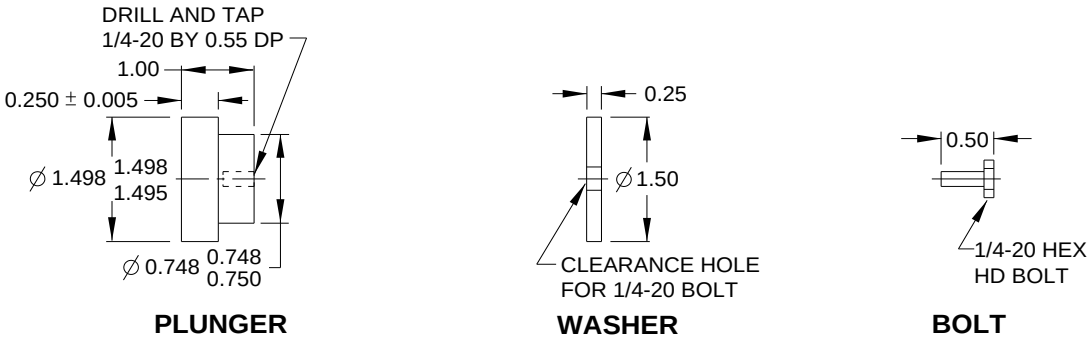


FIGURE 1 - FLOW TEST FIXTURE

8.4 VISCOSITY

a. Determine viscosity using a Model RVF Brookfield Viscometer with a Number 6 spindle operating at 20 rpm.

b. Ensure that the compound and the viscometer are maintained at a uniform temperature of 77 ± 2 F during the test.

8.4 VISCOSITY (Continued)

c. Prepare a 250 ± 1 ml sample of the compound in a clean container. Stir the components together slowly for 2 to 3 minutes to thoroughly blend the materials.

d. Insert the spindle into the sample taking care to avoid entrapment of air under the spindle plate.

e. Start the viscometer one minute after completion of blending. Allow the spindle to rotate for approximately 30 seconds. Stop the instrument through use of the clutch and read the dial.

f. Record the first reading, then allow the spindle to rotate an additional 3 to 4 cycles and take a second reading. Repeat this procedure to obtain a third reading.

g. Convert the readings to viscosity, in centipoise, and report the average of the three readings as the test value.

8.5 DENSITY

Determine density in accordance with ASTM D 792 or ASTM D 1622. Perform test at 77± 2 F.

8.6 COMPRESSIVE STRENGTH AND COMPRESSIVE MODULUS

a. Determine compressive strength in accordance with ASTM D 695. Specimens shall have a square cross section of 0.5 by 0.5 inch and be 1 inch long. All measurements are nominal.

$$\text{CompressiveStrength} = \frac{\text{Ultimate Load (Pounds)}}{\text{Cross Sectional Area (Square Inches)}}$$

b. Determine compressive modulus by drawing a straight line tangent to the initial linear portion of the load-deflection curve, and then dividing the slope of the straight line by the cross sectional area of the specimen.

$$\text{CompressiveModulus} = \frac{\text{Slope of Load} - \text{Deflection Curve (Pounds)}}{\text{Cross Sectional Area (Square Inches)}}$$

c. If elevated temperature compression and modulus testing is required, condition specimens at elevated temperature for 10 - 20 minutes prior to test.

d. Test speed shall be 0.05 ± 0.01 inch/minute.

8.7 TENSILE SHEAR STRENGTH

Tensile shear strength test methods and test specimens shall be in accordance with ASTM D 1002, at 77 ± 2 F, except 10 specimens shall be tested. Bonding pressure shall be sufficient to obtain a nominal bond line thickness of 0.01 inch. 2024-T3 clad aluminum alloy 0.064 inch thick (nominal) shall be used for preparation of the test panel. Clean and deoxidize panels in accordance with BAC5514 prior to bonding.

8.8 FLAMMABILITY (HORIZONTAL DIRECTION)

Determine flammability in accordance with BSS7230, Method F4, except that the test specimens shall be 0.50 by 0.50 ± 0.05 inch, cut from a cast, cured block of material, and the gage lines shall be 1.0 ± 0.1 inch and 4.0 ± 0.1 inches from one end of the specimen. No specimen shall burn past the 4.0 inch mark when self extinguishing is required.

8.9 FLAMMABILITY (VERTICAL DIRECTION, 12-SECOND IGNITION)

Determine flammability in accordance with BSS7230, Method F2, except that the test specimens shall be 0.50 by 0.50 inch nominal, cut from a cast, cured block of material. Test specimens that are 5.00 ± 0.05 inch long may be used unless the burn length on any specimen exceeds 4 inches, in which case the results shall be rejected and a set of specimens 12.0 ± 0.1 inches long shall be tested.

8.10 RESISTANCE TO AIRCRAFT FLUIDS AND MOISTURE

a. Cut specimens of the material 0.50 ± 0.05 by 0.50 ± 0.05 by 0.50 ± 0.05 inch from a cast, cured block of material.

b. Weigh the specimens to the nearest 0.001 gram.

c. Immerse five specimens in each of the following test fluids for 24 to 25 hours at 77 ± 2 F.

(1) TT-3-375, Type III Test Fluid

(2) MIL-PRF-5606 Hydraulic Fluid

(3) BMS3-11, Type IV, Class 1, Grade A, Low-Density Aviation Hydraulic Test Fluid

(4) Distilled Water

d. Following immersion, remove the specimens, wipe dry with a soft cloth, and weigh.

e. Calculate the percent weight increase from the equation:

$$\frac{(\text{Final Weight} - \text{Initial Weight})}{(\text{Initial Weight})} x100 = \text{percent weight increase}$$

8.11 EXTRUDABILITY

a. Frozen material may be left at room temperature to thaw or the container may be placed in 77 ± 5 F tap water. Insert a thermometer or thermocouple when material is soft and continue to heat until thawed.

b. For two component materials, precondition the components at 77 ± 5 F for 4 hours minimum prior to blending, then combine 50 ± 1 gram of resin base with the required amount of hardener. Hand blend for 2 to 3 minutes.

c. Place the potting compound in a 6 oz. (150mL) cartridge (Semco No. 250 – C6 or equivalent). The cartridge shall have no nozzle unless otherwise specified in Table XII. The nozzle shall be 0.125 in. ± 0.005 in. (3.0mm – 3.3mm) (Semco No. 440 or equivalent) with a smooth bore, free of flash or other protrusions.

d. Test conditions shall be in accordance with Table XII when specimens are conditioned at a hold temperature of 77 ± 2 F and a minimum hold time as stated in Table XII.

8.11 EXTRUDABILITY (Continued)

TABLE XII - TEST CONDITIONS

TYPE	CLASS	MINIMUM HOLD AT 77 ± 5 F	TEST TEMP. F	NOZZLE
12	1 and 2	4 hours	77 ± 2 F	No FL 1
13	- - -	18 hours	77 ± 2 F	No
14	1	8 hours	77 ± 2 F	No
14	2	8 hours	115 ± 5 F	No
18	1	4 hours FL 2	77 ± 2 F	Yes
18	2	4 hours FL 2	77 ± 2 F	Yes
19	- - -	4 hours FL 2	77 ± 2 F	Yes
25	- - -	4 hours FL 2	77 ± 2 F	Yes
27	- - -	24 hours	77 ± 2 F	No
29	- - -	4 hours	77 ± 2 F	Yes
31	- - -	4 hours FL 2	77 ± 2 F	Yes

FL 1 Test after Table I storage time limit

FL 2 Prior to blending

e. For Type 18 Class 1, blend material in accordance with Section 8.2. After blending, place material in tube in accordance with Section 8.11.c..

f. For all types and classes, use 75 to 85 psig air pressure and extrude 2 to 3 inches of material to clear trapped air. After 10 minutes elapsed time from beginning of blending, extrude material onto a tared sheet of paper for about 10 seconds with the sealant gun operating at full rate. Time may be adjusted depending upon how quickly the tube empties, but should be measured to the nearest second. Weigh the extruded potting compound and calculate extrudability.

g. Calculate extrudability as follows:

$$\text{Extrudability (gm/minute)} = \frac{\text{weight extruded (grams) x 60 (seconds/minute)}}{\text{flow time (seconds)}}$$

8.12 HANDLING PROPERTIES

Combine 100.0 ± 0.1 grams of resin base with the required amount of hardener as described in Section 8.1 or, in the case of one part products, use 150.0 ± 0.1 gram of material. Hand blend for 2 to 3 minutes. Wearing a pair of clean, white cotton gloves, roll the mixture between the hands, forming a sphere with approximately 2 inch diameter. Compress the sphere between the palms, forming an oblate spheroid from the gloved hands, and observe the condition of the potting compound. Report handling properties as satisfactory if the potting compound does not crumble and does not leave excessive residue on the gloves. Report handling properties as not satisfactory if the potting compound cracks and breaks into small pieces and/or clings to the gloves when released from the gloved hands.

8.13 FLEXURE TESTING PROCEDURE AND REQUIREMENTS

a. Prepot a BMS8-124, Class IV, Type V, Grade 3.0, 0.95 inch nominal thickness core with BMS5-28, Type 10 as shown in Figure 2, and cure under vacuum bag pressure of 20 inches of mercury (minimum) for a minimum of 1 hour at 260 ± 10 F.

8.13 FLEXURE TESTING PROCEDURE AND REQUIREMENTS (Continued)

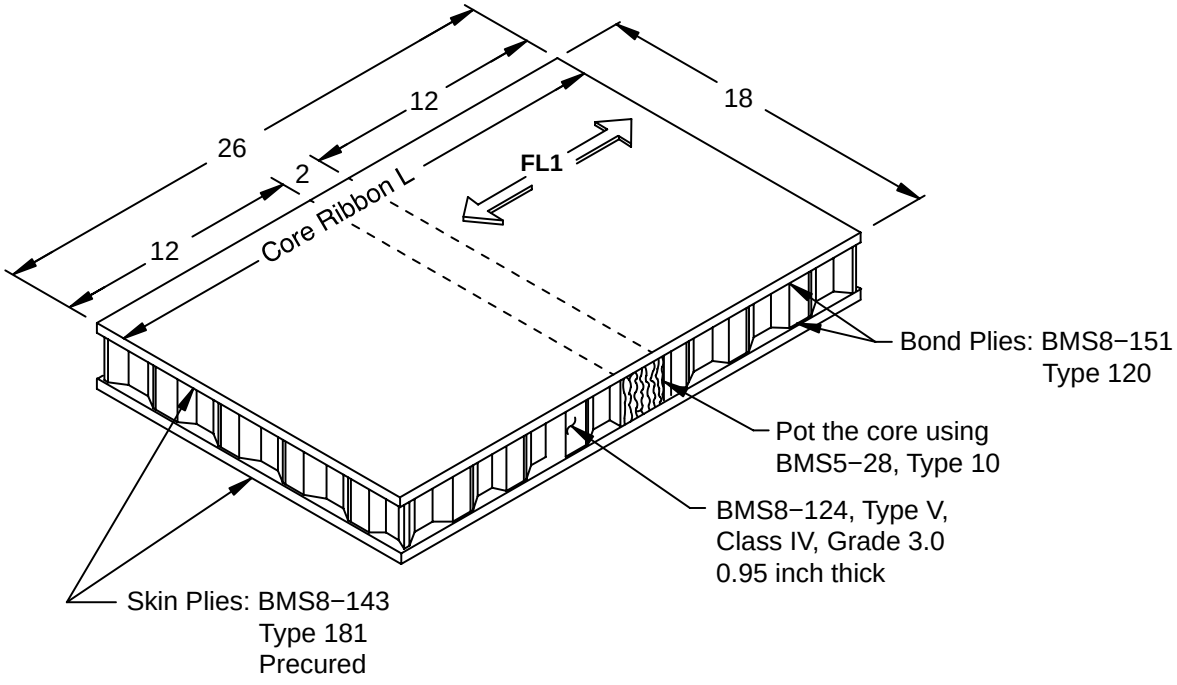


FIGURE 2 - FLEXURE PANEL LAYUP

All dimensions are in inches

All values are nominal

FL 1 Warp direction of pre-cured BMS8-143, Type 181, both sides

b. Obtain five long beam flexure test specimens from the test panel and prepare as shown in Figure 3. Test the specimens in accordance with ASTM C 393 using three point loading. Calculate the ultimate stress and modulus of elasticity in flexure developed in the faces as follows:

$$F = \frac{\mathrm{PL}}{4bt_f(\mathrm{t} - t_f)}$$

$$E = \frac{(\mathrm{P/Y})L^3}{4\mathrm{b}\,(t^3 - t_c{}^3)}$$

where:

F = ultimate flexure stress, psi

P = load, pounds

L = span, inches

b = specimen width, inches

t_f = face thickness, inches FL 1

8.13 FLEXURE TESTING PROCEDURE AND REQUIREMENTS (Continued)

t = sandwich thickness, inches

E = flexure modulus, psi

P/Y = tangent to initial portion of load-deflection curve, pounds/inch

t_c = core thickness, inches ($t - 2t_f$)

FL 1 For the decorative face ply cured over core, use 0.018 inch as the thickness.

All dimension in inches
All values are nominal

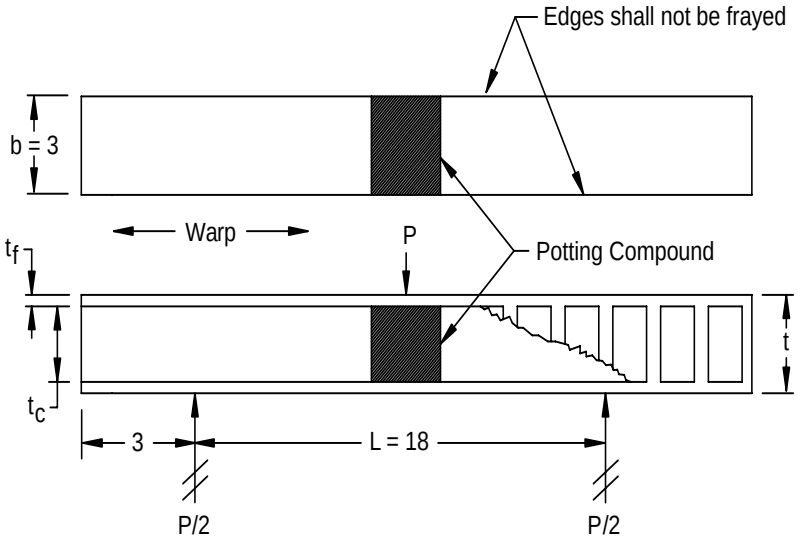


FIGURE 3 - FLEXURE TEST SPECIMEN CONFIGURATION

8.14 INSERT PULL-OUT AND TORQUE

a. Prepare test specimens as illustrated in Figure 4.

8.14 INSERT PULL-OUT AND TORQUE (Continued)

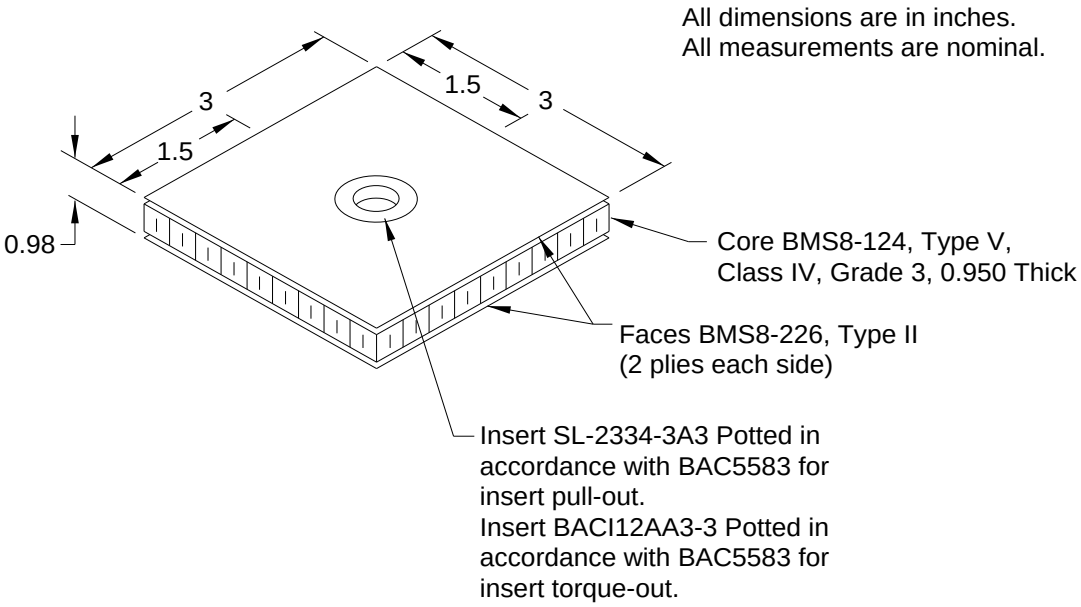


FIGURE 4 - TENSILE PULL-OUT AND TORQUE TEST SPECIMEN CONFIGURATION

b. Prepare and test three specimens as shown in Figure 5. The rate of pull shall be set at 0.05 inch per minute. Determine the average of the values obtained and report as the test value.

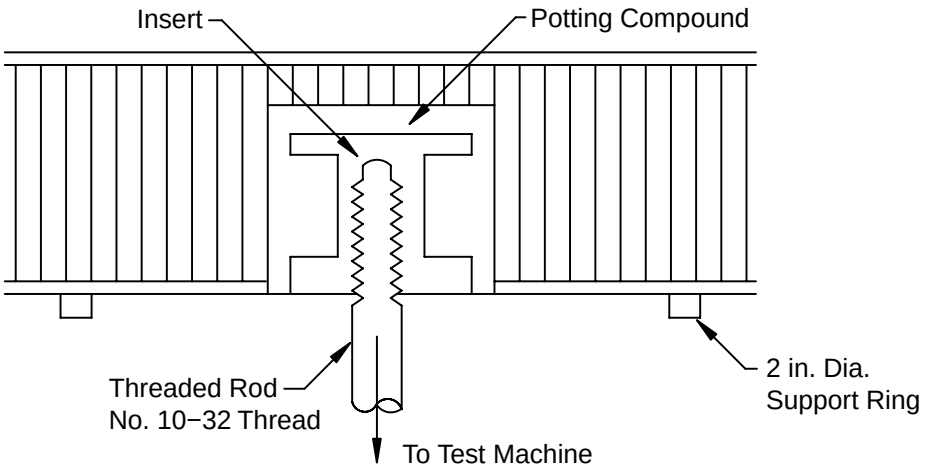


FIGURE 5 - TENSILE PULL-OUT TEST CONFIGURATION

c. Prepare and test three specimens as shown in Figure 6. Apply torque at a steady rate of approximately one revolution every 5 seconds. Determine the average of the values obtained and report as the test value.

8.14 INSERT PULL-OUT AND TORQUE (Continued)

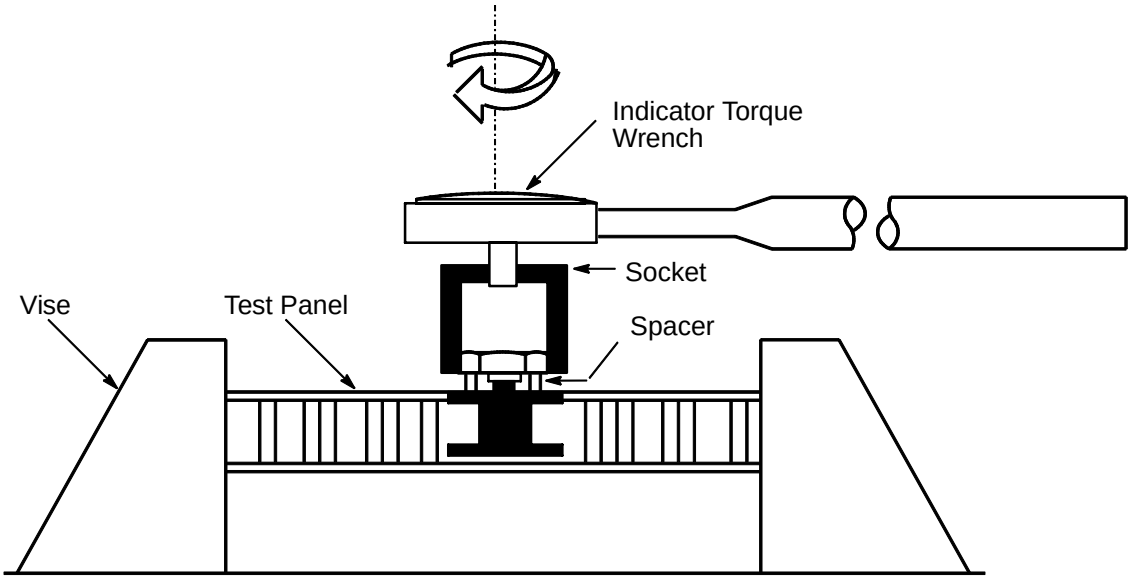
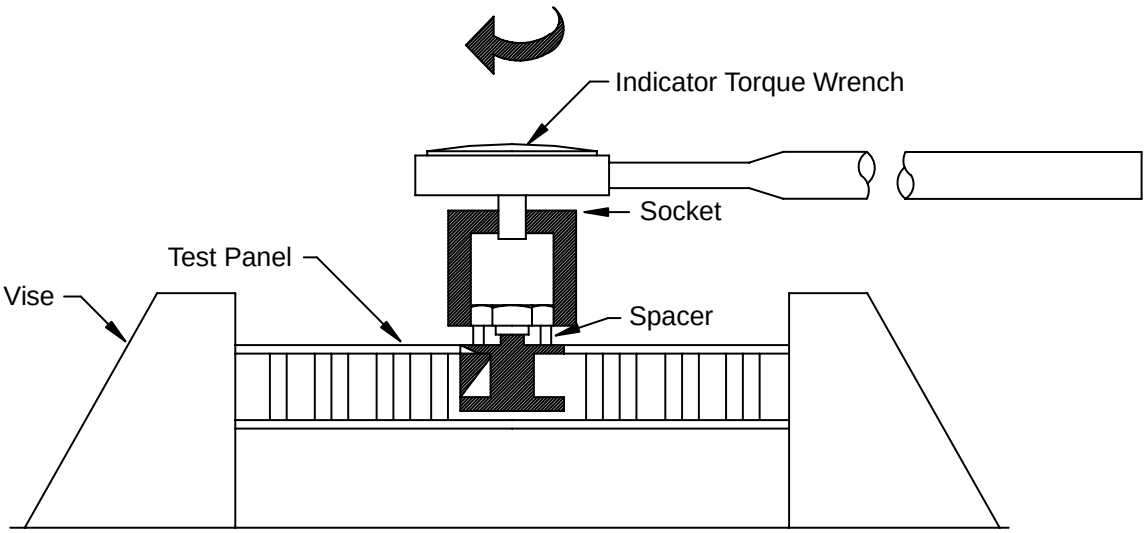


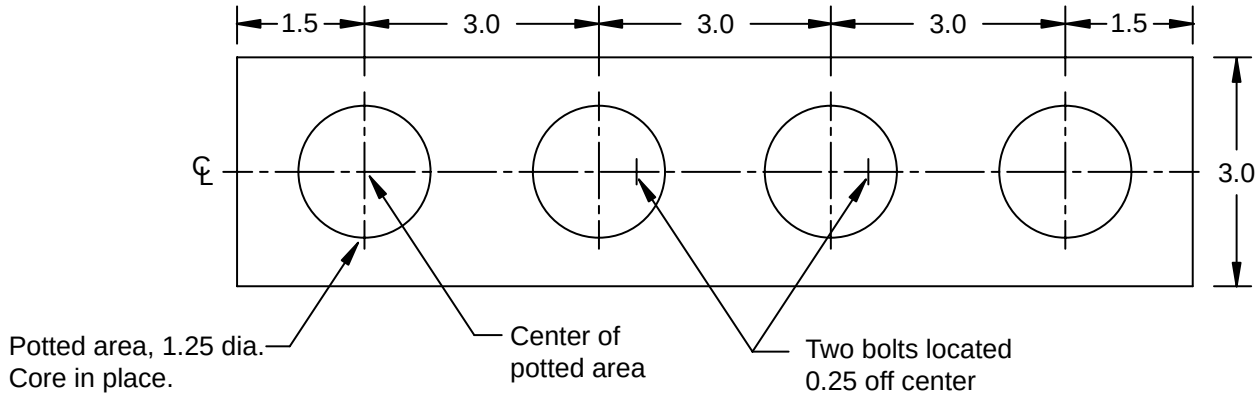
FIGURE 6 - TORQUE-OUT TEST SETUP



8.15 BOLT PULL THROUGH

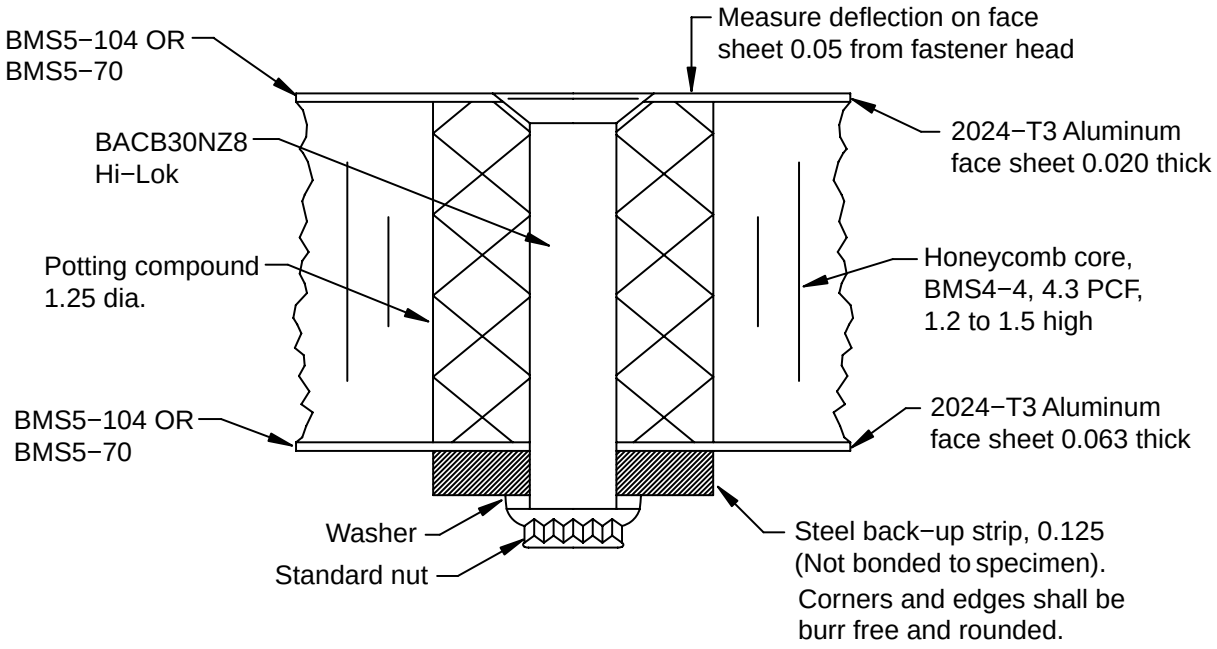
a. Fabricate a test specimen with four potted areas as illustrated in Figure 7 and Figure 8. Drill holes for insertion of bolts so that two of the holes are centered and two of the holes are 0.25 inch off center. Bolts shall be installed in accordance with BAC5009.

8.15 BOLT PULL THROUGH (Continued)



ALL DIMENSIONS ARE IN INCHES

FIGURE 7 - TEST PANEL CONFIGURATION



ALL DIMENSIONS ARE IN INCHES

FIGURE 8 - BOLT PULL THROUGH SPECIMEN CONFIGURATION

b. Place specimens in a test fixture that allows torque to be applied evenly and the torque indicating needle to be observed continuously (see Figure 9).

8.15 BOLT PULL THROUGH (Continued)

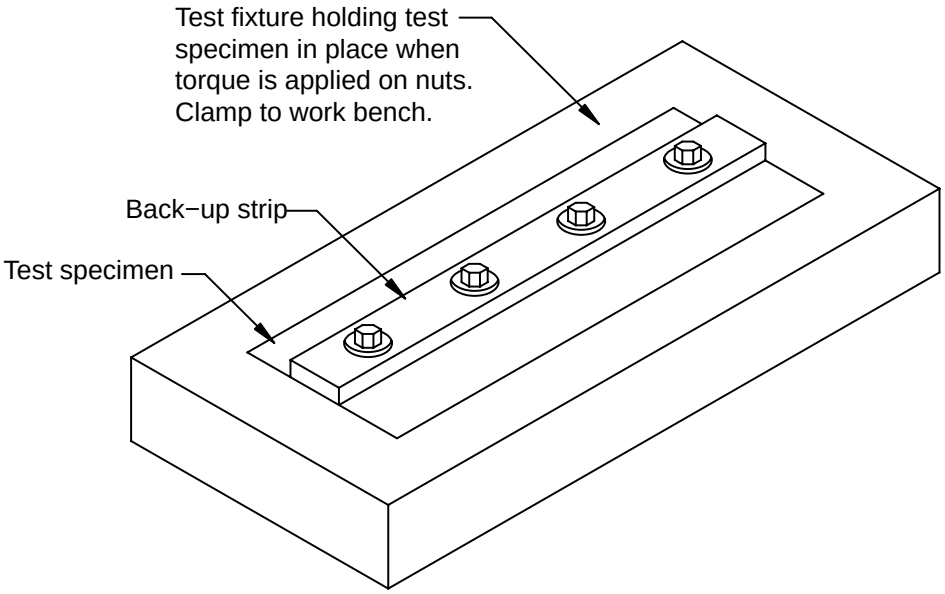


FIGURE 9 - BOLT PULL THROUGH TEST SETUP

c. Room Temperature Testing:

Apply torque on the nut at an even nominal rate to 45 in-lbs, 90 in-lbs, and 135 in-lbs. Measure deflection 0.05 inch nominal from the fastener head at each of these increments (see Figure 8). Observe the needle continuously when applying torque.

d. Elevated Temperature Testing:

After all fasteners on the specimen have been torqued to 135 in-lb nominal, expose the specimen to 220 ± 5 F until the entire specimen has stabilized at that temperature. Reduce the temperature to 75 ± 5 F and measure the deflection at the same location as in Section 8.15.c.

e. After testing is completed, cut the core in each specimen parallel to the face sheets and inspect for cracks in the potting compound.

8.16 HARDNESS

Conduct Type D Durometer Hardness on cured material in accordance with ASTM D 2240. Average a minimum of five readings.

8.17 TENSILE STRENGTH AND ELONGATION

Conduct tensile strength and percent elongation in accordance with ASTM D 412. Prepare a flat sheet of material approximately 0.125 inch thick and cut five dumbbell specimens using Die C. Test for tensile and elongation using a machine set speed of 0.2 inch/minute.

8.18 FLAMMABILITY (CAST SPECIMEN)

Cut three test specimens from a cured block or sheet of material. Specimen thickness shall be 0.125 ± 0.002 inch, and width and length shall be nominally 3 by 12 inches. Conduct flammability testing in accordance with BSS7230 Vertical Test Method F1 (60-second ignition), or Method F2 (12-second ignition) as specified.

8.19 FLAMMABILITY (EDGE POTTED FLOOR PANEL)

a. Cut three 12.0 by 3.0 inch nominal test specimens from BMS4-17, Type I Class 1, floor panel.

b. Route each specimen at one 3 inch end to a depth of 0.125 to 0.250 inch.

c. Pot the routed edges and cure the panels.

d. Conduct flammability testing in accordance with BSS7230 Vertical Test Method F1 (60-Second Ignition).

8.20 CORE CRACKING

a. Cut a 12.0 ± 0.1 by 12.0 ± 0.1 by 0.60 ± 0.05 inch specimen from BMS8-124, Class IV, Type I, Grade 4 honeycomb core.

b. Thaw the frozen potting compound for 3 hours minimum at room temperature and fill a 10 by 10 inch minimum area of the core specimen. Place coarse fiberglass fabric under the core before potting in order to allow trapped air to bleed from the core.

c. Cure the potting compound in accordance with the manufacturer's instructions.

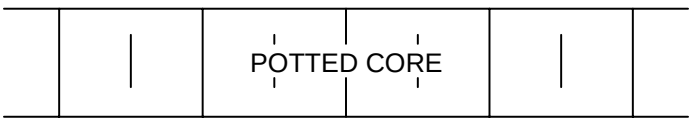
d. X-ray the potted core after curing. The X-ray shall show no potting compound cracks and/or core wall separation.

e. Lightly sand the potted area with 150 grit or finer aluminum oxide sandpaper and wipe with methyl ethyl ketone to remove dust.

f. Bond graphite skins to the potted core and cure in accordance with BAC5317-1 using the materials and configurations shown in Figure 10.

g. Conduct X-Ray and Through Transmission Ultrasonic (TTU) examinations of the cured sandwich panel for potting compound cracks and core wall separation in accordance with BAC5439 and BSS7041.

Graphite	0 - 90	8 Harness FL 1
Graphite	0 - 90	Plainweave FL 2
Graphite	± 45	8 Harness
Graphite	± 45	Plainweave
Graphite	0 - 90	Plainweave
Graphite	± 45	8 Harness
Graphite	0 - 90	Plainweave
Graphite	± 45	Plainweave
Graphite	± 45	8 Harness
Graphite	0 - 90	Plainweave
Graphite	0 - 90	8 Harness
Film Adhesive		FL 3



Film Adhesive FL 3

8.20 CORE CRACKING (Continued)

Graphite	0 - 90	8 Harness
Graphite	0 - 90	Plainweave
Graphite	± 45	8 Harness
Graphite	± 45	Plainweave
Graphite	0 - 90	Plainweave
Graphite	± 45	8 Harness
Graphite	0 - 90	Plainweave
Graphite	± 45	Plainweave
Graphite	± 45	8 Harness
Graphite	0 - 90	Plainweave
Graphite	0 - 90	8 Harness

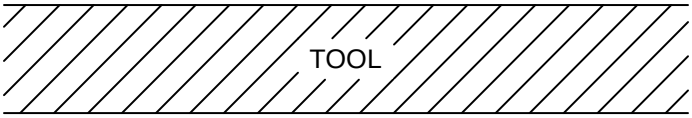


FIGURE 10 - LAY-UP CONFIGURATION OF CORE-CRACKING TEST SPECIMENS

FL 1 BMS8-212, Type III, Class 2, Style 3K-135-8H

FL 2 BMS8-212, Type IV, Class 2, Style 3K-70-PW

FL 3 BMS8-245, Type II, Class 1, Grade 05 adhesive

NOTE: If a prepreg is in contact with the prepreg of a different class or type, the prepregs shall come from the same supplier.

9 MATERIAL IDENTIFICATION

Each container of a component BMS5-28 material shall be legibly and durably marked with the following information:

a. BMS5-28 (including the latest revision letter) and Type (including Class or Grade)

b. Manufacturer's name and material designation

c. Manufacturer's batch or lot number

d. Blending proportions (not required for single component materials)

e. Date of manufacture

f. Recommended storage temperature

10 PACKAGING AND MARKING

a. Material shall be furnished in one quart kits unless otherwise specified.

b. Each component of each kit shall be packaged in clean, airtight containers that will not contaminate the contents.

c. The exterior packaging shall be of such a nature as to assure safe delivery.

10 PACKAGING AND MARKING (Continued)

d. When containers are shipped in a package, each package shall be marked durably and legibly with the following information:

(1) BMS5-28 (including the latest revision letter) and Type (including Class and Grade as applicable)

(2) Supplier's name and product designation

(3) Batch or lot number

(4) Date of manufacture

(5) Purchase order number

(6) Quantity

(7) Recommended storage temperature

e. All labeling shall conform to 29 CFR 1910.1200.

f. Packaging shall be accomplished in such a manner as to assure delivery of material capable of meeting the requirements of this specification.