

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

SPECIFICATION

SHOVEL, FOREST FIRE

1. SCOPE

1.1 Scope. This specification covers one type of forest fire shovel (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 Government documents

2.1.1 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 in effect on the date of the invitation for bids or request for proposals (see 6.2).

SPECIFICATIONS

FEDERAL

NN-H-81- Handles, Ash
PPP-B-636- Boxes, Shipping, Fiberboard

STANDARDS

FEDERAL

FED-STD-123- Marking for Shipment (Civil Agencies)
FED-STD-151- Metals; Test Methods
FED-STD-376- Preferred Metric Units for General Use by the
Federal Government

MILITARY

MIL-STD-105- Sampling Procedures and Tables for Inspection by
Attributes

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be used in improving this document should be addressed to: USDA Forest Service, Missoula Technology and Development Center, Building 1, Fort Missoula, Missoula, MT 59801-7294 by using the Specification Comment Sheet at the end of this document or by letter.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Ave., Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals.

DRAWINGS

USDA FOREST SERVICE

MEDC-705 - Shovels, Forest Fire
MEDC-707 - Shovel, Test Gage

(Address requests for copies to USDA Forest Service, Missoula Technology and Development Center, Building 1, Fort Missoula, Missoula, MT 59801-7294.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals.

ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE, INC.)

B46.1 - Surface Texture (Surface Roughness, Waviness, and Lay)

(Address requests for copies to American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 3951 - Standard Practice for Commercial Packaging
E 18 - Standard Test Methods for Rockwell Hardness and Rockwell
Superficial Hardness of Metallic Materials

(Address requests for copies to American Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103-1187.)

AMERICAN WELDING SOCIETY

A2.4-93 - Standards for Welding and Non-Destructive Testing

(Address requests for copies to American Welding Society, P.O. Box 351040, Miami, FL 33135.)

IRON AND STEEL SOCIETY

Alloy, Carbon and High Strength Steel, Semifinished for Forging, Hot Rolled Bars; Cold Finished Steel Bars; Hot Rolled Deformation and Plain Concrete and Reinforced Bar

(Address requests for copies to Iron and Steel Society, 410 Commonwealth Dr., Warrendale, PA 15086.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Address requests for copies to American Trucking Association, Inc., Traffic Department, 1616 P St. NW, Washington, DC 20036.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification

(Address requests for copies to Uniform Freight Classification Committee, Room 1106, 222 S. Riverside Plaza, Chicago, IL 60606.)

(Non-Government standards and other publications normally are available from the organizations that prepare and distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of 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. Unless otherwise specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.2 Materials and construction. The forest fire shovel covered by this specification shall conform in all respects to the design, details, dimensions, and materials specified herein and in the referenced drawing, MEDC-705. Should there be conflicts between the text of this document and the drawing, this document takes precedence, unless otherwise specified.

3.2.1 Blade and socket. The blade and socket shall conform to the configuration and dimensions shown in MEDC-705. The socket shall be either tab end or square top pattern.

3.2.1.1 Blade style. The design of the shovel blade shall conform to either the solid shank style or the closed back style (see 3.2.1.1.1 and 3.2.1.1.2). Unless otherwise specified by the contracting officer, the style shall be optional to the contractor, but only one style shall be furnished throughout the contract.

3.2.1.1.1 Solid shank style. The solid shank style shovel shall be roll forged and formed from one solid steel bar making blade and shank integral. The shank and the center or thickest portion of the blade at the shoulder end shall be formed to provide a frog. The blade shoulders shall be turned to form non-cutting, forward-turned steps.

3.2.1.1.2 Closed back style. The closed back shovel shall be formed so that the handle socket and forward-turned steps are integral with the blade. The center portion of the blade at the shoulder end shall be arched to form a frog with an open or hollow recess in the back. The back of the blade frog shall be reinforced and covered by a steel plate concentric with the blade back. The plate shall be resistance seam welded to the blade and all welds shall be faired to the blade surface. The weld shall conform to American Welding Society Standard A2.4-93 in all respects. The blade shoulders shall be turned to form non-cutting, forward-turned steps. Except for the steps, all rolled or folded edges incorporated on the blade shoulders and that part of the shoulder socket that laps over the steel plate shall be closed to within 1/32 inch or less of an adjacent metal surface.

3.2.1.2 Steel composition. The blade shall be made from special quality, hot top, fully killed, fine grain carbon AISI/SAE 1060 or 1050 steel (UNS G10600 or G10500). Steel composition of the blade shall be determined as specified in 4.5.1.1.

3.2.1.3 Steel hardness. The blade shall be hardened to a value of not less than 38 nor more than 47 on the Rockwell C scale. Steel hardness shall be determined in accordance with 4.5.1.2.

3.2.1.4 Blade thickness. Blade thickness shall be 0.069 +0.015,-0.005 inch measured in the three areas shown in MEDC-705.

3.2.1.5 Finish of cutting edge. The cutting edge of the shovel blade as shown in MEDC-705 shall be beveled to an included angle of 35 degrees minimum and 50 degrees maximum to the adjacent back surface. The cutting edge shall be ground to a finish having a roughness of not more than 125 microinches as defined by ANSI B46.1.

3.2.2 Handle. The handle shall be ash, conforming to grade SA of NN-H-81. Dimensions shall conform in all respects to drawing MEDC-705. A shoulder at the chucked end shall be provided on the handle when fitted to a square top pattern socket (see 3.2.1). The handle shall be free from crooks, bows, cracks, splits, and scores.

3.2.2.1 Handle finish. The handle shall be sanded to a smooth finish and coated with a minimum of two coats of clear waterbase lacquer. No wax or stain is allowed. The lacquer shall be applied evenly over the surface and shall be free of sags, runs, blisters, drips, wrinkles, frothing, or other defects characteristic of improper application or cure. If the dip method is used, coating of the tapered end of the handle is optional. Flame hardening is optional.

3.2.2.2 Moisture content. Moisture content of the handle at the time of assembly shall not exceed 12 percent when tested as specified in 4.5.2.1.

3.2.3 Tool assembly. The handle shall fit smoothly and tightly into the socket. The handle shall be secured by two rivets located as shown in MEDC-705.

3.2.3.1 Handle rivets. The two rivets affixing the handle to the socket of the blade shall be steel with a $7/32 \pm 1/32$ inch diameter. Rivet heads shall be oval or flat top with chamfered top. They shall be tight and flush to contact surfaces.

3.2.4 Tool weight. Weight of the assembled shovel shall be:
Solid shank type - 4 pounds, 2 ounces ± 5 ounces
Closed back type - 3 pounds, 8 ounces ± 5 ounces

3.2.5 Strength. The shovel assembly shall show no evidence of fracture, breaks, splits, nor take on a permanent set exceeding 1 inch when tested in accordance with 4.5.2.2.

3.3 Identification marking. Each blade shall be marked in a permanently legible manner as follows:

- a. The FSS mark shall be metal stamped in 1/4- to 1/2-inch-high letters on the inside right corner of the blade or on the shank, location optional to the manufacturer.
- b. The manufacturer's name or trademark shall be metal stamped in $5/16 \pm 1/16$ inch high size maximum on the inside right corner of the blade or on the shank, location optional to the manufacturer.

3.4 Workmanship. The finished tool shall be free of rust and all other defects that may affect serviceability, durability, and appearance. The tool shall conform to the quality of product established by this specification. It shall be manufactured using the best commercial workmanship in all respects.

3.5 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units, provided they fall within the tolerances specified using conversion tables contained in the latest revision of FED-STD-376, and all other requirements of this specification are met.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his/her 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 this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Responsibility for dimensional requirements. Unless otherwise specified in the contract or purchase order, the contractor is responsible for ensuring that all specified dimensions have been met. When dimensions cannot be examined on the end item, inspection shall be made at any point or at all points in the manufacturing process necessary to ensure compliance with all dimensional requirements.

4.2 Sampling for inspections and tests. Sampling for inspections and tests shall be made in accordance with MIL-STD-105. The inspection levels and acceptable quality levels (AQL) shall be as specified. All tools manufactured at one time shall be considered a lot for purposes of acceptance inspection and test. A sample unit shall be one complete shovel.

4.3 Quality conformance inspection. Each end item lot shall be sampled and inspected as specified in 4.3.2. Each lot shall be sampled and tested as specified by 4.5.2. Test reports showing compliance with 4.5.2.1 and 4.5.2.2 shall be submitted as part of quality conformance inspections. The packaging shall be inspected as specified in 4.4. Packaging is not required when first articles are presented. As part of quality conformance inspections, data analysis shall be submitted to determine compliance of the steel composition as specified in 4.5.1.1 and steel hardness as specified in 4.5.1.2. See also 4.5.1.3. When conducting quality conformance inspections of first articles, the presence of any defect or failure of any test shall be cause for rejection of the first article.

4.3.1 Component and material inspection. To meet the requirements of 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents, drawings, and standards unless otherwise excluded, amended, modified, or qualified in this document or applicable purchase document.

4.3.2 End item examination. The end items shall be examined for the defects listed in tables I and II. The inspection level shall be S-3, the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 4.0.

TABLE I. End item visual defects

| Examine | Defect | Classification | |
|--|--|-----------------------|-------|
| | | Major | Minor |
| Blade and Socket | Metal not as specified | X | |
| | Cutting edge not correct angle or not finished as specified | X | |
| | Radii or contours not faired or smoothly finished | X | |
| | Broken or skip in weld on back plate of closed back style shovel | X | |
| | Weld on backplate not faired to the blade surface on closed back style shovel | | X |
| | Edges of rivet heads not flush (exposed sharp edges) with contact surfaces | X | |
| | Missing or loose rivets | X | |
| | Handle | Wood not as specified | X |
| Handle broken, cracked, showing crooks or bows, split or scored | | X | |
| Fit in socket not tight and smooth | | X | |
| Finish not smooth, has blisters, drips, wrinkles, frothing, etc. | | X | |
| Wax or stain used | | X | |
| Markings: "FSS" And Mfg. logo | Omitted, incorrect, illegible, misplaced, or size of characters not as specified | | X |

TABLE II. End item dimensional defects

| Examine | Defect | Classification | |
|------------------|---------------------------------------|----------------|-------|
| | | Major | Minor |
| Blade and socket | Not within shovel test gage | X | |
| | Cutting edge not beveled as specified | X | |
| Handle | Length not as specified | X | |
| | Diameters not as specified | | X |

4.4 Packaging examination. The fully packaged end items shall be examined for the defects listed below. The lot size shall be expressed in units of shipping containers. The sample unit shall be one shipping container fully packaged. The inspection level shall be S-3 and the AQL, expressed in terms of defects per hundred units, shall be 2.5.

ExamineDefect

| | |
|-----------------------------------|--|
| Markings (external and unit pack) | Omitted; incorrect; illegible; of improper size, location, sequence, or method of application |
| Materials specified | Any component missing, damaged, or not as specified |
| Workmanship | Inadequate application of components, such as: cushioning; inadequate, bulged, or distorted interior container |
| Contents | Number per interior box and shipping container is more or less than required |

4.5 Tests.

4.5.1 Component material testing.

4.5.1.1 Steel composition test. The blade shall be tested in accordance with FED-STD-151, method 111.2 or 112.2 to verify steel composition as required in 3.2.1.2. Any failure shall fail the lot.

4.5.1.2 Hardness test. Hardness tests to determine compliance with 3.2.1.3 shall be in accordance with ASTM E 18. Three readings shall be taken at the three blade thickness points indicated on MEDC-705. During the test, the blade shall be supported to limit the movement and keep the test surface perpendicular to the axis of the penetrator. Any reading not within specified requirements shall constitute a defect.

4.5.1.3 Steel testing documentation. To meet the requirements of 4.5.1.1, a test report/analysis from the steel manufacturer shall be acceptable in lieu of lot by lot testing when validated by the contractor's own tests on the first lot of steel received. The contractor need not retest again unless a new steel supplier is used. Lot by lot hardness testing may be performed any time after tool blades are heat treated. Hardness testing need not be repeated as part of end item testing.

4.5.2 End item testing. Unless otherwise specified, the sample size for testing shall be S-2 with an AQL of 4.0 for all testing.

4.5.2.1 Handle moisture content testing. Moisture content testing to meet the requirements of 3.2.2.2 shall be part of quality conformance inspection. Moisture testing shall be performed in the following manner: Using a calibrated moisture meter, readings shall be obtained from each end of the handle and its mid point. The handle's moisture content will then be determined by averaging the three readings.

4.5.2.2 Strength test. Strength testing to determine compliance with 3.2.5 shall be performed as illustrated in figure 1. The blade shall be securely clamped and a measurement made of the vertical distance "D" before applying the load. A 175 +1 -0 pound weight shall than be applied to the handle at point A for not less than 120 nor more than 125 seconds. The weight shall then be removed and a remeasurement taken of vertical distance "D". The difference in measurement "D" before and after the weight application is the amount of set or bend. Failure is deemed to have occurred if any part of the shovel fractures or breaks or when the permanent set or bend exceeds 1 inch.

5. PACKAGING

5.1 Preservation. The cutting edge of the shovel blade shall be protected with packing materials securely fastened in place. All other preservation shall be in accordance with ASTM D 3951.

5.2. Unit packing. Five shovels shall be placed together and the handles either taped or tied firmly together in two places with either a filament tape or a sisal rope of not less than 200 pounds tensile strength for either tape or rope (see figure 2).

5.3 Packaging. Two unit packs (10 shovels) prepared as specified in 5.2 shall be packed in each shipping container. All packaging shall comply with the Uniform Freight Classification and the National Motor Freight Classification. Boxes shall be type CF, class Domestic, variety DW, grade 500, style FTC of PPP-B-636. Inside dimensions shall be as shown in figure 2. Tolerances on all dimensions are -1/2 inch, +1 inch. Metal staples shall be used on all corners and joints. The boxes shall have the flaps outside the side panels of the body and inside the end panels of the cover. When set up, the flaps of the cover shall not overlap, but shall have sufficient length to be securely fastened to the adjoining walls with no less than five staples. The cover shall be securely fastened to the body with either a filament type tape or sisal rope of not less than 200 pounds tensile strength. The cover shall be secured t the body in two places approximately 6 inches from either end, and if filament tape is used it shall extend all the way around the box in a continuous strip with one end of the tape overlapping the other by at least 6 inches.

5.4. Marking. In addition to any special marking required by the contract or purchase order, shipping containers shall be marked in accordance with FED-STD-123.

5.4.1 Unit pack marking. Each unit pack preserved in accordance with 5.1 and packed to meet 5.2 and 5.3 shall have the required identification information legibly printed or stamped in black directly across the center face of the outside of the pack so as to permit ready identification. The required information shall be as follows:

National stock number
Nomenclature
Manufacturer's name
Contract number
Month and year of manufacture

6. NOTES

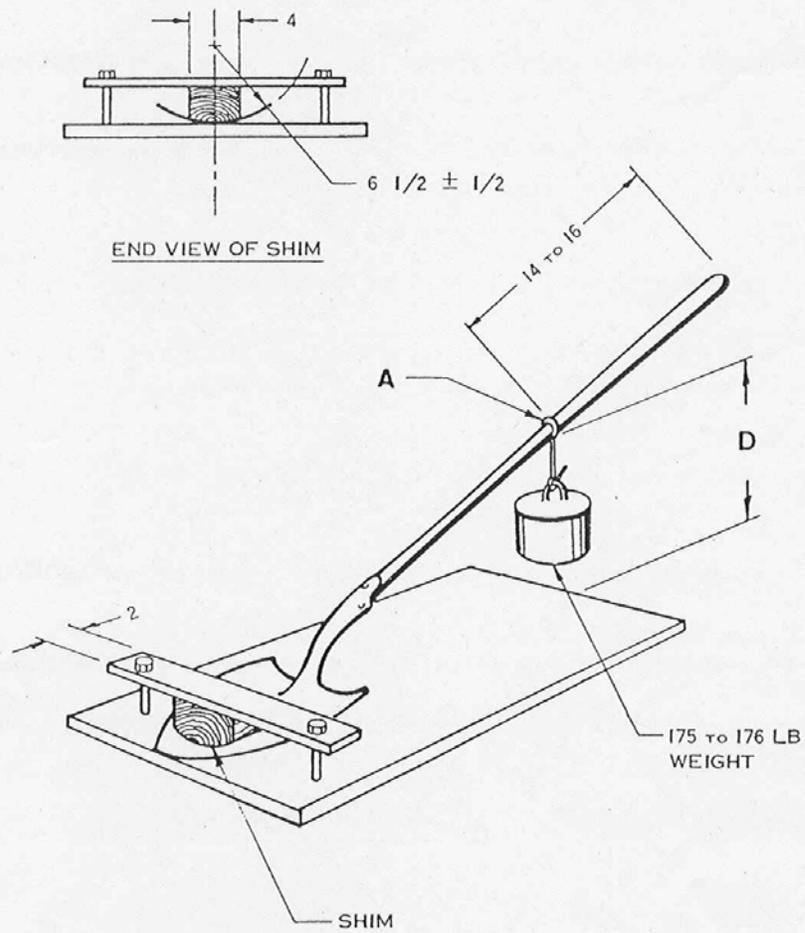
6.1 Intended use. The forest fire shovel is intended primarily for constructing firelines on wildfires and controlled burn operations. It is used to cut small limbs and light brush, dig out burning material, throw soil on flaming fuel, and to scrape combustible material from the fireline down to mineral soil.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. When a first article sample is required (see 3.1, 4.3, and 6.3).
- c. Style of shovel blade required when not optional to the contractor (see 3.2.1.1).

6.3 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of Federal Acquisition Regulation (FAR) 52.209. The first article shall be a preproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Preparing activity. USDA Forest Service, Missoula Technology and Development Center, Building 1, Fort Missoula, Missoula, MT 59801-7294.



NOTE - DIMENSIONS ARE IN INCHES

Figure 1.-Method of applying test load.

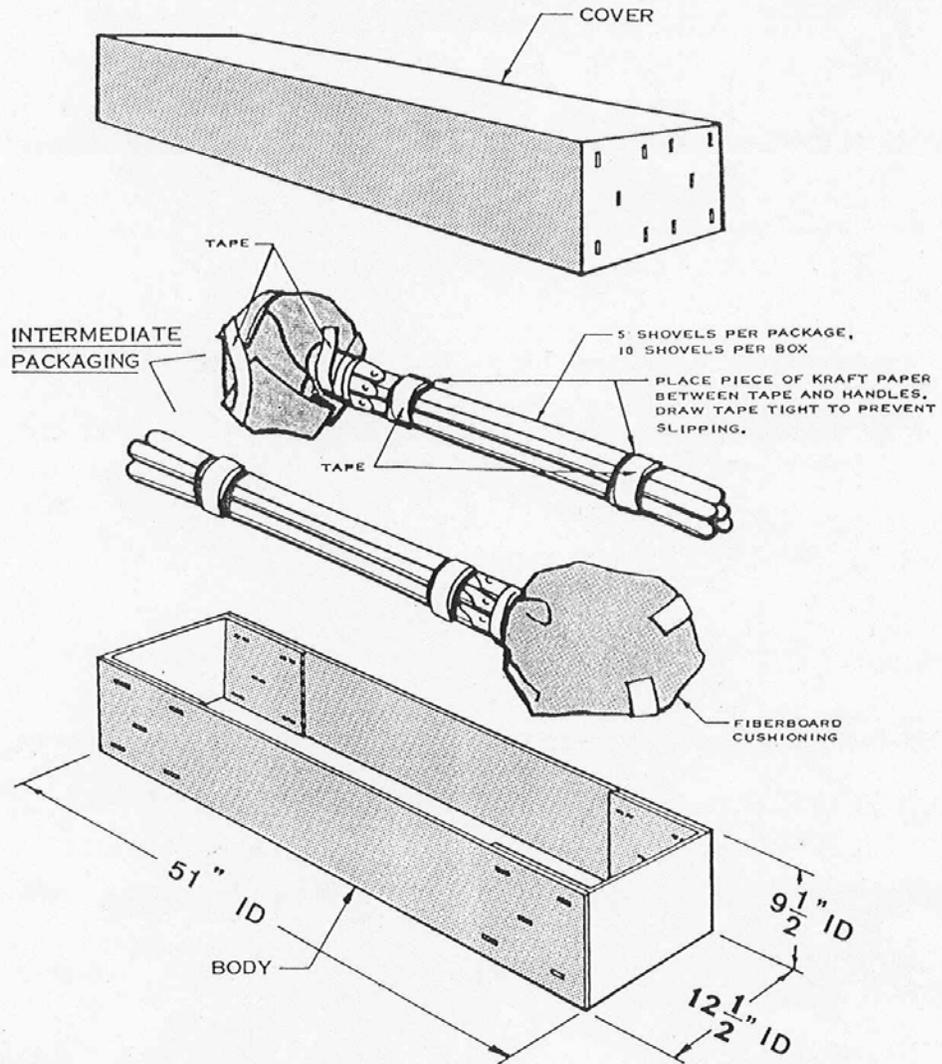


Figure 2.-Securing and packaging.

Standardization Document Improvement Proposal

This form is provided to solicit beneficial comments that may improve this document and enhance its use. Contractors, government activities, manufacturers, vendors, and users are invited to submit comments to:

USDA Forest Service
Missoula Technology and Development Center
5785 Highway 10 West
Missoula, MT 59808

Attach any additional pertinent information that may be of use in improving this document to this form and mail in an envelope. A response will be provided when the submitter includes their name and address.

NOTE: This form shall not be used to submit requests for waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the document, or to amend contractual requirements.

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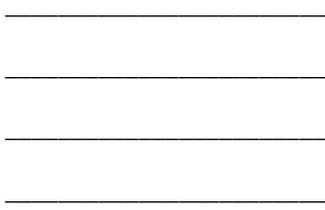
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