

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

SPECIFICATION

MCLEOD TOOL

1. SCOPE

1.1. Scope. This specification covers a combination hoe and rake handtool used primarily for clearing brush and other surface debris and for digging in the soil to construct fire control lines on wildfires and controlled burn operations.

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
TT-C-490 - Cleaning Methods for Ferrous Surfaces and Pretreatments
for Organic Coatings
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
FED-STD-595 - Colors (Requirements for Individual Color Chips)

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.

MILITARY

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

(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-566 - Tool, McLeod

(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)

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

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

- 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.)

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

(Copies are available from American Trucking Associations, 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, supersede 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 4.3.1.

3.2 Materials and construction. The McLeod tool shall conform in all respects to the design, details, dimensions, and materials specified herein and in the referenced drawing, MEDC-566. Should there be conflicts between the text of this document and the drawing, this document takes precedence, unless otherwise specified.

3.2.1 Blade.

3.2.1.1 Steel composition. The blade shall be made from standard killed carbon AISI/SAE 1095 steel (UNS G10950). Steel composition of the blade shall be determined as specified in 4.5.1.1.

3.2.1.2 Hardness. The blade shall be hardened to a value of not less than 38 nor more than 48 on the Rockwell C scale. Steel hardness shall be determined in accordance with 4.5.1.2.

3.2.2 Ferrule assembly. The design and dimensions of the components making up the ferrule assembly: ferrule, ferrule plate, ferrule hub, and ferrule pins shall be as specified in MEDC-566.

3.2.2.1 Steel composition. The ferrule, ferrule plate, and ferrule pins shall be standard killed carbon AISI/SAE 1020 steel (UNS G10200). Steel composition shall be determined as specified in 4.5.1.1. In addition, the ferrule hub shall be AISI/SAE 1020 steel tubing (UNS G10200) of the diameter and thickness specified in MEDC-566.

3.2.3 Finish of steel components. Before assembly, steel components shall be pretreated for painting in accordance with TT-C-490, then painted with a black enamel matching color chip 27038 of FED-STD-595 to provide a rust-resistant finish. In addition, after sharpening, the cutting edges of the blade shall be coated with a rust preventative such as light oil, lacquer, or wax.

3.2.3.1 Cutting edge. The cutting edge of the tool shall be ground to a finish having a roughness of not more than 125 microinches as defined by ANSI B46.1. The cutting edge shall be beveled and sharpened to a sharp edge. The bevel shall be 45 ± 5 degrees as shown in drawing MEDC-566.

3.2.4 Handle. The handle shall be ash, conforming to grade A of NN-H-81. Dimensions shall conform in all respects to drawing MEDC-566. The handle shall be free from crooks, bows, cracks, splits, and scores. Alignment of the grain of the handled tool shall run parallel to the center line of the handle, 90° to the split of the ferrule, and parallel with the rivet, as illustrated in MEDC-566.

3.2.4.1 Handle finish. The handle shall be sanded to a smooth finish and coated with a minimum of one coat 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.

3.2.4.2 Moisture content. Moisture content of the handle at the time of assembly shall not exceed 10 percent when tested as specified in 4.5.2.1.

3.2.5 Handle to ferrule assembly.

3.2.5.1 Handle rivet. The rivet affixing the handle and ferrule shall be steel with a $7/32 \pm 1/32$ inch diameter. The rivet head shall be oval or flat top. If flat top is used, it shall be flush with the surface. There shall be no sharp edges. The rivet shall be located as shown in drawing MEDC-566.

3.2.6 Blade to handle assembly. The contract or purchase order shall specify whether the tools shall be packed assembled or unassembled (see 5.2 and 6.2).

3.2.6.1 Bolt and washer. The bolt shall have a hexagon head and shall be grade 5, $5/8$ inch diameter, 1 inch in length with 11 national coarse threads per inch. The head shall be modified with a $1/8$ - by $1/8$ -inch slot as shown in drawing MEDC-566. A regular $5/8$ inch cut steel washer is required. When assembly by the contractor is required (see 6.2) a torque of 30 to 40 foot pounds as tested according to 4.5.2.2 shall be used to tighten the bolt. When provided unassembled, the bolt and washer shall be threaded on to the handle finger tight.

3.2.6.2 Alignment. When attached to the blade, the handle shall be no more than ± 1 inch off the perpendicular of the blade when measured according to 4.5.2.3.

3.2.6.3 Strength. The handle and ferrule component of the assembled tool shall not retain a permanent set in excess of 2-1/2 inches when tested as specified in 4.5.2.4.

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

- a. The manufacturer's name or trademark shall be metal stamped in 1/4 inch high size maximum on the inside face of the blade either right or left side, as shown in drawing MEDC-566.
- b. The FSS mark shall be stamped in 1/4 to 1/2 inch high letters adjacent to or directly above the trademark or manufacturer's name as specified in (a).

3.4 Workmanship. The blade and ferrule assembly shall be smooth and free of rust and all other defects that may affect serviceability, durability, and appearance. The enamel paint on the steel components shall be a continuous, uniform, smooth, dry coating having no area without paint, except the cutting edge, 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.

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 ANSI/ASQC Z1.4. The inspection level and acceptable quality level (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 McLeod tool. If the tool is specified to be provided unassembled by the contract or purchase order, and assembly is necessary for measurement or testing, the samples shall be assembled as specified in 3.2.6.1 using a calibrated torque gauge.

4.3 Quality conformance inspection. Each end item lot shall be sampled and inspected as specified in 4.3.1. Each lot shall be sampled and tested as specified by 4.5.2. Test reports showing compliance with 4.5.2.1, 4.5.2.2, 4.5.2.3, and 4.5.2.4 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 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 4.0.

TABLE I. End item visual defects

<u>Examine</u>	<u>Defect</u>	<u>Classification</u>	
		<u>Major</u>	<u>Minor</u>
Blade	Metal not as specified	X	
	Flutes on tines on wrong side		X
	Cutting edge not correct angle or not finished as specified	X	
	Finish not as specified		X
	Dirt or other foreign matter embedded in finish		X
	Rust on blade	X	
	Area of no paint		X
	Color not as specified		X

TABLE I. End item visual defects - Continued

<u>Examine</u>	<u>Defect</u>	<u>Classification</u>	
		<u>Major</u>	<u>Minor</u>
Ferrule assembly	Metal not as specified	X	
	Any rust, cracks, burrs, laps, flash or cupping	X	
	Hole not in location specified	X	
	Split not in location specified	X	
	Rivet missing	X	
	Rivet not flush with handle (if flat top rivet used)		X
	Threads not as specified, crossed or damaged	X	
	Handle to ferrule joint loose due to missing rivet, improper ferrule fit, or other workmanship defects	X	
Bolt and washer	Not as specified		X
	Threads crossed or damaged	X	
	Bolt or washer missing	X	
Handle	Wood not as specified	X	
	Finish not smooth, has blisters, drips, wrinkles, frothing, etc.	X	
	Wax or stain used	X	
	Grain of wood not parallel to the centerline and perpendicular to the ferrule split line	X	
	Handle split or broken	X	
Markings: FSS and contractor logo	Omitted, incorrect, illegible, misplaced, or size of characters not as specified		X

TABLE I. End item visual defects

<u>Examine</u>	<u>Defect</u>	<u>Classification</u>	
		<u>Major</u>	<u>Minor</u>
Blade	Ferrule hub location holes not within tolerance both in size and location	X	
	Center hole not in proper location	X	
	Overall height and width of blade not within tolerance	X	
	Flutes not as specified	X	
	Cutting edge not beveled as specified	X	
	Cutting edge not finished as specified	X	
	Ferrule assembly	Locator pins not within tolerance both in size and location	X
Bolt and washer	Not as specified		X
Handle	Length not as specified	X	
	Diameters not as specified	X	

4.4 Packaging inspection. The fully packaged 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.

<u>Examine</u>	<u>Defect</u>
Markings (external and unit pack)	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application.
Materials	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, ferrule, ferrule plate, and ferrule hub shall be tested in accordance with FED-STD-151, method 111.2 or 112.2 to verify steel composition as required in 3.2.1.1 and 3.2.2.1. Any failure shall fail the lot.

4.5.1.2 Hardness test. Hardness tests to determine compliance with 3.2.1.2 shall be in accordance with ASTM E 18. Three readings shall be made at various points on the blade, ensuring that they are not in line either perpendicularly or horizontally. During the test, the blade shall be supported to limit the movement and keep the test surface perpendicular to 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. Where assembly is not required by the contract or purchase order but assembly is required for the test, the tool shall be assembled as specified by 3.2.6.1 using a calibrated torque gauge.

4.5.2.1 Handle moisture content testing. Moisture content testing to meet the requirements of 3.2.4.2 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 Bolt tightness test. This test shall be performed only on tools that are required to be assembled by the contract or purchase order. A calibrated torque gauge shall be used to determine compliance with the requirements of 3.2.6.1.

4.5.2.3 Alignment test. Alignment testing to determine compliance with 3.2.6.2 shall be conducted as illustrated in figure 1.

4.5.2.4 Strength test. Strength testing to determine compliance with 3.2.6.3 shall be as follows: The assembled McLeod tool shall have the blade inserted into a vise having a minimum grip length of 5 inches. The top of the vise shall be a minimum of 36 inches above the floor. The handle shall be parallel to the floor and the flange edge of the ferrule plate shall touch the top of the vise jaws. From a point 47 inches plus or minus 1 inch from the blade, a measure shall be taken from the bottom edge of the handle to the floor (see figure 2). Then, a 75 pound load shall be applied slowly at the 47 inch \pm 1 inch point. The load shall remain suspended for 1 minute then slowly released. Another measurement shall then be taken from the bottom edge of the handle to the floor. The difference between the two readings shall not exceed 2-1/2 inches. Noncompliance shall constitute a defect.

5. PACKAGING

5.1 Preservation. On tools to be assembled by the contractor, sheaths of cardboard, plastic, or other suitable material shall be provided along the entire cutting edge of the blade; on unassembled tools, sheathing is not required, but blades should be preserved in such a way that blade cutting edges are protected by packing materials. 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 either assembled or unassembled as required by the contract or purchase order (see 6.2). Figures 3A and 3B illustrate the proper method of packing tools assembled or unassembled and dimensions of each type of box. Packaging and packing shall comply with the Uniform Freight Classification and National Motor Freight Classification. Boxes shall be in type CF, class domestic, variety DW, grade 500, style FTC of PPP-B-636. 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.

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.

5.3.1 Unit pack marking. Each unit pack preserved in accordance with 5.1 and packed to meet 5.2 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 McLeod tool is used by firefighters for constructing fireline on wildfires and controlled burn operations.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. When a first article samples are not required (see 3.1 and 6.3).
- c. Whether tools shall be packed assembled or unassembled (see 3.2.6 and 5.2).

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.

5100-353D

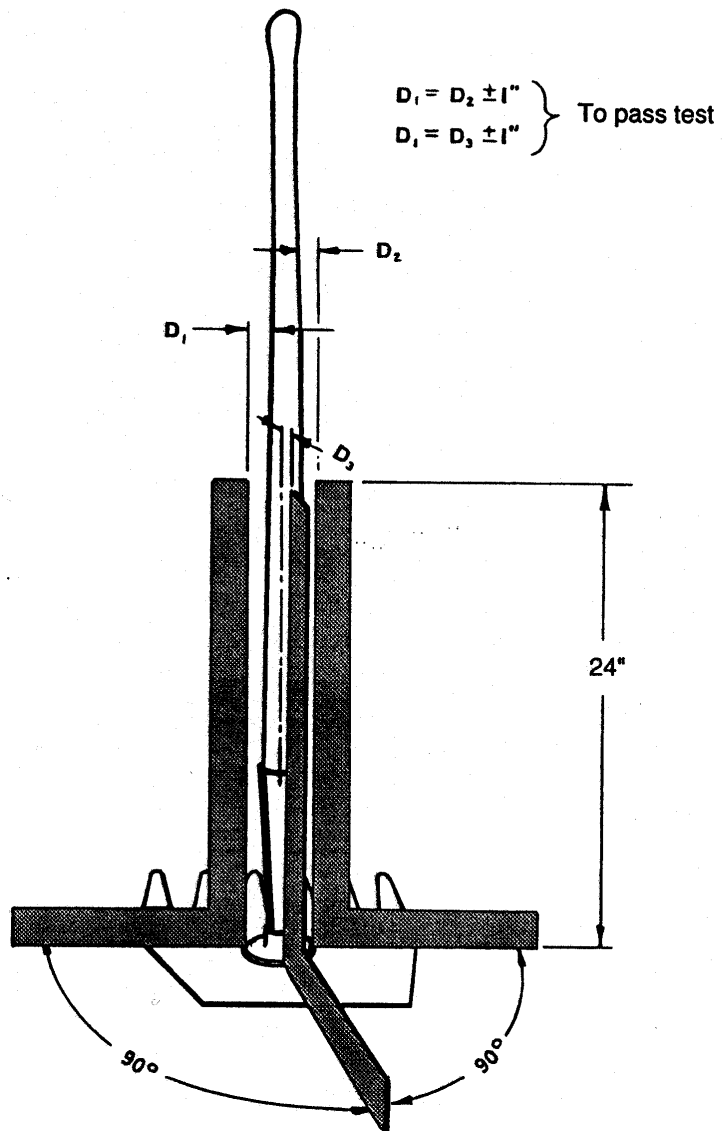


Figure 1.-Alignment test.

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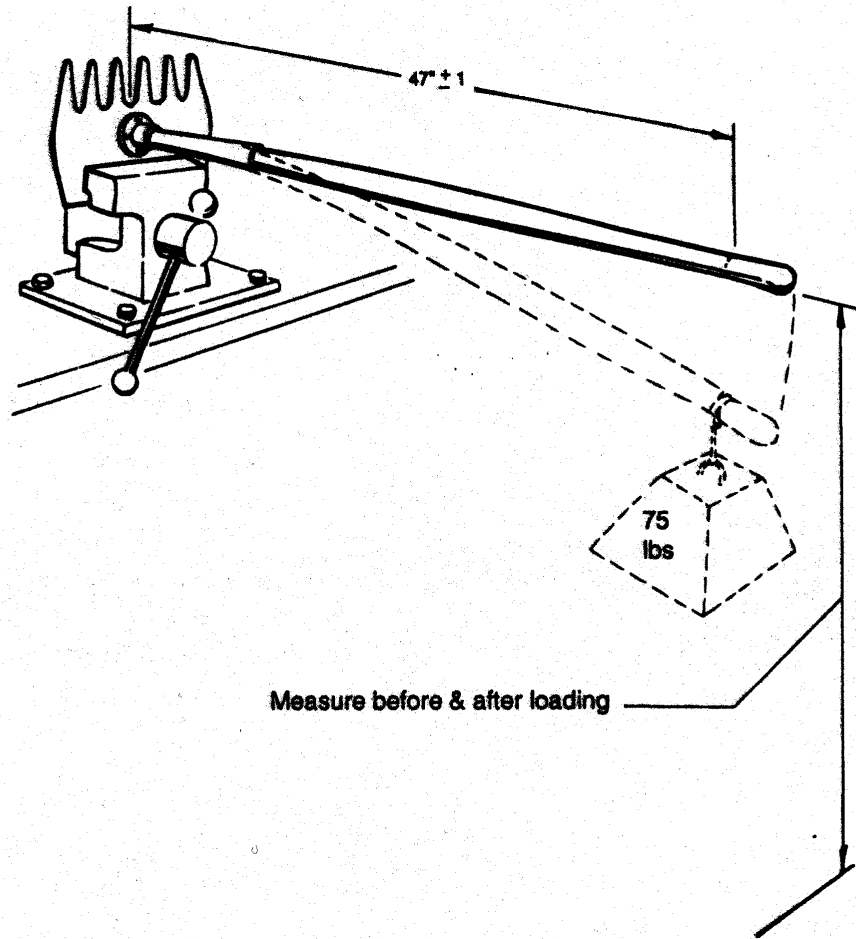


Figure 2.-Strength test.

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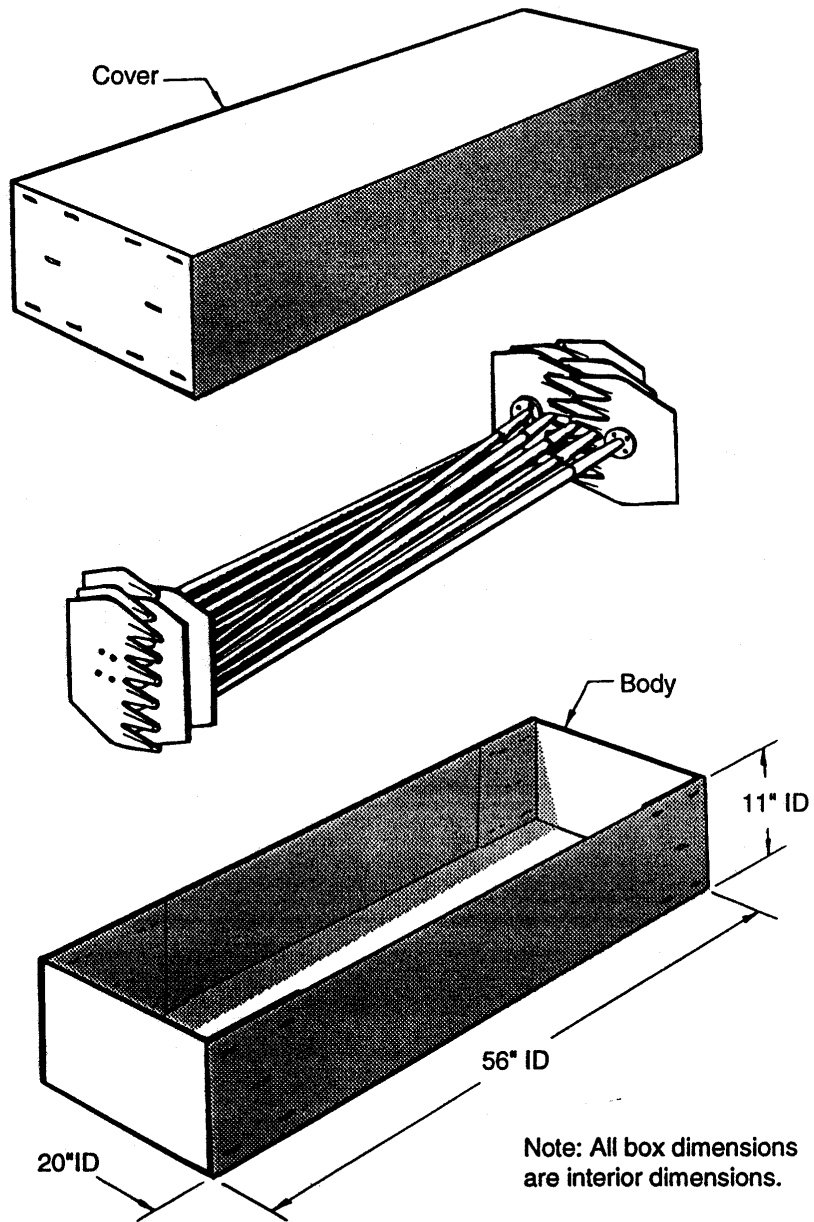


Figure 3A.-Packaging assembled McLeod tools.

5100-353D

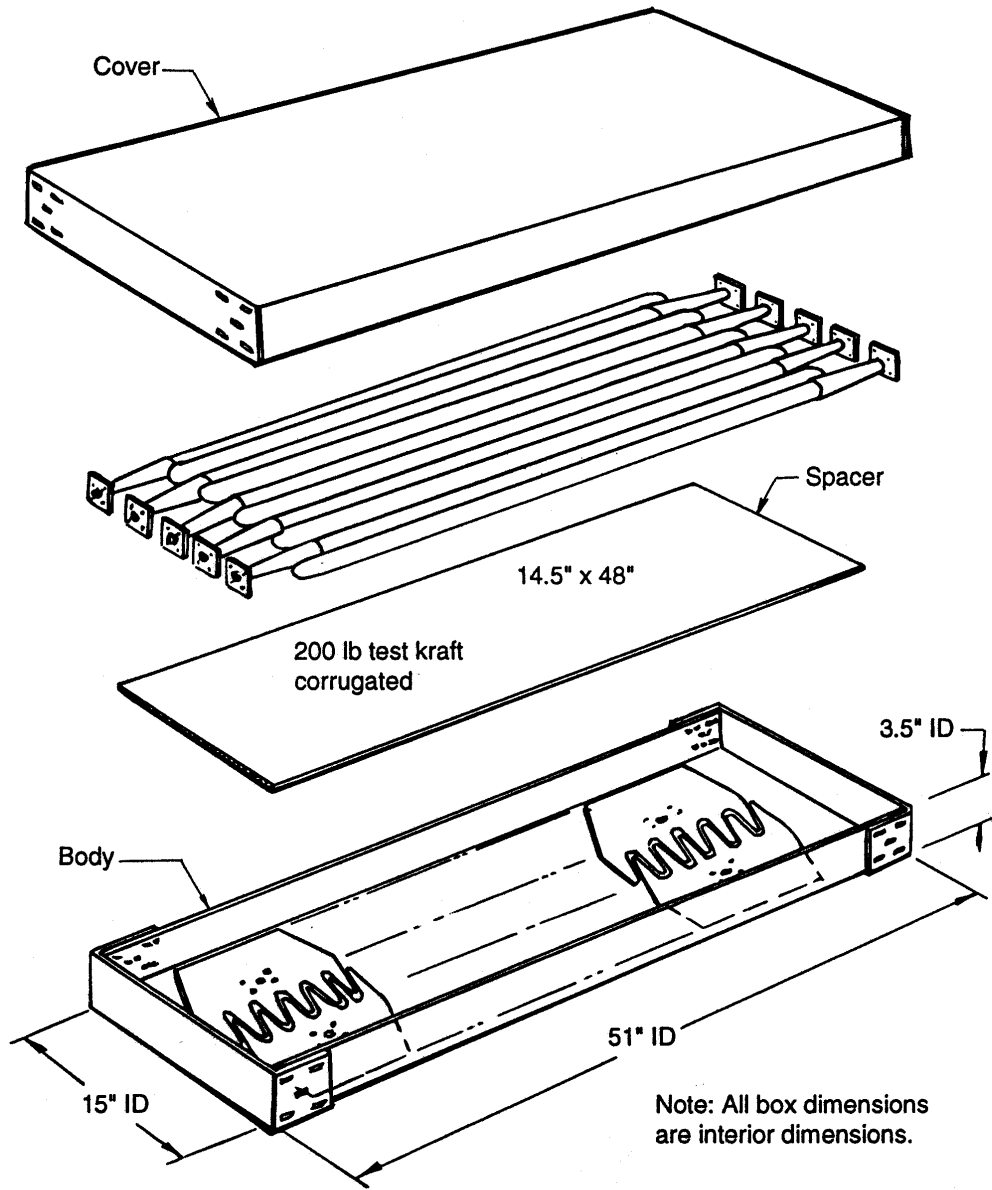


Figure 3B.-Packaging unassembled McLeod tools.

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.

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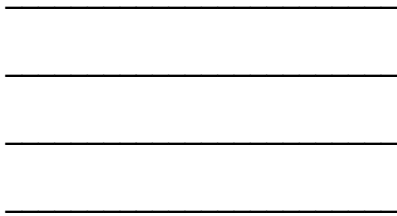
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