

INCH-POUND

MIL-DTL-32265
2 November 2007DETAIL SPECIFICATION SHEET
FOLDED FIBERGLASS MAT FABRICATION AND PACKAGING

This specification is approved for use by all
Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This document specifies the requirements for folded fiberglass mats (FFM) and joining panels for airfield pavement repair. Fiberglass mats are used as foreign object debris (FOD) covers, for crushed-stone crater repairs as part of Air Force's airfield damage repair (ADR) procedures. Mat assemblies are packaged with two folding fiberglass mats and four joining panels together. Note this specification eliminates "training mats" and modifies the "operational mats" defined in the previous specification. Folded fiberglass mat (FFM)/fiberglass reinforced plastic (FRP) foreign object damage (FOD) covers are suitable only for fighter aircraft and C-130 operations. These FOD covers are not approved for C-17, C-5 Galaxy, C-141 Starlifter, KC-10 Extender, and KC-135 Stratotanker operations.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this standard. This section does not include documents cited in other sections of this standard or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this standard, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-Y-1140	Yarn, Cord, Sleeving, Cloth and Tape -Glass Resin, Polyester, Low Pressure Laminating Mats, Reinforcing, Glass Fiber
MIL-R-7575	Resin, Polyester, Low-Pressure Laminating
MIL-M-43248	Mats, Reinforcing, Glass Fiber

Comments, suggestions, or questions on this document should be addressed to HQ AIR FORCE CIVIL ENGINEERING SUPPORT AGENCY, CONTINGENCY SUPPORT DIRECTORATE, TYNDALL AFB, FL 32403-5319, or emailed to AFCESAR@Tyndall.af.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST database at <http://assist.daps.dla.mil>

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-129 Marking for Shipping and Storage

(Copies of these documents are available online at <http://assist.daps.dla.mil> or <http://assist.daps.dla.mil/quicksearch> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

Federal Handbooks

H4/H8 Commercial and Gov't Entity Codes (CAGE)

(Copies of these documents are available at DLIS-VSS Customer Contact Center by emailing dlis-support@dlis.dla.mil or by contacting the Defense Logistics Information Service 74 Washington Ave N Ste 7, Battle Creek, MI 49017-3084)

Federal Register

EPA 40 CFR 261 Identification and Listing of Hazardous Waste Vol. 60 Number 245 dated 1995 Pages 66343-66469

(Federal Register documents can be obtained through <http://www.gpoaccess.gov/cfr/retrieve.html> or by contacting U.S. Government Printing Office 732 N. Capitol Street, NW Washington, DC 20401)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM G154	Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials
ASTM D123	Standard Terminology Relating to Textiles
ASTM D696	Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C With a Vitreous Silica Dilatometer
ASTM D732	Test for Shear Strength by Punch Tool
ASTM D790	Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D1929-96	Standard Test Method for Determining Ignition Temperature of Plastics
ASTM D4389	Standard Specification for Finished Glass Fabrics Woven From Rovings—Used instead of ASTM D2410 Test Method for Finish Content of Woven Glass Fabric, Cleaned and After-Finished with Chrome Complexes, for Plastic Laminates (Withdrawn 1988)
ASTM D2565	Standard Practice for Xenon Arc Exposure of Plastics Intended for Outdoor Applications
ASTM D2583	Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
ASTM D3039/M,	Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials
ASTM D3950	Standard Specification for Strapping, Nonmetallic (and Joining Methods)
ASTM D4801	Standard Specification for Polyethylene Sheeting in Thickness of 0.25 mm (0.010 in.) and Greater
ASTM B633-07	Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel

(ASTM documents may be obtained at www.astm.org or addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated specifications or specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Mat Description. The fiberglass-reinforced mats defined in this specification include mats, and joining panels. Mats are constructed of rigid fiberglass panels connected by flexible elastomer hinges. The rigid panels are 30 feet long by approximately 6 feet wide. Hinges are 3 inches wide by 30 feet long. Each mat has nine panels and is 30 feet long by 54 feet wide when unfolded. Mats are folded in an accordion (fanfold) fashion along the hinges for shipment and storage. The mats are nominally 0.20 Inch thick, except around the perimeter which is reinforced to 0.30 inches. Anchoring holes are cut along all four edges of the mat and spaced 2 feet apart. Two or more mats may be joined together using joining panels. The FFM is air-transportable, can be moved easily by vehicles, can be positioned at greater distances from airfield pavement surfaces, and can be stored indoors out of the elements.

3.2 Materials. Rigid mats and joining panels are a fiberglass-reinforced polyester resin composite. The resin is the thermosetting polyester type, in accordance with Section 3.2.1. Flexible hinges are a fiberglass and polyester reinforced polyurethane elastomer composite. The elastomer is a polyether-based polyurethane type, in accordance with 3.2.2. Both rigid panels and hinges are made with reinforcement fiberglass constructed of a plain-weave pattern of rovings bonded to a chopped fiberglass mat, in accordance with 3.2.3. Hinges are reinforced with an additional three (3) ply of polyester material, in accordance with 3.2.4.

3.2.1 Polyester Resin Requirements. Rigid mat and joining panels shall be made using a polyester resin. The resin shall be the polyester, thermosetting, low-pressure, laminating type. The resin shall be styrenated and shall contain a styrene suppressant which shall not adversely affect secondary bonding or environmental stability. A catalyst may be used to achieve appropriate gel times. Note: The previous version of this specification (RRR-88-003) had 60-AA-143 resin from Erskine-Johns as an approved product. This product is no longer manufactured and Erskine Johns is part of Composites One. Products submitted for approval shall match the characteristics of 60-AA-143 and shall conform to MIL-R-7575C, Grade A, Class 0, with the following exceptions:

- a. The requirements of Section 3.1.1 of MIL-R-7575C, titled "One year weathering data," may be fulfilled by testing sample laminates (prepared using the polyester proposed for mat fabrication and the fiberglass reinforcement specified in 3.2.3) which have been exposed to artificial ultra violet (UV) light for 720 hours, as per ASTM 2565. The UV-conditioned laminate must retain 75 percent of its initial flexural strength when tested per ASTM 790, and retain 75 percent of its initial tensile strength when tested per ASTM 3039.
- b. The requirements of Section 3.7 of MIL-R-7575C, titled "Mechanical and physical properties of the laminate," are waived.
- c. The requirements of Section 4.3.1 of MIL-R-7575C, titled "Sampling for Preproduction Test," are waived. Resin suppliers shall submit samples and materials as required by the manufacturer to conform to the requirements of MIL-R-7575C as modified herein.
- d. The requirements of Section 4.5.1 of MIL-R-7575C titled "Test conditions," are waived. Test conditions shall be as required to conduct the tests specified in Table III of MIL-R-7575C. The conditioning period for any test, however, must not be less than 4 hours.

- e. The test methods specified in Section 4.6 of MIL-R-7575C, titled "Test methods," may be substituted with those published by the Resin Technical Committee of the Composites Institute of The Society of the Plastics Industry.
- f. The resin and catalyst composition shall be designated by a code number. The code number may include a trade name, if desired. Any changes in the resin components or manufacturing process shall necessitate use of a different code number. The cured resin shall not be corrosive to metals. When used in conjunction with the fiberglass specified in 3.2.3 and tested as per Section 4.4, the resin shall produce a laminate with the required physical properties listed in 3.3.1.

3.2.2 Hinge area elastomer

3.2.2.1 Requirements. Mat hinges shall be fabricated using an elastomer compound. The elastomer shall be the polyether-based polyurethane type. The contractor shall designate each elastomer composition by a code number. The code number may include a trade name, if desired. Any changes in the elastomer components or manufacturing process shall necessitate the use of a different code number. When used in conjunction with the fiberglass specified in 3.2.3 and 3.2.4 and tested as per 4.4, the elastomer shall produce a laminate with the required physical properties listed in 3.3.1. The elastomer shall remain stable and flexible at temperatures between 15°F and 120°F. The elastomer shall be such that the cured laminate does not constitute a hazardous waste when offered for disposal, as defined by Federal Register, Vol. 60, No. 245, December 21, 1995, [Proposed Rules], Page 66343-66469, and EPA 40 CFR 261. The elastomer type used to fabricate mats under this specification will require qualification of the product in accordance with 4.21. A change in the elastomer will require re-qualification under 4.2.2.1.

3.2.2.2 Physical Properties. The resin shall be a two component urethane elastomer designed specifically to make flexible molds for use with thermosetting resins. This elastomer shall mix, pour, and cure at room temperature. It shall not be moisture sensitive. The fully cured, un-reinforced elastomer shall have a minimum ultimate tensile strength of 1000 psi, and a minimum elongation of 800% when tested in accordance with 4.4.10. After accelerated aging at 160°F and 95% relative humidity continuously for 120 days, the un-reinforced elastomer shall retain at least 75% of its original tensile strength and elongation. The elastomer shall also meet the UV aging requirements of 3.2.1.1. Note: The previous version of this specification (RRR-88-003) called for Uralite 3147 as an approved product. This product is no longer manufactured, but products submitted for approval shall match the characteristics of this product listed in the Elastomer Physical Properties Table 1.

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Processing Properties	ASTM Test Method	Value
Viscosity Part A at 77° F, CPS	D -2393-71	6,800
Viscosity Part B at 77° F, CPS	D -2393-71	50
Viscosity Mixed at 77° F, CPS	D -2393-71	5,000
Work Life, Min at 77° F, 100 GAS	N/A	15
Mix Ratio by Weight (A/B)	N/A	100/20
Mix Ratio by Volume (A/B)	N/A	100/19.2
Color	N/A	Black
Performance Properties	ASTM Test Method	Value
Shore Hardness, A	D-2440-08	10-35
Gel Time, (100) Min. at 77° F	D-2471-71	25
Tensile Strength, PSI	D-412-08	1,150
Elongation %	D-412-08	970
Tear Strength, PPI	D-024 DIE C	185
Tear Strength, PPI	D-470	52
Tear Strength, PPI	D-1938	98.8
Density Part A (Lbs/Gal)	D-792-66	1.029 (8.59)
Density Part B (Lbs/Gal)	D-792-66	1.071 (8.92)
Modulus at 100% PSI	D-412-68	239
Modulus at 300% PSI	D-412-68	632
Cure Cycle	ASTM Test Method	Value
Demolding time, Hrs at 77° F	N/A	12-24
Demolding time, Hrs at 180° F	N/A	2
Complete Cure, Days at 77° F	N/A	3

Table 1 Elastomer Physical Properties

3.2.3 Fiberglass Reinforcement.

3.2.3.1 Fiberglass Type. The fiberglass reinforcement used for the rigid mat panels, hinges, and joining panels shall be a fiberglass fabric mat reinforcement composite Type III Class I Grade A per MIL-M-43248C. The fabric mat reinforcement composite is made of a plain-weave pattern of rovings stitched to a chopped fiberglass mat. One ply is defined as the combination of the woven roving bonded to the chopped fiber layer. Definition of the textile terms used herein is described in ASTM D123. All fiberglass used in the woven roving and chopped fiber mat portions of the reinforcement shall be E-type (MIL-M-43248C). The glass shall be white in color.

3.2.3.2 Woven Roving. The woven roving shall be constructed by weaving, in a plain weave, 113 linear yards per pound fiberglass rovings into a pattern consisting of four rovings per inch in the warp by two double rovings per inch in the fill. The woven roving shall have an average weight of 40.8 +/- 2.4 ounces per square yard. Each roving shall consist of continuous filament yarns of style number ECK75-1/0 in accordance with MIL-Y-1140. A silane sizing compatible with the rigid panel resin and flexible hinge elastomer shall be applied to the roving, in accordance with ASTM D4389.

3.2.3.3 Chopped Fiber Mat. The chopped fiber layer shall consist of randomly oriented fibers 1.5 to 2.5 inches long. The fibers shall be designated as type "K" fibers with an average diameter of 0.00051 inch, or type "H" fibers having an average diameter of 0.0004 inch. The fibers shall be treated with a silane sizing compatible with the rigid-panel resin and flexible hinge elastomer in accordance with ASTM D4389, and shall be bonded together with a compatible bonding agent. The chopped fiber shall weigh 2.0 +/- 0.2 ounces per square foot (18 +/- 1.8 ounce per square yard).

3.2.3.4 Reinforcement Composite. The chopped fiber mat shall be bonded, with a compatible bonding agent, to one side of the woven roving to form a ply. The minimum thickness of the ply shall be 0.100 inch when measured in accordance with the procedure described in MIL-M-43248. The nominal weight of a ply shall be 58.8 ounces per square yard.

3.2.4 Polyester Hinge Reinforcement.

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3.2.4.1 Requirements. The additional hinge reinforcing material shall be a woven polyester cloth, 8.6 ounces/square yard, specifically manufactured, and sized (treated) for use with thermosetting polyester resins in the production of composite materials. The material shall thoroughly wet out with the resin in 3.2.1, and bond to the fiberglass reinforcement.

3.2.4.2 Approved Resources. Poly Compet™, PF(K) 1W70, 1000 basket weave, 11x11-3, 8.6 oz., manufactured by Honeywell. Alternative sources may be used if they meet the requirements of 3.2.4.1 and are approved by the government as required by 4.2.2.2.

3.3 Design and Construction of Components.

3.3.1 Mats.

3.3.1.1 Dimensions. Mats shall be finished to the dimensions shown in Appendix A Sheet 1 of 6. The minimum thickness of the mat at any point made with two plies of reinforcement, including hinges, shall be 0.20 inch. The minimum thickness of the mat within the three-ply edge reinforcement area shall be 0.30 inch. For testing purposes (see 4.4) the mats shall be fabricated with an 8.75 foot wide by 6 foot long quality-control tab which shall be trimmed as indicated in Appendix A Sheet 1 of 6. As an alternate, the QC tab may be laminated adjacent to the rigid panel mold by the same personnel, same process and same equipment, at the same time during the curing cycle of the production mat. The QC tab shall be fully representative of the production mat to include at least one 6-inch overlap in one ply of the rigid panel area. The QC tab shall be tested at the discretion of the Government. In the event that government representatives have concerns with product quality or whether the QC tab is representative of production mats, the Government reserves the right to sample and test actual mats; whereas the inspection of actual mats will always supersede the inspection of QC tabs.

3.3.1.2 Fiberglass Reinforcement layouts. The mat reinforcement shall be the type specified in 3.2.3 and may be laid out on the mold in either direction. The reinforcement shall be placed in continuous, unsegmented sections for the full length that it is laid out and shall be of a width that allows for a maximum of two overlaps in the same ply between two hinges in the same rigid panel when the material is laid out in the 30-foot direction. Splicing together reinforcements to form adequate length or width dimensions is unacceptable. Adjacent strips of reinforcement shall overlap each other by 6 inches. Placement of the bottom and top plies shall be staggered such that overlaps between rolls of the top ply do not fall on top of the overlaps of the bottom ply. Additionally, if the reinforcement is laid out in the 30-foot dimension, no overlaps are allowed in the hinge area. The woven rovings shall face out and the chopped fiber layers shall face inward on the two plies of the mat. A third ply of reinforcement, 18 inches wide, shall be placed between the two main plies, on the outer perimeter of the mat for edge strengthening.

3.3.1.3 Polyester Reinforcement Layout. The polyester reinforcement shall be the type specified in 3.2.4. Three unsegmented plies of this material, 18 inches wide, are required to reinforce each hinge. One ply is on the bottom, mold side, the second ply is placed between the two fiberglass plies, and the third ply of polyester reinforcement shall be placed the full length on the top of all hinges. All plies are aligned such that they are centered along the hinge area extending approximately 7.5 inches beyond each side of the 3-inch wide hinges.

3.3.1.4 Hinge. Hinges are located as shown in Appendix A Sheet 1 of 6. The hinge area shall consist of the fiberglass and polyester reinforcement impregnated with a polyether-based polyurethane elastomer (3.2.2). The hinges shall be no more than 3 inches wide. The elastomer shall thoroughly wet all reinforcement. The interface between the two filler materials shall make a straight line with no voids that would allow bare reinforcing to be exposed. The maximum migration of material (either polyester or elastomer) across the hinge/ rigid panel shall be 0.5 inches.

3.3.1.5 Resin. The rigid mat panels shall be made with a polyester resin (3.2.1) applied at a ratio of resin-to-fiberglass reinforcement of approximately 55:45 by weight. The exact rate of application shall be as required to obtain the specified properties and dimensions of the mat. The polyester resin shall thoroughly wet all reinforcement.

3.3.1.6 Surface Texture. The upper surface of the mat shall have a texture defined by the woven roving weave pattern, which shall not be smoothed over by of excess (neat) resin.

3.3.1.7 Holes and Trimming. Holes shall be cut around the mat periphery, in accordance with the patterns shown in Appendix A Sheet 1 of 6. The holes shall be 2.25 inches in diameter and counterbored at a diameter of 5 inches, so the remaining mat thickness is 0.25 inch + .05/-0.0 inch, as shown in Appendix A Sheet 1 of 6 Section AA. The distance of the holes from the edge shall be nominally 6 inches +0.0/-0.25 inch along all four edges. All holes along a common edge shall be placed along a common centerline.

3.3.1.8 Identification Markings. The top surface of each mat and quality-control tab shall be permanently marked as "TOP", in 4-inch high letters at the locations shown in Appendix A Sheet 4 of 6. Each shall be permanently marked with an identification number at the locations shown in Appendix A Sheet 4 of 6. Mat identification numbers shall be assigned as follows:

Mat identification no. = MIL-DTL-32265 - AAAAA - xx/yy - zzzz

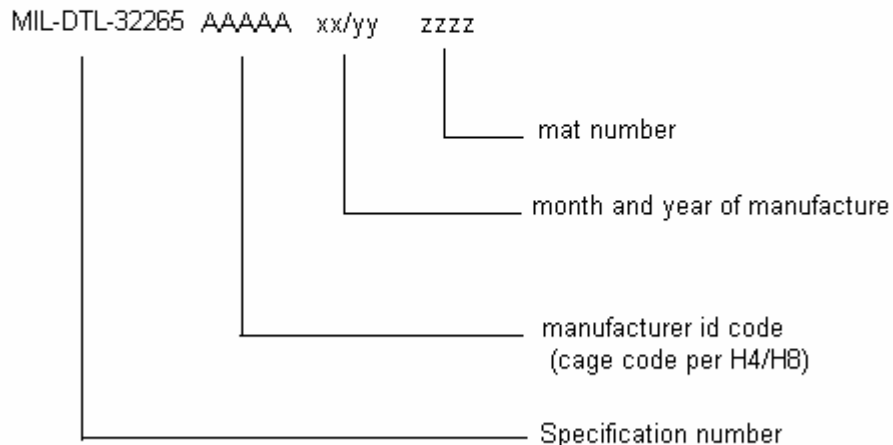
MIL-DTL-32265 = this specification number

AAAAA = manufacturer identification code (CAGE per H4/H8)

xx = month of manufacture

yy = year of manufacture

zzzz = mat number, sequentially numbered, 0001 through n.



Note: Quality-control tab identification numbers shall be identical to the identification number of the mat from which it was trimmed.

3.3.1.9. Physical Properties. The rigid mat panel and hinges, when reinforced with three plies of fiberglass and tested as per 4.4, shall have the minimum physical properties specified in Table 2.

Location	Test	Requirement	Test Method Ref.
Rigid	Thermal Expansion	Less than 3.5 x 10 ⁻⁵ in/in/*C	4.4.2
Panel	Ignition Temp.	greater than 450° F	4.4.3
	Tensile Strength	> 17,500 psi (1)	4.4.5
	Flexural Strength	> 35,000 psi (1)	4.4.6
	Hardness, Top	> 45	4.4.7
	Hardness, Bottom	> 25	4.4.7
	Punch Shear	> 9,000 psi	4.4.8
Hinge	TCLP Test	Acceptable Contaminants (2)	4.4.1
Area	Ignition Temp.	greater than 450° F	4.4.3
	Tensile Strength (3)	> 1,600 lbs/linear inch	4.4.4, 4.4.9

(1) For both x- and y- axis tests

(2) Not classified as a hazardous waste when offered for disposal (see 4.4.1)

(3) After bending for all tested temperature conditions

3.3.1.10. Folding. The mats shall be folded in fanfold (accordion) fashion such that the mat topside of the panel is up.

3.3.2. Joining Panels.

3.3.2.1. Dimensions. Joining panels shall be finished to the dimensions in the Appendix A Sheet 2 of 6. The finished joining panels shall be 24 inches +/- 0.5 inch wide. The panels shall be fabricated in two (2) lengths, 30 feet and 24 feet, +0 /-1 inches long. The minimum panel thickness at any point shall be 0.20 inch.

3.3.2.2. Mold. Joining panels shall be made using open-mold construction. One mold may be used for constructing both joining panel sizes. Mold dimensions shall be sufficient to lay out the fiberglass reinforcement as specified in 3.3.2.3.

3.3.2.3. Reinforcement Layout. The joining panel reinforcement shall be of the type specified in 3.2.3. Two (2) plies shall be laid out on the mold table with the woven rovings facing out and the chopped fiber layers facing inward. The reinforcement may either extend slightly over the edge of the mold and be trimmed to proper dimensions, or it may be laid out to exactly 24 inches wide if the panel mold has edges that are built up with a lip.

3.3.2.4. Filler. The joining panels shall be made with the same polyester resin (see 3.2.1) and fabrication techniques (see 3.3.1.5) used to fabricate the rigid mat panels. The filler shall thoroughly wet all reinforcement.

3.3.2.5. Surface Texture. The upper surface of the panel shall have a texture defined by the woven-roving weave pattern, which shall not be smoothed over by use of excess (neat) resin.

3.3.2.6. Holes and Bushings. The joining panel shall have 1.5-inch diameter holes in two rows, as shown in FFM Joining Panel Drawing Sheet Appendix A Sheet 2 of 6. Each row of holes shall be placed along a common centerline with the rows 12 inches +0.25/-0.0 inches apart. A joining panel lower bushing as shown in FFM Bushing Drawing Appendix A Sheet 3 of 6 shall be attached to the panel at each hole using two (2) Marson Klik Fast SSB8-8S stainless rivets as shown. The rivet head shall extend no more than 0.125 inch above the surface and shall have no sharp edges or damage allowed. The base of the rivet may extend below the surface of the joining panel lower bushing no more than 0.25 inch. FFM Bushing Drawing Appendix A Sheet 3 of 6

3.3.2.7. Mechanical Properties. The joining panel shall have the same minimum mechanical properties as the rigid mat panels—specified In Table 2 (see 3.3.1.9).

3.3.3. Packaging Panels. Protective fiberglass panels are required for packaging. The panels shall be fabricated with at least one ply of reinforcement in accordance with 3.2.3 and resin in accordance with 3.2.1. The panels shall be approximately 6 feet wide by 30 feet long. Holes 2.25 inches in diameter shall be cut around the periphery in accordance with the spacing given in 3.3.1.7. See FFM Packaging Drawing Appendix A Sheet 6 of 6 for diagram.

3.3.3.1 Mat Assembly Contents. This section specifies the requirements for assembling and packaging individual components of the Fiberglass Mat System into kits. Each Mat Assembly (kit) shall contain two (2) 30 feet by 54 feet mats, two (2) 24 feet long joining panels, two (2) 30 feet long joining panels and quality control tabs/mat fabricated under this specification shall be packaged together. The mat kits shall be packaged for air shipment and subsequent storage as War Reserve Material in shipping containers. The kits will be packaged by the manufacturer for shipment and storage as required by this specification. See FFM Packaging Drawing Appendix A Sheet 6 of 6 for details.

3.3.3.2 Fiberglass Packaging Panels. Fiberglass packaging panels (3.3.3) are required to protect the mats from physical and ultraviolet light damage during shipping and to provide additional protection during storage. Holes are cut around the panels to match the holes in the mats so they may be used as emergency repair materials.

3.3.3.3 Mat Assembly Packing. The four joining panels shall be sandwiched between the two folded mats. The quality control tab(s) from those mats not used for testing in 4.4 shall be folded along the hinge and placed on the top of the top mat, approximately six feet from the end of the top mat. The entire package is wrapped in two layers of polyethylene sheeting, 10 mil, conforming to ASTM D 2103-05, Classification 4503G, and sandwiched between two fiberglass packaging panels (reference paragraph 5.2 above). The wrapped mats are then secured with non-metallic bands conforming to ASTM D3950-05, Type 2, size 5/8 inch, spaced no greater than 3 feet apart with 5/8 inch clips at each edge.

3.3.4 Bushing Packages

- a. The Upper Joining Panel Bushing Halves, drawing 3 of 6, will be packaged in M-548 containers NSN 8140-00-739-0233. The bushings will be packaged in two containers with 54 per container, and the containers will be stenciled to indicate contents.
- b. The Anchor Bushings, drawing 3 of 6, are to be packaged in M-2Al containers. The Anchor Bushings shall be packaged in three containers with 25 bushings in each container, each stenciled to indicate contents.

3.3.5 Mat Kit B

- a. Mat Kit B includes two separate anchor bolt kits for fastening FFM to the pavement. Kit B-1 contains 360 each 5.25-inch Type I anchor bolts. Kit B-2 contains 360 each 9.25-inch Type II anchor bolts. The 5.25-inch anchor bolts are intended for use on concrete pavements from 6 to 10 inches. The 9.25-inch anchor bolts are intended for use on asphalt, concrete, or composite pavements (asphalt over concrete) over 10 inches thick. The bolts of Kit B-1 and B2 are to be packaged with 30 bolts in M-2Al containers (12 containers for Kit B-1 and 12 containers for Kit B-2). Each container shall be stenciled to indicate contents.

3.3.6 Shipment of Containers

- a. The M-548 containers containing the upper joining panel bushings and the M-2Al containers containing the anchor bushings and anchor bolts, shall be palletized for ease of shipment with the Mat Assemblies. One bushing package and one Mat Kit B worth of containers shall be loaded on each pallet.

3.3.7 Marking for Shipment. Fiberglass Mat Assemblies are to be marked for shipment in accordance with MIL-STD-129.

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3.3.8 Packaging Inspection. The preservation, packing, and marking of the components shall be examined to verify conformance with the requirements of Section 5.

3.4. Workmanship. Examining the mats and joining panels for suitable workmanship is required as part of the quality-assurance provisions specified in Section 4. Every mat and joining panel shall be inspected per the examination requirements specified in 4.3. The following items shall be considered defects in workmanship and shall be evaluated as specified in 4.3:

- a. Insufficient thickness (3.3.1.1, 3.3.2.1, 4.3a),
- b. Incorrect hole placement or size (3.3.1.8, 3.3.2.6, 4.3b),
- c. Insufficient or misplaced ply overlaps (3.3.1.2, 4.3c),
- d. Delaminations (4.3d),
- e. Dry Spots (4.3e),
- f. Excessive migration of filler across hinge/rigid panel interfaces (3.3.1.4, 4.3f),
- g. Blisters and voids (4.3g),
- h. Cracks or tears (4.3h).

4. VERIFICATION

4.1. Classification of inspections.

- a. First article inspection (see 4.2.3)
- b. Conformance inspection (see 4.2.4)

4.1.1 Unless otherwise specified by the contract, the manufacturer shall be responsible for conducting the inspection and testing specified herein. The Government reserves the right to perform any of the inspections set forth in the specification where deemed necessary to ensure that materials and services conform to prescribed requirements.

4.2. Quality assurance inspection and testing.

4.2.1 Material Inspection. Supplies, products, and raw materials shall be inspected before incorporation into the finished product to ensure compliance with all requirements specified within.

4.2.2. Qualification Testing.

4.2.2.1. Elastomer Qualification. Elastomer material must meet the requirements in 3.2.2 and be approved by the Government. Approval shall be obtained by submitting to the Government a data package verifying the suitability of the proposed elastomer, consisting of certification by an independent laboratory that the elastomer is a polyether-based polyurethane elastomer, will not result in a product that will constitute a hazardous waste (3.2.2.1) when tested in accordance with 4.4.1, and meets the physical and aging requirements specified in 3.2.2.1 and 3.2.2.2 when tested in accordance with 4.4.10.

4.2.2.2. Polyester Reinforcement Qualification. Polyester reinforcement, other than that from approved sources (3.2.4.2), must be approved by the Government. Approval shall be obtained by submitting to the Government, a statement from the manufacturer that the material meets the requirements of 3.2.4 and is equal to the approved material. A test panel shall also be constructed and tested in accordance with 4.4.2 through 4.4.8. For the rigid panel tensile test, the specimens shall be taken from the 7.5-inch area around the hinge that contains the polyester reinforcement.

4.2.3. First Article Inspection and Testing.

4.2.3.1. First Article Inspection. A first article inspection of a mat assembly (two mats and four joining panels) shall be performed in accordance with 4.3 to verify compliance with the requirements of this specification. The first article inspection shall be performed on the first mat assembly offered to the Government. The preservation, packaging, and marking of the components shall be examined to verify conformance with the requirements of Section 5. The submittal must be representative of the construction, manufacturing process, and packaging to be used for subsequent mat assemblies. First-article inspections shall be conducted by the manufacturer, at their facility, under the direction and in the presence of authorized Government representatives. Failure to meet inspection criteria shall constitute cause for rejection.

4.2.3.2. First Article Testing. First article testing shall consist of the testing specified in 4.4.2 through 4.4.8 and shall be conducted by an independent laboratory. Test results shall be on hand at the time of examination. Failure to meet test or inspection criteria shall constitute cause for rejection. First article approval shall not constitute a waiver by the Government of its rights under the provisions of a contract document or relieve the manufacturer of any requirements defined in this specification.

4.2.4. Quality-conformance Inspection. Quality-conformance inspections shall be conducted throughout production of the mat assemblies. The workmanship of every mat and joining panel manufactured shall be examined as specified in 4.3. Every packaged set shall be inspected as specified in 4.5. Testing as specified in 4.4.5 through 4.4.9 shall be performed randomly at a rate of five percent on quality-control tabs produced after the first article acceptance. If the government inspector determines by inspection outlined in section 4.3 that the QA tabs are not representative of the mat fabrication, the government inspector may direct testing on the material trimmed from the perimeter of a mat or may direct testing of a representative mat per section 4.4. Failure to meet test or inspection criteria shall constitute cause for rejection of the lot.

4.3 Workmanship Examination. Each mat and joining panel manufactured under this specification shall be examined by the contractor for compliance with the requirements in Section 3. Examination shall encompass visual inspections and dimensional measurements. Noncompliance with any of the criteria listed below shall constitute cause for rejection.

- a. Thickness. Verify by measuring each mat and joining panel edge in at least two (2) places (eight measurements per piece).
- b. Hole placement and size. Verify specification compliance by measuring at least five (5) holes on each mat and joining panel.
- c. Ply overlaps. Verify by visual examination and measurement when removing the mat from the mold.
- d. Delaminations. Minor separation (not to exceed 1/2 inch of the 3 inch wide hinge) of plies is allowed in the hinge area when folded. None are tolerable in the rigid mat or joining panel. Verify by visual examination when removing the mat from the mold.
- e. Dry spots. None are tolerable in excess of 0.5 inch in diameter. More than 10 occurrences in any 1-square foot area are not tolerable. Dry spots found on the underside of the mat may be reworked by wetting with extra resin. Verify by visual examination when removing the mat from the mold.
- f. Migration of filler across hinge/rigid panel interfaces. This is not tolerable in excess of 0.5 inch. Verify by visual inspection and measurement. Measure areas that appear to exceed this criterion.
- g. Blisters and voids. None are tolerable in excess of 0.5 inch in diameter. More than 10 occurrences in any 1-square foot area are not tolerable. Verify by visual examination when removing the mat from the mold.
- h. Cracks or tears. None are tolerable that penetrate into the fiberglass reinforcement of the rigid mat or joining panel sections. Minor cracks or tears of outer fibers in the hinge area reinforcement are allowable if the cracks or tears do not exceed 1/16 inch in depth. Verify by visual examination and measurement when removing the mat from the mold.

4.4 Testing.

4.4.1. Toxicity Characteristic Leaching Procedure (TCLP) Test. The TCLP test shall be conducted in accordance with the procedures defined in the proposed expanded definition of the hazardous waste toxicity characteristic per Federal Register, Vol. 51, No. 114, June 13, 1986, pages 21648 to 21693 (51 FR 21648) and Federal Register: December 21, 1995 (Volume 60, Number 245)] [Proposed Rules] [Page 66343-66469]. Samples must be cut from a quality control tab that includes both hinge and rigid panel material. Testing shall be performed by an independent laboratory. The independent laboratory shall perform the tests and report that the resultants. Tested specimens shall not be reused. The material shall be such that the resultant product does not constitute a hazardous waste when offered for disposal, as defined in 51 FR 21648. Failure of any tested specimen to meet this requirement shall be cause for rejection of the material used to fabricate the sample.

4.4.2. Thermal Expansion. At least three (3) rigid mat specimens shall be prepared and tested, in accordance with ASTM D1929, Procedure A. The test specimen shall be cut from the quality control tabs/mats, at least one from each mat in the test mat assembly. Temperature extremes shall be -30°C to +30°C. Failure of the tested average to meet the requirement specified in Table 2 (3.3.1.9) shall be cause for rejection of the product.

4.4.3. Ignition Temperature. At least three (3) rigid mat and three (3) hinge specimens shall be prepared and tested, in accordance with ASTM D1929, Procedure A. The test specimens shall be cut from the quality-control tabs/mats, at least one from each mat in the test mat assembly. Failure of any specimen to meet the requirement specified in Table 2 (3.3.1.9) shall be cause for rejection of the product.

4.4.4. Hinge Tensile Strength After Bending at Various Temperatures. Nine (9) test specimens shall be prepared and tested for tensile strength, in accordance with ASTM D3039. The test specimens shall be cut from a quality control tab/mat as shown in FFM Test Drawing Appendix A Sheet 5 of 6 and shall be randomly selected from both mats in the test mat assembly. Testing shall be conducted after preconditioning three (3) specimens for at least 5 hours at each of the following conditions: -15°F +/- 3.6°F, 73.4°F +/- 3.6°F, and 110°F +/- 3.6°F, at 50 percent relative humidity +/- 10. Immediately before testing, each specimen shall be bent through the pattern shown in FFM Test Drawing Appendix A Sheet 5 of 6. Failure of the tested average at any temperature condition to meet the requirement specified in Table 2 (3.3.1.9) shall be cause for rejection of the product.

4.4.5. Mat Tensile Strength. Two tensile tests will be performed on specimens selected from quality-control tabs, on the two first article mat assemblies. One specimen shall be oriented parallel to the X axis, and one shall be oriented parallel to the Y axis (FFM Test Drawing Appendix A Sheet 5 of 6). Test specimens shall be cut from Region A and/or Region B of the quality-control tabs (see Figure 9) or selected areas of actual mats. Each specimen shall be tested at 73.4°F +/- 3.6°F after being conditioned at that temperature with 50 percent relative humidity +/- 10 for 5 hours. The test specimens shall measure 10 inches long (along referenced axis) and 1 inch wide by the thickness of the mat (1/4 inch nominal). Each specimen shall be tested in accordance with ASTM D3039 to obtain the ultimate tensile strength. The rate of crosshead movement shall be 0.6 inch per minute. Failure of the tested average to meet the requirement specified in Table 2 (3.3.1.9) shall be cause for rejection of the product.

4.4.6 Flexural Strength. Flexural strength tests shall be conducted on specimens taken from each sample in accordance with ASTM D790, Method 1, Procedure A. The specimen size shall be 1.0 inch wide by 10 inches long by the mat thickness (1/4 inch nominal). The support span shall be 8.0 inches. The rate of crosshead movement shall be 0.43 inch per minute using a loading nose with a radius of 1.0 inch. If required due to surface roughness, a piece of steel shim stock, measuring 1 inch by 1 inch, may be bonded to the nose loading point using a flexible adhesive. Two specimens shall be tested from each quality-control tab/mat cut from Region A and/or Region B as shown in Figure 9 or selected areas of actual mats. One of the specimens shall have its length parallel to the X axis, and one shall have its length parallel to the Y axis (FFM Test Drawing Appendix A Sheet 5 of 6). Specimens shall be tested at 73.4°F +/- 3.6°F at 50 percent relative humidity +/- 10. All specimens shall be conditioned for 5 hours before each test at the test temperature and humidity. Failure of the tested average to meet the requirement specified in Table 2 (3.3.1.9) shall be cause for rejection of the product.

The calculation for maximum fiber stress shall be:

$$S = (3PL/2BD^2) \times (\text{long span correction factor})$$

Where:

S	extreme fiber maximum stress
P	load (lb – force)
L	support span (inches)
b	specimen width (inches)
d	depth (inches)
	correction factor = $[1 + 6 (D/L)^2 - 4 (d/L) (D/L)]$
D	midpoint deflection at which P is measured

4.4.7 Hardness. The hardness of each selected specimen shall be tested using the ASTM D2583 Barcol Impressor method. The hardness shall be measured at two points, one on the top surface and one on the bottom, from Region A and/or Region B shown in FFM Test Drawing Appendix A Sheet 5 of 6 on each quality-control tab/mat in the test mat assembly or selected locations of the actual mat. The measurements shall be taken at 73.4°F +/- 3.6°F at 50 percent relative humidity +/- 10 after at least 5 hours of conditioning at those conditions. Failure of the tested average to meet the requirement specified in Table 2 (3.3.1.9) shall be cause for rejection of the product.

4.4.8 Punch Shear Strength. Punch shear tests, in accordance with ASTM D732, shall be conducted on mat specimens taken from Region A and/or Region B of the quality-control tabs/mats of each mat in the test mat assembly or specimens collected from the actual mat. Punch shear specimens shall be 2 inches square or 2 inches in diameter by the thickness of the mat (1/4 inch nominal), Specimens shall be prepared for testing by drilling a 0.43-inch diameter hole in the center and by conditioning the specimens at 73.4°F +/- 3.6°F at 50 percent relative humidity +/- 10 for 5 hours before testing. Two specimens shall be tested from each quality-control tab. Failure of the tested average to meet the requirement specified in Table 2 (3.3.1.9) shall be cause for rejection of the product.

4.4.9 Hinge Tensile Strength After Bending at One Temperature. Two test specimens shall be tested for tensile strength from each mat quality-control tab/mat in the test mat assembly or from selected areas of the actual mats, as described in 4.4.4, except only one preconditioning requirement is specified 73.4°F +/- 3.6°F at 50 percent relative humidity +/- 10. Immediately before testing, the specimen shall be bent once through the pattern shown in Figure 8. Failure of the tested average to meet the requirement specified in Table 2 (3.3.1.9) shall be cause for rejection of the elastomer used to fabricate the specimen.

4.4.10 Elastomer Qualification Testing. Eight specimens of candidate elastomer shall be prepared, and fully cured in accordance with the manufacturer's instructions and ASTM D412. Test four specimens for ultimate tensile strength and elongation in accordance with ASTM D412. Four specimens shall be placed in a humidity chamber which maintains 95 percent relative humidity at 160°F +/- 2°F for 120 days. After 120 days, the specimens shall be removed, cooled for four hours at room temperature, and tested for ultimate tensile strength and elongation in accordance with ASTM D412. Average the tensile strength and elongation results and divide by the averages of the initial four tests to determine percent tensile strength and percent elongation retained.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of material is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point packaging activity within the Military Department or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department or Defense Agency automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The fiberglass mats are used as foreign object debris (FOD) covers, for crushed-stone crater repairs as part of Air Force's airfield damage repair (ADR) procedures. Mat assemblies are packaged with two folding fiberglass mats and four joining panels together.

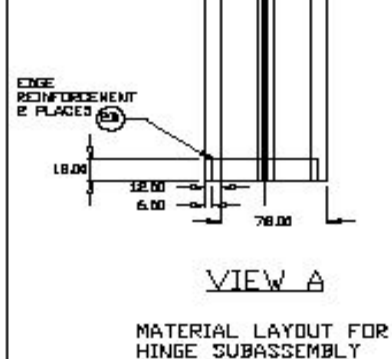
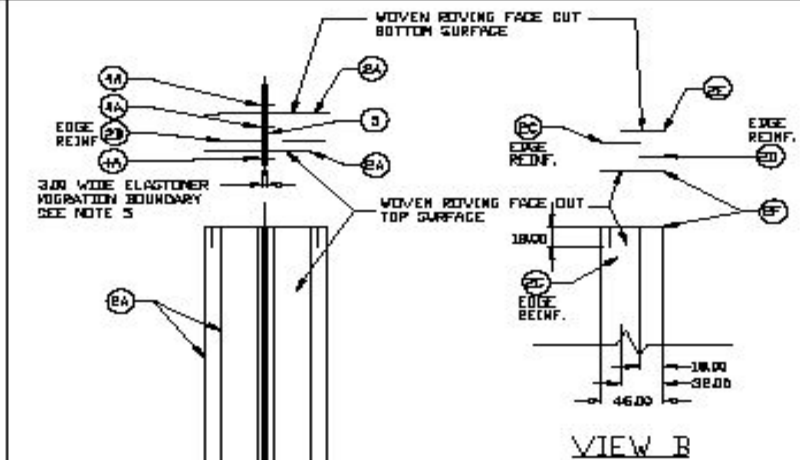
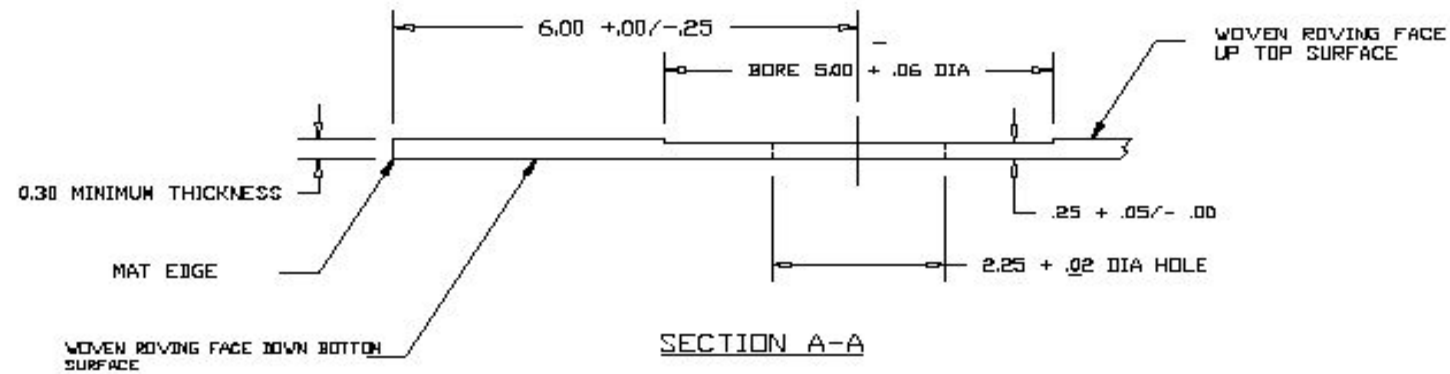
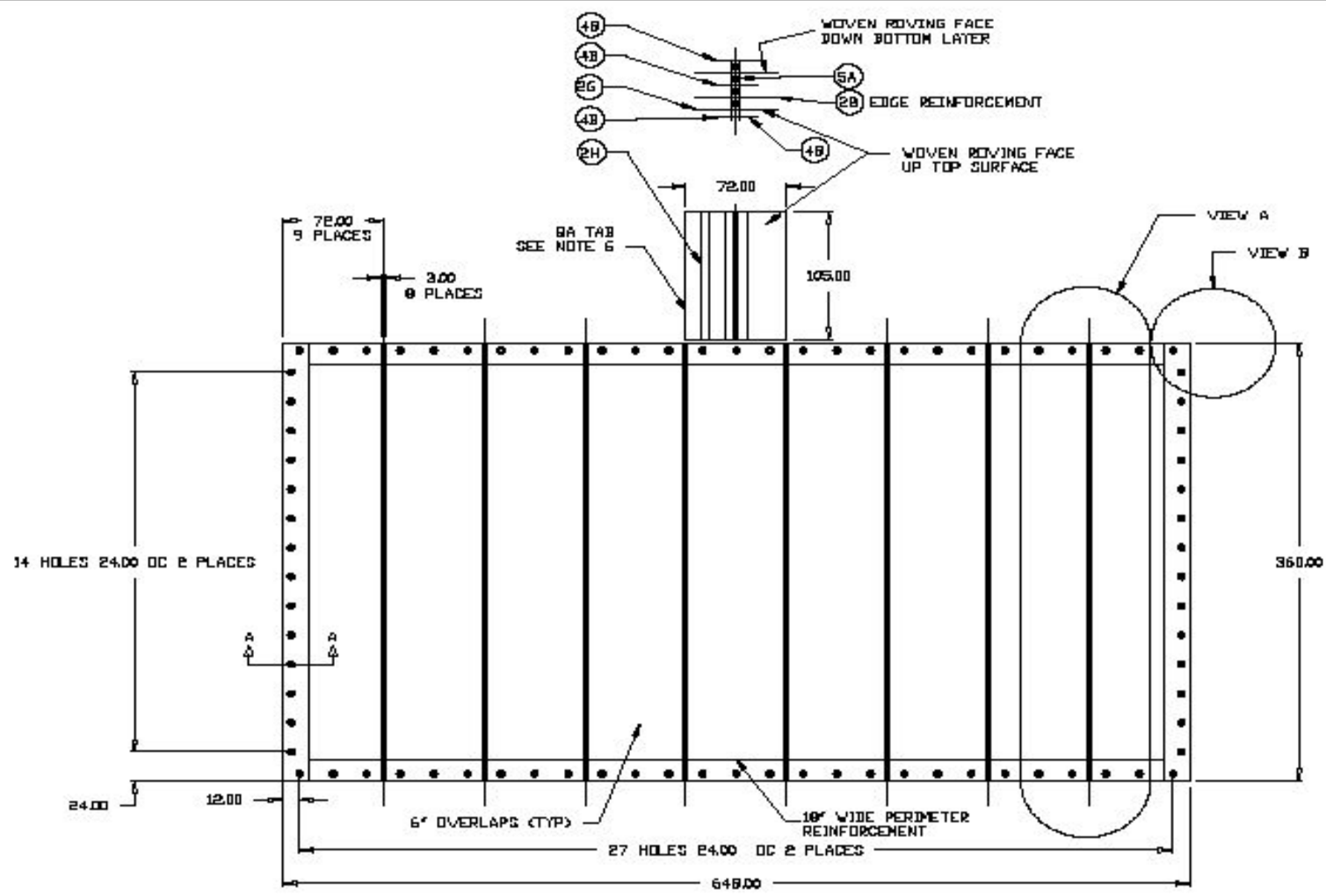
6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification
- b. Packaging (see 3.3.3 and 5.1)

6.3 Subject term (key word) listing.

- a. ADR
- b. Crater Repair
- c. FOD cover

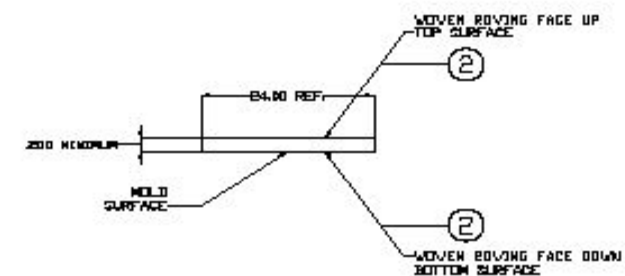
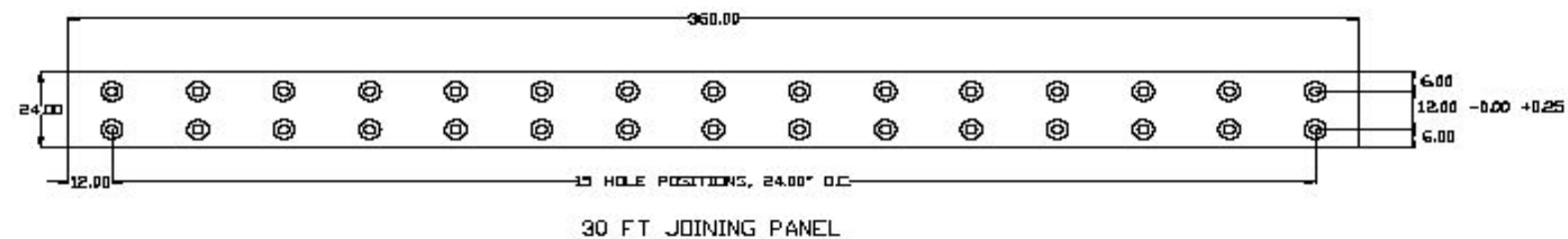
APPENDIX A
MAT SPECIFICATION DRAWINGS



- NOTES:**
- INTERPRET DRAWING IN ACCORDANCE WITH ASME Y14.100 AND SECTION 3.2.2 OF THIS SPECIFICATION.
 - THE FIBERGLASS REINFORCEMENT (ITEMS 1, 2, 5 THRU 10 (PARA 3.2.3 OF SPECIFICATION)) ARE A COMBINATION OF WOVEN ROVING STITCHED TO A CHOPPED FIBER LAYER. THE WOVEN ROVING SHALL HAVE AN AVERAGE WEIGHT OF 400 ± 24 OUNCES PER SQUARE YARD. THE CHOPPED FIBER SHALL WEIGH 80 ± 48 OUNCES PER SQUARE FOOT. THE FIBERGLASS FABRIC REINFORCEMENT COMPOSITE SHALL BE IN ACCORDANCE WITH MIL-F-3294C:
 - 1A. 78\" W X 360\" STITCHMAT 540-20 REINFORCEMENT
 - 1B. 18\" W X 78\" STITCHMAT 340-20 REINFORCEMENT
 - 2C. 18\" W X 27\" STITCHMAT 340-20 REINFORCEMENT
 - 2D. 18\" W X 360\" STITCHMAT 540-20 REINFORCEMENT
 - 2E. 36\" W X 360\" STITCHMAT 340-20 REINFORCEMENT
 - 2F. 44\" W X 360\" STITCHMAT 340-20 REINFORCEMENT
 - 2G. 72\" W X 105\" STITCHMAT 540-20 REINFORCEMENT
 - 2H. 6\" W X 105\" STITCHMAT 540-20 REINFORCEMENT
 - THE POLYESTER RESIN SHALL CONFORM TO MIL-P-7575C, GRADE A, CLASS D WITH THE MODIFICATIONS OF PARA 3.2.1 OF THIS SPECIFICATION. THE RESIN WILL BE APPLIED AT A RATIO OF RESIN-TO-FIBERGLASS REINFORCEMENT OF APPROXIMATELY 55:45 BY WEIGHT.
 - THE POLYESTER HINGE REINFORCEMENT PER PARAGRAPH 3.2.4 OF THIS SPECIFICATION SHALL BE WOVEN POLYESTER CLOTH (6.5 OUNCES PER SQUARE YARD, SPECIALLY MANUFACTURED AND SIZED (CREATED) FOR USE WITH THE PROTECTING POLYESTER RESIN IN THE PRODUCTION OF COMPOSITE MATERIALS. THE MATERIAL SHALL THOROUGHLY WET OUT WITH THE RESIN ON NOTE 5 ABOVE AND BOND TO THE FIBERGLASS REINFORCEMENT. USE POLY COMPET, PFGD 1470, 1000 OR EQUIVALENT. NOTE: COMPET-P TYPE 1471-L0 BASKET WEAVE, 11 X 11-3, 6.5 OZ, WAS THE APPROVED SOURCE FROM THE 1989 SPECIFICATION BUT IS NO LONGER MANUFACTURED.
 - 4A. 18\" W X 360\" COMPET-P 1471 REINFORCEMENT
 - 4B. 18\" W X 105\" COMPET-P 1471 REINFORCEMENT
 - THE HINGE AREA ELASTOMER PER PARA 3.2.2 OF THIS SPECIFICATION SHALL BE POLYESTER-BASED POLYURETHANE TYPE. THE FULLY CURED UNREINFORCED ELASTOMER SHALL HAVE A MINIMUM ELONGATION OF 800% WHEN TESTED IN ACCORDANCE WITH 4.4.30 OF THIS SPECIFICATION. AFTER ACCELERATED AGING AT 140 F AND 95% RELATIVE HUMIDITY CONTINUOUSLY FOR 120 DAYS, THE UNREINFORCED ELASTOMER SHALL RETAIN AT LEAST 75% OF ITS ORIGINAL TENSILE STRENGTH AND ELONGATION.
 - THE QA TAB PER PARA 3.3.11 OF THIS SPECIFICATION MUST BE LAMINATED ADJACENT TO THE RIGID PANEL MOLD BY THE SAME PERSONNEL, SAME PROCESS, AND SAME EQUIPMENT, AT THE SAME TIME DURING THE CURING CYCLE OF THE PRODUCTION MAT TO INCLUDE AT LEAST ONE 6-INCH OVERLAP IN ONE PLY OF THE RIGID PANEL AREA.
 - THE TOP SURFACE OF THE MAT AND THE QA TAB SHALL BE PERMANENTLY MARKED IN ACCORDANCE WITH PARAGRAPH 3.3.1.8 OF THIS SPECIFICATION.

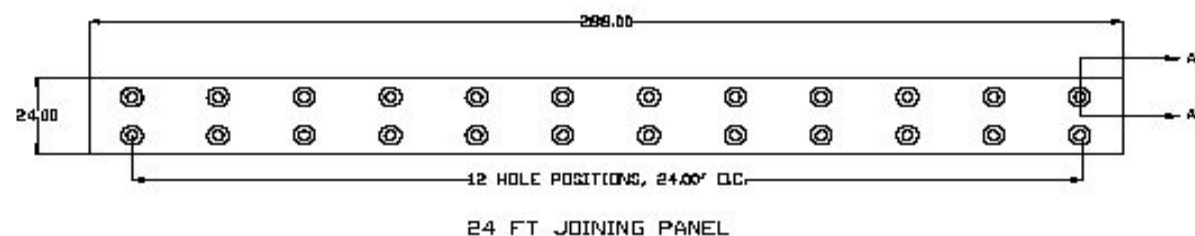
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UNITED STATES AIR FORCE CIVIL ENGINEER SUPPORT AGENCY TYNDALL AIR FORCE BASE, FLORIDA		
DIMENSIONS AND DETAILS		
DATE	REV	FORM
Jan 1, 2008	001	813064000
DESIGNED BY	DATE	BY
Jan A. Reed	1/1/08	W/bsw
		SHEET 1 OF 1



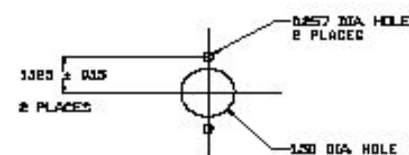
TYPICAL REINFORCEMENT LAYOUT

ROUND NONE

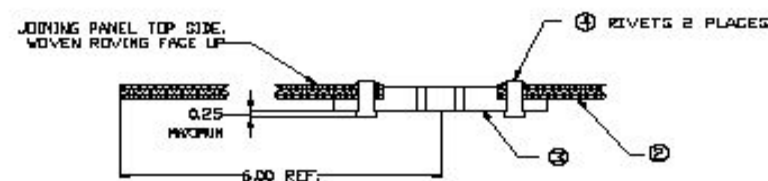


NOTES:

1. INTERPRET DRAWING IAW ASME Y14.100 AND SECTION 3.3.2 OF THIS SPECIFICATION
2. JOINING PANELS (30 FT OR 24 FT): THE JOINING PANEL REINFORCEMENT, STITCHMAT 540-20, IS A COMBINATION OF WOVEN ROVING STITCHED TO CHOPPED FIBER LAYER. THE WOVEN ROVING SHALL HAVE AN AVERAGE WEIGHT OF 40.8 PLUS/MINUS 2.4 OUNCES PER SQUARE YARD. THE CHOPPED FIBER SHALL WEIGHT 2.0 PLUS/MINUS 0.2 OUNCES PER SQUARE FOOT. THE FIBERGLASS FABRIC REINFORCEMENT COMPOSITE IAW MIL-M-43248C, TYPE III, GRADE A. THE RESIN, SHALL CONFORM TO MIL-R-75750, GRADE A, CLASS 0, WITH THE MODIFICATIONS OF PARAGRAPH 3.2.1 OF SPECIFICATION THE PANEL SHALL BE MADE WITH RESIN APPLIED AT A RATIO OF RESIN-TO-FIBERGLASS REINFORCEMENT OF APPROXIMATELY 55:45 BY WEIGHT.
3. LOWER BUSHING 30 EACH OR 24 EACH DEPENDING ON PANEL SIZE
4. RIVET, MARSON KLIL FAST SS88-8S



TYPICAL HOLE LAYOUT

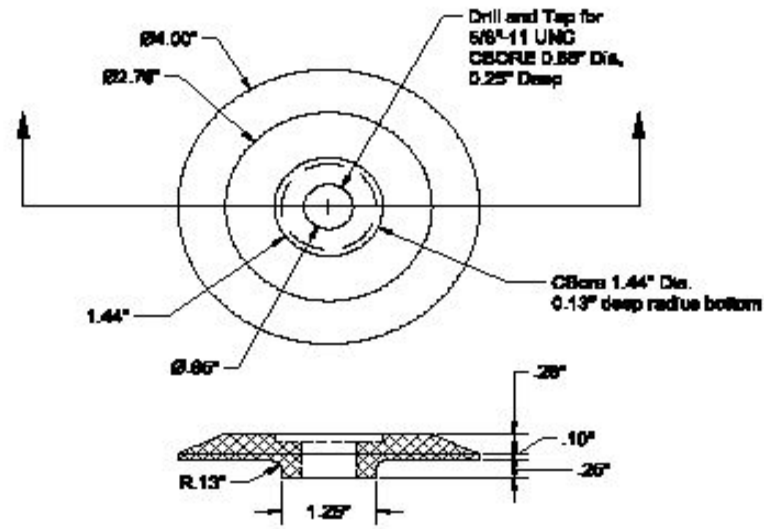


SECTION A-A

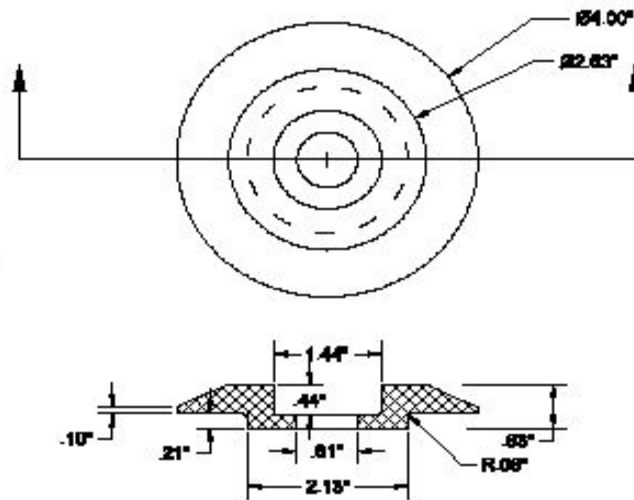
ROTATED 90 DEGREES CCW

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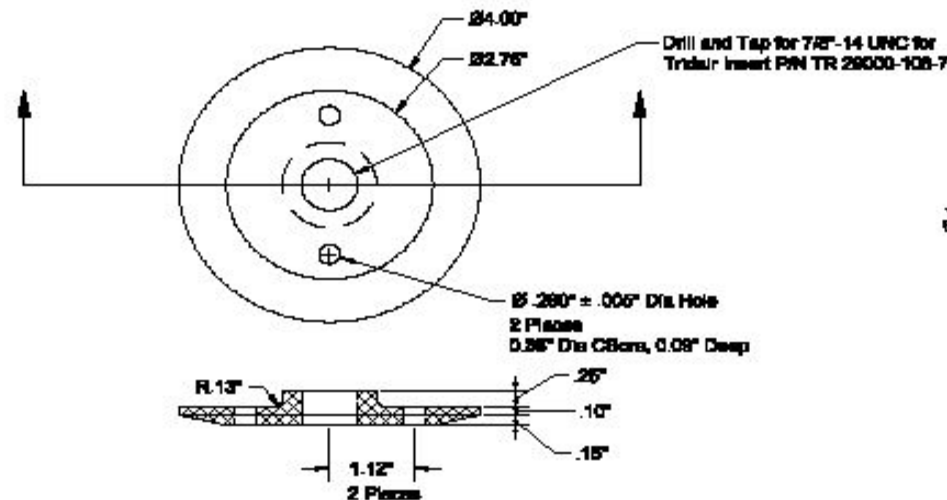
UNITED STATES AIR FORCE CIVIL ENGINEER SUPPORT AGENCY TYNDALL AIR FORCE BASE, FLORIDA		
FFM JOINING PANELS		
DESIGNED BY Jan A. Reed	DATE OCT 2006	DESIGN NUMBER 8138840DD
	SCALE Various	SHEET 2 OF 5



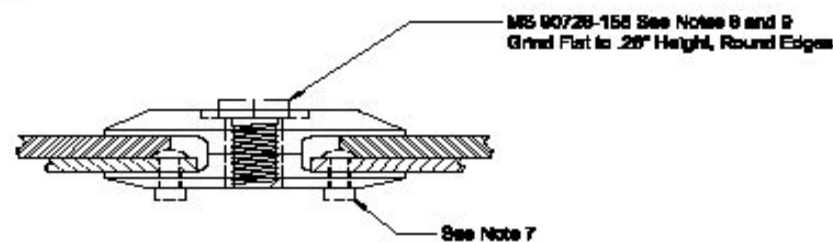
Joining Upper Bushing



Anchor Bushing



Joining Bushing Lower



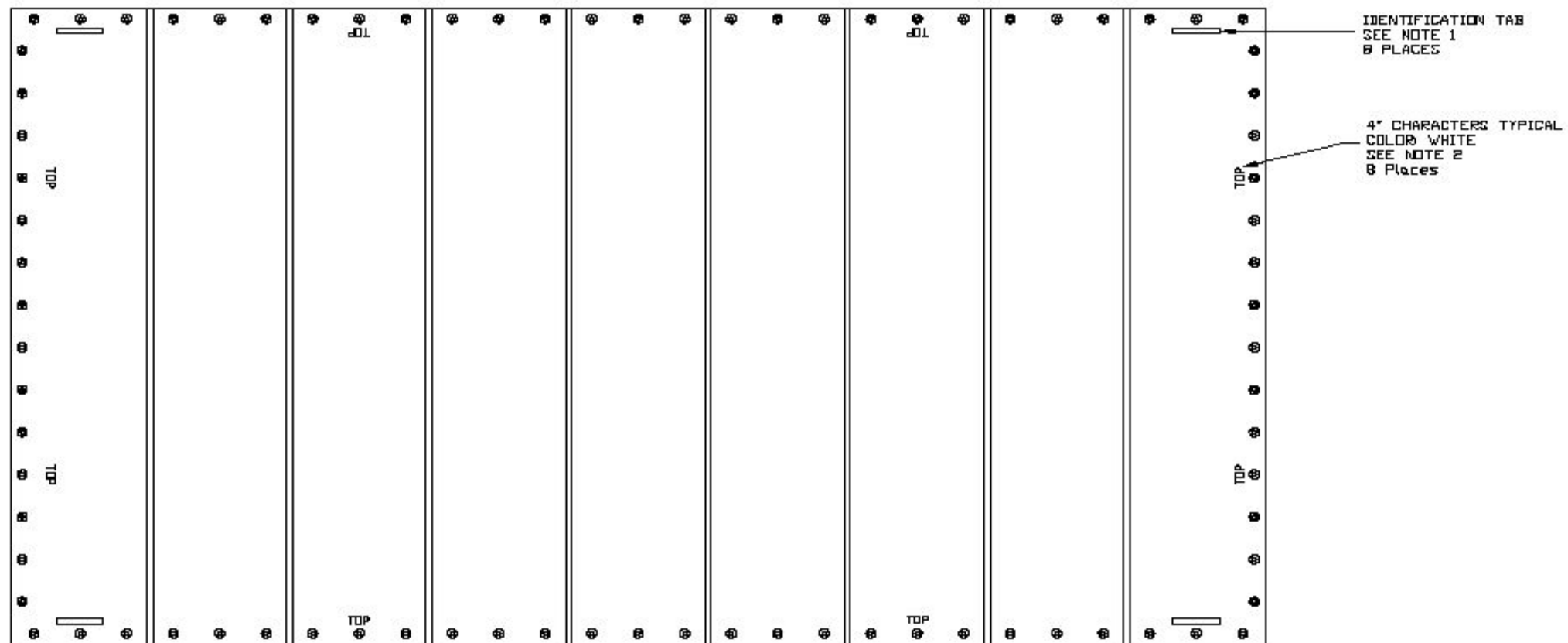
Joining Bushing Assembly

Notes:

1. All dimensions in inches.
2. Break sharp corners and remove all burrs.
3. Dimensions plus/minus .02 inches.
4. Material AISI C1040.
5. Zinc plate per ASTM B 633 Type II, Class SC3.
6. Install and secure Tridair Insert TR 29000-108 Finish Insert flush with 2 3/4 inch diameter surface.
7. Rivets: Use Marson Klik Fast SSB8-8S.
8. Apply thread compound MIL-R-46082 to thread interface
9. Finish bolt: Zinc Plate per ASTM B633-07

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 32403-5319

UNITED STATES AIR FORCE CIVIL ENGINEER SUPPORT AGENCY TYNDALL AIR FORCE BASE, FLORIDA		
FFM BUSHINGS		
OWNER	DATE	ISSUE NUMBER
Jan A. Reed	OCT 2006	FFM BUSHINGS
DESIGN	SCALE	SHEET 2 OF 6
	Various	



MARKING LOCATIONS

NOTES:

1. Identification Markings: The top surface of each mat and shall be permanently marked as "TOP", in 4-inch high letters at the locations shown.
2. Each shall be permanently marked with an identification number at the locations shown. Mat identification numbers shall be assigned as follows:

Mat Identification Number: M RRR-BB-003 AAAAA-xx/yy-zzzz
 M = Military code identifying product dimensions by inch-pound (US) units
 RRR 06-XXX = this specification number
 AAAAA = Manufacturer identification code (per Federal Cataloging Handbook)
 xx = Month of manufacture
 yy = Year of manufacture
 zzzz = Mat number, sequentially numbered, 0001 through n.

DISTRIBUTION STATEMENT:
 DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES AND THEIR CONTRACTORS
 AND IS CONSIDERED EXPORT-CONTROLLED TECHNICAL DATA IN ACCORDANCE WITH
 DoD DIRECTIVE 5230.25 (27 OCT 06). REQUESTS MUST BE REFERED TO HQ
 AFCEA/DESC, TYNDALL AFB, FL 32403-5319

UNITED STATES AIR FORCE CIVIL ENGINEER SUPPORT AGENCY TYNDALL AIR FORCE BASE, FLORIDA		
FFM MARKINGS		
DATE	DATE	ISSUE NUMBER
10/06	OCT 2006	0139450
NAME	ISSUE	
Jan A. Reed	Various	SHEET 4 OF 6

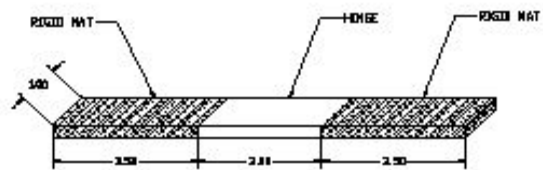
TOP SURFACE
 (1). START SPECIMEN AT PRECONDITIONED TEMPERATURE FLAT.

(2). BEND HINGE 180 DEGREE'S CCW AND TOUCH MAT EDGES.

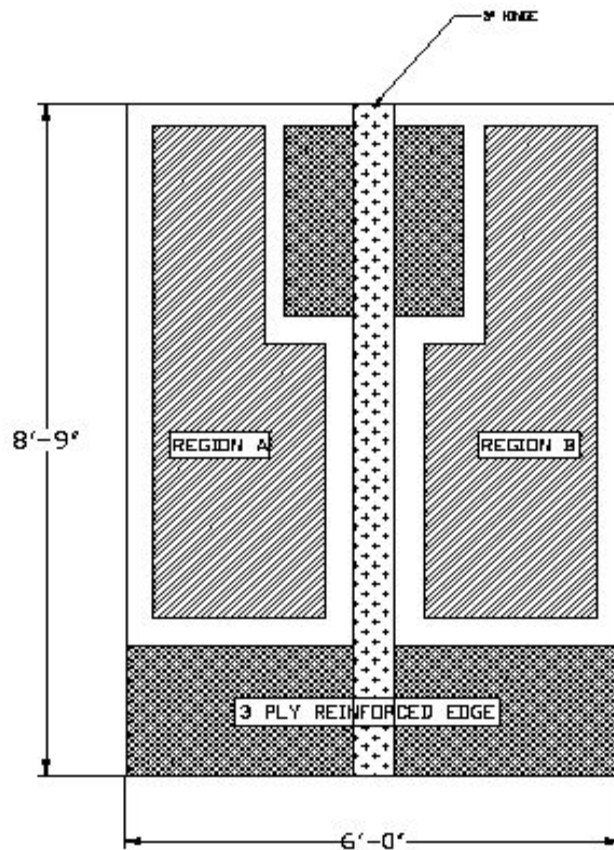
(3). RETURN TO START POSITION AND TEST IMMEDIATELY.

NOTE: THE TIME FROM REMOVAL OF THE SPECIMEN FROM PRECONDITIONING ENVIRONMENT TO THE APPLICATION OF LOAD FOR TESTING SHALL NOT EXCEED 1 MINUTE.

HINGE BENDING PATTERN



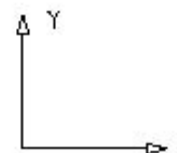
BENDING TEST SPECIMEN



QUALITY CONTROL TAB TEST SPECIMEN LOCATIONS

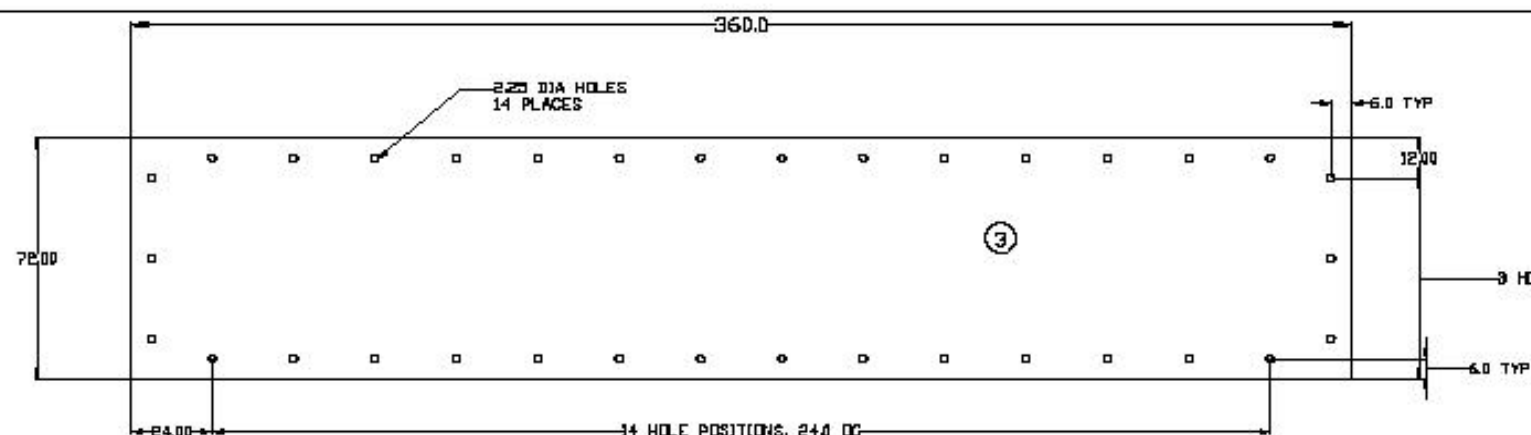
TAB LOCATION FOR HINGE TESTS.

TAB LOCATION FOR ALL TESTS OTHER THAN THOSE INVOLVING HINGES.

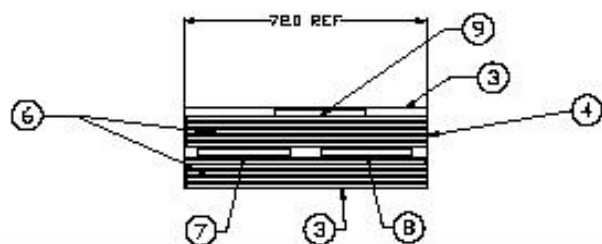
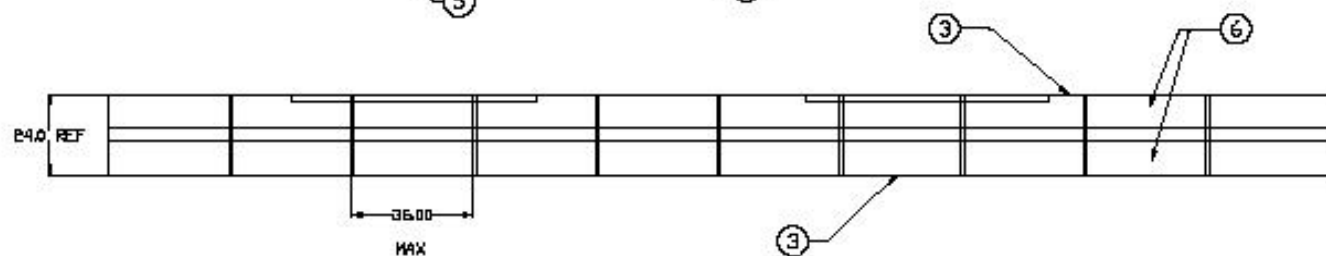
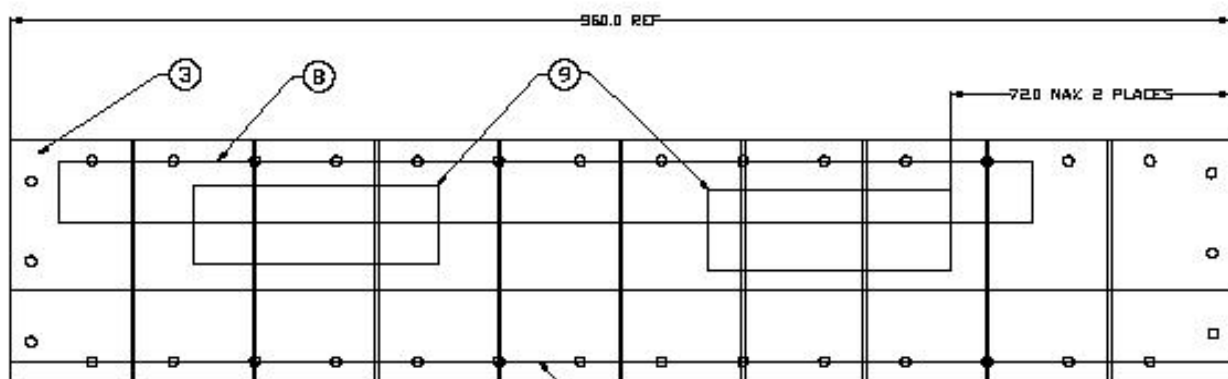


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UNITED STATES AIR FORCE CIVIL ENGINEER SUPPORT AGENCY TYNDALL AIR FORCE BASE, FLORIDA		
TEST SAMPLES		
DATE	BY	SPACE LEADER
09/01/2009	JAN A. REED	01304558
DATE	BY	SPACE LEADER
01/20/2010	VERKAS	
DRAWN Jan A. Reed		SHEET 5 OF 8



PACKAGING PANEL,
FIBERGLASS



NOTES: PACKAGING

1. INTERPRET DRAWING IAW ASME Y14.100 AND SPECIFICATION
2. PREPARATION FOR DELIVERY SHALL BE IN ACCORDANCE WITH SECTION 5 OF SPECIFICATION DS-XXX AND NOTES 3 THROUGH 9 BELOW
3. PACKAGING PANEL: PER SPECIFICATION PARAGRAPH 3.3.3, THE REINFORCEMENT STITCHMAT 348-20 FOR THE PACKAGING PANEL IS A COMBINATION OF WOVEN ROVING STITCHED TO CHOPPED FIBER LAYER. THE WOVEN ROVING SHALL HAVE AN AVERAGE WEIGHT OF 40.8 PLUS/MINUS 2.4 OUNCES PER SQUARE YARD. THE CHOPPED FIBER SHALL WEIGH 2.0 PLUS/MINUS 0.2 OUNCES PER SQUARE FOOT. THE FIBERGLASS FABRIC REINFORCEMENT COMPOSITE SHALL BE IAW MIL-H 43246C, JWH D2, TYPE III, CLASS I, GRADE A. THE RESIN SHALL CONFORM TO MIL-R-7573C, GRADE A, CLASS D, WITH MODIFICATIONS OF PARAGRAPH 3.2.1. THE PACKAGING PANEL SHALL BE MADE WITH AT LEAST ONE PLY OF REINFORCEMENT WITH RESIN AS APPLIED AT A RATIO OF RESIN-TO-FIBERGLASS REINFORCEMENT OF APPROXIMATELY 55:45 BY WEIGHT.
4. THE PACKAGE SHALL BE WRAPPED IN 2 LAYERS OF POLYETHYLENE SHEET, 10 MIL CONFORMING TO ASTM D 2103-05, CLASSIFICATION 4503G PRIOR TO PLACING PACKAGING PANELS ON TOP AND BOTTOM AND THEN BANDING.
5. THE WRAPPED MATS ARE SECURED WITH NON-METALIC BANDING, CONFORMING TO ASTM D2950-05, TYPE II POLYOLEFIN PLASTIC WATER RESISTANT STRAPPING, SIZE 5/8 INCH WIDE, SPACED NO GREATER THAN 3 FEET APART WITH 3/8" CLIP AT EACH EDGE.
6. MAT, FIBERGLASS; REFERENCE SHT 1 OF 6
7. JOINING PANEL ASSY, 30 FT; REFERENCE SHT 2 OF 6
8. JOINING PANEL ASSY, 24 FT; REFERENCE SHT 2 OF 6
9. QA TAB; REFERENCE SHT 1 OF 6

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FFM PACKAGING		
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DRWN	ENGR	
Jon A. Reed	Various	SHEET 2 OF 2

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