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19 February 2009

Mr. Pierre Saverot
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Docket No.: 71-9283 & TAC No. L24256

Subject: RAI Response for Model 660-OP Type B Container

Dear Mr. Saverot:

The following is provided in response to your letter dated 3 November 2008 regarding the 660-OP Type B container.

1. Military specification MIL-S-23389B references additional documents which provide information on the material type and thicknesses used in construction of the overpack box for this Type B container. The referenced documents are included as Enclosure A to this letter.
2. Drawings as enclosed and/or previously submitted, reference nationally recognized industry standards for components judged to be safety related by our Engineering Department. The example noted regarding the C12L14 steel bolts is actually referenced on drawing R66060 Rev B and C as "AISI C12L14" steel bolts. AISI is the American Iron and Steel Institute which is a nationally recognized standards organization. This specification was adopted by the Society of Automotive Engineers and may alternately be found as "AISI/SAE C12L14".
3. Enclosure B includes Drawing R66060 Rev D. Sheet 1, note 1.5 of this drawing has been revised to reference welding and inspection in accordance with MIL SPEC W-6858. This is the welding specification followed for spot welds on the 660 device shell which is the only welding on this device.

The note also states that this welding documents manufacture of historic product. No future repair or replacement of the 660 shell will be performed for any Type B containers currently in use.

4. Revision 3 to the 660-OP SAR contains the following modification to Section 7.1.1:

“The Model OP-660 & OPL-660 packages must be loaded and closed in accordance with procedures that, at a minimum, include the requirements specified in this section.”

This section no longer references the use of the term “or equivalent”. A copy of page 7-1 to Revision 3 of the SAR is included in Enclosure C of this letter.

5. Revision 3 to the 660-OP SAR has been revised to include inspection of the projector hardware for readily visible signs of fatigue cracking (without hardware removal or disassembly) prior to shipment. A more detailed inspection of the bolt/fastener thread condition after disassembly will be performed during Quarterly/Annual Maintenance performed in accordance with 10 CFR 34.31 (or equivalent Agreement State regulations). Performance of the inspection of thread condition during this maintenance is added as a note. This change is incorporated under section 7.1.1.2.a. Page 7-2 of Revision 3 to the SAR is included with this letter. (Note no changes were made to Section 7.1.1.2.b of the SAR since the overpack box assembly does not incorporate any bolts or screws.)
6. The alloy designation for the titanium s-tube has been added to Sheet 3 of Drawing R66060 Rev D. The shield assemblies associated with the 660 series inner devices are no longer being manufactured. At the time these shield assemblies were manufactured, there was no industry standard used to obtain the titanium s-tube material (e.g. ASTM, ASME, etc.). Beginning in September 1992, suppliers of the s-tube material were required to provide a material certification for the source tubes, however, there was no requirement on the production drawing prior to that date and the added requirement in 1992 did not specify conformance to any specific industry standard.
7. Note 1.5 on sheet 1 of drawing R66060 Rev D notes that the welding referenced on this drawing reflects historical fabrication. This device had only one weld performed on the device shell and there will be no repair or maintenance performed on the existing device's shell welding. Though now inactive/obsolete, reference to Mil-Spec W-6858 applied at the time of fabrication for existing devices, therefore its remains noted on note 1.5 of the drawing for historical production.
8. As discussed during our site visit on 3 December 2008, the best method for identifying shielding porosity is an adequate radiation survey. Specifying a minimum shield weight is not a reliable or adequate means for identification of a defective shield due to porosity.

The description of the radiation surveys referenced in Section 8 of the SAR has been improved to add more detail regarding the radiation profiles performed for the 660 Series inner devices prior to their distribution as radiography devices. The 660 Series device is now an obsolete design and no new fabrication of 660 Series devices will be performed. Only service and repair of existing 660 Series devices will continue. Further, since this is an obsolete design, we confirm that no service or repair operations on an existing 660 Series device will include replacement of the depleted uranium shield.

9. Page 3-3 of the SAR Revision 3 is enclosed and adds the requested note regarding thermal expansion to Table 3.2.A.

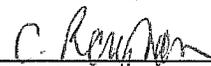
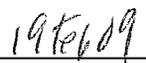
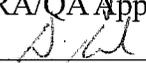
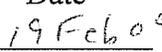
10. Page 3-2 of the SAR Revision 3 is enclosed and corrects the titanium alloy designation in Table 3.2.A. The designation is now shown as Ti-3Al-2.5V.

Should you have any questions prior to the submission of our response, please feel free to contact me at (781) 505-8241.

Sincerely,



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 RA/QA Approval	 Date
 Engineering Approval	 Date

Enclosures:

- A- Referenced drawings from MIL-S-23389B
- B- R66060 Rev D and Table of Drawing Changes
- C- SAR Revision 3 pages 3-2, 3-3, 7-1 thru 7-7, 8-2 thru 8-4 and List of affected pages

**Enclosure A – Reference Documents MIL-S-23389B
MIL-S-23389B
Drawings 7258943 through 7258957 and 11075780**

MIL-S-23389B
29 September 1975
SUPERSEDING
MIL-S-23389A
6 March 1968

MILITARY SPECIFICATION

SHIPPING AND STORAGE CONTAINER,
CARTRIDGE, 20MM, M548

This specification is approved for use by all departments and agencies of the Department of Defense.

1. SCOPE

1.1 This specification covers one model steel container for shipping and storing ammunition.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

TT-C-490 - Cleaning Methods and Pretreatment of Ferrous Surfaces for Organic Coatings

MILITARY

MIL-L-19896 - Labels and Label Tape, Pressure Sensitive Adhesive, Paper, Water Resistant
MIL-W-12332 - Welding, Resistance, Spot, Seam, and Projection; for Fabricating Assemblies of Low-Carbon Steel

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-109 - Quality Assurance Terms and Definitions
MIL-STD-406 - Visual Inspection Standards for Tern Plate Cans and Steel Boxes Used in Small Arms Ammunition Packaging.

FSC 8140

THIS DOCUMENT CONTAINS 13 PAGES

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- MIL-STD-414 - Sampling Procedures and Tables for Inspection by Variables for Percent Defective
- MIL-STD-1235 - Single and Multilevel Continuous Sampling Procedures and Tables for Inspection by Attributes

DRAWINGS

ARMAMENT COMMAND

- D7258943 - Shipping and Storage Container, Cartridge, 20mm, M548
- D7258944 - Body Assembly
- D7258945 - Cover Assembly
- IEL 7259441 - Index of Inspection Equipment Lists for: Shipping and Storage Container, Cartridge, 20mm, M548

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other Publications.-The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM)
ASTM B117-64 -- Method of Test for Salt Spray (Fog) Testing

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103)

Technical Society and Technical Association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.

3. REQUIREMENTS

3.1 General.-The container shall comply with the requirements of Drawing (Dwg.) D7258943, referenced specifications and other requirements specified herein.

3.2 First Article Sample.-Unless otherwise directed by the contracting officer, a first article sample shall be required.

3.3 Welding Procedure.-Fabrication of the container shall be in accordance with the recorded welding procedure requirements of MIL-W-12332.

3.4 Protective Coating.

3.4.1 Phosphate.-The cleaning method and pretreatment process used shall comply with the requirements of Dwgs. D7258944 and D7258945. The phosphate coating shall comply with the requirements of TT-C-490 for appearance and minimum weight, as applicable to the type of phosphate used.

3.4.2 Paint.-The paint coating shall comply with the requirements of Dwgs. D7258944 and D7258945. In addition, the coating shall be smooth, unbroken and free of blisters, runs, thin spots and foreign matter. Adhesion of the paint to the pretreated surfaces shall comply with applicable requirements of TT-C-490.

3.4.3 Corrosion Resistance.-The exterior surface of the container shall show no visible evidence of paint blistering, creepage (loss of adhesion), or corrosion of basis metal in excess of 1/8 inch from a test score, or more than five scattered blisters or corrosion spots having individual diameters greater than 3/16 inch in any 4 x 12 inch flat area, excluding score marks, after exposure to a 5% solution of salt spray for 80 hours.

3.5 Gasket Compression.-The gasket compression of the container shall be as specified by Dwg. D7258943. (see 6.4)

3.6 Airtightness.-The assembled container shall withstand, without leakage, an air pressure differential of three pounds per square inch (psi).

3.7 Functioning.

3.7.1 Cover Assembly.-The locking hardware shall be operable manually. The cover assembly shall be removable manually without the use of exorbitant force. The gasket shall remain secure in the correct position within the cover upon removal of the cover assembly. The gasket shall not stick to, be cut or split by contact against the top edge of the body assembly.

3.7.2 Hasp and Latch.-Mating parts of the body hasp and latches shall engage without requiring deformation of any container part, and the latches shall close and open freely. When closed the latches of the assembled container shall remain closed until manually opened.

3.7.3 Elevated Temperature Storage.-Following storage of the container in its closed position at an air temperature of 163 degrees Fahrenheit (°F) minimum for a period of 24 hours minimum and subsequent return to ambient temperature, the container shall function as required in 3.7.1 and 3.7.2.

3.8 Weld Security.

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3.8.1 Hasp Assembly.-Each hasp of the body assembly shall comply with the security requirement of Dwg. D7258944 without permanent deformation or failure of a weld.

3.8.2 Handle Assembly.-The handles of the body assembly shall withstand a pull of 600 pounds without permanent deformation of a component or failure of a weld.

3.8.3 Latch Assembly.-The latch assemblies of the cover assembly shall comply with the security requirement of Dwg. D7258945 without breakage or permanent deformation of any of the components or welds.

3.9 Concavity and convexity.

3.9.1 Cover Assembly.-The cover assembly shall meet the requirements of Dwg. D7258945 for flatness.

3.9.2 Body Assembly.-The top edges of the body assembly shall meet the requirements of Dwg. D7258944 for straightness.

3.10 Workmanship.-The requirements for workmanship are as specified by applicable drawings, referenced specifications and the following:

3.10.1 Processing Defects.-The container shall be free of cracks, splits, sharp edges, slivers, burrs, severe dents, cuts and scratches, missing or defective welds and components and other forms of unsatisfactory workmanship.

3.10.2 Cleanliness.-The painted container shall be free of all foreign matter.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection.-Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Quality Assurance Terms and Definitions.-Reference shall be made to MIL-STD-109 for definition of quality assurance terms.

4.2 Classification of Inspections.—The inspection requirements specified herein are classified as follows:

1. First Article Inspection (see 4.3)
2. Quality Conformance Inspection (see 4.4)

4.3 First Article Inspection.

4.3.1 First Article Sample.—At the beginning of production, a sample representative of the production material, equipment, processes and procedures shall be submitted in accordance with contract requirements and shall consist of 50 painted containers, three sets of unassembled component parts, and the welding procedure. Prior to approval of the first article sample, the acquisition of material or components for, or the commencement of production of the balance of the contract quantity shall be at the sole risk of the contractor.

4.3.1.1 First Article Inspection.—Prior to submission of the first article sample to the Government, the contractor shall inspect all components and assemblies for all contract, drawings and specification requirements. The contractor's inspection shall be subjected to verification by the Government representative.

4.3.1.2 Examination and Tests.—The first article sample will be inspected for all requirements of the drawings and specifications at a Government laboratory or such facility specified in the contract. Determination as to approval of any first article sample shall be based only upon results of initial examinations and tests.

4.3.1.3 First Article Sample Failure.—Failure of the sample to comply with requirements of the drawings and specifications will result in sample disapproval.

4.4 Quality Conformance Inspection.

4.4.1 Submission of Product.—The product shall be submitted in accordance with MIL-STD-105 or MIL-STD-1235, as applicable.

4.4.1.1 Lot.—A lot shall consist of assembled containers produced by one manufacturer in one unchanged process, in accordance with the contract, the same drawings and drawing revisions, and same specification and specification revision.

4.4.1.2 Lot Identification.—The cover and body assemblies of each container of the lot shall be identified as specified by Dwg. D7258944 and D7258945, supplemented as directed by the procuring activity.

4.4.2 Examination.—Examination for major and minor defects shall be performed as specified herein. Each assembly found to be defective shall be rejected.

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4.4.2.1 Sampling Plans. -The sampling plans of either MIL-STD-105 or MIL-STD-1235 shall apply at the option of the contractor. To determine product acceptability, major and minor defects as listed herein may be considered on a class basis, or they may be considered individually. (see 6.2) However, when three or less defect characteristics are listed in a classification, acceptability shall be determined on an individual basis for major defects. (see 6.2)

4.4.2.2 AQL's. -The following AQL's are assigned:

a. Individual defects

Major defects	0.25%
Minor defects	0.40%

b. Class basis

Major defects	1.50%
Minor defects	2.50%

4.4.3 Classification of Defects (see 6.3). -The classification of defects shall be as follows:

4.4.3.1 Body (see Dwg. D7258949, a detail of Dwg. D7258944).

<u>Categories and Defects</u>	<u>Method of Inspection</u>
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Critical: None defined.

Major:

101. Thickness, metal -----	Gage
102. Convexity or concavity top edges of body -----	Gage

Minor:

201. Height of body seam -----	Gage
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4.4.3.2 Bottom (see Dwg. B7258950, a detail of Dwg. D7258944).

<u>Categories and Defects</u>	<u>Method of Inspection</u>
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Critical: None defined.

Major:

101. Thickness, metal -----	Gage
102. Length -----	Gage
103. Width -----	Gage

Minor: None defined.

4.4.3.3 Cover (see Dwg. D7258946, a detail of Dwg. D7258945).

Categories and Defects

Method of Inspection

Critical: None defined.

Major:

- 101. Thickness, metal ----- Gage
- 102. Width, inside cover (2 places) ----- Gage

Minor: None defined.

4.4.3.4 Shipping and Storage Container, Painted (see Dwg. D7258943, D7258944, and D7258945, as applicable).

Categories and Defects

Method of Inspection

Critical: None defined.

Major:

- 101. Inside width, body assembly, min ----- Gage
- 102. Inside length, body assembly, min ----- Gage
- 103. Inside depth, body assembly, min ----- Gage
- 104. Interior or exterior paint inadequate ----- Visual 1/
- 105. Corrosion ----- Visual
- 106. Cracked or split component ----- Visual
- 107. Missing, incomplete, broken or mislocated metal component ----- Visual
- 108. Missing welds ----- Visual
- 109. Mutilated metal component ----- Visual 2/
- 110. Steel sliver, burr or sharp edge ----- Visual-Feel 3/
- 111. Missing, inverted, loose, misaligned or defective gasket ----- Visual-Manual 4/

Minor:

- 201. Outside height ----- Gage
- 202. Outside length ----- Gage
- 203. Outside width ----- Gage
- 204. Marking incorrect, incomplete, illegible or missing -- Visual
- 205. Foreign matter, except corrosion ----- Visual

1/ MIL-STD-406 shall be used as a guide to classify paint defects. In the standard defects classified as incidental shall be considered permissible; defects classified as minor shall be considered major. Missing, damaged or incomplete paint shall be classified a defect. Bare spots on any subassembly which do not accumulate to exceed 1/2 square inch in area or scratches which do not penetrate to the phosphate coating shall be disregarded.

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2/ If the body or cover is severely dented or malformed, or the carrying or locking hardware is bent or otherwise distorted to cause a functional failure or become a personnel hazard, the sample unit shall be classed defective.

3/ If a steel sliver, burr or sharp edge which could injure unprotected hands is found on a ferrule, the bottom edge of a latch or cover skirt, or on the top or bottom edges of the body, the sample unit shall be classed defective.

4/ If the gasket is missing, inverted, broken, split or torn, contains a gross defect in texture or fit, or can be shifted horizontally within the gasket retainer by finger pressure or manual shake off the cover assembly, the sample unit shall be classed defective.

4.4.4 Tests.—The tests listed in Table I shall be performed on each lot in compliance with the test methods and procedures specified by 4.5. The sampling plans for the various tests shall be as specified by Table I. For acceptance, the results of each test shall apply with the applicable requirement(s).

Table I

<u>Test</u>	<u>Sample Size</u>	<u>Item</u>	<u>Requirement</u>
Phosphate coating	1/	3-Standard panels, TT-C-490	3.4.1
Paint adhesion	2/ 3	Containers	3.4.2
Corrosion resistance	3/ 2	Containers	3.4.3
Gasket compression	4/ 10	Containers	3.5
Airtightness	5/ 50	Containers	3.6
Functioning	6/ 8	Containers	3.7
Weld security	7/ 8	Containers	
Hasp		Body assemblies	3.8.1
Handle		Body assemblies	3.8.2
Latch		Cover assemblies	3.8.3
Concavity and convexity	8/ 50	Containers	
		Cover assemblies	3.9.1
		Body assemblies	3.9.2

1/ Failure of the phosphate coating on the standard panels to comply with the applicable requirements for appearance and minimum weight, shall be cause for rejection of all container subassemblies phosphated since the preceding test.

2/ Failure of one or more units of the sample to comply with the requirements for paint adhesion shall be cause for rejection of the lot.

3/ Failure of one or more units of the sample to comply with the requirements for corrosion resistance shall be cause for rejection of the lot.

4/ A variables inspection plan from MIL-STD-414, Table B-3, an AQL of 1.50 percent shall be used to determine lot acceptability, applying the method of calculation as shown in Example B-3. Failure of the sample to meet the acceptability criterion shall be cause for rejection of the lot.

5/ Failure of four or more units of the sample to comply with the requirement for airtightness shall be cause for rejection of the lot. If two or three units of the sample fail to comply with the requirement, a second sample consisting of the same number of units as specified for the first sample shall be tested. If in the accumulated samples, five or more units fail to comply with the requirement, the lot shall be rejected. A stream or recurring succession of bubbles from any surface, seam or gasket junction shall be evidence of a defective container.

6/ Failure of two or more units of the sample to comply with the specified functioning requirements shall be cause for rejection of the lot. If one unit fails to comply with the requirements, a second sample consisting of the same number as specified for the first sample, shall be tested. If in the accumulated samples, two or more units fail to comply with the requirements for functioning, the lot shall be rejected.

7/ Failure of one or more units of the sample to comply with the specified requirements for weld security of hasp assemblies, latch assemblies or handle assemblies shall be cause for rejection of the lot.

8/ Failure of four or more units of the sample to comply with the requirement for convexity or concavity shall be cause for rejection of the lot. If two or three units of the sample fail to comply with the requirement, a second sample consisting of the same number of units as specified for the first sample shall be tested. If in the accumulated samples, five or more units fail to comply with the requirement the lot shall be rejected. The sampling plan shall apply independently to cover and body assemblies.

4.4.5 Packaging, Packing and Marking Inspection.-There are no packaging or packing requirements applicable to this item.

4.4.6 Inspection equipment.-Index of Inspection Equipment List (IEL) 7259441 identifies the applicable Inspection Equipment Lists required to perform examination and tests prescribed herein. Equipment design(s) shall be in accordance with the applicable IEL code designations. The code designations are defined on Dwg. B1107528, a detail of IEL 7259441.

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4.5 Test Methods and Procedures.

4.5.1 Phosphate Coating.-The method of test shall be as specified in the requirements of TT-C-490, as applicable to the type of phosphate used. The prescribed panels shall be processed with the cover or body assemblies to be represented, beginning with the start of daily production and at 4 hour intervals, maximum, thereafter. Appearance and weight of the phosphate coating on the panels shall be recorded against the batch of cover or body assemblies represented.

4.5.2 Paint Adhesion.-The method of test shall be as specified in the applicable requirements of TT-C-490. The test shall be performed on three randomly selected surfaces of each unit of the sample.

4.5.3 Corrosion Resistance.-The method of test shall be as specified in ASTM B117-64 - Method of Test for Salt Spray (Fog) Testing. Using a sharp instrument, one "X" 6 to 7 inches long shall be scored on a flat surface of the cover and one side of the body of each sample container. The samples shall be supported, one with the scored "X" in the upright position for the cover test and the other sample supported with the scored "X" in the upright position for the body side test. Traces of paint blistering or corrosion spots on component edges or sharp corners shall not be classed as protective coating failure.

4.5.4 Gasket Compression.-The method of test shall be as specified on Dwg. D11075090, a detail of IEL 7259441, to determine compliance to the requirement.

4.5.5 Airtightness.-The container shall be conditioned to ambient temperature and pressure prior to testing. The containers shall be tested in accordance with 4.5.5.1 or with permission of the procurement agency with 4.5.5.2. A wetting agent may be used to minimize air bubbles clinging to the exterior surface.

4.5.5.1 Vacuum Method.-The container shall be tested for leakage by immersing the closed container in the inverted position under water in a vacuum vessel and lower the pressure in the vessel to three pounds per square inch minimum below ambient pressure. Observation for leakage of air from the container interior shall be made for a minimum of 30 seconds after reduction of pressure.

4.5.5.2 Hot Water Method.-The container shall be tested for leakage by immersing the closed container, in the inverted position, to a depth of one inch below the surface of the water. The temperature of the water and the length of time of immersion shall be that which will assure an increase in pressure to a minimum of 3 psi above ambient pressure. Observation for air leakage from the container interior shall be made during the period of pressure buildup and for 30 seconds after the 3 psi pressure differential has been reached.

4.5.6 Functioning.—The container shall be inspected to assure compliance with the requirements of 3.7 through the following procedures:

- a. Unlock and lock the cover assembly hardware by hand leverage. Note the locking and unlocking action for effectiveness and ease of operation.
- b. Remove and replace the cover assembly. Note any misfit or bind with the body assembly.
- c. Remove all cover assemblies. Inspect the gaskets for fit, security, cuts, and splits.
- d. Note any sticking of gaskets to the top edges of the body assemblies.
- e. Environmentally condition the container as specified in 3.7.3. After conditioning reinspect the container in accordance with a, b, c, and d, above.

4.5.7 Weld Security.

4.5.7.1 Hasp Assembly.—The sample body assembly resting on their bottoms shall be clamped in a suitable device. The specified tensional force, utilizing the test fixture (see Dwg. D11075104, a detail of IEL 7259441) for hasp weld security, shall be slowly applied perpendicular to the bottom and against the underside of the offset of the hasp. The force shall be applied at a rate of .125 to .25 inch per minute and held for one minute. After removal of the force, examine the hasp for distortion and weld failure.

4.5.7.2 Handle Assembly.—With the sample body assembly resting on its bottom or on end, attach the test fixture (see Dwg. D11075103, a detail of IEL 7259441) for end handle security to each end handle. With one test fixture securely held, apply the specified tensional force through the other test fixture parallel to the container bottom against the ferrule of each handle. The force shall be applied at a rate of .125 to .25 inch per minute and held for one minute. After removal of the force, examine the handle and hasp for distortion and weld failure.

4.5.7.3 Latch Assembly.—Attach test fixture (see Dwg. D11075102, a detail of IEL 7259441) for latch assembly security to each latch on the cover assembly. Secure one test fixture and slowly apply a tensional force to the other parallel to the face of the cover. The force shall be applied at a rate of .125 to .25 inch per minute and held for one minute. The test fixtures apply the force against the surface of the latch links exposed on the underside of each latch. After removal of the force, examine the latches, latch links, latch link retainers and cover for distortion and weld failure.

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4.5.8 Concavity and Convexity.

4.5.8.1 Cover Assembly.-The concavity and convexity shall be measured on the sample cover assemblies using test equipment (see Dwg. D7259439, a detail of IEL 7259441) along the length of the cover in the area above the cover gasket and the width adjacent to latch link retainer on the flat surface of the cover.

4.5.8.2 Body Assembly.-The concavity and convexity shall be measured on the sample bodies along the length and width of the top edge using test equipment (see Dwg. D7259440, a detail of IEL 7259441).

5. PREPARATION FOR DELIVERY

5.1 Packaging and Packing.-There are no packaging or packing requirements for this item.

5.2 Marking.-Each container shall be marked on the welded end in accordance with Dwg. D7258944 and each cover assembly in accordance with Dwg. D7258945.

5.3 Shipping Labels.-Shipping labels shall be affixed to each container on the welded end when shipment is made in less than full car or truck load quantities.

5.3.1 Labels.-The labels shall conform with MIL-L-19896 and shall be 4 inches square, approximately. The labels shall be marked with 1/4 inch high, minimum, letters and figures with the following information:

- a. Consignee.
- b. Manufacturer.
- c. Item nomenclature.
- d. Lot number.
- e. Contractor number.

6. NOTES

6.1 Ordering Data.-Invitation for bids and contracts or orders will specify the following:

6.1.1 Title, number and date of this specification.

6.1.2 Place of inspection, if not place of manufacture.

6.1.3 First article sample requirements. (see 3.2 and 4.3)

6.1.4 Provisions for the submission and approval of the welding procedure.

6.2 AQL's. -The optional use of AQL values for either individual defects or classes of defects is intended to minimize inspection agency administrative burden which might result from an exclusive assignment of individual defect AQL's. The option also permits flexibility where sampling inspection for acceptance is integrated into the manufacturing process.

6.3 Intermediate Point Inspection. -The classification of defects identifies the defect characteristics (among other things) for acceptance inspection. It may be necessary to modify the sequence of inspection stations to best suit the manufacturing process. Inspection for defect characteristics which will be hidden or altered by subsequent processing operations (including unrelated operations) should be scheduled to prevent premature acceptance which could be detrimental to the attainment of optimum product quality in the end item.

6.4 Measurement for Gasket Compression. -Three point contact of the container resting on blocks may be used to overcome any rocking motion which might be encountered with the container resting on the surface plate. However, since the measurement technique relies upon relative distances, care should be taken to assure that there is no displacement on the referenced surfaces between the readings.

NOTE: Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army - MU
Air Force - 70

Preparing Activity:

Army - MU

Review Activities:

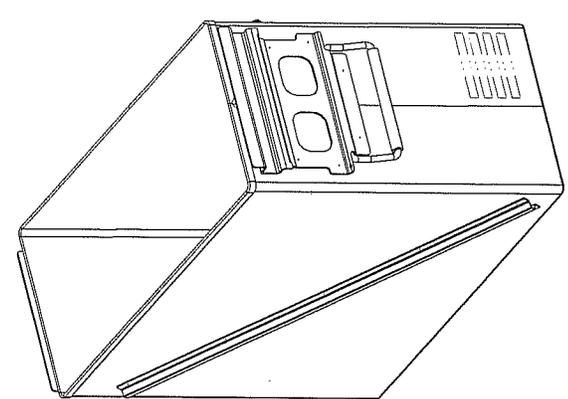
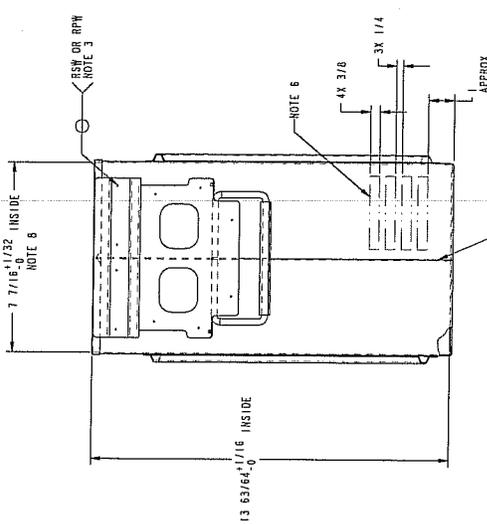
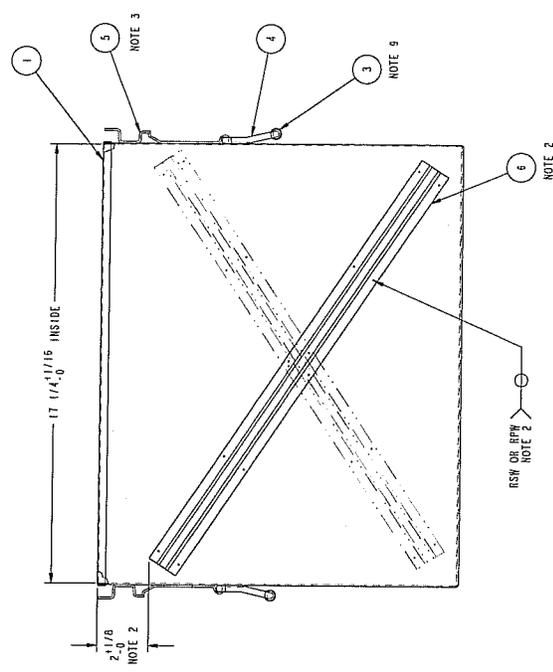
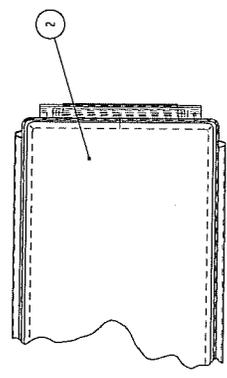
Army - MU
Air Force - 70

Project No. 8140-0119

☆ U. S. GOVERNMENT PRINTING OFFICE: 1975 -603-766/1339

NOTES

1. APPLICABLE STANDARDS/SPECIFICATIONS:
 A. MIL-STD-883
 B. MIL-STD-883C
 C. AMS 43.0 - 61
 D. MIL-S-23369
2. BODY REINFORCEMENTS 7258951 SHALL BE POSITIONED DIAGONALLY OPPOSITE AS SHOWN AND ATTACHED WITH A MINIMUM OF 10 WELDS EACH, EQUALLY SPACED.
3. HASP 7258952 WITH HANDLE 7258953 (IN POSITION SHOWN) SHALL BE LOCATED TO INSURE COMPLIANCE WITH COMPRESSION BEING WITHIN THE RANGE OF 7258954 WITH A MINIMUM OF 10 WELDS AS SHOWN. WELDS SHALL WITHSTAND A PULL TEST OF 7250 ± 10% MINIMUM.
4. CLEAN AND PREPARE ALL METAL SURFACES IN ACCORDANCE WITH TYPE 1, SPEC TT-C-490, BEFORE PAINTING.
5. COAT ENTIRE EXTERIOR AND INTERIOR SURFACES OF ASSEMBLY WITH A .001 SPEC TT-C-490, BEFORE PAINTING. USE WHEN APPROVED BY THE PROCURING CONTRACTING OFFICER.
6. MARK LOT NUMBER OF BODY ASSEMBLY WITH LUSTERLESS YELLOW (NO. 33529, FED-STD-595) OR LUSTERLESS WHITE, QUICK DRYING, WEATHER RESISTANT PAINT, LACQUER, ENAMEL OR INK APPROVED BY THE PROCURING CONTRACTING OFFICER. IF CONTAINER IS RECONDITIONED, THE WORD "REHAB" MONTH AND YEAR OF RECONDITIONING SHALL BE STENCILED IN WHITE INK ON THE SAME END AS MANUFACTURER'S IDENTIFICATION. LETTERING SHALL BE A MINIMUM OF 3/16 INCH HIGH.
7. TOP EDGE OF BODY SHALL BE FLAT WITH NOT MORE THAN .040 TOTAL INDICATOR READING ALONG THE LENGTH OF BODY. THIS REQUIREMENT SHALL BE CHECKED ALONG THE WIDTH. COMPLIANCE WITH FLATNESS REQUIREMENTS WILL BE GAGED ON EITHER THE PAINTED OR UNPAINTED BODY ASSEMBLY.
8. INSIDE WIDTH MAY BE 7 7/16 ± 1/8 AT THE APPROXIMATE MID-POINT ALONG BODY LENGTH.
9. IF ALTERNATIVE FERRULE, PART NO. 11075780, IS USED, FERRULE WILL BE ASSEMBLED TO HANDLE AFTER THE PAINTING OPERATION.



ITEM OR QTY.	DESCRIPTION	PART NO. OR IDENTIFYING NO.	REMARKS
6	2	19201	7258951 REINFORCEMENT, BODY
5	2	19201	7258952 HASP
4	2	19201	7258956 HANDLE
3	2	19201	7258957 FERRULE
2	1	19200	7258950 BOTTOM
1	1	19201	7258949 BODY

ITEM NO.	REV.	DESCRIPTION	DATE	BY	CHKD.	APP'D.
1	1	ISSUED	1974-11-17	L. LITZEL		
2	1	ISSUED	1974-11-17	A. LUDWIG		

DESIGN ACTIVITY	DESIGNER	DATE
DESIGNED BY	L. LITZEL	1974-11-17
CHECKED BY	A. LUDWIG	1974-11-17
APPROVED BY		

CONTRACT NUMBER	7258944
PROJECT NUMBER	7258944
REV.	1 OF 1

DATE	1974-11-17
TIME	177
SCALE	1:1
BY	L. LITZEL
CHECKED BY	A. LUDWIG
APPROVED BY	

ISSUED BY	L. LITZEL
DATE	1974-11-17
TIME	177
SCALE	1:1
BY	L. LITZEL
CHECKED BY	A. LUDWIG
APPROVED BY	

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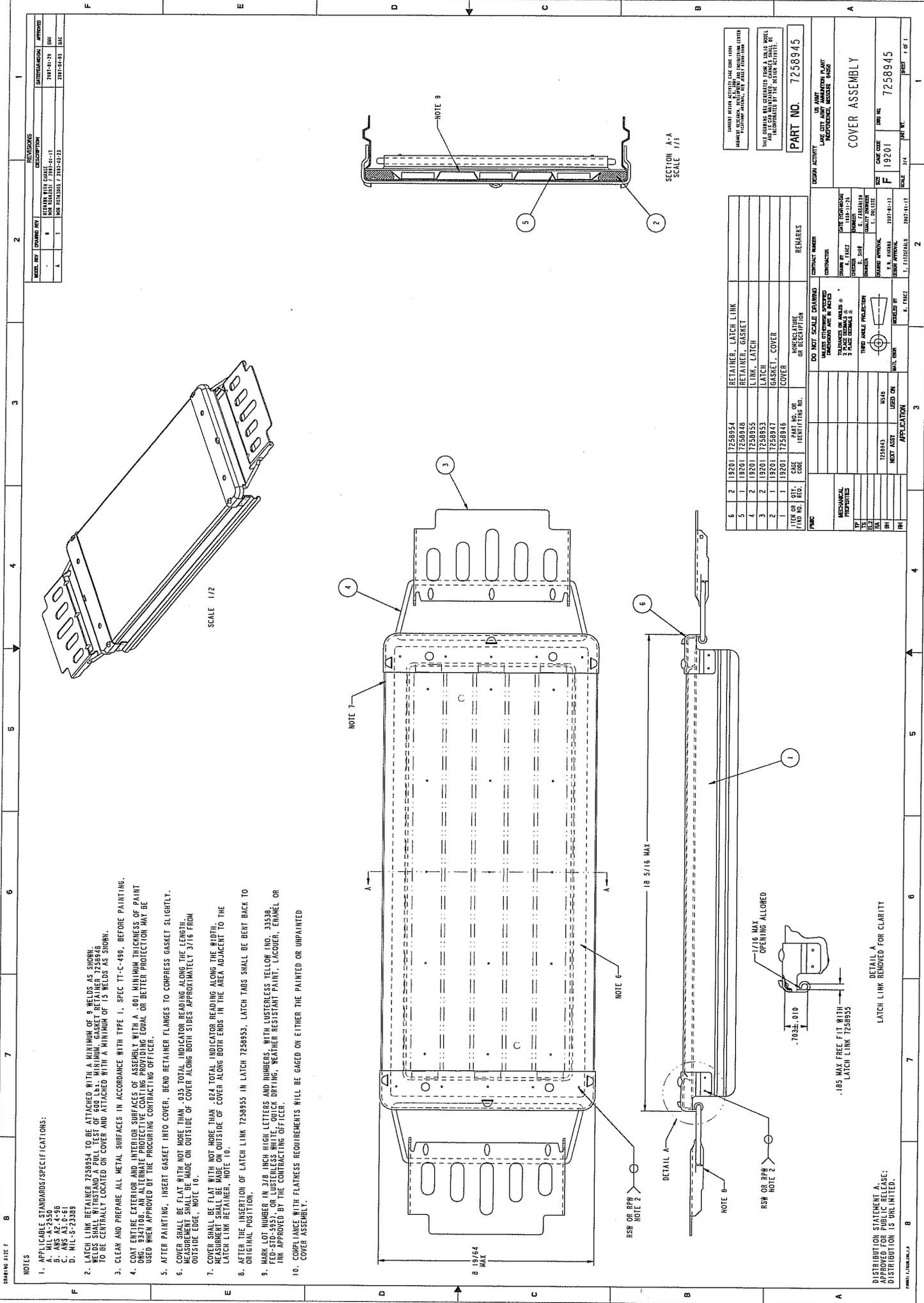
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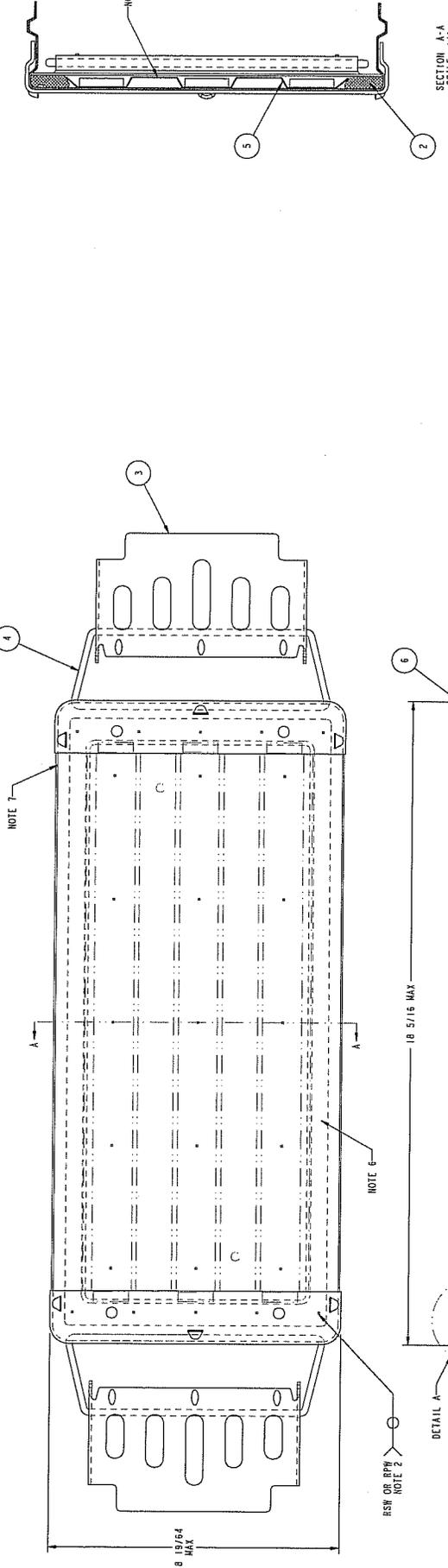
ISSUED BY	L. LITZEL
DATE	1974-11-17
TIME	177



APPLICABLE STANDARDS/SPECIFICATIONS:

- A. MIL-A-2550
- B. AMS A-4-29
- C. MIL-S-23369
- D. MIL-S-23369

1. LATCH LINK RETAINER 7258954 TO BE ATTACHED WITH A MINIMUM OF 9 WELDS AS SHOWN. WELDS TO BE CENTRALLY LOCATED ON COVER AND ATTACHED WITH A MINIMUM OF 15 WELDS AS SHOWN.
2. CLEAN AND PREPARE ALL METAL SURFACES IN ACCORDANCE WITH TYPE 1, SPEC TT-C-490, BEFORE PAINTING.
3. COAT ENTIRE EXTERIOR AND INTERIOR SURFACES OF ASSEMBLY WITH A .001 MINIMUM THICKNESS OF PAINT DMS. 3347188 - AN ALTERNATE PROTECTIVE COATING PROVIDING EQUAL OR BETTER PROTECTION MAY BE USED WHEN APPROVED BY THE PROCURING CONTRACTING OFFICER.
4. AFTER PAINTING, INSERT GASKET INTO COVER, BEND RETAINER FLANGES TO COMPRESS GASKET SLIGHTLY.
5. COVER SHALL BE FLAT WITH NOT MORE THAN .024 TOTAL INDICATOR READING ALONG THE LENGTH. COVER SHALL BE MADE ON OUTSIDE OF COVER ALONG BOTH SIDES APPROXIMATELY 3/16 FROM OUTSIDE EDGE, NOTE 10.
6. MARK LOT NUMBER IN 3/8 INCH HIGH LETTERS AND NUMBERS, WITH LUSTERLESS YELLOW (NO. 33538, FED-STD-595), OR LUSTERLESS WHITE, QUICK DRYING, WEATHER RESISTANT PAINT, LACQUER, ENAMEL OR INK APPROVED BY THE CONTRACTING OFFICER.
7. COMPLIANCE WITH FLATNESS REQUIREMENTS WILL BE GAGED ON EITHER THE PAINTED OR UNPAINTED COVER ASSEMBLY.



REV. NO.	DATE	DESCRIPTION	APPROVED
1	1971-11-23		
2	1971-11-23		
3	1971-11-23		

REV. NO.	DATE	DESCRIPTION	APPROVED
1	1971-11-23		
2	1971-11-23		
3	1971-11-23		

ITEM NO.	QTY.	DESCRIPTION	REMARKS
1	1	COVER	
2	1	RETAINER, LATCH LINK	
3	1	RETAINER, GASKET	
4	1	LATCH LINK	
5	1	LATCH	
6	1	GASKET, COVER	

ITEM NO.	QTY.	DESCRIPTION	REMARKS
1	1	COVER	
2	1	RETAINER, LATCH LINK	
3	1	RETAINER, GASKET	
4	1	LATCH LINK	
5	1	LATCH	
6	1	GASKET, COVER	

ITEM NO.	QTY.	DESCRIPTION	REMARKS
1	1	COVER	
2	1	RETAINER, LATCH LINK	
3	1	RETAINER, GASKET	
4	1	LATCH LINK	
5	1	LATCH	
6	1	GASKET, COVER	

DISTRIBUTION STATEMENT A:
 APPROVED FOR PUBLIC RELEASE;
 DISTRIBUTION IS UNLIMITED.

NOTES

1. APPLICABLE STANDARDS/SPECIFICATIONS:
 A. MIL-S-25300
 B. MIL-S-23389
2. MATERIAL: STEEL, SHEET OR STRIP, COLD ROLLED OR HOT ROLLED PICKLED AND OILED PER ASTM-A109 OR ASTM-A568.

FORMING SIZE D

8

7

6

5

4

3

2

1

REVISIONS

NO.	DATE	DESCRIPTION	BY	CHKD
1	2007-01-23	INITIAL DESIGN	J	ENG
2	2007-02-23	REVISED PER COMMENTS	K	ENG
3	2007-04-03	REVISED PER COMMENTS	K	ENG

DESIGN ACTIVITY

NO.	DATE	DESCRIPTION	BY	CHKD
1	2007-01-23	INITIAL DESIGN	J	ENG
2	2007-02-23	REVISED PER COMMENTS	K	ENG
3	2007-04-03	REVISED PER COMMENTS	K	ENG

CONTRACTOR

CONTRACTOR	AMERICAN AIRCRAFT MANUFACTURING COMPANY
DESIGNER	A. ZIEMBA
CHECKER	D. SHAW
ENGINEER	G. T. FARRAR/SH
QUALITY ENGINEER	L. BELISS
DATE	2007-01-17
DESIGN APPROVAL	A. ZIEMBA
CONTRACT APPROVAL	T. FITZGERALD

SCALE

SCALE	1/1
SCALE	1/1

PART NO.

7258952

US ARMY

LARGE CITY ARMY AMMUNITION PLANT
 PRODUCTIONS, INDIANAPOLIS, INDIANAPOLIS, INDIANAPOLIS

DESIGN ACTIVITY

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DESIGNER	A. ZIEMBA
CHECKER	D. SHAW
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SCALE

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 PRODUCTIONS, INDIANAPOLIS, INDIANAPOLIS, INDIANAPOLIS

DO NOT SCALE DRAWING
 UNLESS OTHERWISE SPECIFIED
 DIMENSIONS ARE IN INCHES
 TOLERANCES UNLESS OTHERWISE SPECIFIED:
 3 PLACE DECIMALS ± .010
 5 PLACE DECIMALS ± .005
 THIRD ANGLE PROJECTION

MECHANICAL PROPERTIES

TEMP	MS2
EL2	MS2
RA	MS2
BT	MS2
PH	MS2

APPLICATION

USED ON

NEXT ASSEMBLY

UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED

CONTRACTOR

DESIGNER

CHECKER

ENGINEER

QUALITY ENGINEER

DATE

DESIGN APPROVAL

CONTRACT APPROVAL

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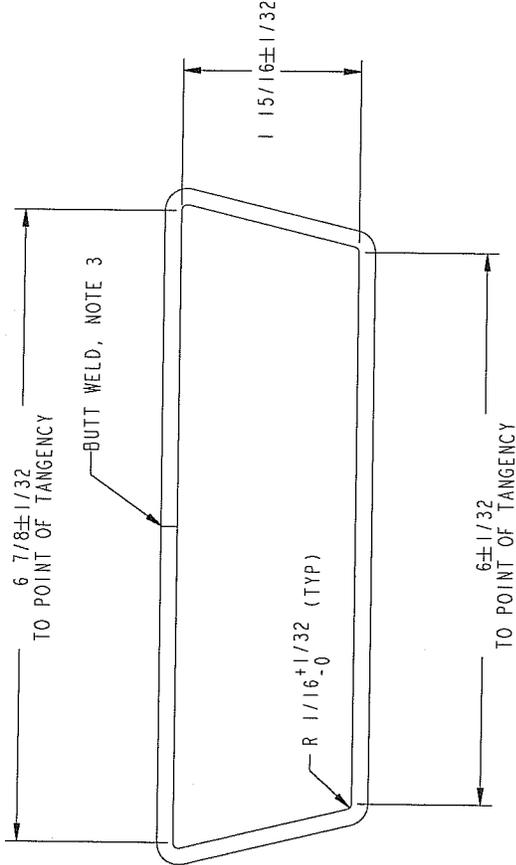
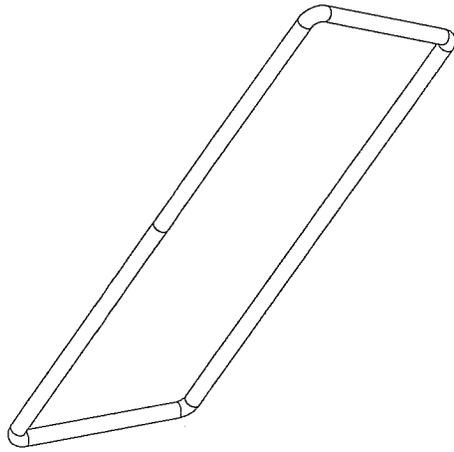
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AMERICAN AIRCRAFT MANUFACTURING COMPANY

NOTES

1. APPLICABLE STANDARDS/SPECIFICATIONS:
 A. MIL-A-2550
 B. MIL-S-23389
 C. AWS A3.0-61
2. MATERIAL: WIRE, STEEL, CARBON, ASTM A853, STEEL NOS. 1010, 1015 OR 1020, KILLED OR SEMI-KILLED, FINISH 1; TENSILE STRENGTH 80,000 PSI MINIMUM.
3. WELD MUST WITHSTAND A MINIMUM PULL TEST OF 50 LBS.



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PART NO. 7258955

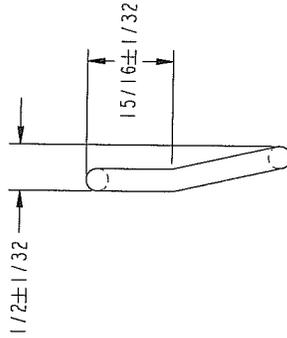
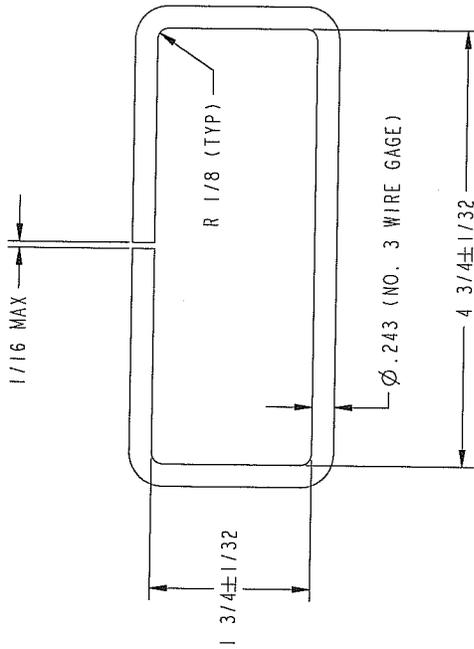
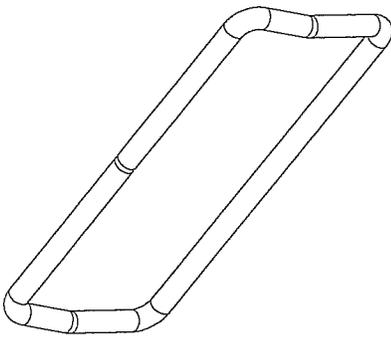
DESIGN ACTIVITY US ARMY LAKE CITY ARMY AMMUNITION PLANT INDEPENDENCE, MISSOURI 64056		CONTRACT NUMBER CONTRACTOR		DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PMIC	
DATE/REVISION 2007-01-29 BKG 2007-04-03 BAC	REVISIONS DESCRIPTION REDRAWN WITH CHANGE NOR R06K2031 / 2007-01-17 NOR R07K3005 / 2007-03-23	MODEL REV A	DRAW REV H J	DRAWN BY A. ZIOBRO 1959-11-25 ENGINEER	CHECKER K. FRACZ G. FARRANISH QUALITY ENGINEER L. DULISSE	TOLERANCE ON ANGLES \pm ° 2 PLACE DECIMALS \pm 3 PLACE DECIMALS \pm 1/64 FRACTIONS \pm 1/64 THIRD ANGLE PROJECTION	DRAWING APPROVAL V. H. KHANNA 2007-01-17 DESIGN APPROVAL T. FITZGERALD 2007-01-17
SIZE C CAGE CODE 19201	DWG NO. 7258955	SCALE 1/1	UNIT WT. 1 OF 1	DRAWING APPROVAL V. H. KHANNA 2007-01-17 DESIGN APPROVAL T. FITZGERALD 2007-01-17	MODELED BY A. ZIOBRO	MECHANICAL PROPERTIES YP TS EL2 RA BH RH	APPLICATION 7258945 M548 USED ON NEXT ASSY
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NOTES

1. APPLICABLE STANDARDS/SPECIFICATIONS:

- A. MIL-A-2550
- B. MIL-S-23389

2. MATERIAL: WIRE, STEEL, CARBON, ASTM A853, STEEL NOS. 1010, 1015 OR 1020, KILLED OR SEMI-KILLED, FINISH 1; TENSILE STRENGTH 80,000 PSI MINIMUM.



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PART NO. 7258956

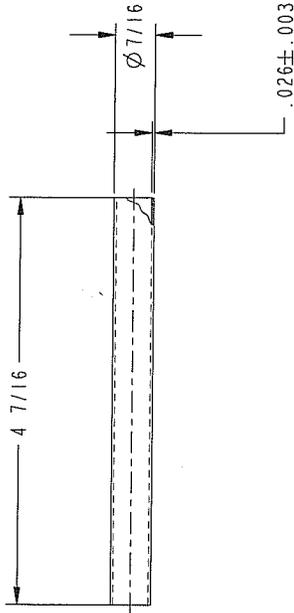
PMIC MECHANICAL PROPERTIES YP TS ELZ RA BH RH		DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON ANGLES ± ° PLACE DECIMALS ± 3 PLACE FRACTIONS ± 1/64 THIRD ANGLE PROJECTION 		CONTRACT NUMBER CONTRACTOR DRAWN BY A. ZIOBRO 1959-11-25 ENGINEER G. FARBANISH CHECKER K. FRACZ ENGINEER QUALITY ENGINEER L. DULLESSE		DESIGN ACTIVITY US ARMY LAKE CITY ARMY AMMUNITION PLANT INDEPENDENCE, MISSOURI 64456	
NEXT ASSY 10542566 7258944 USED ON M592 M548		MATL ENGR A. ZIOBRO MODELED BY		DRAWING APPROVAL V. N. KHANNA 2007-01-17 DESIGN APPROVAL T. FITZGERALD 2007-01-17		SIZE CAGE CODE DWG NO. 19201 7258956	
APPLICATION		SCALE 1/1		UNIT WT. SHEET 1 OF 1		HANDLE	

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NOTES

1. APPLICABLE STANDARDS/SPECIFICATIONS:
 A. MIL-A-2550
 B. MIL-S-23389

2. MATERIAL:
 STEEL, SHEET OR STRIP, COLD ROLLED, PER ASTM A109 OR ASTM A568.



CURRENT DESIGN ACTIVITY CASE CODE 19200
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 PICATUNNY ARSENAL, NEW JERSEY 07006-5000

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 INCORPORATED BY THE DESIGN ACTIVITY.

PART NO. 7258957

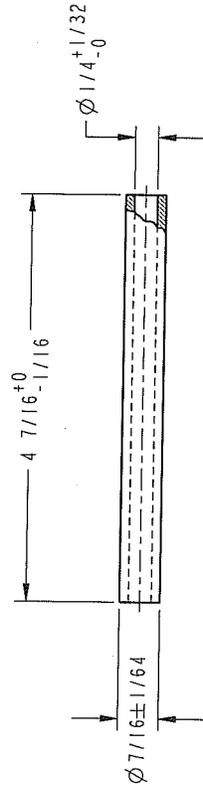
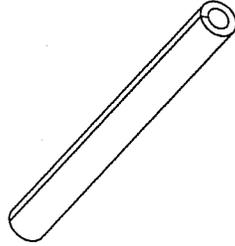
PMIC MECHANICAL PROPERTIES YP TS EL2 RA BH RH		DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON ANGLES ± ° 2 PLACE DECIMALS ± FRACTIONS ± 1/64 THIRD ANGLE PROJECTION 		CONTRACT NUMBER CONTRACTOR DRAWN BY A. ZIORRO CHECKER K. FRACZ ENGINEER G. FARBANISH QUALITY ENGINEER L. DULISSE		DESIGN ACTIVITY US ARMY RESEARCH, DEVELOPMENT AND ENGINEERING CENTER LAKE CITY, ARMY MISSOURI 64656	
NEXT ASSY 10542566 M592 7258944 M548		MODELED BY A. ZIORRO		DATE/YEAR-MO-DA 1959-11-25 ENGINEER G. FARBANISH QUALITY ENGINEER L. DULISSE		DESIGN APPROVAL V. H. KHANNA DESIGN APPROVAL T. FITZGERALD	
APPLICATION		SCALE 1/1		UNIT WT. 1 OF 1		SHEET	
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NOTES

1. APPLICABLE STANDARDS/SPECIFICATIONS:

- A. MIL-A-2550
- B. MIL-S-23389

2. MATERIAL: PLASTIC MOLDING AND EXTRUSION MATERIAL, POLYETHYLENE, MEDIUM DENSITY, 1AW L-P-390, TYPE III, CLASS M, GRADE 2, COLOR BLACK, NON REFLECTIVE SURFACE REQUIRED. DIELECTRIC CONSTANT, DISSIPATION FACTOR AND MILLING STABILITY TESTS LISTED IN L-P-390 ARE NOT REQUIRED FOR THIS APPLICATION.



SLIT FULL LENGTH WITHOUT THE REMOVAL OF MATERIAL



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ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
F. FENTON ARSENAL, NEW JERSEY 07066-5000

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PART NO. 11075780

<p>DESIGN ACTIVITY US ARMY LAKE CITY ARMY AMMUNITION PLANT INDEPENDENCE, MISSOURI 64056</p>		<p>CONTRACT NUMBER CONTRACTOR</p>		<p>DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES</p>		<p>DATE YEAR-MOD-JA 1970-10-22</p>		<p>DESIGN ACTIVITY LAKE CITY ARMY AMMUNITION PLANT INDEPENDENCE, MISSOURI 64056</p>	
<p>MODEL REV - A B</p>		<p>DRAW REV D E F</p>		<p>DESCRIPTION REDRAWN WITH CHANGE NOR R06K2031 / 2007-01-17 NOR R07K3005 / 2007-03-23 NOR R07K5002 / 2008-06-26</p>		<p>DATE YEAR-MOD-JA 1970-10-22</p>		<p>DATE YEAR-MOD-JA 2007-01-17</p>	
<p>DATE YEAR-MOD-JA 2007-01-29 2007-04-03 2008-07-09</p>		<p>DATE YEAR-MOD-JA 2007-01-17</p>		<p>ENGINEER A. ZIOBRO</p>		<p>ENGINEER G. FARBANISH</p>		<p>QUALITY ENGINEER L. DILLISSE</p>	
<p>APPROVED</p>		<p>APPROVED</p>		<p>CHECKER K. FRACZ</p>		<p>DRAWING APPROVAL V. N. KHANNA</p>		<p>SCALE C 19201</p>	
<p>APPROVED</p>		<p>APPROVED</p>		<p>ENGINEER A. ZIOBRO</p>		<p>MODELED BY A. ZIOBRO</p>		<p>UNIT WT. 1/1</p>	
<p>APPROVED</p>		<p>APPROVED</p>		<p>MATL ENGR</p>		<p>APPLICATION</p>		<p>SHEET 1 OF 1</p>	
<p>APPROVED</p>		<p>APPROVED</p>		<p>MECHANICAL PROPERTIES</p>		<p>7258944</p>		<p>11075780</p>	
<p>APPROVED</p>		<p>APPROVED</p>		<p>YP</p>		<p>USED ON</p>		<p>11075780</p>	
<p>APPROVED</p>		<p>APPROVED</p>		<p>TS</p>		<p>APPLICATION</p>		<p>11075780</p>	
<p>APPROVED</p>		<p>APPROVED</p>		<p>EL2</p>		<p>APPLICATION</p>		<p>11075780</p>	
<p>APPROVED</p>		<p>APPROVED</p>		<p>RA</p>		<p>APPLICATION</p>		<p>11075780</p>	
<p>APPROVED</p>		<p>APPROVED</p>		<p>BH</p>		<p>APPLICATION</p>		<p>11075780</p>	
<p>APPROVED</p>		<p>APPROVED</p>		<p>RH</p>		<p>APPLICATION</p>		<p>11075780</p>	

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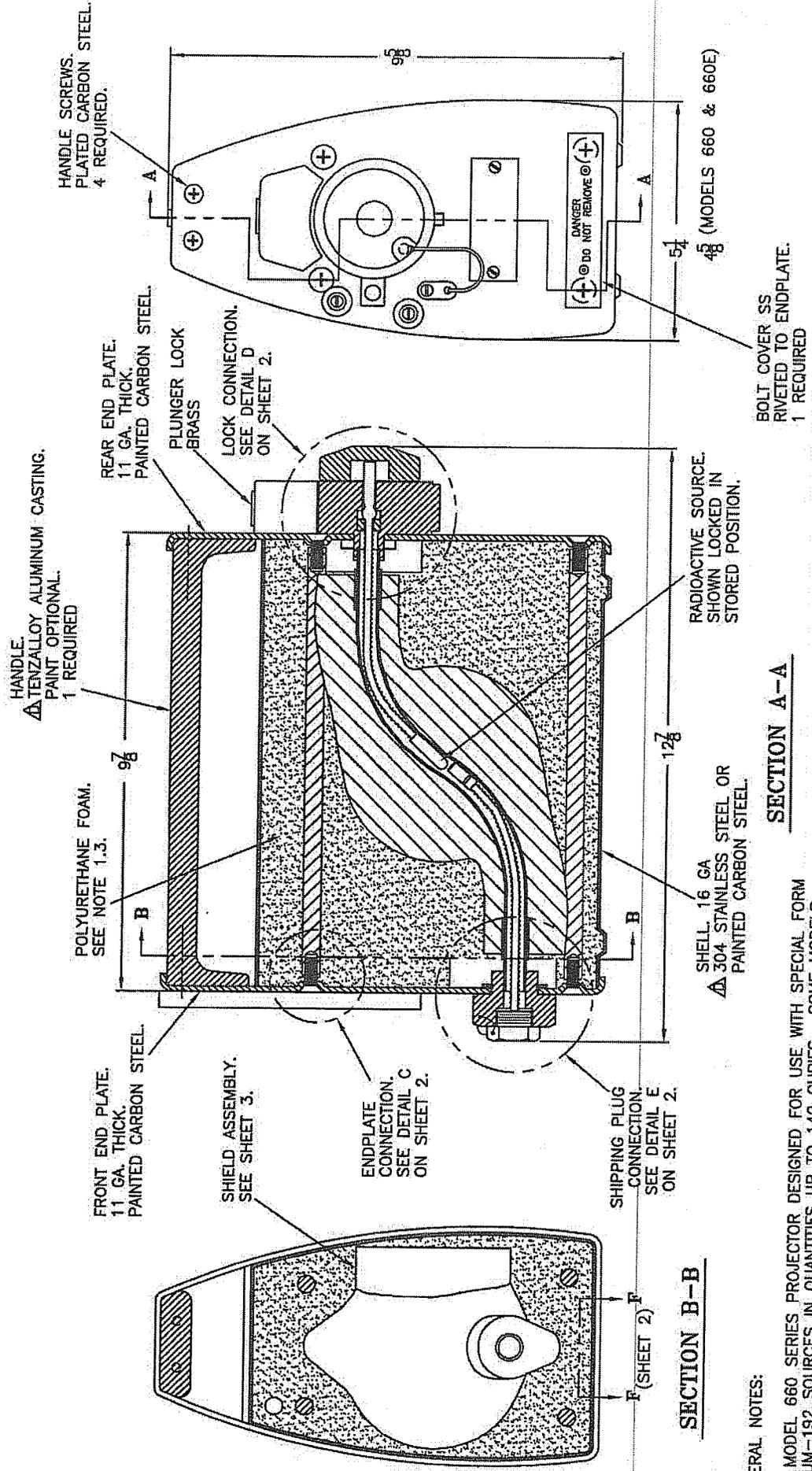
Enclosure B – Drawing R66060 Rev D with Table of Drawing changes

Summary Table of Changes to Drawing R66060 Rev C to Rev D

Change Location	Summary Change	Change Reported Pursuant to 71.95	Impact of Change on Units Previously or Currently in Use under the Certificate	Action Taken By QSA Regarding Affected Units
Sheet 1	Note 1.5 of this drawing has been revised to reference welding and inspection in accordance with MIL SPEC W-6858. This is the welding specification followed for spot welds on the 660 device shell which is the only welding on this device. The note also states that this welding documents manufacture of historic product. No future repair or replacement of the 660 shell will be performed for any Type B containers currently in use.	No	No change to package construction or design. Detail added for completeness and clarity only.	None. Not applicable.
Sheet 1	Material specification for the handle is changed from "cast aluminum" to "Tenzalloy Aluminum Casting"	No	No change to package construction or design. Detail added for completeness and clarity only.	None. Not applicable.
Sheet 1	Shell material changed from "Stainless Steel or Painted Carbon Steel" to "304 Stainless Steel or Painted Carbon Steel".	No	No change to package construction or design. Detail added for completeness and clarity only.	None. Not applicable.
Sheet 2	Material description for the Backing Plate in Section F-F revised from "16 Ga. Thick. Stainless Steel" to read "16 Ga. 304 Stainless Steel"	No	No change to package construction or design. Detail added for completeness and clarity only.	None. Not applicable.
Sheet 2	Weld Note 1 in Section F-F revised to refer to notes on Sheet 1 of the drawing. (Weld specification now covered in Note 1.5 on sheet 1.)	No	No change to package construction or design. Change administrative only.	None. Not applicable.

Summary Table of Changes to Drawing R66060 Rev C to Rev D

Change Location	Summary Change	Change Reported Pursuant to 71.95	Impact of Change on Units Previously or Currently in Use under the Certificate	Action Taken By QSA Regarding Affected Units
Sheet 2	Revised material for lock slide from "AISI 01 or AISI A2" to read "Flat Ground Stock Oil Hardening Rc 45-55."	No	No change to package construction or design. Detail added for completeness and clarity only.	None. Not applicable.
Sheet 2	Material for lock cover from both the Posilock and Non-Posilock versions of Detail D revised to change the material from "300 Series SS" to read "304 SS".	No	No change to package construction or design. Detail added for completeness and clarity only.	None. Not applicable.
Sheet 2	Material for selector ring from both the Posilock and Non-Posilock versions of Detail D revised to change the material from "300 Series SS" to read "304 Stainless Steel".	No	No change to package construction or design. Detail added for completeness and clarity only.	None. Not applicable.
Sheet 3	Material for standard S-tube was changed from "Titanium" to read "Titanium, Ti-3Al-2.5V".	No	No change to package construction or design. Detail added for completeness and clarity only.	None. Not applicable.



HANDLE.
 ▲ TENZALLOY ALUMINUM CASTING.
 PAINT OPTIONAL.
 1 REQUIRED

HANDLE SCREWS.
 PLATED CARBON STEEL.
 4 REQUIRED.

POLYURETHANE FOAM.
 SEE NOTE 1.3.

FRONT END PLATE.
 11 GA. THICK.
 PAINTED CARBON STEEL.

REAR END PLATE.
 11 GA. THICK.
 PAINTED CARBON STEEL.

SHIELD ASSEMBLY.
 SEE SHEET 3.

LOCK CONNECTION.
 SEE DETAIL D
 ON SHEET 2.

ENDPLATE
 CONNECTION.
 SEE DETAIL C
 ON SHEET 2.

SHIPPING PLUG
 CONNECTION.
 SEE DETAIL E
 ON SHEET 2.

SHELL, 16 GA
 ▲ 304 STAINLESS STEEL OR
 PAINTED CARBON STEEL.

RADIOACTIVE SOURCE.
 SHOWN LOCKED IN
 STORED POSITION.

BOLT COVER SS
 RIVETED TO ENDPLATE.
 1 REQUIRED

REVISED PER ERF 2078

APPROVED/DATE
AR 17 Feb 69
AR 18 Feb 69

UNLESS OTHERWISE SPECIFIED;
 1. DIMENSIONS ARE IN INCHES.
 2. TOLERANCES: .X ± 0.1
 .XX ± 0.06
 FRACTIONS ± 1/8

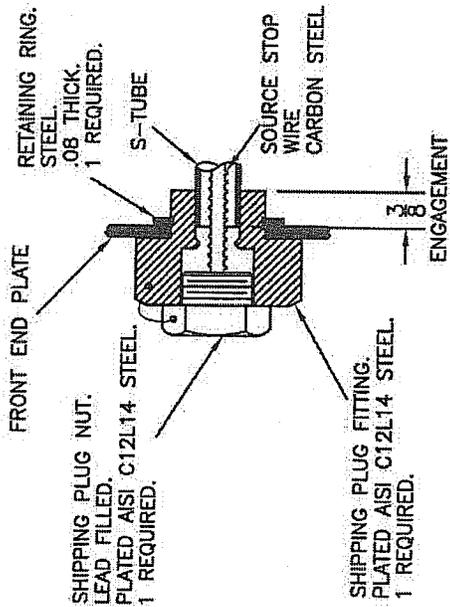


40 NORTH AVE, BURLINGTON, MA 01803

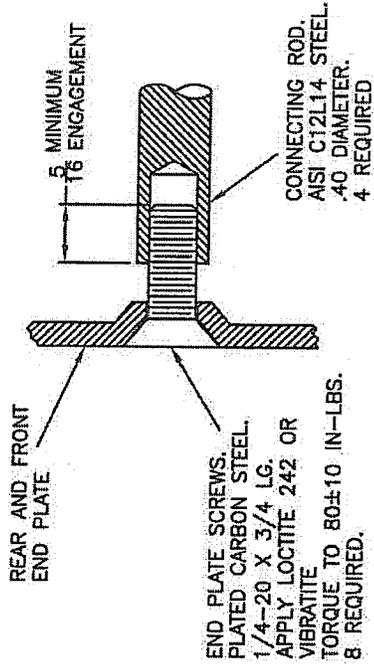
DESCRIPTIVE
 DRAWING

TITLE
 MODEL 660 SERIES PROJECTOR

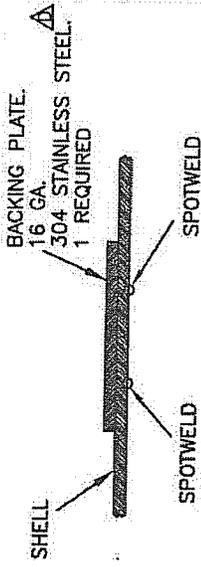
SIZE	DWG. NO.	REV
A	R 66060	D
SCALE	NONE	SHEET 1 OF 3



DETAIL E (FROM SHEET 1)
SHIPPING PLUG/STUBE CONNECTION

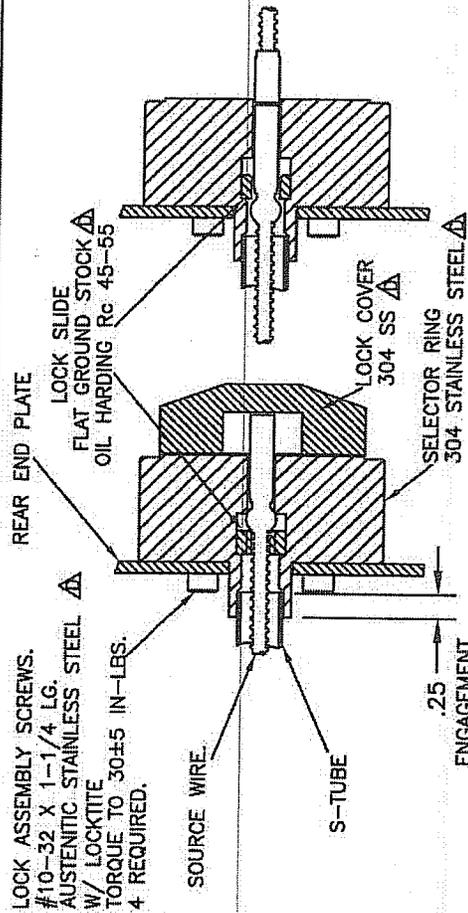


DETAIL C (FROM SHEET 1)
END PLATE/ROD CONNECTION



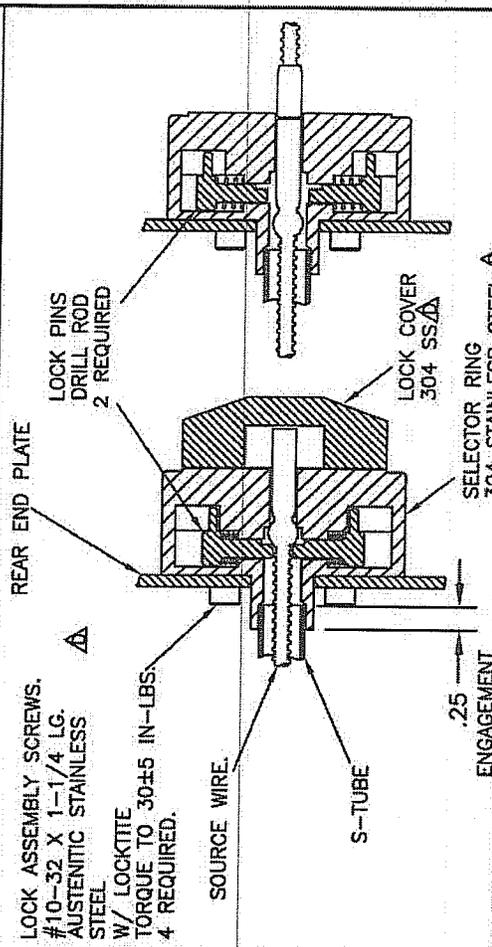
- WELDING NOTES:
1. SEE NOTES SHEET 1 Δ
 2. SPOTWELD SIZE = 1/8" DIAMETER MINIMUM.
 3. SPOTWELD SPACING = 1 INCH.

SECTION F-F (FROM SHEET 1)
SHELL WELD SPECIFICATIONS



LOCKED POSITION — UNLOCKED POSITION
POSILOCK DESIGN

MODELS 660A, 660AE, 660B, 660BE



LOCKED POSITION — UNLOCKED POSITION
NON-POSILOCK DESIGN

MODELS 660, 660E

DETAIL D (FROM SHEET 1)

S-TUBE/LOCK CONNECTION & OPERATION

UNLESS OTHERWISE SPECIFIED;

1. DIMENSIONS ARE IN INCHES.

2. TOLERANCES:

.X ± 0.1

.XX ± 0.06

FRACTIONS ± 1/8

TITLE

MODEL 660 SERIES PROJECTOR

SIZE DWG. NO. R 66060

REV

A SCALE NONE

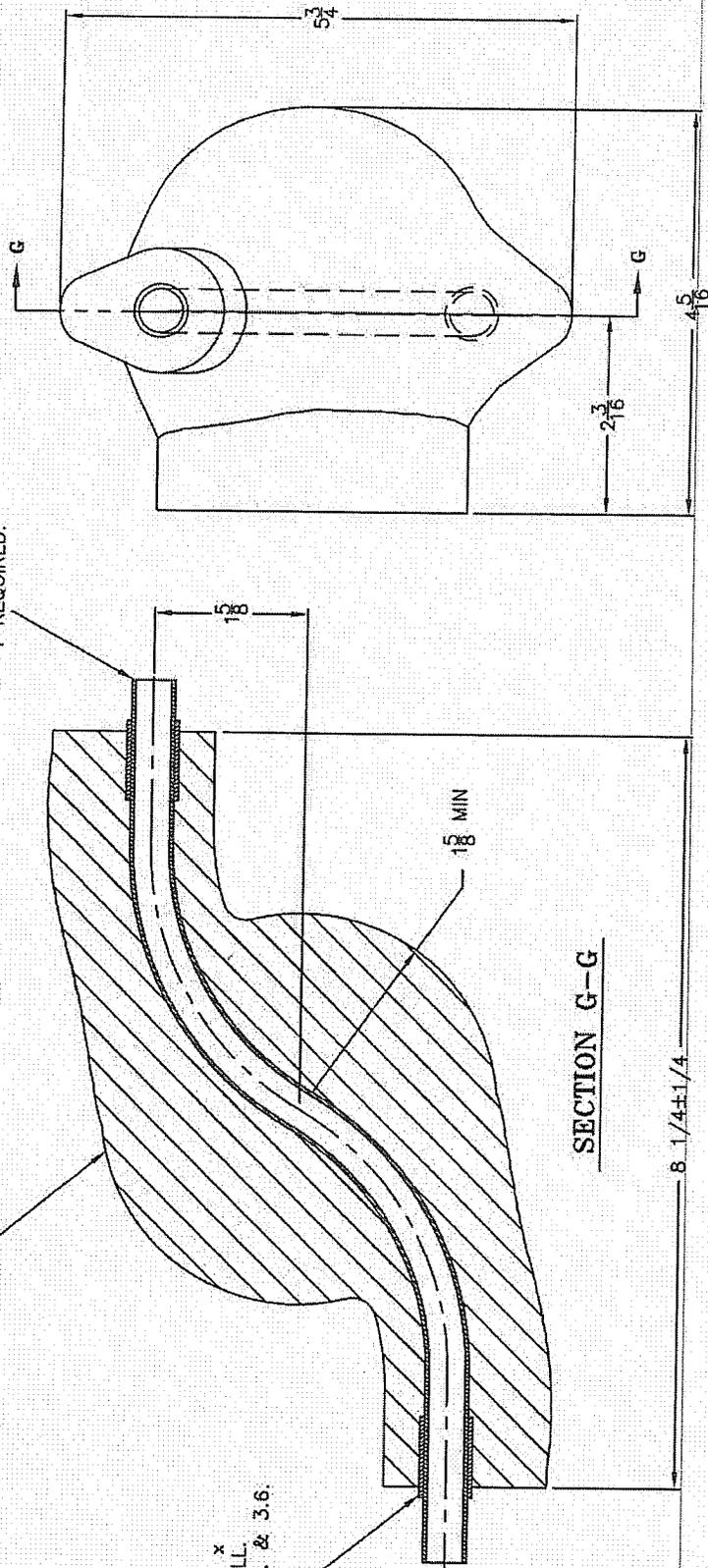
SHEET 2 OF 3

D

SHIELD.
PAINTED DEPLETED URANIUM.
1 REQUIRED.

S-TUBE.
.467 OD x .385 ID.
SEE NOTES 3.4 & 3.6.
1 REQUIRED.

SLEEVE.
.56 ± .02 OD x
.03 ± .01 WALL.
SEE NOTE 3.5 & 3.6.
2 REQUIRED.



SHIELD ASSEMBLY

SHIELD ASSEMBLY NOTES:

- 3.1. MAXIMUM DEPLETED URANIUM WEIGHT = 37 LBS.
- 3.2. MAXIMUM SUPPLEMENTAL LEAD SHIELDING WEIGHT = 3 LBS.
- 3.3. MAXIMUM TOTAL SHIELD ASSEMBLY WEIGHT = 40 LBS.
- 3.4. STANDARD S-TUBE MATERIAL: TITANIUM, Ti-3Al-2.5V ΔΔ
OPTIONAL S-TUBE MATERIAL: ZIRCALLOY
- 3.5. SLEEVE MATERIAL: TITANIUM
- 3.6. S-TUBE AND SLEEVE CAST INTO SHIELD.
- 3.7. MAXIMUM SUPPLEMENTAL LEAD SHIELDING THICKNESS = 1/4 IN.
- 3.8. LEAD ADDED AROUND SHIELD SURFACE.

UNLESS OTHERWISE SPECIFIED;

1. DIMENSIONS ARE IN INCHES.

2. TOLERANCES: .xxx ± 0.005

FRACTIONS ± 1/8

TITLE

MODEL 660 SERIES PROJECTOR

SIZE

DWG. No.

R 66060

REV

A

SCALE NONE

SHEET 3 OF 3

D

Enclosure C – SAR Revision 3 pages 3-2, 3-3, 7-1 thru 7-7 & 8-2 thru 8-4

Safety Analysis Report for the Model OP-660 & OPL-660 Transport Package

QSA Global Inc.
Burlington, Massachusetts

03 February 2009 - Revision 3
Page 3-2

3.1.3 Summary Tables of Temperatures

Table 3.1.A: Summary Table of Temperatures

Temperature Condition	OP-660 or OPL-660	Comments
Insolation (38°C in full sun)	69°C (156°F)	Section 3.4.1.1.
Decay Heating (38°C in shade)	45.3°C (113.5°F)	Section 3.4.1.2
Maximum Fire Test Temperature	838°C (1,540°F)	Results based on maximum seen for inner device as described in Section 2.7.4.
Post-Fire Steady State (maximum)	838°C (1,540°F)	Results based on maximum seen for inner device as described in Section 2.7.4. Maximum did not exceed temperatures seen immediately before removal from oven.

3.1.4 Summary Tables of Maximum Pressures

All package components are vented to atmosphere. As such, no pressure will build up in the units under either Normal or Hypothetical Accident conditions. Normal operating conditions will generate negligible pressure differential within the package. The package has the ability to withstand elevated atmospheric pressure because all components except the special form source are open to the atmosphere.

Any pressure generated within the special form source is significantly below that which would be generated during the Hypothetical Accident Conditions thermal test, which is evaluated in Section 2.7.4 .3 to result in no loss of structural integrity or containment.

3.2 Material Properties and Component Specifications

3.2.1 Material Properties

Table 3.2.A lists the relevant thermal properties of the important materials in the package. The resources referred to in the last column are listed below the table.

Table 3.2.A: Thermal Properties of Principle Package Materials

Material	Density (lb/in ³)	Melting/Combustion Temperature	Thermal Expansion	Resource
Depleted Uranium (U-0.75 Ti)	0.68	2,071°F	8μin/in°F	Reference #2, p.20-35
Copper	0.32	1981°F	16.5μin/in°F	Reference #5, p.1203
Lead (99%)	0.41	621°F	16μin/in°F	Reference #2, p.1-46
Low Carbon Steel (nominal)	0.28	2,750°F	7μin/in°F	Reference #1, p.6-11
Titanium Tube, Ti-3Al-2.5V	0.16	3,100°F	5μin/in°F	Reference #4
Stainless Steel-Type 304	0.29	2,600°F	9.9μin/in°F	Reference #1, p. 6-11
Polyurethane Foam	20 lb/ft ³ 8 lb/ft ³	Unknown	120μin/in°F	Reference #1, p.6-199

Safety Analysis Report for the Model OP-660 & OPL-660 Transport Package

QSA Global Inc.
Burlington, Massachusetts

03 February 2009 - Revision 3
Page 3-3

Material	Density (lb/in ³)	Melting/Combustion Temperature	Thermal Expansion	Resource
Wood (12% moisture)	25 lb/ft ³	≈750°F	31μin/in°F	Reference #3, p.260-262

NOTE: The thermal expansion of the materials in this table are temperature dependent.

Resource references:

1. Eugene A. Avallone and Theodore Baumeister III, Editions, Mark's Standard Handbook for Mechanical Engineers, Tenth Edition. New York: McGraw-Hill, 1978
2. Howard E. Boyer and Timothy L. Gall, Editors, *Metals Handbook*. Metals Park, Ohio: American Society for Metals, 1985.
3. Lawrence H. Van Vlack, *Materials for Engineering: Concepts and Applicants*. Boston: Addison-Wesley Publishing Company, 1992.
4. Compact Disk: *Material Spec*, Volume 1.1 San Rafael, California: Autodesk Data Publishing, 1985.

3.2.2 Component Specifications

All components are specified and described on the Descriptive drawings included in Section 1.3.

3.3 Thermal Evaluation for Normal Conditions of Transport

Evaluations by analysis are described in the section they apply to in this Safety Analysis Report or when applicable in Test Plan Reports contained in Section 2.12. Evaluations by direct testing are documented in Test Plan Reports which are contained in Section 2.12.

Margins of safety are discussed in each section as appropriate. All testing and analysis resulted in no loss of source containment or securement in the transport packages. Though this demonstrates package compliance, it is difficult to quantify the margin related to these results. All physical testing used multiple specimens, with demonstrated results well within the regulatory requirements. Based on the results of the physical testing and the related analyses, we estimate the margin of safety for the Model OP-660 & OPL-660 packages as high.

Section 7 – Package Operations

Operation of the Model OP-660 & OPL-660 transport packages must be in accordance with the operating instructions supplied with the transport package, per 10 CFR 71.87 and 71.89.

(Reference:

- *USNRC, 10 CFR 71.87 and 71.89*
- *IAEA TS-R-1, paragraph 501(a), 502(e) and 503)*

7.1 Package Loading

7.1.1 Preparation for Loading

The Model OP-660 & OPL-660 packages must be loaded and closed in accordance with procedures that, at a minimum, include the requirements specified in this section. Maintenance and inspection of the Model OP-660 & OPL-660 packaging is in accordance with the requirements specified in Section 7.1.1.2.

7.1.1.1 Authorized Package Contents

(Reference:

- *USNRC, 10 CFR 71.87(a)*
- *IAEA TS-R-1, paragraph 502(f))*

Shipment of Type B quantities of radioactive material are authorized for sources specified in the Type B package approval certificate.

7.1.1.2 Packaging Maintenance and Inspection Prior to Loading

7.1.1.2.a Instructions for the 660 Projector

1. Inspect the labels for legibility and that they are securely fastened to the projector housing.
2. Ensure the shipping plug end plate assembly and the locking end plate assembly are securely attached to the projector housing with the hardware specified on the descriptive assembly drawings.
3. Check the shipping plug and assure that it threads fully and securely into the shipping plug end plate.
4. Ensure the dust cover installs properly onto the lock assembly.

Safety Analysis Report for the Model OP-660 & OPL-660 Transport Package

QSA Global Inc.
Burlington, Massachusetts

03 February 2009 - Revision 3
Page 7-2

5. Inspect the projector shell housing for signs of damage. Ensure visible welds are intact and that the end plates have no significant damage and are secured flush to the of the projector shell.
6. Assure all bolts and fasteners (hardware) required for assembly of the package and as specified on the drawing referenced on the Type B transport certificate are fit for use. Without removing the hardware by disassembly from the device, examine the visible external surfaces of the bolts/fasteners for any signs of fatigue cracking.

Note: A visual examination of the bolt/fastener thread condition is performed after removal from the exposure device as part of the Quarterly and Annual Maintenance inspections required for radiography devices under 10 CFR 34.31 or equivalent Agreement State regulations.

The bolts/fasteners must be replaced if they are no longer fit for use (e.g., threads stripped, unable to fully thread, signs of cracking, etc).

7. If the projector fails any of the inspections in steps 7.1.1.2.a.1-6, remove the container from use until it can be brought into compliance with the Type B certificate.

7.1.1.2.b Instructions for the Overpack and Overpack Inserts

1. Visually inspect the outer container to verify the following:
 - a) The inserts are properly installed and secured within the container.
 - b) The sides, top and bottom of the foam and wood inserts have no significant damage, and there are no missing pieces.
 - c) Replace any missing or significantly damaged pieces.
 - d) The outer container and lid are in good physical condition with no excessive rust, cracked welds, major dents or holes. DO NOT use the container if it is not in good condition.
 - e) The latches are not broken and can be properly secured.

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2. Inspect the labels for legibility and that they are securely fastened to the outer container.
3. If the outer container fails any of the inspections in steps 7.1.1.2.b.1-2, remove the container from use until it can be brought into compliance with the Type B certificate.

7.1.2 Loading of Contents

7.1.2.1 Prior to transportation, ensure the package and its contents meet the following requirements:

- 7.1.2.1.a The contents are authorized for use in the package.
- 7.1.2.1.b The package condition has been inspected in accordance with Section 7.1.1.2.
- 7.1.2.1.c Ensure that the source is secured into place in the inner device in accordance with the following requirements.
 1. Removal and installation of radioactive material contained within the shield containers must be performed in a shielded cell/enclosure capable of holding the maximum isotope capacity of the container, or by using remote transfer operations. Container loading can only be performed by persons specifically authorized under an NRC or Agreement State license (or as otherwise authorized by an International Regulatory Authority). All necessary safety precautions and regulations must be observed to ensure safe transfer of the radioactive material.
 2. Model 660 Projector
 - i. Using remote handling techniques, load the source assembly so that it is fully retracted into the device shield and secured by the lock assembly. Once the source is loaded, install the lock cover, ensure the plunger lock is depressed and the key removed.
 - ii. Fully thread the shipping plug into the nut on the shipping plug plate assembly. Attach a seal wire to the shipping plug and end plate connector as shown on the descriptive drawing.

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3. Place the 660 projector into the container and attached the container lid to the container body.
4. Secure the latches of the lid and attach a seal wire to both latches of the lid as shown on the descriptive drawing for the container.

7.1.3 Preparation for Transport

(Reference:

- 10 CFR 71.87
- IAEA TS-R-1, applicable paragraphs of Section V)

- 7.1.3.1 Ensure that all conditions of the certificate of compliance are met.
- 7.1.3.2 Ensure the non-fixed contamination on the accessible surface area of the package does not exceed 0.4 Bq/cm^2 ($0.00001 \text{ } \mu\text{Ci/cm}^2$) based on wiping an area of 300 cm^2 (or the entire package surface area is less than 300 cm^2).
- 7.1.3.3 Survey all exterior surfaces of the package to assure that the radiation level does not exceed 200 mR/hr at the surface. Measure the radiation level at one meter from all exterior surfaces to assure that the radiation level is less than 10 mR/hr .
- 7.1.3.4 Ship the container according to the procedure for transporting radioactive material as established in 49 CFR 171-178.

NOTE: The US Department of Transportation, in 49 CFR 173.22(c), requires each shipper of Type B quantities of radioactive material to provide prior notification to the consignee of the dates of shipment and expected arrival.

7.2 Package Unloading

7.2.1 Receipt of Package from Carrier

7.2.1.1 The consignee of a transport package of radioactive material must make arrangements to receive the transport package when it is delivered. If the transport package is to be picked up at the carrier's terminal, 10 CFR 20.1906 requires that this be done expeditiously upon notification of its arrival.

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7.2.1.2 Upon receipt of a transport package of radioactive material:

(Reference:

- *IAEA TS-R-1, paragraph 510 and 511)*

- 7.2.1.2.a Survey the transport package with a survey meter as soon as possible, preferably at the time of pick-up and no more than three hours after it was received during normal working hours. Radiation levels should not exceed 200 mR/hr at the surface of the transport package, nor 10 mR/hr at a distance of 1 meter from the surface.
- 7.2.1.2.b Record the actual radiation levels on the receiving report.
- 7.2.1.2.c If the radiation levels exceed these limits, secure the container in a Restricted Area and notify the appropriate personnel in accordance with 10 CFR 20 or applicable Agreement State regulations.
- 7.2.1.2.d Inspect the outer container for physical damage or leaking. If the package is damaged or leaking or it is suspected that the package may have leaked or been damaged, restrict access to the package. As soon as possible, contact the Radiation Safety Office to perform a full assessment of the package condition and take necessary follow-up actions.
- 7.2.1.2.e Record the radioisotope, activity, model number, and serial number of the source and the transport package model number and serial number.

7.2.2 Removal of Contents

- 7.2.2.a Remove the 660 projector from the outer overpack.
- 7.2.2.b Transfer the 660 to a remote handling cell, or prepare the 660 projector for source transfer/exposure in accordance with the applicable licensing provisions for the user's facility related to radioactive material handling.

7.3 Preparation of Empty Package for Transport

(Reference:

- *IAEA TS-R-1, paragraph 520)*

In the following instructions, an *empty* transport package refers to a Model OP-660 & OPL-660 transport package without an active source contained within the shielded container. To ship an empty transport package:

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- 7.3.1. Perform the following procedure to confirm that there are no unauthorized sources within the container:
 - 7.3.1.1. Remove the authorized source assembly from the 660 Projector in accordance with the applicable licensing provisions for the user's facility related to radioactive material handling.
 - 7.3.1.2. After removing the source and disconnecting the source assembly, attach the jumper (dummy connector without a serial number) to the male connector of the drive cable.
 - 7.3.1.3. Return the drive cable and connector to the projector and disconnect the controls.
 - 7.3.1.4. Insert dust cover cap, place selector ring in lock position, depress the lock and remove the key. Insert the shipping plug.
 - 7.3.1.5. Remove the source ID tag and keep it with the source.
- 7.3.2. Ensure the non-fixed contamination on the accessible surface area of the package does not exceed 0.4 Bq/cm^2 ($0.00001 \text{ } \mu\text{Ci/cm}^2$) based on wiping an area of 300 cm^2 (or the entire package surface area is less than 300 cm^2).
- 7.3.3. Ensure the non-fixed contamination on the inside surface of the package does not exceed 40 Bq/cm^2 ($0.001 \text{ } \mu\text{Ci/cm}^2$) based on wiping an area of 300 cm^2 (or the entire package surface area is less than 300 cm^2).
- 7.3.4. When it is confirmed that the Model OP-660 & OPL-660 transport package is empty, prepare the transport package for shipment. Survey the assembled package to ensure the external surface radiation level does not exceed 0.5 mR/hr .
- 7.3.5. Ship the container according to the procedure for transporting radioactive material as established in 49 CFR 171-178.

7.4 Other Operations

7.4.1 Package Transportation By Consignor

(Reference:

- *IAEA TS-R-1, paragraph 508, 512 through 514)*

Persons transporting the Model OP-660 & OPL-660 transport package in their own conveyances should comply with the following:

7.4.1.1 For a conveyance and equipment used regularly for radioactive material transport, check to determine the level of contamination that may be present on these items. This contamination check is suggested if the package shows signs of damage upon receipt or during transport, or if a leak test on the special form source transported in the package exceeds the allowable limit of 185 Bq (0.005 μCi).

7.4.1.2 If contamination above 4 Bq/cm² (0.0001 $\mu\text{Ci}/\text{cm}^2$) based on wiping an area of 300 cm² is detected on any part of a conveyance or equipment used regularly for radioactive material transport, or if a radiation level exceeding 0.5 mR/hr is detected on any conveyance or equipment surface, then remove the affected item from use until decontaminated or decayed to meets these limits.

7.4.1.3 Ensure the package is properly blocked and braced prior to transport to prevent movement within the conveyance during transport.

7.4.2 Emergency Response

(Reference:

- *IAEA TS-R-1, paragraph 308 and 309)*

In the event of a transport emergency or accident involving this package, follow the guidance contained in “2004 Emergency Response Guidebook: A Guidebook for First Responders During the Initial Phase of a Dangerous Goods/Hazardous Materials Incident”, or equivalent guidance documentation.

7.5 Appendix

7.5.1 Reference: “2004 Emergency Response Guidebook: A Guidebook for First Responders During the Initial Phase of a Dangerous Goods/Hazardous Materials Incident”

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8.1.4 Leakage Tests

The source capsules (primary containment) are wipe tested for leakage of radioactive contamination upon initial manufacture. The removable contamination must be less than 185 Bq (0.005 μ Ci). The source capsules will also be subjected to leak tests under ISO9978:1992(E) (or more recent editions). The source capsules are not used if they fail any of these tests.

8.1.5 Component and Material Tests

Component and material compliance is achieved in accordance with the requirements in QSA Global Inc.'s USNRC approved Quality Assurance Program No. 0040.

8.1.6 Shielding Tests

The radiation levels at the surface of the inner 660 Series device used in this transport package and at 1 meter from the surface of the 660 Series device were evaluated prior to first transport. This survey, performed in a low background area involved a slow scan survey of the entire surface area as well as one meter from the surface of the 660 Series device. This survey was used to identify any significant void volumes or shield porosity which could prevent the finished device, and now the Type B(U) transport package, from complying with the dose limits in 10 CFR 71.47.

This radiation profile was performed at the time of manufacture of the inner 660 Series device. (Note that new manufacture of 660 Series devices is no longer performed though service/repair of existing units is ongoing. However, no shield repair or replacement will be performed as part of any future service/repair of an existing 660 Series device.)

The radiation profile survey was made with the radiation detector housing in contact with the surface of the device. The maximum radiation levels, when extrapolated to the rated capacity of the transport package, can not exceed 200 mR/hr at the surface, nor 10 mR/hr at 1 meter from the surface of the transport package. Since the inner 660 Series device also functions as a radiography exposure device, the maximum allowed dose rate at one meter from the surface of the device was further limited to 2 mR/hr at the time of manufacture.

Since the surface and one meter dose rate acceptance criteria for the inner 660 device is within the allowed maximum transport dose limits for the Type B(U) package, insertion of the 660 Series devices in the Model OP-660 or OPL-660 overpack will also ensure that the Type B(U) package remain compliant to the regulatory transport dose limits.

Failure of the radiation profile tests for any 660 Series device identified the potential of significant shielding porosity which then caused the rejection of the 660 Series device. Rejected 660 Series devices which did not comply with the construction requirements on drawing R66060 and the radiation profile requirements were not distributed and therefore prevented from use as part of a OP-660 or OPL-660 Type B(U) package.

8.1.7 Thermal Tests

Not applicable. The source content of the Model OP-660 & OPL-660 packages has minimal effect on the package surface temperature and therefore no additional testing is necessary to evaluate thermal properties of the packaging.

8.1.8 Miscellaneous Tests

When applicable, subject the swage coupling between the source capsule and cable to a static tensile test with a load of 100 lbs (445 N). Failure of this test will prevent use of the source in the Type B(U) transport package.

8.2 Maintenance Program

8.2.1 Structural and Pressure Tests

Not applicable. Material certification is obtained for Safety Class A components used in the transport package prior to their initial use. Based on the construction of the design, no additional structural testing during the life of the package is necessary if the container shows no signs of defect when prepared for shipment in accordance with the requirements of Section 7 of the SAR.

The OP-660 & OPL-660 packaging system is not designed to require increased or decrease operating pressures to maintain containment during transport, therefore pressure tests of package components prior to individual shipment is not required.

8.2.2 Leakage Tests

As described in Section 8.1.4, "Leakage Tests," the radioactive source assembly is leak-tested at manufacture. In addition, the sources are leak tested in accordance with that Section at least once every six months thereafter if being transported to ensure that removable contamination is less than 185 Bq (0.005 μ Ci).

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8.2.3 Component and Material Tests

The transport package is inspected for tightness of fasteners, proper seal wires, and general condition prior to each use as described in Section 7 of this SAR. No additional component or material testing is required prior to shipment.

8.2.4 Thermal Tests

Not applicable. The source content of the Model OP-660 & OPL-660 packages has minimal effect on the package surface temperature and therefore no additional testing is necessary to evaluate thermal properties of the packaging prior to shipment.

8.2.5 Miscellaneous Tests

Inspections and tests designed for secondary users of this transport package under the general license provisions of 10 CFR 71.17(b) are provided in Section 7.

8.3 Appendix

Not applicable.