

INCH-POUND

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PERFORMANCE SPECIFICATION

BOX, SHIPPING AND STORAGE, HELICOPTER BLADE

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

1. SCOPE

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

2. APPLICABLE DOCUMENTS

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

2.2 Government documents.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Aviation and Missile Command, ATTN: AMSAM-RD-SE-TD-ST, Redstone Arsenal, AL 35898-5000, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8145

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

Military

MIL-C-53072

Chemical Agent Resistant Coating (CARC)
Application Procedures

STANDARDS

Federal

FED-STD 101

Test Procedures for Packaging Materials

Military

MIL-STD-209

Slings and Tiedown Provisions for Lifting
and Tying Down Military Equipment

(Unless otherwise indicated, copies of the above specifications and standards are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

AMS 2470

Anodic Treatment of Aluminum Alloys,
Chromic Acid Process (DOD adopted)

AMS 2471

Anodic Treatment of Aluminum Alloys,
Sulfuric Acid Process, Undyed Coating
(DOD adopted)

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AMS 2472

Anodic Treatment of Aluminum Alloys,
Sulfuric Acid Process, Dyed Coating
(DOD adopted)

AMS 2474

Chemical Treatment for Aluminum Alloys,
Low Electrical Resistance Coating

(Copies of SAE standards may be obtained from SAE, Inc., 400 Commonwealth Drive,
Warrendale, PA 15096-0001.)

AMERICAN WOOD PRESERVERS ASSOCIATION

AWPA C2

Lumber, Timbers, Bridge Ties, and Mine
Ties

(Copies of AWPA documents may be obtained from AWPA, P.O. Box 286, Woodstock, MD
21163-0286.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified, a sample shall be subjected to first article inspection in accordance with 4.2 (see 6.2).

3.2 Materials. Unless otherwise specified, the contractor is free to choose any materials in the manufacture of the containers. However, all provisions of this specification must be met, regardless of the choice of materials.

3.2.1 Prohibited materials. Magnesium and cadmium shall be prohibited. Also, polyethylene and polypropylene shall be prohibited from use in the container shell (see 4.4.1).

3.2.2 Cushioning material. Material used to cushion the blades shall not have any deleterious effect on the blades (see 4.4.2).

3.2.3 Metals. Metal components shall be corrosion resistant or suitably processed to resist corrosion. To prevent galvanic corrosion, there shall be no contact between the blade and any dissimilar metal component used in the storage box, including any blade mounting provision (see 4.4.3).

3.2.4 Toxic chemicals, hazardous substances, and ozone depleting chemicals (ODCs). The use of toxic chemicals, hazardous substances, and ODCs shall be avoided, whenever feasible.

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3.3 Design and Construction. The box shall be adaptable to as many different model helicopter rotor blades as practicable. The blade models shall be specified by the procuring activity (see 6.6).

3.3.1 Blade installation/removal. Each box shall include complete interior supports and attachments to receive and secure the models or type of blades prescribed by the procuring activity. Unless otherwise specified, each container shall be accompanied by two sets of installation instructions. One set of instructions shall be placed in the record receptacle, and the second set of instructions shall be bonded to the inner wall of the bottom half of the container. The instructions shall be positioned for easy viewing, and be provided with waterproof protection. Instructions shall include at a minimum:

- a. A step-by-step procedure for installing and removing the blade.
- b. An isometric illustration of the blade hub mount, where applicable, with blade mounting hardware.
- c. Torque values for blade mounting hardware, where applicable.

See 4.4.4 for verification.

3.3.1.1 Blade mounting provision. If the design includes a blade mounting provision, it shall allow the blades to be installed and removed by hand or using common hand tools. It shall take no more than ten minutes for each operation. The removable portion of the provision shall be permanently affixed in some fashion to the box (see 4.4.4).

3.3.2 Size. The box shall provide a minimum of 2 inches clearance between the blade and the interior of the box (see 4.4.5).

3.3.3 Weight. The box shall be of minimal weight consistent with the requirements of this specification. The box with all components, including the blade mounting provision (if one is part of the design), shall not exceed five pounds per cubic foot (see 4.4.6).

3.3.4 Center of balance. The container and its components shall be designed so that the center of balance marking shall be an accurate indication of the true center of balance of the box when loaded and prepared for shipment. When blades of different lengths 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 lifted by forklift (see 4.4.7).

3.3.5 Blade protection. The box shall be designed to protect the 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 blade resulting from longitudinal, lateral, or vertical movement of the blade within the box. The maximum allowable “g” forces imposed on

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the blade during testing shall not exceed the fragility limits specified by the blade manufacturer (see 6.2). See 4.4.8 for verification provisions.

3.3.6 Fasteners. Quick latching non-removable fasteners shall be used to secure the top of the box. At most, only common hand tools shall be required to open and close the box (see 4.4.9).

3.3.7 Rodent protection. When the box is closed and ready for shipment, any openings in the exterior shall be covered with corrosion-resistant material that will prevent rodents from entering the box (see 4.4.10).

3.3.8 Spray protection. The box shall be designed to prevent spray or rainwater from contacting the rotor blades when the box is in a normal shipping position (see 4.4.11).

3.3.9 Drainage. Provisions shall be incorporated to insure that every pocket in which water might collect inside or on top of the box (when the box is in the normal shipping position) is provided with a means of drainage (see 4.4.12).

3.3.10 Ventilation. A means of ventilation of the inside of the box shall be provided. There shall be free passage of air to all sections of the box (see 4.4.13).

3.3.11 Moisture resistance. Interior supports/cushioning that are in contact with the blade shall be made of material which does not retain moisture (see 4.4.14).

3.3.12 Blade records receptacle. A waterproof receptacle shall be provided on one end of the box for a logbook or record and blade removal/installation instructions. The receptacle shall be of just sufficient size to permit easy insertion and removal of the necessary records. It shall be accessible only from outside the box. The receptacle shall be so designed and constructed as to prevent entry of water into the storage box (see 4.4.15).

3.3.12.1 Receptacle cover. The receptacle cover shall be permanently attached to the box by some means that will not interfere with accessibility to the receptacle contents. The cover shall be capable of being removed and replaced by hand or common hand tools. The cover shall not be a structural part of the box. Provisions shall be made for sealing the receptacle so that opening it would be detected readily (see 4.4.15.1).

3.3.13 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. When 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 3 inches to accommodate forklift tines. When skids are used, they shall be easily removed and replaced using common hand tools. The lower inch of the skid ends shall be designed for ease of sliding, flat or tipped, over uneven surfaces without damage to skid or box (see 4.4.16).

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3.3.14 Concentrated load resistance. Each box shall be capable of supporting loaded boxes, stacked one on top of another, to a minimum height of 20 feet (see 4.4.17).

3.3.15 Distributed load resistance. Boxes shall be capable of withstanding a distributed load of 175 pounds per square foot (see 4.4.18).

3.3.16 Handling provisions. Lifting rings, eyes and lugs, when not in use, shall not project beyond the dimensions of the box. The minimum inside diameter of rings, eyes, or lugs shall be three inches (see 4.4.19). Features provided for lifting, tiedown, and towing shall be combined wherever possible. A four point suspension system for lifting the box shall be incorporated into the handling provisions.

3.3.16.1. Stacking guides. Stacking guides shall be positioned on box tops to prevent longitudinal and lateral slippage of stacked boxes. (The drawing in Figure 1 is an example of a workable stacking guide; the dimensions are for guidance purposes only.) The stacking guide shall be attached on each end of the box top at locations directly above the end skids. The centerline through the apex of the stacking guide shall be perpendicular to the lateral centerline of the box top. 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 4.4.19.1).

3.3.16.2 Bumpers. Bumpers shall be installed in a staggered manner on each side of the blade box. (The drawing in Figure 2 is an example of an anti-chafing bumper; the dimensions are for guidance purposes only.) The bumpers shall not come in contact with each other when the blade boxes are placed along side each other (see 4.4.19.2).

3.3.16.3 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 from the sides without additional blocking and without deformation (see 6.5) of the box. Two openings, 3 by 19 inches, minimum, spaced approximately 30 inches center to center, or a 3 by 40-inch opening, minimum, shall be provided for lifting by forklift. The opening or openings shall be symmetrically positioned about the center of balance of the loaded box (see 4.4.19.3).

3.3.16.4 Forklift scuff plate. Each container shall be equipped with an externally attached scuff plate. It shall extend beyond the forklift area in width and shall extend at least half way up the sides. It shall be constructed so as to protect the sides of the box from damage during forklift operations (see 4.4.19.4).

3.3.16.5 Hoisting. Suitable lifting rings, eyes, or lugs shall be provided for lifting a fully loaded box with chains, hooks or ropes by overhead facilities. Lifting shall be done without failure or deformation of the box (see 4.4.19.5).

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3.3.16.6 Individual hoisting devices. The rings, eyes, or lugs shall be designed such that the loaded box can be lifted free of the ground by any single ring, eye, or lug in accordance with 4.4.19.6.

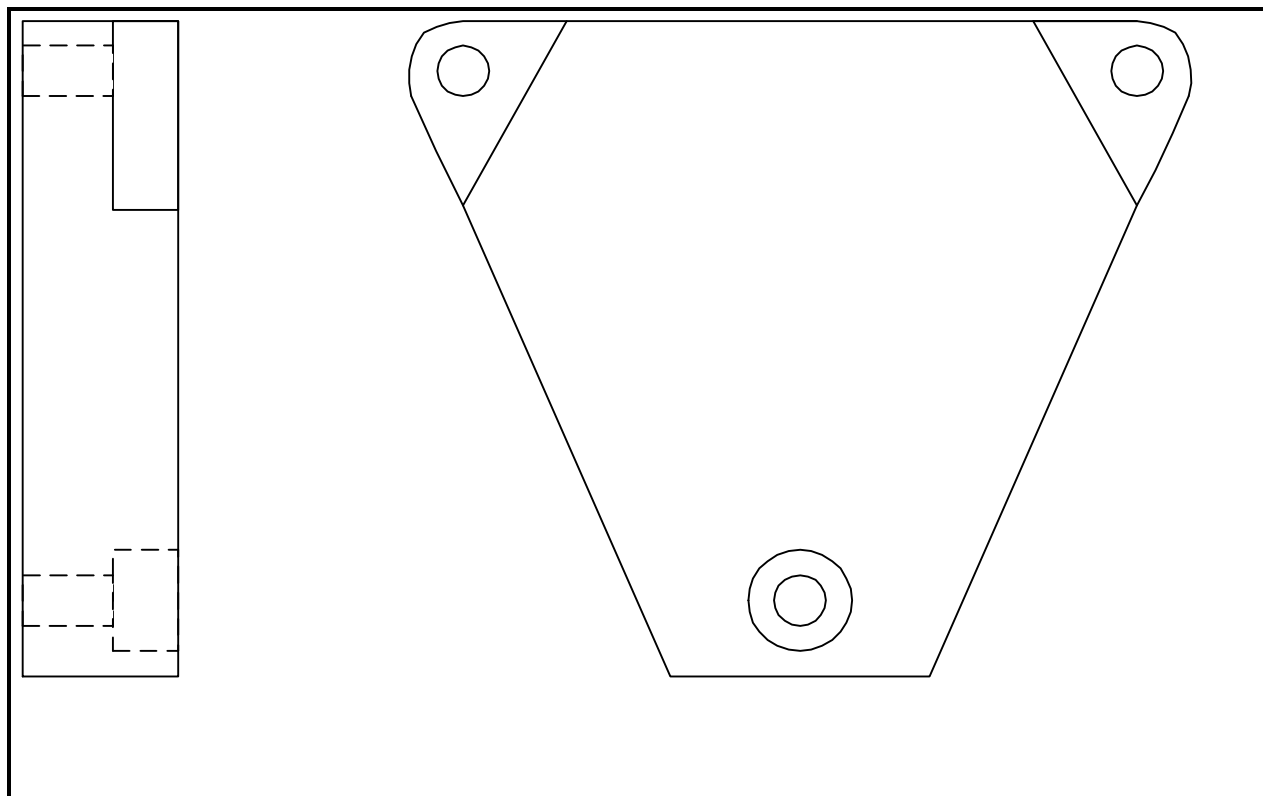


FIGURE 1. Stacking guide

3.3.16.7 Tiedown/towing devices. These devices shall have a minimum inside diameter of 3 inches. These devices, when not in use, shall not project beyond the dimensions of the box. The devices shall be subjected to loading as outlined in 4.4.19.7 without yielding or failure or deformation of the box.

3.3.16.8 Pulling. The loaded box shall be capable of being pulled from each end without damage to the blade or deformation of the box (see 4.4.19.8).

3.3.16.9 Pushing. A loaded box, when tested in accordance with 4.4.19.9, shall show no evidence of damage to the blade or deformation of the box when pushed with a forklift.

3.3.17 Environmental conditions. The storage and shipping box shall be capable of meeting requirements of this specification subject to the following adverse environmental conditions:

Temperature	-25° F to 160° F
Relative humidity	100%

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See 4.4.20 for verification.

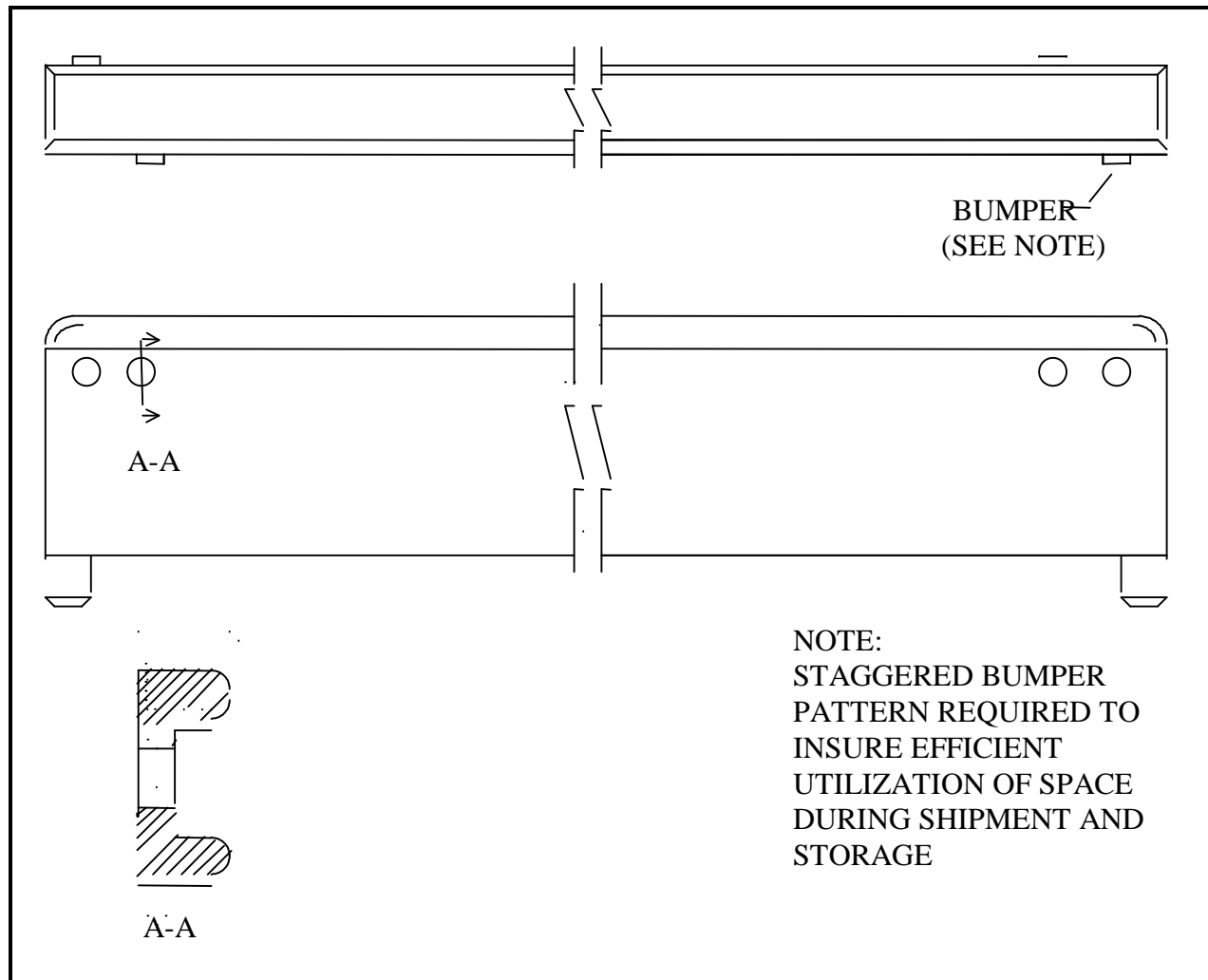


FIGURE 2. Bumper

3.3.18 Ruggedness. The box, complete with blade, shall be capable of being dropped on all sides, edges, and corners, as well as withstanding falling objects without damage to the blade or deformation of the box (see 4.4.21).

3.3.19 Interchangeability. All parts removable by common hand tools shall be directly and completely interchangeable with corresponding parts of other boxes of the same model (see 4.4.22).

3.3.20 Cleaning and Surface Treatment. Box shall be treated in a way as to prevent corrosion or deterioration of the box material. Threaded or other working surfaces which are required to be bare for operation shall have a corrosion resistant treatment applied that is nonvolatile, non-carcinogenic, and provides a thin easily removable film. Wood shall be pressure treated and

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marked in conformance with AWP C2, except that only ammoniacal copper arsenate or chromated copper arsenate preservatives shall be used for treatment. Wood used shall have the appropriate moisture content for the size, species, and ultimate service conditions, but in no case greater than 20 percent. Wood shall be sealed with a polyurethane-based wood sealer. All parts shall be treated after cutting, drilling, and welding, and prior to assembly (see 4.4.23).

3.3.21 Paint. All painted/anodized and wood surfaces shall resist absorption of chemical agents and withstand the use of caustic cleaners (see 4.4.24).

3.3.22 Markings. Markings shall be of black cork coating. They shall be black or white so as to provide a contrast with the background color and in accordance with the standard paint sample (see 6.3). The following markings shall be applied to all boxes at the locations and in the size letters indicated (see 4.4.25):

- a. Adjacent to the lifting rings, eyes, or lugs in 2-inch letters: "LIFT HERE". Arrows 5 inches long shall point to the rings, eyes, or lugs.
- b. Adjacent to lifting rings, eyes, or lugs, that are located on 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 2.5 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".

3.3.23 Alignment pin. In order to prevent misalignment of the cover, an alignment pin shall be located on either the top or bottom section (see 4.4.26).

3.3.24 Name plate. A name plate 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 (see 4.4.27):

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BOX, SHIPPING, HELICOPTER ROTOR BLADES, REUSABLE

Model No.: (if not classified, insert model No. of helicopter on which blade is used)

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National Stock No. _____

Manufacturer's Part No. _____

Manufacturer's Serial No. _____

Contract or Order No. _____

Manufacturer's Name or Trademark _____

The abbreviation "US"

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection
- b. Conformance inspection (4.4.)

4.2 First article inspection. First article test sample shall consist of two boxes that are representative of the production item. One of the test samples shall be subjected to each test in paragraphs 4.4.1 through 4.4.27.

4.3 Test conditions. Unless otherwise specified, the following standard ambient conditions shall be used to establish normal performance requirements.

Temperature	77°F ±3°
Relative Humidity	uncontrolled room ambient
Atmospheric Pressure	site pressure

4.3.1 Low temperature. The box, when it is subjected to any type of static or dynamic loading, shall be temperature conditioned to -25° F ±5°.

4.3.2 Rejection. Failure to conform to any of the requirements of this specification shall be cause for rejection of the box.

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4.4. Conformance inspection. The conformance inspection shall consist of an examination of each box that is submitted for acceptance. Each box shall be carefully examined to determine conformance with the appropriate materials, design, physical measurements, markings, finish, and contractor drawings.

4.4.1 Verification of prohibited materials. Design drawings and other contractor documents shall be reviewed to insure that prohibited materials are not being used (see 3.2.1).

4.4.2 Verification of cushioning material. Material shall be subjected to accelerated testing equivalent to one year. The material shall be subjected to a humidity level of a minimum of $85\% \pm 5\%$ and $180^{\circ}\text{F} \pm 5^{\circ}$ throughout the test. A sample piece of a blade (metallic) or exterior blade material (metallic) shall be placed in contact with the cushioning material. At the end of the test the blade sample or blade material shall exhibit no adverse effects from contact with the cushioning material (see 3.2.2).

4.4.3 Verification of metals. Design drawings shall be reviewed to insure that all metal components are corrosion resistant. It shall also be determined that there are no dissimilar metals in contact with the blade and any metallic component in the storage box (see 3.2.3).

4.4.4 Verification of blade installation/removal and blade mounting provision. Following the written instructions, a blade shall be installed in the box using only common hand tools and then removed. If it cannot be installed, or removed, within 10 minutes, it shall be cause for rejection. If the instructions are not clear or not in a logical sequence, it shall be cause for rejection. By reviewing the drawings or observing the box, it shall be noted that the removable portion of the provision shall be tethered in some fashion to the box (see 3.3.1).

4.4.5 Verification of size. The blade shall be placed into the box and the measured clearance between the blade and the interior of the box shall be not less than 2 inches. If this clearance is not met, it shall be cause for rejection (see 3.3.2).

4.4.6 Verification of weight. An empty box, including the blade mounting provision (if any), shall be weighed. If it exceeds five pounds per cubic foot, it shall be cause for rejection (see 3.3.3).

4.4.7 Verification of center of balance. A loaded box shall be picked up by a forklift in accordance with the marked center of balance. If the load is not stable, it shall be cause for rejection. This shall be repeated for boxes loaded with blades of each different length that is designated to be shipped in a given box (see 3.3.4).

4.4.8 Verification of blade protection. All tests in 4.4.22 shall measure maximum “g” forces on the blade. Accelerometers shall be attached to measure forces on all three axes. If the level specified by the blade manufacturer is exceeded, the box shall be rejected. Any and all tests that are conducted to verify the structure of the box shall also include a visual inspection of the blade following the completion of each test. If the blade has been damaged, it shall be cause for rejection of the box (see 3.3.5).

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4.4.9 Verification of fasteners. The ability to open and close the box using, at most, common hand tools, shall be demonstrated (see 3.3.6). Failure to meet this requirement shall be cause for rejection.

4.4.10 Verification of rodent protection. The box shall be examined to determine if any openings in a closed box are covered with corrosion-resistant material capable of preventing rodents from entering the box. Failure to meet this requirement shall be cause for rejection (see 3.3.7).

4.4.11 Verification of spray protection. With a fully loaded and closed box in normal shipping position, a heavy spray of water (3/4-inch hose at city water pressure) shall be directed on all sides of the box at an angle 45 degrees from horizontal. Each side and top of the container shall be subjected to the spray test for two minutes. The box shall be opened and checked to insure that no water has contacted the blade. Any water on the blade shall be cause for rejection (see 3.3.8).

4.4.12 Verification of drainage. Water shall be placed in each section of the interior of an empty box. If the top has depressed areas that can hold water, water shall be placed on it as well. There shall be no standing water in the interior or on the top after one minute. If so, it shall be cause for rejection (see 3.3.9).

4.4.13 Verification of ventilation. Air shall be introduced into a closed loaded box. If air is detected passing out through other openings or past the interface between the top and bottom, this requirement shall have been met (see 3.3.10).

4.4.14 Verification of moisture resistance. The interior supports/cushioning that are in contact with the blade shall be thoroughly wetted. After six hours, the surfaces of the cushioning must be completely dry. Failure shall be cause for rejection (see 3.3.11).

4.4.15 Verification of blades records receptacle. The location, design, and dimensions of the receptacle shall be verified by observation/measurement. After the box has been tested in accordance with 4.4.12, the inside shall be examined. Any moisture detected inside the receptacle shall be cause for rejection.

4.4.15.1 Verification of receptacle cover. By demonstration it shall be shown that the cover can be removed and replaced by hand or common hand tools. Also, the receptacle cover shall be sealed with a tamperproof device and then an attempt made to open the cover. If entry can be made without disturbing the tamperproof device, it shall be cause for rejection (see 3.3.12.1).

4.4.16 Verification of skids. The requirements of 3.3.13 shall be accomplished by demonstrating the removal and replacement of skids using only common hand tools. Skid ends shall be checked for beveled edges. If either requirement is not met, it shall be cause for rejection (see 3.3.13).

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4.4.17 Verification of concentrated load resistance. Boxes loaded with blades, or equivalent weight, shall be stacked to a height of at least 20 feet. (Alternatively, an equivalent weight can be placed on a loaded box such that the points directly above the skids are bearing the full weight.) Deformation of the box shall be cause for rejection (see 3.3.14).

4.4.18 Verification of distributed load resistance. A load of 175 pounds per square foot (psf) shall be evenly applied to the top surface of a loaded box. Any deformation shall be cause for rejection (see 3.3.15).

4.4.19 Verification of handling provisions. Determine by observation that lifting rings, eyes, or lugs do not project beyond the dimensions of the box. If the requirement is not met, it shall be cause for rejection (see 3.3.16).

4.4.19.1 Verification of stacking guides. The stacking guides shall be evaluated by conducting test 4.4.19.3. If a box shifts longitudinally or laterally in relation to one above or below it, it shall be cause for rejection (see 3.3.16.1).

4.4.19.2 Verification of bumpers. Proper placement of the bumpers shall be verified by observation. Bumpers on one box shall not contact those on another box placed next to it (see 3.3.16.2).

4.4.19.3 Verification of lifting by forklift. A stack of loaded boxes not less than 80 inches high shall be lifted free of the supporting surface by a hard-wheeled forklift, with forks spaced 30 inches center-to-center. The load shall be transported at 5 to 10 miles per hour for not less than 100 feet over a horizontal surface. The surface shall provide the effect of driving over nominal 1-inch thick boards spaced every 10 feet. The box shall be rejected if deformation is observed (see 3.3.16.3).

4.4.19.4 Verification of forklift scuff plate. The placement of the scuff plate on the side of the box shall be verified by observation. A box loaded with the equivalent weight of a blade shall be set on a level surface. A forklift shall impact the scuff plate with its forks perpendicular to the plate at a speed of five miles an hour. This shall be repeated 25 times. Penetration of the box through the scuff plate shall be cause for rejection (see 3.3.16.4).

4.4.19.5 Verification of hoisting. A loaded box, plus additional weight equal to 1.3 times the weight of the loaded box, shall be lifted free of the supporting surfaces and held for five minutes by means of the lifting rings, eyes, or lugs. Any deformation of the box or yielding or failure of the lifting rings, eyes, or lugs shall be cause for rejection (see 3.3.16.5).

4.4.19.6 Verification of individual hoisting devices. A loaded box, plus an additional weight equal to 1.3 times the weight of the loaded box, shall be lifted free of the supporting surface by each individual lifting ring, eye, or lug for a period of five minutes. As an alternate, a force may be exerted on each of the individual devices which is equal in magnitude and direction of this load. If

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a lifting ring, eye, or lug yields or fails, it shall be cause for rejection of that device. Likewise, any deformation of the box shall be cause for rejection (see 3.3.16.6).

4.4.19.7 Verification of tiedown/towing device. The devices and/or drawings shall be examined to determine if the inside diameters meet the requirements and that they do not extend beyond the perimeter of the box. The loading for the devices in the longitudinal, lateral, and vertical directions shall be in accordance with Appendix C, MIL-STD-209. Yielding or failure of the devices shall be cause for rejection (see 3.3.16.7).

4.4.19.8 Verification of pulling. A chain, hook, rope, etc. shall be attached to the lifting rings, eyes, or lugs. The loaded boxes shall be pulled or dragged at approximately 5 to 10 mph for 100 feet along a concrete floor. Deformation of the box shall be cause for rejection (see 3.3.16.8).

4.4.19.9 Verification of pushing. Three loaded boxes stacked on top of each other shall be pushed by a forklift at a speed of 25 feet per minute for a distance of 35 feet on a concrete floor. The forklift shall push one end of the bottom box. Deformation of the box shall be cause for rejection (see 3.3.16.9).

4.4.20 Verification of environmental conditions. The test specimen shall be subjected to temperatures of $-25^{\circ}\text{F}\pm 5^{\circ}$ and $160^{\circ}\text{F}\pm 5^{\circ}$ and relative humidity of 100%. After the environmental conditioning, the various handling and ruggedness tests shall be performed (see 3.3.17).

4.4.21 Verification of ruggedness. The box shall be loaded and subjected to the tests in FED-STD 101:

- a. Cornerwise drop (rotational) test, method 5005, test to level A and repeat the drop six times.
- b. Drop (free fall) test, method 5007, test to level A, use procedure B.
- c. Edgewise (rotational) test, method 5008, test to level A and repeat the drop six times.
- d. Roll-over test, method 5014.
- e. Pendulum-impact test, method 5012 or incline-impact test, method 5023, impact shall be seven feet per second. For naval ship use, the velocity shall be 10 feet per second.
- f. Dent resistance. The loaded box shall be placed in the normal shipping position. A 70 pound load shall be affixed to a solid block of wood (fir, pine, spruce, or harder wood). The corner of the block of wood shall resemble the corner of the box and have a 3/4-inch radius. The block shall be dropped from a height of 30 inches on the most vulnerable points on the top surface of the box. There shall be no damage to the blade, and the dents in the box shall not exceed 1/4-inch in depth.

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Deformation of the box during any of these tests shall be cause for rejection (see 3.3.18).

4.4.22 Verification of interchangeability. All parts that can be removed and replaced using common hand tools shall be removed from two boxes and installed on the other box. The inability to accomplish this for even a single part, using common hand tools, shall be cause for rejection of the box and/or the part (see 3.3.19).

4.4.23 Verification of surface treatment. Surface treatments of ferrous or aluminum alloy surfaces, threaded surfaces, and wood shall be verified by observation or evaluation of product specifications. Lack of compliance with the specification shall be cause for rejection (see 3.3.20).

4.4.24 Verification of paint. It shall be observed that the application of the paint shall be in accordance with MIL-C-53072 (see 3.3.21).

4.4.25 Verification of markings. Proper markings and their locations shall be verified by observation/measurement (see 3.3.22).

4.4.26 Verification of alignment pin. By demonstration, it shall be shown that the top section will fit properly on the bottom section in only one orientation (3.3.23).

4.4.27 Verification of name plate. Design drawings shall be reviewed to determine that the information to be placed on the name plate is in fact the correct information, in accordance with 3.3.24.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materials is to be performed by DOD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the military department or defense agency, or within the military department's system command. Packaging data retrieval is available from the managing military department or defense agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

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

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

6.2 Acquisition requirements. Acquisition documents should specify the following:

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- a. Title, number, and date of this specification.
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced.
- c. When first article is required (3.1).
- d. If required, low temperature testing of first article sample (see 4.3.1).
- e. When required, the desired exterior color will be specified in the contract.
- f. Blade models to be used.
- g. Packaging requirements (see 5.1).
- h. Fragility limits of the blades.

6.3 Standard paint sample. The procuring activity will provide standard paint samples to the contractor.

6.4 Blade sample. The procuring activity will provide samples of metallic blades or samples of exterior metallic blade material, as required, to the contractor.

6.5 Definitions.

Deformation. This is a qualitative evaluation of the structure of the box. Any permanent visible distortion, bending, twisting, or buckling of any surface or edge of the box is considered a deformation. This includes loosening, failure, or yielding of any lifting ring, eye, or lug.

6.6 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 first article testing. The contracting officer should arrange to loan the property listed in 3.3.

6.7 Subject term (key word) listing.

Blade, rotor
 Bumpers
 Center of balance
 Deformation
 Guide, stacking
 Hoisting
 Lift, sling
 Protection, spray
 Provision, blade mounting
 Provisions, handling
 Receptacle, blade record
 Skids
 Tiedown

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6.8 Changes from previous issues. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:

Army - AV

Navy - AS

Air Force - 11

Preparing Activity:

Army - AV

(Project No.: 8145-0100)

Review Activities:

Navy - MC, OS, SA, SH

Air Force - 71, 84, 99

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7, and send to preparing activity.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:		1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYYYMMDD)
3. DOCUMENT TITLE			
4. NATURE OF CHANGE <i>(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)</i>			
5. REASON FOR RECOMMENDATION			
6. SUBMITTER			
a. NAME <i>(Last, First, Middle Initial)</i>		b. ORGANIZATION	
c. ADDRESS <i>(Include ZIP Code)</i>		d. TELEPHONE <i>(Include Area Code)</i> (1) Commercial (2) DSN <i>(If applicable)</i>	7. DATE SUBMITTED (YYYYMMDD)
8. PREPARING ACTIVITY			
a. NAME		b. TELEPHONE <i>(Include Area Code)</i> (1) Commercial (2) DSN	
c. ADDRESS <i>(Include ZIP Code)</i>		IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman Road, Suite 2533 Fort Belvoir, Virginia 22060-6221 Telephone (703) 767-6888 DSN 427-6888	