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SUPERSEDING
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MILITARY SPECIFICATION

BOX, SHIPPING AND STORAGE, HELICOPTER BLADE

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

1. SCOPE

1.1 This specification covers requirements for one type of reusable shipping and storage box for helicopter rotor blades.

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

QQ-P-416	Plating, Cadmium (Electro-deposited)
RR-W-365	Wire Fabric (Insect Screening)
TT-C-490	Cleaning Method and Pretreatment of Ferrous Surface for Organic Coatings
TT-E-529	Enamel, Alkyd, Semigloss
TT-I-1795	Ink, Marking Stencil, Opaque, (Porous and Non-Porous Surfaces)
TT-L-32	Lacquer, Cellulose Nitrate, Gloss for Aircraft Use
TT-P-636	Primer Coating, Alkyd, Wood and Ferrous Metal
TT-P-1757	Primer Coating, Zinc Chromate, Low Mositure Sensitivity
TT-W-571	Wood Preservation, Treating Practices

Military

MIL-D-1000	Drawings, Engineering and Associated Lists
MIL-T-5021	Tests, Aircraft and Missile Welding Operators Qualification
MIL-D-5480	Data, Engineering and Technical: Reproduction Requirements for

MIL-C-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-R-7575	Resin, Polyester, Low Pressure, Laminating
MIL-P-8625	Anodic Coatings, For Aluminum and Aluminum Alloys
MIL-C-16173	Corrosion Preventive Compound, Solvent Cutback, Cold Application
MIL-P-19834	Plate, Identification, Aluminum Foil, Adhesive Backed Modification Applied
MIL-M-43719	Marking Materials and Markers, Adhesive, Elastomeric, Pigmented, General Specification For

STANDARDS

Federal

FED. STD. 595	Colors
FED. TEST METHOD STD. NO. 101	Preservation, Packaging, and Packing Materials: Test Procedure

Military

MIL-STD-129	Marking for Shipment and Storage
MIL-STD-731	Quality of Wood Members for Containers and Pallets
MIL-STD-831	Test Report, Preparation of
MS-51938	Seal, Metallic, Lead and Wire

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

3. REQUIREMENTS

3.1 First Article Tests. This specification makes provisions for First Article Tests (see 4.3).

3.2 Materials. Materials used in manufacturing these containers shall be in accordance with the requirements specified and specifications referenced herein. Use of materials, other than those specified are subject to approval by the procurement agency.

3.2.1 Metals. Metals may be either non-ferrous or ferrous and must be capable of resisting permanent deformation during normal handling or transportation throughout the logistics cycle. All metals shall be treated in accordance with 3.6.1 and 3.6.2. The use of magnesium is prohibited.

3.2.2 Non-Metallic materials. Glass fiber reinforced plastics may be used. Resins used shall conform to MIL-R-7575. A process specification for

manufacture of glass fiber base reinforced plastics shall be prepared. In addition, plastics shall be compounded to the requirements of 4.3. The use of polyethylene or polypropylene for manufacture of the container shell is prohibited.

3.2.3 Selection of materials. Specifications and standards for all materials, parts, and Government certification and approval of processes and equipment, which are not specifically designated herein and which are necessary for the execution of this specification, shall be selected in accordance with procedures established by the procuring activity, except as provided in the following paragraph.

3.2.4 Standard parts. Standard parts (MS and AN) shall be used and shall be identified on the drawings by their part numbers. Commercial utility parts such as screws, bolts, nuts, cotter pins, etc., may be used, provided they possess suitable properties and are replaceable by the standard parts (MS and AN) without alteration, and provided the corresponding standard part numbers are referenced in the parts list and on the contractor's drawing. In the event there is no standard part, commercial parts shall be used provided they conform to all requirements of this specification.

3.3 Design and construction. The box shall be adaptable to as many different model helicopter rotor blades as practicable. The blade models will be specified by the procuring activity. (See 6.2).

3.3.1 Size. The box shall be of minimum size that will provide sufficient clearance between the blades and the interior of the box, with full allowance for movement of blades as determined by the mounting provisions, and with full allowance for beam vibration of the blades. (See 3.3.2).

3.3.2 Blade-mounting provisions. Each box shall include complete interior supports and attachments to receive and secure the models or type of blades prescribed by the procuring activity. When a box is designed to accommodate more than one basic blade, the mounting provisions shall be standard insofar as possible between the various models of blades Blade-mounting provisions shall allow the blades to be installed and removed quickly and easily. (See 3.3.3.4).

3.3.3 Assembly and disassembly.

3.3.3.1 Assembly guides for container sections. The sections of the box or blade-mounting provisions, which may otherwise be assembled in more than one relative position, shall be furnished with assembly guides or suitable markings which will permit assembly of sections in one position only. This paragraph is intended for use only where the assembly of the box or blade-mounting provisions in more than one position would be harmful to the blades or box. (See 3.8.1).

3.3.3.2 Center of balance marking. All box sections and container components shall be so designed that they cannot be interchangeably installed in such a manner that the true center of balance of the box will be different from that indicated by the CENTER-OF-BALANCE marking on the exterior of the container.

When this is not practicable with certain box sections and components, these sections or components shall be furnished with assembly guides or markings which will insure their assembly in such a manner that the CENTER-OF-BALANCE marking will be an accurate indication of the true center of balance of the box when loaded and prepared for shipment.

NOTE: Helicopter blade cuff ends are heavier than the tip ends. The cuff and tip ends of blades shall be so positioned in the box that the CENTER-OF-BALANCE marking on the exterior of the box will be an accurate indication of the true center of balance of the box when loaded and prepared for shipment. When blades of different length are shipped in the same box, the CENTER-OF-BALANCE markings shall be an average for the different blades. The box shall be stable when tested to 4.5.3.2. If it is not practical to design the box in accordance with this NOTE, then installation instructions or markings will insure that the blade ends are positioned in accordance with the intent of this paragraph.

3.3.3.3 Accessibility. The box shall be so designed as to provide ready accessibility to blade-mounting provisions and shall permit easy blade installation by a sequence of simple operations.

3.3.3.4 Closure. Quick fastening, nondemountable closure fasteners shall be used to open and close the box. The fasteners shall be such that only common hand tools will be required.

3.3.4 Protection. The box and blade-mounting provisions shall be designed to protect the helicopter rotor blade against damage from shock, vibration, and deterioration normally encountered during storage and shipment. Suitable means shall be provided to prevent damage to the blades resulting from longitudinal movement of the blades within the box. The box and blade-mounting provisions shall be designed to prevent damage to the blades resulting from transient vibrations excited by rough handling tests and also from steady-state vibrations normally experienced during shipment.

3.3.5 Rodent protection. When the box is closed and ready for shipment, there shall be no openings in the exterior of the box that are not covered with corrosion-resistant wire screening conforming to RR-W-365 (approximately 20 by 20 mesh).

3.3.6 Spray protection. The box shall be designed to prevent spray or rainwater from contacting the helicopter rotor blades. All openings in the box shall have provisions which prevent spray or rainwater from contacting the blades, when the box is in a normal shipping position. When tested in accordance with 4.5.4, there shall be no evidence of water on the blades.

3.3.7 Free drainage. Provisions shall be incorporated in the box to insure that every pocket, in which water might collect inside or outside the box, is provided with a means of drainage in the normal shipping position of the box. (See 4.5.4.1).

3.3.8 Ventilation. A means of ventilation for the inside of the box shall be provided. There shall be free passage of air to all sections of the box. Designs utilizing vent holes and plugs shall use a minimum of 6 holes.

3.3.9 Blade records receptacle. A weather-proof receptacle shall be provided on an end of the box for a logbook or record, installation instructions, and assembly guides. Cylindrical receptacles shall be a minimum of 2-3/4 inches inside diameter and 10-1/2 to 12 inches inside length. Oval receptacles shall be a minimum of 2 inches by 3 inches across, and 10-1/2 to 12 inches inside length. Rectilinear receptacles shall have a minimum inside dimension of 12 inches by 11 inches by 1 inch. The receptacle shall be so designed as to protect its contents from water and physical damage, allow drainage outside the box when the box is in normal shipping position, and permit ready access and closure by hand or with common hand tools from the outside of the box without requiring the box to be otherwise opened.

3.3.9.1 Shipping document receptacle. A receptacle identical to that specified in paragraph 3.3.9 shall be provided for shipping documents.

3.3.9.2 Receptacle closure. All receptacle closures shall be permanently attached to the box by some means that will not interfere with accessibility to the receptacle contents. The closures shall be capable of being removed and replaced by hand or common hand tools. Receptacle closures shall not be a structural part of the box. Provisions shall be made for sealing the receptacles with lead and wire seals, conforming to MS 51938, Type I. The wire shall be threaded through drilled bolts, nuts or wing nuts.

3.3.10 Handling provisions.

3.3.10.1 Skids. There shall be a minimum of three skids. When a skid pattern has been approved for a particular rotor blade box, that pattern shall be required on all future designs unless otherwise specified (see 6.2). Design concepts which preclude the use of skids or utilize part of the box shell as a skid shall be submitted to the procuring activity for design approval prior to construction of a first article. When wood or metal skids are not used, a means shall be provided to prevent abrasion of the box shell caused by skidding. Clearance between stacked boxes shall be a minimum of 2-7/8 inches. The total number of attachments of all skids to the box shall be designed to a minimum strength in longitudinal shear equal to 10 times the gross weight of the box. The lower inch of the skid ends shall be beveled 45 degrees. Wood and metal skids shall be easily removed and attached with common hand tools.

3.3.10.1.1 Metal skids. Metal skids shall meet the requirements of 3.3.10.1.

3.3.10.1.2 Wood skids. Hardwood skids shall meet the requirements of 3.3.10.1. Hardwood skids shall be one piece or laminated of group III or IV woods as classified in MIL-STD-731. The wood shall be sound and free from all defects that would materially effect the strength or interfere with fastenings. Steel bolts 1/4-inch minimum diameter shall be provided transversely in each of the skids to prevent splitting. Bolts used below the surface of the skid bottoms shall be countersunk. After fabrication, drilling of holes and beveling ends, etc., have been completed, the skids shall be treated in accordance with TT-W-571 to a retention of 10#/cubic foot or refusal.

3.3.10.2 Static loading. Boxes shall be suitable for stacking one upon another in such manner as not to interfere with forklift access.

3.3.10.2.1 Concentrated load resistance. Each box shall be capable of supporting like boxes, stacked with contents in a superimposed position, to a minimum height of 20 feet. (See 4.5.2.1).

3.3.10.2.2 Distributed load resistance. Boxes shall be capable of withstanding a distributed load of 175 pounds per square foot (PSF). (See 4.5.2.2).

3.3.10.3 Nesting. Stacking guides conforming to figure 1 shall be positioned on box tops to prevent longitudinal and transverse motion of stacked boxes. One stacking guide shall be bolted on each end of the box top at locations directly above the end skids. The base of the stacking guide shall be parallel to the base of the skid. The centerline through the apex of the stacking guide shall be perpendicular to the transverse centerline of the box top. The base of the skids shall be notched to receive the stacking guides as mounted on box tops. When a nesting pattern has been approved for a particular model rotor blade box, that pattern shall be maintained on all future designs to assure satisfactory nesting of all boxes for the same model rotor blade. (See 6.2).

NOTE: Provisions for nesting may be molded into box top and skids when the process lends itself during fabrication.

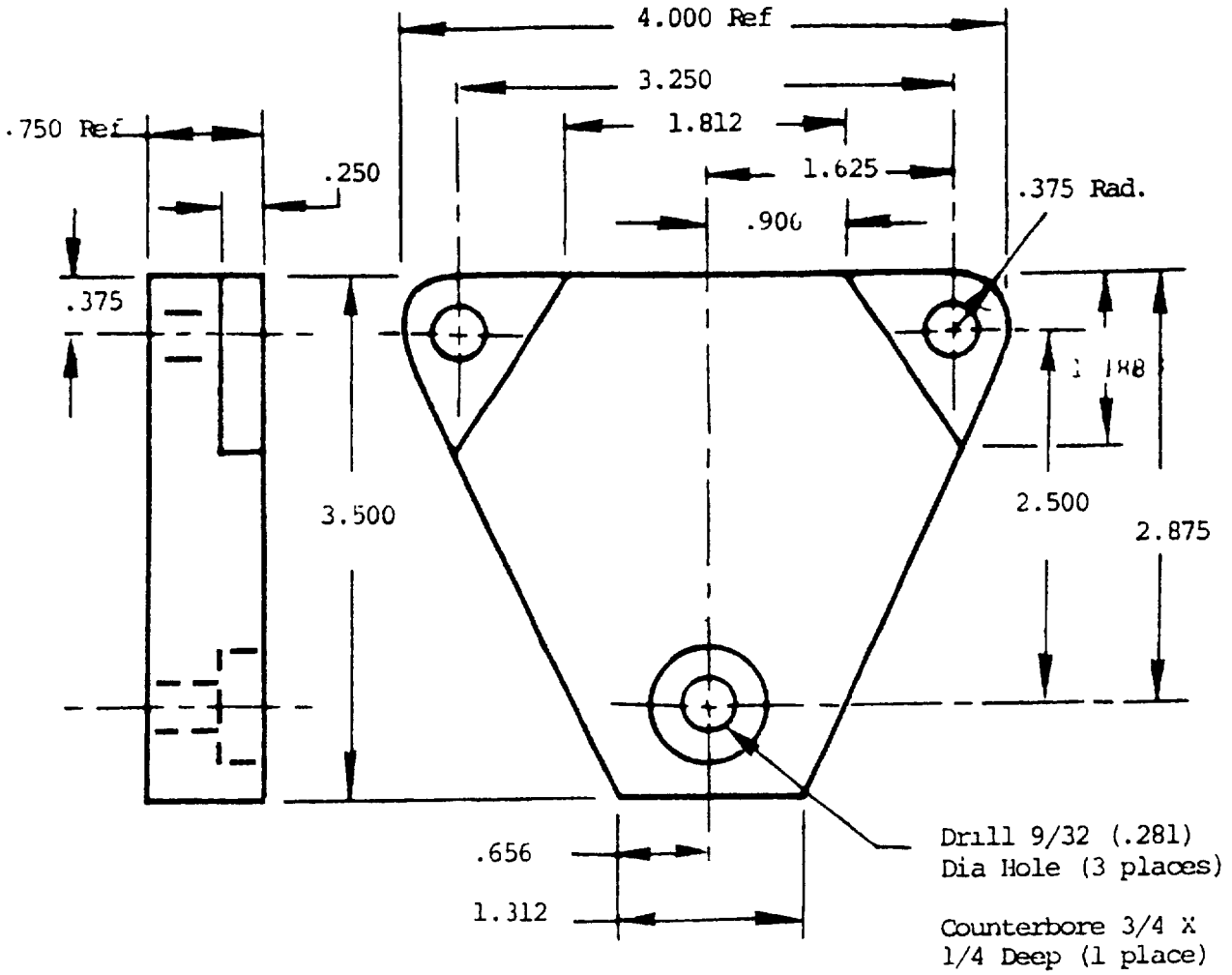
3.3.10.3.1 Rubber bumpers. Rubber disc dumpers conforming to Figure 2 shall be installed, in a staggard manner, on each side of the blade box. The bumpers shall not come in contact with each other when the blade boxes are placed along side each other.

3.3.10.4 Lifting by forklift. The boxes shall be so constructed that a stack of fully loaded boxes, a minimum of 80 inches high, can be lifted by forklift trucks from the sides and tested to 4.5.3.2, without employing additional blocking and without permanent deformation of the box. Two openings, 2-7/8 inches high by 19 inches wide, minimum, spaced approximately 30 inches, center to center, or one 2-7/8 inch by 40-inch opening, minimum, shall be provided for lifting by forklift. The opening or openings shall be symmetrically disposed about the center of balance of the loaded box.

3.3.10.4.1 Forklift scuff plate. Each container shall be equipped with an externally attached scuff plate. The scuff plate shall be a minimum 0.090 inch thick and shall extend beyond the forklift area in width and shall extend at least half way up the sides.

3.3.10.5 Handling characteristics. Rings, eyes, and lugs when not in use shall not project beyond the limits of the maximum dimensions of the box. The minimum inside diameter of rings, or eyes, or lugs, etc., shall be large enough to permit the use of crane hooks of sufficient capacity to support the loaded box. If lifting rings or eyes are installed for handling major sections during assembly and disassembly, they shall be located to insure a stable lifting configuration.

3.3.10.5.1 Hoisting. Suitable lifting rings, eyes, or lugs capable of withstanding tests prescribed in 4.5.3.1.1 without failure or visible distortion to either the box or the lifting component shall be provided for lifting the box with chains, hooks or ropes by overhead facilities. These rings, eyes, or lugs shall be so dispersed as to permit the box to be lifted

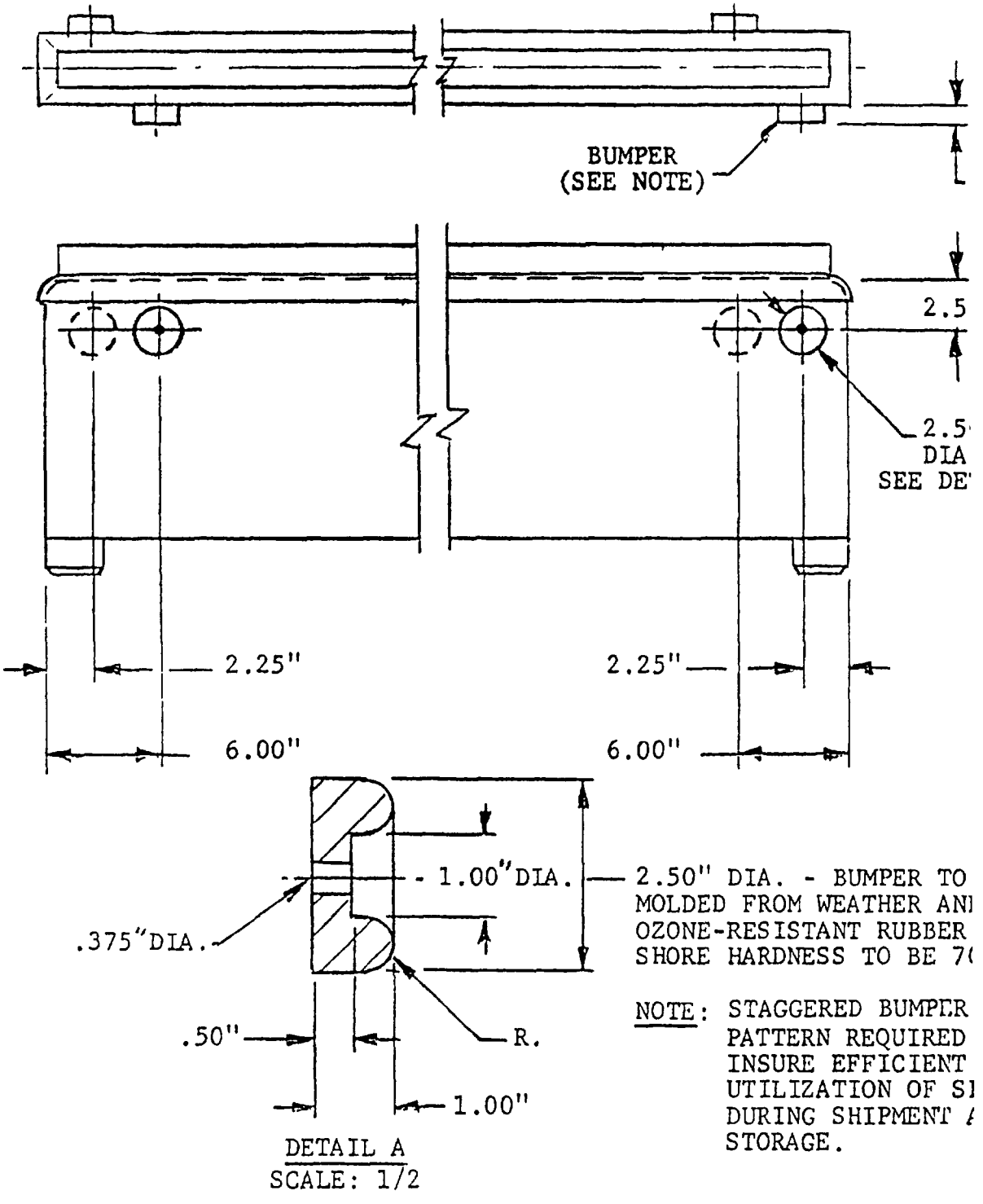


Break all sharp edges .01 to .06
Maximum fillet .06

Dimensions in inches. Unless otherwise specified, tolerance: Decimal ± .031

STACKING GUIDE

Figure 1



TOP AND SIDE VIEW OF HELICOPTER BLADE BOX
SHOWING LOCATION OF ANTI-CHAFING BUMPERS

Figure 2

with its axis parallel to and also normal to the position most frequently used for storage.

3.3.10.5.2 Individual ring, eye, or lug hoisting. The rings, eyes, and lugs shall be designed in such a manner that the loaded box can be lifted free of the ground by any single ring, eye, lug, etc., in accordance with 4.5.3.1.2.

3.3.10.5.3 Underslung lifting facility. Suitable facilities shall be incorporated in the box body so that the box, when loaded, will withstand lifting by two underslung 1/4-inch cables when a weight equivalent to three times its gross weight is superimposed thereon. The facility shall be of such design that it will be protected from damage when the box is removed by sliding from a truck bed. (See 4.5.3.3).

3.3.10.6 Pulling. Suitable facilities, capable of withstanding the tests prescribed in 4.5.3.4 without damage to the blades or failure or visible permanent distortion of the box, shall be provided for pulling the box from each end with chains, hooks, or ropes, etc. There shall be no projections on the box to which chains, hooks, or ropes can be attached for pulling purposes, which cannot sustain the prescribed tests for pulling a loaded box along a concrete surface.

3.3.10.7 Pushing. A three-high stack of boxes when tested as specified in 4.5.3.5 shall show no evidence of functional damage to blade or damage to box that would involve its reusability or repair.

3.4 Interchangeability. All parts removable with hand tools shall be directly and completely interchangeable with corresponding parts of other boxes of the same model. Changes in the manufacturer's part numbers shall be covered by the drawing number requirements of MIL-D-1000.

3.5 Weight. The box and blade-mounting provisions (tare weight) shall be of the minimum practical weight consistent with the performance characteristics of this specification. Unless otherwise specified by the procuring activity, a box with its blade-mounting provisions (tare weight) shall not exceed the weight given in Figure 3 for boxes with single blades. When more than one blade is shipped per box, a 10 percent increase in weight of that indicated in Figure 3 may be added for each additional blade.

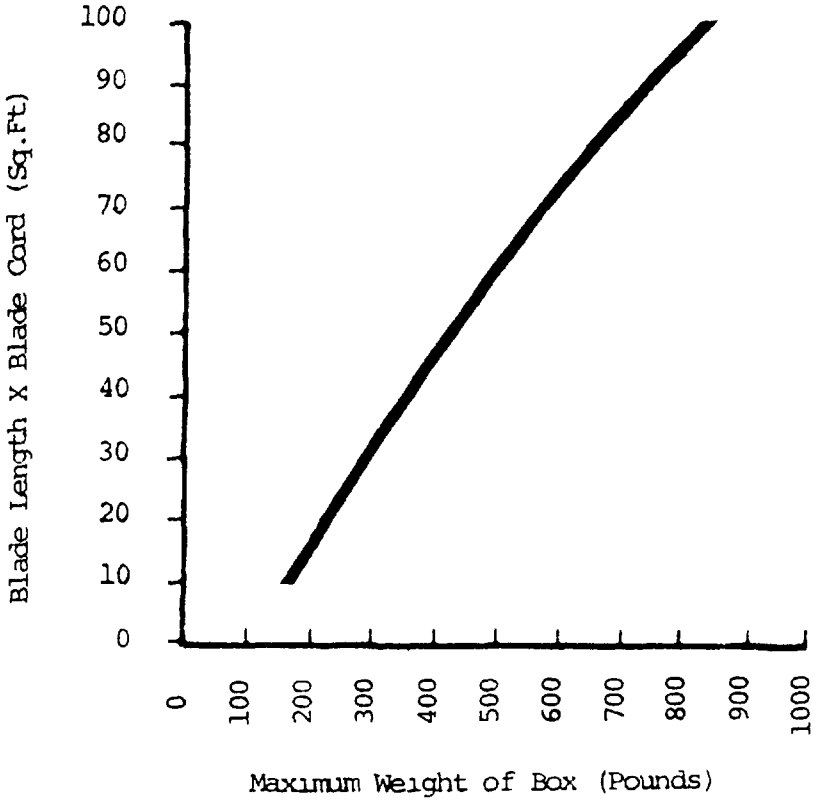


Figure 3

Weights indicated are for single blades in boxes. A 10 percent increase is permissible for each additional blade.

3.6 Finish.

3.6.1 Cleaning and surface treatment. Aluminum-alloy parts shall be anodized either in accordance with MIL-P-8625, surface treated in accordance with MIL-C-5541, or shall be given other surface treatment as may be specifically authorized by the procuring activity. Ferrous surfaces shall be treated in accordance with TT-C-490 prior to painting. Threaded or other working surfaces which are required to be bare for operation and are not to be painted shall be cadmium plated in accordance with QQ-P-416. After applying and tightening nut-type fasteners, threaded area and nut shall be coated with MIL-C-16173, grade I preservative. Wood surfaces should be wiped or brushed dry. All parts shall be treated after cutting, drilling and welding, and prior to assembly.

3.6.2 Paint.

3.6.2.1 Primer. Nonferrous metal surface, treated in accordance with 3.6.1, shall be painted with one coat of primer conforming to TT-P-1757. Ferrous surfaces, unless they are required to be bare for operation, shall be painted

with one coat of primer conforming to TT-P-636. All matching or adjacent dissimilar metal parts shall be painted prior to assembly.

3.6.2.2 Exterior finish. Exterior metal surfaces, primed in accordance with 3.6.2.1, shall be painted in accordance with 3.6.2.2.1 or 3.6.2.2.2 as specified by the procuring activity. (See 6.2).

3.6.2.2.1 Aluminum. When specified, exterior surfaces shall be painted with one coat of lacquer, conforming to TT-L-32.

3.6.2.2.2 Olive drab. When specified, exterior surfaces shall be painted with two coats of enamel conforming to TT-E-529. The color shall be olive drab No. X24087 in accordance with FED-STD-595.

3.7 Performance.

3.7.1 Ability of the box to protect contents. When tested in accordance with the requirements of section 4, the contents of the box shall show no injury that would affect their utility. There shall be no evidence of damage to the contents from shock, vibration, and deterioration encountered during tests.

3.7.2 Ability of the box to withstand handling. When tested in accordance with section 4, the box, blade-mounting provisions, and all box accessories shall reveal no structural weaknesses; no deformation shall have occurred that will not permit ready disassembly, reassembly, and reuse of the box following complete disassembly.

3.8 Marking. Markings shall be of waterproof ink, paints, or decalcomania. Ink shall conform to TT-I-1795, paint shall conform to TT-E-529, and decalcomania shall conform to MIL-M-43719. Color of markings shall be black, No. 37038, or white, No. 37875 of FED-STD-595, as specified by the procuring activity. The following markings shall be applied to all boxes at the locations and in the sizes indicated:

a. Adjacent to the overhead hook lifting rings, eyes, or lugs, etc., in 2-inch letters: "LIFT HERE". Arrows 5 inches long shall point to the rings, eyes, lugs, etc.

b. Adjacent to lifting rings, eyes, lugs, etc., that are located on the designed top of the box in 2 inch letters: "TOP".

c. Adjacent to the locations where sling provisions have been made, in 1 inch letters: "SLING HERE". Vertical arrows 2-1/2 inches long shall point to the correct sling locations.

d. On two places on the top of the box in 2 to 3-inch letters: "DO NOT DROP".

e. On opposite sides of the upper section of the box in 2-inch letters: "REUSABLE BOX -- DO NOT DESTROY -- DO NOT PUSH AGAINST SKIN WITH FORKLIFT PRONGS".

f. At the loaded center of balance on both sides of the box, a vertical line 6-inches long and 2-inches wide with adjacent 1-inch letters: "CENTER OF BALANCE".

g. Adjacent to and if possible, above the blade records receptacle in 1-inch letters: "INSTALLATION INSTRUCTIONS AND BLADE RECORD INSIDE".

h. On opposite sides of upper section of box in 1-inch letters: "INSTALLATION INSTRUCTIONS INSIDE".

3.8.1 Installation instructions for blade mounting. Each box shall be accompanied by two sets of installation instructions printed on durable paper. One set of instructions shall be contained in an envelope marked, INSTALLATION INSTRUCTIONS, and placed in the record receptacle. The second set of instructions shall be bonded to the inside of the lid or box. The instructions shall be positioned for easy viewing and provided with waterproof protection. Instructions shall include a step-by-step procedure for installing and removing the blade model or models for which the box is used. These instructions shall be represented by an individual drawing included in the parts list.

3.9 Identification of product. A name plate conforming to MIL-P-19834, type 2, permanently and legibly marked with the following information, including all information required to be inserted in the blanks indicated, shall be permanently attached to each major section of the box.

BOX, SHIPPING, HELICOPTER ROTOR BLADES, REUSABLE

Model No.: If not classified (Insert Model No. of helicopter on which blade is used)

Specification MIL-B-5806F

National Stock No. _____

Manufacturer's Part No. _____

Manufacturer's Serial No. _____

Contract or Order No. _____

Manufacturer's Name or Trademark

The abbreviation "US"

3.10 Workmanship. The box shall be of clean design, well made, and free from any defects which may effect durability, strength, or serviceability.

3.10.1 Welding. Welds shall be reasonably smooth and free of craters. They shall exhibit characteristics of fusion, penetration, and soundness of weld deposit representative of good welding practice. They shall be free of irregularities which indicate lack of skill or experience on the part of the operator. All welding fluxes, scale, weld spatter, acids, or basic solutions

shall be completely removed prior to application of any finish (See 3.6). Rivets shall be tight and free from cracks; heads shall be properly formed and concentric with the body of the rivet.

3.10.2 Welding operators. All fusion welding shall be performed by operators who are currently certified as Class A operators in accordance with MIL-T-5021 except that certification joint No. 4 or No. 4 alternate shall not be required as a prerequisite of certification for welding of shipping containers.

3.11 Government-loaned property. When the procurement document so provides, the Government will loan to the contractor the required quantity of helicopter rotor blades of the type for which the box is designed for use in final First Article testing. (See 6.2).

3.12 Drawings. The design and development of the prototype box shall include the preparation of appropriate detail and assembly drawings to be furnished to the Government as additional supplies and subject to the terms of the data clauses in the contract. Ownership of such drawings for use by the Government in competitive procurement shall apply to final drawings only. Where no data clauses exist, and when specified by the procurement activity (see 6.2), ownership of the drawings to the extent required for competitive procurement of additional box production shall be conveyed to the Government.

3.12.1 Preliminary drawings. Drawings which serve to illustrate the design and indicate the probability of successful qualification, shall be submitted 30 days in advance of First Article testing. These drawings shall conform to Category A, Form 2, MIL-D-1000 and shall be subject to review and approval before First Article testing may be authorized. The number of copies shall be as specified by the procuring activity. The kind of drawing (whether blue-line, pencil original, microfilm) shall be in accordance with MIL-D-5480 as specified by the procuring activity (See 6.2). In addition, for plastic boxes, a process specification for fabricating plastic reinforced materials shall be submitted for review.

3.12.2 Final drawings. Final drawings, reflecting all design changes dictated by tests, shall be submitted within 60 days after First Article approval (see 4.3.2.1). These drawings shall conform to Category E, Form 2, MIL-D-1000. The kind of drawing (whether blue-line, pencil original, microfilm) shall be in accordance with MIL-D-5480 as specified by the procuring activity (See 6.2). They shall be subject to review and approval prior to acceptance of production boxes.

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.

4.2 Classification of tests. The inspection and testing of helicopter rotor-blade shipping boxes shall be classified as follows:

a. First Article tests (see 4.3).

b. Quality conformance inspection (see 4.4).

4.3 First Article tests.

4.3.1 First Article test sample. First Article test sample shall consist of one box representative of production and construction upon which approval is desired. First Article tests of helicopter rotor-blade shipping boxes shall be conducted as specified by the procuring activity. Samples shall be appropriately identified with the box manufacturer's part number and any additional information required by the procuring activity.

4.3.2 Tests. The First Article tests shall consist of all the tests specified under 4.5, subject to the test conditions specified herein.

4.3.2.1 First Article test report. After the contractor completes the First Article inspection, he shall prepare a test report in accordance with MIL-STD-831, and furnish three complete copies of the report to the procuring activity. This report shall be subject to review and approval before production may be authorized. When specified by the procuring activity (See 6.2), this report shall be certified. Photographs shall be included with the report.

4.4 Quality Conformance inspection. The Quality Conformance inspection shall consist of examination of the product as specified in 4.5.1.

4.4.1 Rejection and retest. Failure of any box to conform to any of the requirements of this specification shall be cause for rejection of the box. Boxes which have been rejected may be reworked or replaced to correct the defects and resubmitted for acceptance. Before resubmitting, full particulars concerning previous rejection and the action taken to correct the defects found in the original shall be furnished to the Inspector.

4.4.2 Blade check. Blades shall be visually checked before and after tests. The box shall be rejected if there is any evidence of blade damage.

4.5 Test methods.

4.5.1 Examination of product. Each box submitted for acceptance shall be carefully examined to determine conformance with the materials, design, finish, and workmanship requirements of this specification and with the approved drawings.

4.5.2 Static loading.

4.5.2.1 Concentrated load resistance. A load equal to the weight of loaded

›xes stacked to a minimum height of 20 feet shall be applied to the top of the ›x in a manner simulating the effect of similar boxes being stacked on top of ıe box.

.5.2.2 Distributed load resistance. A load sufficient to provide a bearing ressure of 175 pounds per square foot (PSF) shall be evenly applied to the top ırface of the box. The area shall be calculated from the projected length and ıdth of the box. The container shall be loaded in a manner simulating the ffect of a load placed on nominal 10-inch wide boards placed transversely ross the box, for the full length of the box, where possible. The load shall ave a column effect on each of the individual bearing areas.

.5.3 Handling characteristics.

.5.3.1 Assembly and disassembly. The blades shall be placed in the box and he box made ready for shipment. The blades shall then be removed from the ›x. Records shall be maintained of the tools required for this work.

.5.3.1.1 Hoisting. A stack of four loaded boxes shall be lifted free of the upporting surface and held for 5 minutes by means of the suspension rovisions specified in 3.3.10.5.1.

.5.3.1.2 Individual ring, eye, or lug hoisting. The loaded box, plus an added eight of two loaded boxes (safety factor) shall be lifted free of the upporting surface by means of each of the suspension provisions specified in .3.10.5.2 As an alternate, a force may be exerted on each of the suspension ›rovisions which simulates the magnitude and direction of this load. The test hall be applied separately to each individual lifting ring or eye. For this est, the rotor blade shall be removed and a load (three times the weight of a oaded box) may be secured in the box.

.5.3.2 Lifting. A stack of loaded boxes not less than 80 inches high shall ıe lifted free of the supporting surface by a hard-wheeled forklift truck, with orks spaced 30 inches center-to-center, and transported slowly for a distance ›f not less than 100 feet over a level surface. The surface shall be such that he effect of nominal 1-inch thick boards spaced every 10 feet in front of the ˙orklift truck will be simulated. The box shall be rejected if permanent listortion or other damage is observed.

1.5.3.3 Underslung lifting. A loaded box, superimposed with a weight equivalent to three times its gross weight, shall be lifted free of the supporting surface by two 1/4-inch steel cables slung underneath the load. The cables shall be positioned in a manner simulating that which may be encountered in handling. Failure or visible permanent distortion shall be cause for rejection. (See 3.3.10.5.3).

4.5.3.4 Pulling. A chain, hook, rope, etc , shall be attached to the rings, eyes, or lugs specified in 3.3.10.6 and the box shall be pulled or dragged at approximately 5 to 10 miles per hour for 100 feet along a concrete floor.

4.5.3.5 Pushing. A three-high stack of boxes shall be pushed by a forklift truck at a speed of 25 feet per minute at one end of the bottom box for a

distance of 35 feet along a concrete floor. (See 3.3.10.7).

4.5.4 Spray. With a fully loaded and closed box in normal shipping position a heavy spray of water shall be directed on all sides of the box at an angle 45 degrees from the horizontal. Each part of the container shall be subjected to the spray test for 2 minutes. The box shall be opened and checked for compliance with 3.3.6.

4.5.4.1 Free drainage. The box shall be opened and the blade removed. Water shall be placed in each section of the interior of the box. Drainage characteristics shall conform to 3.3.7.

4.5.5 Dynamic tests. The box shall be loaded and subjected to the following tests as applicable and in accordance with Federal Test Method Standard No. 1(

a. Cornerwise drop (rotational) test, Method 5005, test to level A and repeat the drop 6 times.

b. Drop test (free fall), Method 5007, test to level A, use Procedure "B'

c. Edgewise drop (rotational) test, Method 5008, test to level A and repeat the drop 6 times.

d. Roll-over test, Method 5014.

e. Pendulum-impact test, Method 5012 or incline-impact test, Method 5023, impact shall be 9 feet per second instead of 7 feet per second.

f. Dent resistance. The loaded box shall be placed in the normal shippin position. A 70 pound load shall be affixed to a solid block of group I or harder wood, conforming to MIL-STD-731, the corner of which resembles the corner of the box. This one corner of this block shall have a 3/4-inch radius The load shall be dropped from a height of 30 inches on the most vulnerable points on the top surface of the box. The box shall be opened and the blade inspected for dents or other damage. There shall be no damage to the rotor blade and the resulting dent in box shall not exceed 1/4-inch in depth.

5. PREPARATION FOR DELIVERY

5.1 Packaging and packing. Unless otherwise specified (See 6.2), each box shall be completely assembled for shipment. Blade supports shall be mounted i place. Any other accessories shall be securely fixed at any convenient place on the interior of the box. Closure bolts or other closure devices shall be assembled and drawn to apply a firm but not excessive pressure. All exposed operating surfaces of closure devices and exposed threaded surfaces shall be treated with application of material conforming to MIL-C-16173, Grade 2.

5.2 Marking of shipments. In addition to any special markings required by th contract or order, boxes shall be marked in accordance with MIL-STD-129.

6. NOTES

Intended use. The boxes covered by this specification are for domestic and rseas use as reusable shipping and storage boxes for helicopter rotor blades.

Ordering data. Procurement documents should specify the following:

a. Title, number, and date of this specification.

b. Number of boxes to be furnished.

c. Model numbers of rotor blade or blades to be accommodated. (See 3.3).

d. If Government-ownership of final drawings is desired. (See 3.12).

e. Number of copies of preliminary drawings (see 3.12.1) and mailing tructions.

f. Kind of drawings (see 3.12, 3.12.1 and 3.12.2).

g. If skid and nesting patterns have been approved (see 3.3.10.1 and 3.10.3).

h. Where the First Article test samples should be sent, the activity sponsible for testing, and instructions concerning the submittal of the test ports (see 3.1 and 4.3.2.1).

i. Exterior color and color of exterior markings (see 3.6.2.2 and 3.8).

j. When Government-loaned property is to be furnished (see 3.11).

k. How the boxes are to be shipped (see 5.1).

l. Any special requirements not specified herein.

LITARY CUSTODIANS:

Army - AV

Navy - AS

Air Force - 69

Preparing Activity:

Air Force - 69

Project No.: 8115-0325

view Activities:

Navy - SA
Army - AV
Air Force - 11, 71, 82, 84

er Activities:

Navy - SH, OS, MC

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

OMB Approval
No. 22-R255

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DOCUMENT IDENTIFIER AND TITLE

MIL-B-5806F - Box, Shipping and Storage, Helicopter Blade

NAME OF ORGANIZATION AND ADDRESS	CONTRACT NUMBER
	MATERIAL PROCURED UNDER A ☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?
   A GIVE PARAGRAPH NUMBER AND WORDING

   B RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2 COMMENTS ON ANY DOCUMENT REQUIREMENT CONSIDERED TOO RIGID

3 IS THE DOCUMENT RESTRICTIVE?

☐ YES ☐ NO *(If "Yes", in what way?)*

4 REMARKS

SUBMITTED BY *(Printed or typed name and address - Optional)*	TELEPHONE NO
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