

**U.S. DEPARTMENT OF AGRICULTURE  
FOREST SERVICE**

**SPECIFICATION**

**TOOL, RAKE AND CUTTING**

1. SCOPE

1.1 Scope. This specification covers a special handtool designed for both raking and cutting small brush to construct fire control lines on wildfires and controlled burn operations.

2. APPLICABLE DOCUMENTS

2.1 Government documents. The following government 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:

2.1.1 Government specifications and standards.

SPECIFICATIONS

FEDERAL

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

STANDARDS

FEDERAL

FED-STD-123 - Marking for Shipment (Civil Agencies)

FED-STD-376 - Preferred Metric Units for General Use by the Federal Government

FED-STD-595 - Colors (Requirements for Individual Color Chips)

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

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 59804-7294 by using the Specification Comment Sheet at the end of this document or by letter.

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-519 - Tool, Rake & Cutting

(Copies are available from the USDA Forest Service, Missoula Technology and Development Center, Building 1, Fort Missoula, Missoula, MT 59804-7294.)

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.

### AMERICAN SOCIETY FOR QUALITY CONTROL (ASQC)

#### Z1.4 - Sampling Procedures and Tables for Inspection by Attributes

(Copies are available from the American Society for Quality Control, 611 East Wisconsin Avenue, Milwaukee, WI 53202.)

### ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE, INC.)

#### B18.1.1 - Small, Solid Rivets

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

(Copies are available from the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.)

### AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

#### D 1974 - Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Shipping Containers

#### D 3951 - Standard Practice for Commercial Packaging

#### D 5118 - Standard Practice for Fabrication of Fiberboard Shipping Boxes

#### E 18 - Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials

(Copies are available from ASTM, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.)

### AMERICAN WELDING SOCIETY

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

(Copies are available from the American Welding Society, P.O. Box 351040, Miami, FL 33135.)

IRON AND STEEL SOCIETY

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

(Copies are available from the Iron and Steel Society, 410 Commonwealth Dr., Warrendale, PA 15086.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Copies are available from American Trucking Associations, Inc., 2200 Mill Rd., Alexandria, VA 22314.)

(Non-Government standards and other publications normally are available from the organizations that prepare or 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 components. The rake and cutting tool shall conform in all respects to the design, details, dimensions, and materials specified herein and in the referenced drawing, MTDC-519. Should there be conflicts between the text of this document and the drawing, this document takes precedence, unless otherwise specified.

3.2.1 Frame and eye. The frame shall be formed from AISI/SAE 1020 hot-rolled steel. The tool eye shall be fabricated from 1/8 inch thick AISI/SAE 1020 hot-rolled steel. Steel composition for frame and eye shall be determined as specified in 4.5.1.1.

3.2.2 Blades. The blades shall be made from AISI/SAE 1080 or 10B38 steel. Steel composition for blades shall be determined as specified in 4.5.1.1. The blades shall be heat treated to a Rockwell C hardness of 52 to 57 at the cutting edge and back from the cutting edge no less than 3/8 inch. Steel hardness shall be determined as specified in 4.5.1.2.

3.2.3 Rivets. The rivets shall be made from solid steel wire equal to or stronger than AISI/SAE 1006 (43,000 psi tensile strength and 24,000 psi yield strength). Rivets shall be 3/16 inch diameter with button, pan, flat, or truss head. Other rivet dimensions shall be in accordance with ANSI B18.1.1.

3.2.4 Handle. The handle shall be ash, which includes wood cut from white ash (*Fraxinus americana*), green ash (*Fraxinus pennsylvanica*), and blue ash (*Fraxinus quadrangulata*). Permitted colors are white, light red and light brown, with dark red and brown permitted within 10 inches of either end. The wood shall show between 5 and 17 annual rings per inch of radius. The maximum permitted cross grain shall be 1/2 diameter in the bottom 2/3, 1/2 diameter in the top 1/3, and 2/3 diameter in the top 7 inches. The blemishes shall not exceed 1 slight dip in grain, or 2 pin twig marks, small streaks, or butterfly marks per handle. Dimensions shall conform in all respects to drawing MTDC-519. The handle shall be free from crooks, bows, cracks, splits, and scores.

3.2.5 Screw or nail. A #10 round head 1 to 1-1/4 inch long wood screw shall be used to affix the handle to the tool head.

### 3.3 Finish.

3.3.1 Tool head. The head shall be pretreated for painting in accordance with TT-C-490 and painted with an enamel to provide a rust-resistant finish. The enamel shall match color chip 11105 of FED-STD-595. The blade sections shall be coated with a light film of oil after sharpening to prevent rusting

3.3.1.1 Blades. Each blade as shown in MTDC-519 shall be beveled to an included angle of  $21 \pm 2$  degrees to the adjacent back surface. The cutting edges shall be ground to a finish having a roughness of not more than 125 microinches as defined by ANSI B46.1.

3.3.2 Handle. The handle shall be sanded to a smooth finish and coated with a minimum of two coats of clear lacquer. No wax or stain is allowed. The lacquer shall permit visual inspection of the wood, prevent absorption of water, and protect the handle over long periods of storage. The lacquer shall be applied evenly over the surface and shall be free of sags, runs, drips, blisters, wrinkles, frothing, or other defects characteristic of improper application or cure. Flame hardening is optional to the manufacturer.

### 3.4 Tool assembly.

3.4.1 Welding. The eye shall be welded to the frame using a fillet weld all around as shown in MTDC-519. The weld shall conform to American Welding Society Standard A2.4 in all respects.

3.4.2 Riveting. Each of the four blades shall be affixed to the frame with two rivets. Rivet length shall be such that when assembling the blades to the frame, the formed head shall comply with dimensions shown in MTDC-519. Other rivet dimensions shall be in accordance with ANSI B18.1.1. The rivet heads shall be full, neatly made, concentric with the rivet holes, and shall be in full contact with the surface of the riveted member.

3.4.3 Handle 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.

3.5 Identification marking. The "FSS" mark shall be metal stamped in 1/4 inch high letters on the top of the tool head in the location shown in drawing MTDC-519.

3.6 Workmanship. The head shall be smooth and free of cracks, pits, laps, rust, burrs, cupping, or other defects that may affect serviceability, durability, and appearance. The enamel paint shall be a continuous, uniform, smooth, dry coating having no area without paint except for the cutting edges, which shall be coated as specified. 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. All items shall conform to the quality of product established by this document. The occurrence of defects shall not exceed the applicable acceptable quality levels. There shall be no defects that affect use, appearance, or serviceability.

3.7 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.

3.8 Recovered materials. The contractor/offeror is encouraged to use recovered materials to the maximum extent possible in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR).

#### 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 this 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.

4.1.3 Certification of compliance. Unless otherwise specified, certificates of compliance supplied by the manufacturer of the item, component, or material, listing the specified test method and test results obtained, may be furnished in lieu of actual lot by lot testing performed by the contractor (see 4.3.2). When certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of the certification.

4.2 Sampling for inspections and tests. Sampling for inspections and tests shall be made in accordance with ASQC/ANSI Z1.4. 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 ax complete with attached handle.

4.3 Quality conformance inspection. Each end item lot shall be sampled and inspected as specified in 4.3.4. Each lot shall be sampled and tested as specified by 4.5.2. Test reports showing compliance with 4.5.2.1 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 testing. 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 Certification. Unless otherwise specified (see 6.2), as part of first article presentations and lot inspections, it shall be acceptable for the contractor to provide certificates of compliance for all materials and components in lieu of actual lot by lot testing. In addition, when the contractor changes component or material suppliers, a new certification based on actual test results shall be required. All certificates shall include as a minimum:

- Specification, type, class, form, etc. as applicable
- Quantity purchased
- Purchase source, address, and telephone number
- Purchase date
- Lot number traceable to materials used in production
- Contract number

4.3.3 In-process inspection. Inspection shall be made at any point or during any phase of the manufacturing process to determine component parts are in accordance with specified requirements. Whenever nonconformance is noted, corrections shall be made to the parts affected and lot in process. Components that cannot be corrected shall be removed from production.

4.3.4 End item examination. The end items shall be examined for the defects listed in tables I and II. The inspection level shall be S-2, the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 2.5 for major and 6.5 for minor defects.

TABLE I. End item visual defects

<u>Examine</u>	<u>Defect</u>	<u>Classification</u>	
		<u>Major</u>	<u>Minor</u>
Tool head	Metal surfaces not finished and painted as specified	X	
	Not free of cracks, laps, burrs, cupping, rust	X	
	Blade cutting edges not sharpened as specified	X	
	Blade beveled edges not protected with suitable rust preventive		X
Handle	Wood not as specified	X	
	Not free from crooks, bows, cracks, splits, and other defects	X	
	Finish not as specified	X	
	Coating not free of defects such as sags, runs, and drips	X	
Markings (FSS)	Omitted, incomplete, incorrect, illegible, misplaced, or size of characters not as specified		X

TABLE II. End item dimensional defects

<u>Examine</u>	<u>Defect</u>	<u>Classification</u>	
		<u>Major</u>	<u>Minor</u>
Tool head	Dimensions and configuration not as specified	X	
	Hardness not as specified	X	
	Cutting edge angles not as specified	X	
	Marking not as specified		X
Handle	Dimensions not as specified	X	

4.4 Packaging inspection. An examination shall be made to determine that packing and marking comply with the section 5 requirements. Defects shall be scored in accordance with the list below. The sample unit shall be one shipping container fully packaged except that it shall not be palletized and it need not be closed. Shipping containers fully packaged that have not been palletized shall be examined for defects in closure. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 and the AQL shall be 2.5 defects per hundred units.

<u>Examine</u>	<u>Defect</u>
Markings	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application.
Materials	Any component missing or not as specified. Any component damaged, affecting serviceability.
Workmanship	Inadequate application of components, such as: incomplete closure of container flaps, improper taping, loose strapping, inadequate stapling.
Contents	Bulged or distorted container.
	Number of items per container is more or less than required.

## 4.5 Tests.

### 4.5.1 Component material testing.

4.5.1.1 Steel composition test. A repeatable consensus standard test method shall be used to verify steel composition as required in 3.2.1 and 3.2.2. Any failure shall fail the lot (see 4.5.1.3).

4.5.1.2 Hardness test. Hardness tests to determine compliance with 3.2.2 shall be in accordance with ASTM E 18. Any readings not within specified requirements shall constitute a major defect (see 4.5.1.3).

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 heads 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 3.4.3 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.

## 5. PACKAGING, PACKING AND MARKING

5.1 Packaging. The tool head of each tool shall be protected with a fiberboard sleeve securely fastened in place and labeled as shown in figure 1. All other preservation shall be in accordance with ASTM D 3951.

5.2 Packing. Ten tools, packaged as specified in 5.1, shall be packed for shipment as illustrated in figure 1. Packing boxes shall comply with the Uniform Freight Classification and the National Motor Freight Classification and shall be type CF or SF, class Domestic, variety SW or DW, grade 200 minimum, style FOL, and otherwise conforming to ASTM D 5118.

5.3 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.

## 6. NOTES

6.1 Intended use. The rake and cutting tool is used by firefighters for raking and cutting small brush as part of fireline construction on wildfires and controlled burns.

6.2 Ordering data. Documents utilizing this material should specify the following:

- (a) Title, number and date of this specification.
- (b) When first article samples are not required (see 3.1, 4.3, and 6.3).
- (c) When lot by lot testing is required in lieu of certificates of compliance (see 4.3.2).
- (d) Preservation, packing, and marking required in addition to specification requirements (see section 5).



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 should 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 59804-7294.

5100-284C

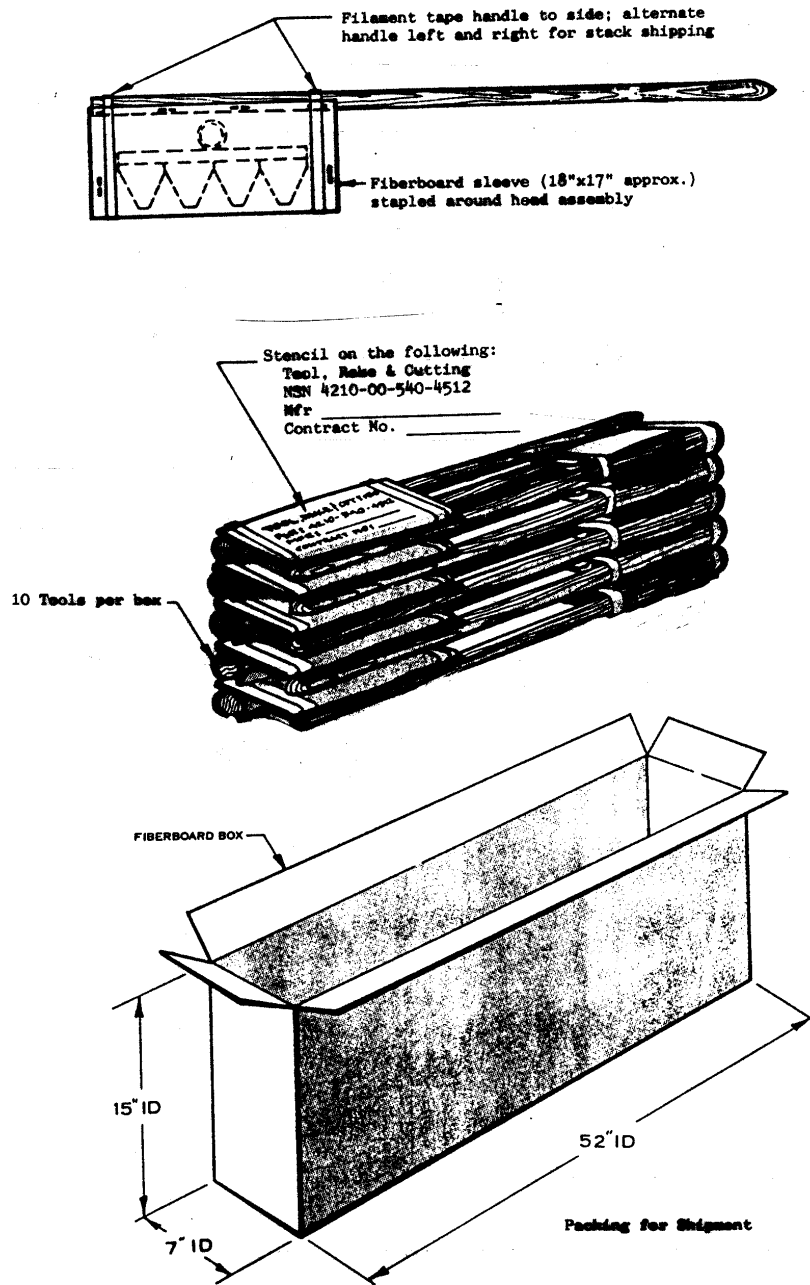
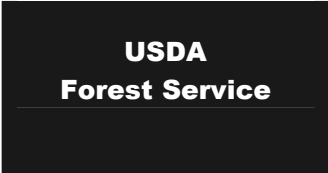


FIGURE 1.--PREPARATION FOR DELIVERY.



# 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  
Building 1, Fort Missoula  
Missoula, MT 59804-7294

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.

Document Identification: **5100-284C - TOOL, RAKE AND CUTTING**

Submitter's Name (Optional. Please print or type): _____	Submitter's Organization and Address: _____
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Give paragraph number and wording: \_\_\_\_\_

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Reason for recommended change(s): \_\_\_\_\_

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