



United States Department of Agriculture

# Specification 5100-355F

# Pulaski Tool

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Forest  
Service

National Technology and  
Development Program

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## 2 Record of Revisions

Date	Revision summary
06/10/2019	<ul style="list-style-type: none"><li>• Complete revision of the specification; numbered sections and appendixes no longer correspond to those in the previous revision. Major changes are listed below. Minor changes that do not modify the intent of the specification are not listed.</li><li>• Introduced a new typing classification for handles.</li><li>• Added material and performance requirements for a 42-inch fiberglass handle.</li><li>• Added references to new drawings NTDP-632 to supersede references to drawings MTDC-632.</li><li>• Added a Record of Revisions to provide continuity between updates.</li><li>• Added a Table of Contents.</li><li>• Added a Definitions section and introduced a list of definitions.</li><li>• Updated references to the terms “defect,” “defects,” and “defective” to reflect conformity with the industry standard cited for sampling and inspection procedures (ANSI/ASQ Z1.4).</li><li>• Separated terms for the testing process from the quality assurance provisions.</li><li>• Streamlined the packaging requirements. Removed requirements that should be defined in the contract documents</li><li>• Added the Product Numbers for contract identification.</li></ul>
[Future revisions]	<ul style="list-style-type: none"><li>• This space is reserved for future revisions.</li></ul>

### 3 Scope

#### 3.1 Purpose and applicability

This specification covers the Pulaski tool, which is a combination ax and mattock.

##### 3.1.1 Intended use

The primary use of the Pulaski tool is to clear brush, small logs, and other surface debris and to dig in the soil to construct firelines on wildfires and controlled burn operations.

#### 3.2 Classification

This specification defines the following tool types and sizes:

##### 3.2.1 Pulaski-36

Standard Pulaski tool, 36-inch hickory handle, NSN 5120-00-293-3467

##### 3.2.2 Pulaski-36 Replacement Handle

36-inch hickory handle, NSN 5110-01-137-7507

##### 3.2.3 Pulaski-42

Longhandled Pulaski tool, 42-inch fiberglass handle, NSN 5120-01-679-2683

#### 3.3 Interpretations and definitions

##### 3.3.1 Interpretations

To carry out the provisions of this document, the word “shall” is to be understood as mandatory.

##### 3.3.2 Definitions

**Defect**—A departure of a quality characteristic from its intended level or state that occurs with a severity sufficient to cause an associated product or service not to satisfy intended normal, or foreseeable, usage requirements (per ANSI/ASQ Z1.4).

**Lot**—All sets of one type and size presented together in one delivery shall be considered a lot for the purpose of inspection.

**Nonconformity**—A departure of a quality characteristic from its intended level or state that occurs with severity sufficient to cause an associated product or service not to meet a specification requirement (per ANSI/ASQ Z1.4).

## **4 Applicable Documents**

### **4.1 Government documents**

#### 4.1.1 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 in effect on the date of the invitation for bids or request for proposals (8.2).

##### *4.1.1.1 Federal*

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.

##### 4.1.1.1.1 Specifications

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

##### 4.1.1.1.2 Standards

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

#### 4.1.2 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.

##### *4.1.2.1 Forest Service drawings*

Copies of USDA Forest Service specifications and standards are available from USDA Forest Service, National Technology and Development Program, 5785 Highway 10 West, Missoula, MT 59808 <wo\_mtdc\_pubs@fs.fed.us>.

NTDP-632—Pulaski Tool

### **4.2 Nongovernment publications**

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

Nongovernment standards and other publications are typically available from the organizations that prepare or distribute the documents. These documents may also be available in or through libraries or other informational services.

#### 4.2.1 American Society for Quality (ASQ)

Address requests for copies to: American Society for Quality, P.O. Box 3005, Milwaukee, WI 53201-3005.

ANSI/ASQ Z1.4—Sampling Procedures and Tables for Inspection by Attributes

#### 4.2.2 American Society for Testing and Materials (ASTM)

Address requests for copies to: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

D256—Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics

D638—Standard Test Method for Tensile Properties of Plastics

D696—Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between  $-30^{\circ}\text{C}$  and  $30^{\circ}\text{C}$  with a Vitreous Silica Dilatometer

D790—Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

D1002—Standard Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal)

E18—Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials

#### 4.2.3 American National Standards Institute, Inc. (ANSI)

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

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

#### 4.2.4 Iron and Steel Society

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

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

#### 4.2.5 Underwriters Laboratories

Address requests for copies to: Underwriters Laboratories, 333 Pfingsten Road, Northbrook, IL 60062.

UL 94—Standard for Tests for Flammability of Materials for Parts in Devices and Appliances

### 4.3 ***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 without obtaining a specific exemption.

## **5 Requirements**

### **5.1 Workmanship**

Workmanship shall be equal to the best commercial practices consistent with the highest engineering standards in the industry and shall be free from any nonconformity, which may impair serviceability or detract from the product's appearance.

### **5.2 Construction and materials**

The Pulaski tool shall conform in all respects to the design, details, dimensions, and materials specified herein and in the referenced drawings—NTDP-632. Should there be conflicts between the text of this document and the drawings, this document takes precedence, unless otherwise specified.

Where more than one type of material is used in various components, there shall be no incompatibility between materials, which may cause corrosion.

#### **5.2.1 Tool head**

The tool head shall be configured as specified in NTDP-632 and herein. Tool head weight shall not be less than 3 pounds 11 ounces or more than 4 pounds 2 ounces.

The head shall be 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.

##### **5.2.1.1 Steel composition**

When tested as specified in 6.1.1, the tool head shall be forged from fully killed, plain carbon AISI/SAE steel containing 0.72 to 0.93 percent carbon, 0.30 to 0.90 percent manganese, not more than 0.04 percent phosphorus, and not more than 0.05 percent sulfur.

##### **5.2.1.2 Hardness**

When tested as specified in 6.1.2, both the ax bit and mattock shall be hardened to a value of not less than 53 or more than 58 on the Rockwell C scale. Ax bit hardness shall extend to a distance of  $1\frac{1}{4} \pm \frac{1}{4}$  inches back from the cutting edge. On the mattock, hardness shall extend for  $2 \pm \frac{1}{4}$  inches back from the sharpened edge. Within 1 inch of the eye of the tool, the steel hardness shall not exceed 45 on the Rockwell C scale. Specified hardnesses shall extend through the entire thickness of the tool head steel. Any readings not within specified requirements shall constitute a major defect.

##### **5.2.1.3 Head finish**

The head shall be pretreated for painting in accordance with TT-C-490 and then painted with black enamel matching color chip 27038 of FED-STD-595 to provide a rust-resistant finish. The sharpened surfaces, which shall extend back  $\frac{1}{2}$  inch from cutting edges, shall be coated with suitable rust preventive, such as light oil, lacquer, or biodegradable wax after sharpening. Sharpened surfaces of the mattock end may be coated with black enamel matching color chip 27038 of FED-STD-595 in lieu of an alternate rust

preventative. Working surfaces and cutting edges shall be finished as specified below. The remainder of the tool head may have a forged finish.

#### 5.2.1.3.1 Working surfaces

Working surfaces (except cutting edges) shall be ground to a finish having a roughness of not more than 125 microinches as defined by ANSI B46.1. The working surface for the ax end extends a minimum of  $1\frac{3}{4}$  inches back from the ax cutting edge on both sides of the tool. The working surface for the mattock end extends a minimum of  $1\frac{3}{4}$  inches back from the mattock cutting edge on the top outside portion of the tool. Only the outside surface of the mattock end is considered a working surface.

#### 5.2.1.3.2 Cutting edges

When tested as specified in 6.2.1, cutting edges, which extend a minimum of  $\frac{1}{2}$  inch back from the end of the ax or mattock blade, shall be ground to a finish having a roughness of not more than 64 microinches as defined by ANSI B46.1. Neither ax nor mattock blade shall have evidence of ridges, bumps, or depressions. Both edges shall be smooth and sharp, without nicks or nonconformities. The cutting edge of the ax shall be sharpened and prepared for use in accordance with the sharpening gauge shown on drawing NTDP-632 and the requirements in 6.2.1. The specified dimensions for the sharpening gauge are exact dimensions; no tolerances are allowed. The cutting edge of the mattock shall be beveled and sharpened to a sharp edge and shall meet the angle requirements shown in NTDP-632.

### 5.2.2 Handle

#### 5.2.2.1 *Pulaski-36*

The handle shall be shagbark hickory (*Carya ovate*), shellbark hickory (*Carya laciniosa*), or mockernut hickory (*Carya tomentosa*) of any natural commercial color. The handle dimensions shall conform in all respects to drawing NTDP-632. The handle centerline shall be parallel to the cutting edge of the ax blade. Each handle shall have a wedging slot cut in the head end as shown on the drawings for the insertion of the wedge. The handle shall fit snugly into the eye of the tool head (5.2.3.1). The knob end of the handles shall be chamfered or rounded. The wood shall be sound and free from crooks, bows, cracks, splits, scores, or other defects that may affect appearance or serviceability.

#### 5.2.2.1.1 Handle finish

The handle, including the knob end, shall be smoothly finished and protected with at least one coat of clear lacquer. Neither wax nor stain is permissible. The lacquer shall permit visual inspection of the wood, prevent absorption of water, and protect the handle over long periods of storage. The protective coating shall be applied evenly over the surface and shall be free from runs, drips, sags, blisters, wrinkles, frothing, wet or tacky spots, or other defects. Flame hardening is optional to the manufacturer.

#### 5.2.2.1.2 Moisture content

Moisture content of the handle at the time of assembly shall not exceed 12 percent when tested as specified in 6.2.2.

#### 5.2.2.1.3 Replacement handles

Pulaski-36 replacement handles shall conform to the requirements of 5.2.2.1, 5.2.2.1.1, and 5.2.2.1.2. A plastic wedge conforming to 5.2.3.1.1 shall be taped to each handle.

#### 5.2.2.2 *Pulaski-42*

The fiberglass handle shall consist of a continuous inner fiberglass core that goes from the bottom through the top of an ergonomic thermoplastic sleeve. The handle dimensions shall conform in all respects to drawing NTDP-632. The handle centerline shall be parallel to the cutting edge of the ax blade.

##### 5.2.2.2.1 Handle core

The handle core shall be a solid single construction from multistranded fiberglass. In accordance with ASTM D-638, the fiberglass must have a flexural strength of not less than 100,000 pounds per square inch (psi), a modulus of elasticity in tension of not less than 3,000,000 psi, and a tensile strength of not less than 90,000 psi. When measured against a sudden blow, the fiberglass must be resistant to fracture, with a minimum of 24 foot-pounds per inch of notch, as measured by the Izod impact strength test per ASTM D-256. The core must be self-extinguishing. The coefficient of thermal expansion for the fiberglass core shall be not greater than 5 millionths of an inch for each degree rise in temperature per ASTM D-696.

##### 5.2.2.2.2 Handle sleeve

The handle sleeve that fits over the fiberglass core shall comply with the dimensional requirements in drawing NTDP-632. There shall be no visible gap between the thermoplastic sleeve and the tool head. The handle sleeve shall be ergonomic and overmolded from a high-impact synthetic material including, but not limited to, thermoplastic with a fire rating of UL V-0 per UL 94. The color shall be bright yellow.

#### 5.2.3 Head-to-handle joint

##### 5.2.3.1 *Pulaski-36*

To ensure the head-to-handle joint maintains its integrity and strength when the tool is exposed to wide fluctuations in relative humidity during storage and field use, both a plastic wedge (5.2.3.1.1) and an epoxy adhesive shall be used to secure them together. The type of epoxy adhesive shall be at the option of the contractor. The wedge shall be fully inserted into the tool handle's wedging slit to ensure a strong head-to-handle joint that meets the test requirements of 5.4.1, 5.4.1.1, 5.4.2, 5.4.3, and 5.4.4. The handle and plastic wedge shall be cut off flush with the tool head at the top of the tool eye.

##### 5.2.3.1.1 Plastic wedge

A plastic wedge of high impact polystyrene, ABS, or PVC plastic shall be used when setting the tool head to the handle. The dimensions and configuration of the wedge shall be in accordance with NTDP-632.

##### 5.2.3.2 *Pulaski-42*

To ensure the head-to-handle joint maintains its integrity and strength when the tool is exposed to wide fluctuations in relative humidity during storage and field use, an epoxy

adhesive that meets the requirements of 5.2.3.2.1 shall fill the entire cavity between the tool head and fiberglass handle core. The handle and epoxy shall be flush with the tool head at the top of the tool eye. The head-to-handle joint shall meet the test requirements of 5.4.1, 5.4.2, 5.4.3, and 5.4.4. Alternative methods and materials for attaching the head to the handle are permissible, providing no materials are proud of the tool head at the top of the tool eye, and the head-to-handle joint meets the test requirements of 5.4.1, 5.4.2, 5.4.3, and 5.4.4.

5.2.3.2.1 Epoxy

The epoxy used in the head-to-handle joint shall meet or exceed the requirements for bonding applications in impact tools as specified in Table 1.

Table 1—Required material characteristics for epoxy

Test specification	Test standard	Material requirement
Hardness, Shore D at 77 °F	ASTM D-2240	80 psi <sup>1</sup>
Tensile lap shear (AL:AL) at 7 °F	ASTM D-1002	1,800 psi
Tensile lap shear (AL:AL) at 77 °F	ASTM D-1002	2,500 psi
Tensile lap shear (AL:AL) at 201.2 °F	ASTM D-1002	800 psi
Minimum flexural strength	N/A	8,400 psi
Minimum tensile strength	N/A	6,000 psi
Viscosity of bond mix	N/A	9,000 cps <sup>2</sup>
Flashpoint of bond mix	N/A	199.4 °F

<sup>1</sup>Pounds per square inch

<sup>2</sup>Centipoise

5.2.4 Recovered materials

The contractor is encouraged to use recovered materials to the maximum extent practicable—in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR)—provided the recovered materials meet all performance requirements of this specification.

**5.3 Identification marking**

5.3.1 Tool head

Each tool head shall be marked in a permanently legible manner as follows.

5.3.1.1 Trademark

The manufacturer's name or trademark shall be metal stamped or laser etched in 1/4-inch-high (maximum) letters near the center of the eye on one side of the tool head or on the flat area of the side of the head near the heel.

### 5.3.1.2 *NFES*

The NFES mark shall be stamped in  $\frac{1}{4}$ - to  $\frac{1}{2}$ -inch-high letters on the same side and adjacent to the manufacturer's name or trademark as specified in 5.3.1.1.

### 5.3.2 Handle for Pulaski-42

#### 5.3.2.1 *Trademark*

On the outside surface of the handle, the manufacturer's name or trademark shall be marked permanently and legibly in  $\frac{1}{4}$ - to  $\frac{1}{2}$ -inch-high letters. Markings shall be centered along the length of the handle and shall not be located within 6 inches of the end of the handle or the tool head-to-handle joint.

#### 5.3.2.2 *Lot number*

On outside surface of the handle, the lot numbers or other identification to determine the lot, the month, and the year of manufacture shall be marked permanently and legibly in  $\frac{1}{4}$ - to  $\frac{1}{2}$ -inch-high letters. Markings shall be centered along the length of the handle and shall not be located within 6 inches of the end of the handle or the tool head-to-handle joint.

## 5.4 *End item performance*

### 5.4.1 Head-to-handle joint

The head-to-handle joint shall not loosen or separate when subjected to the tests specified in 6.3.2. Loosening is any measurable movement within the tool head-to-handle connection.

#### 5.4.1.1 *Pulaski-36*

The Pulaski-36 shall be subjected to a  $4,500 \pm 150$  inch-pound moment loading applied through three cycles as specified in 6.3.2.

#### 5.4.1.2 *Pulaski-42*

After heat treating the entire tool as specified in 6.3.1, the Pulaski-42 tool shall be subjected to a  $6,210 \pm 150$  inch-pound moment loading applied through three cycles as specified in 6.3.2.

### 5.4.2 Pull-apart strength

The tool head shall not pull apart or loosen from the handle when subjected to a tensile force of 3,500 pounds as specified in 6.3.3.

#### 5.4.2.1 *Pulaski-42*

Before the pull-apart strength test, the Pulaski-42 tool shall be heat treated as specified in 6.3.1.

### 5.4.3 Alignment

Complete Pulaski tools with handles shall not be misaligned or warped more than  $\frac{1}{2}$  inch from a line formed by extension of the cutting edge of the ax blade over the knob end of the handle when tested as specified in 6.3.4.

#### 5.4.4 Practical cutting ability

The tools shall be able to pass the practical cutting ability test as specified in 6.3.5. After striking a minimum of 20 heavy blows, there shall be no evidence of chipping, dulling, or turning over of either of the cutting edges, loosening of the handles or wedges, or any other damages to the tool heads or handles.

##### 5.4.4.1 Pulaski-42

Before the practical cutting ability test, the Pulaski-42 tool shall be heat treated as specified in 6.3.1.

### 5.5 **Metric products**

Inch-pound units shall be the required units of measure for this specification. Thread series designation are indicated as 1 inch 11<sup>1</sup>/<sub>2</sub> national pipe straight hose (NPSH), 1<sup>1</sup>/<sub>2</sub> inch 9 national hose (NH), and 2<sup>1</sup>/<sub>2</sub> inch 7<sup>1</sup>/<sub>2</sub> NH. Products manufactured to metric dimensions shall be considered on an equal basis with those manufactured using inch-pound units—provided they fall within the specified tolerances using conversion tables in the latest revision of ASTM E 380 and meet all other requirements of this specification.

## 6 Testing

### 6.1 **Component material testing**

#### 6.1.1 Steel composition testing

The contractor shall use a repeatable consensus standard test method to verify steel composition as specified in 5.2.1.1.

#### 6.1.2 Hardness testing

Hardness tests to determine compliance with 5.2.1.2 shall be in accordance with ASTM E 18. The contractor shall select two samples for testing and shall test both the ax blade and the mattock blade of each sample. The contractor shall cut a blade cross section along the centerline (halfway between each end of the edge), perpendicular to the plane of the blade, without altering the state or hardness of the blade during the cutting process. The contractor shall take three hardness readings on the centerline of the ax blade, at <sup>1</sup>/<sub>4</sub> inch, <sup>1</sup>/<sub>2</sub> inch, and 1 inch from the edge and three readings on the centerline of the mattock blade, at <sup>1</sup>/<sub>4</sub> inch, <sup>1</sup>/<sub>2</sub> inch, and 1 inch from the edge.

### 6.2 **End item testing**

#### 6.2.1 Cutting edges testing

To comply with the requirements of 5.2.1.3.2, the ax bit of each sample tool shall meet the dimensional tolerances described below and shall be able to be inserted evenly into the sharpening gauge to within <sup>1</sup>/<sub>32</sub> inch of the apex of the gauge.

The cutting edge is to be measured and bisected. This line shall be marked and used as the centerline for measurements specified below.

The ax thickness shall be measured along the centerpoint line as specified by drawing NTDP-632 (1/4 inch, 1/2 inch, and 1 inch, as measured from blade edge).

Two more points shall be chosen by moving  $1/2 \pm 1/16$  inch along the edge of the ax from the bisecting line on both sides. Ax thickness measurements as specified by drawing NTDP-632 (1/4 inch, 1/2 inch, and 1 inch, as measured from blade edge) shall be established parallel to the centerline and at the two points specified above.

The three sets of thickness measurements established above shall be averaged to determine compliance with the requirements.

#### 6.2.2 Moisture testing

Moisture content testing to meet the requirements of 5.2.2.1.2 shall be part of quality conformance inspection for the Pulaski-36 handle. The contractor shall use a calibrated moisture meter to test moisture content. The contractor shall obtain three readings, a reading from each end of the handle and a reading at its midpoint. The contractor shall average the three readings to determine the handle's moisture content.

### 6.3 *End item performance testing*

#### 6.3.1 Heat treatment

Before testing to determine compliance with 5.4.1, 5.4.2, and 5.4.4, the entire Pulaski-42 tool shall be heat-treated in a controlled environment of  $125^{\circ} \text{F} \pm 2^{\circ} \text{F}$  with a relative humidity of 10 percent  $\pm$  5 percent for a minimum of 4 hours to reach total heat saturation.

#### 6.3.2 Head-to-handle joint testing

The tool head-to-handle joint test to determine compliance with 5.4.1 shall consist of a moment loading applied through three cycles. The axis for the moment loading shall be a line perpendicular to the side of the tool head and projecting through the estimated center of the tool eye. A load cycle shall be the full moment load, as defined in this paragraph, applied in both clockwise and counterclockwise directions.

Figure 1, Figure 2, and Figure 3 illustrate two suggested methods for applying the required moment loading.

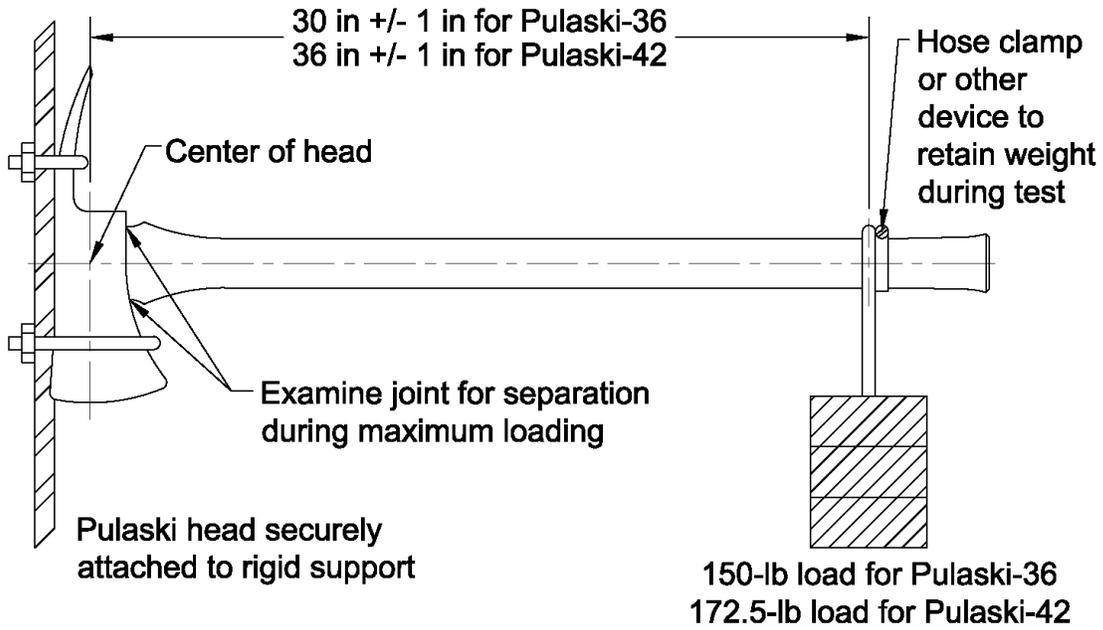


Figure 1—First suggested method for applying the required moment loading applied in a clockwise direction—manual loading.

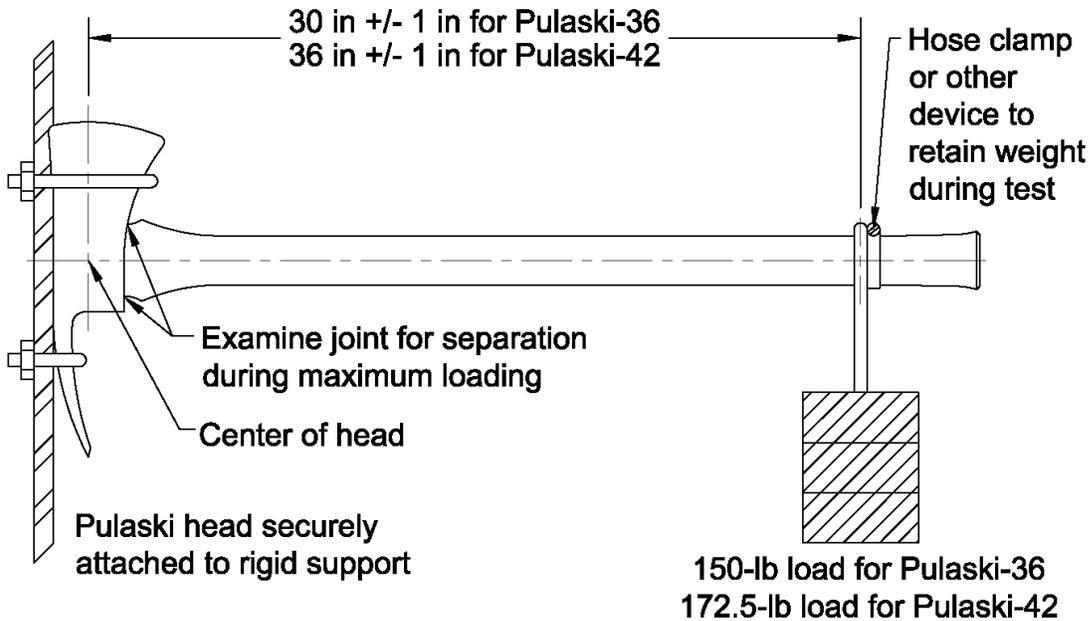


Figure 2—First suggested method for applying the required moment loading applied in a counterclockwise direction—manual loading.

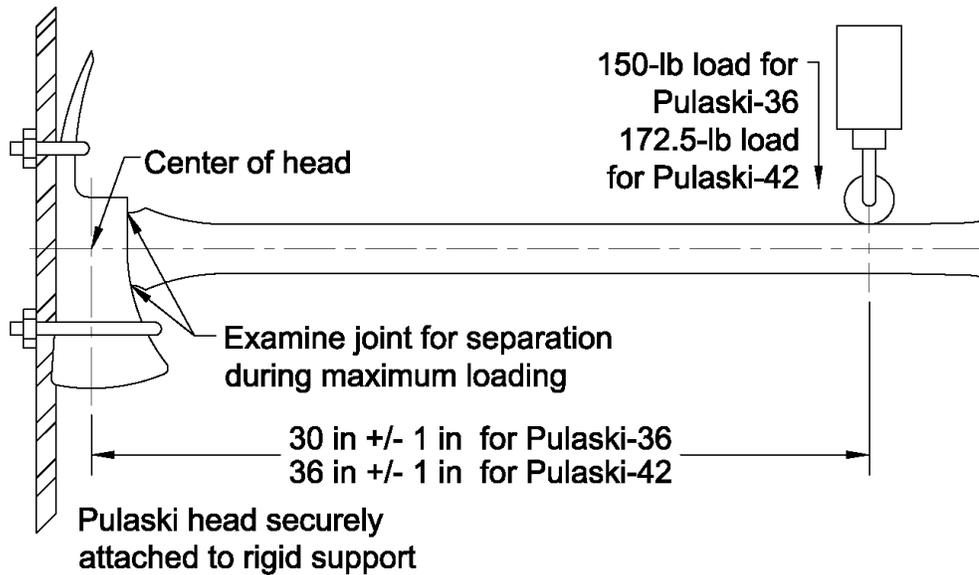


Figure 3—Second suggested method for applying the required moment loading for a clockwise load—compressive loading with test machine.

### 6.3.3 Pull-apart strength testing

To determine compliance with 5.4.2, the Pulaski tool shall be tested in a standard tensile test machine in such a manner as to pull the head off the handle. The rate for applying the tensile load shall not exceed 0.25 inch per minute.

### 6.3.4 Alignment testing

Alignment testing to determine compliance with 5.4.3 shall be conducted as illustrated in Figure 4 and Figure 5. Before clamping the blade, the center of the knob end of the handle shall be established as accurately as possible by visual sight on its circular or elliptical surface. After clamping the blade vertically, one end of a piece of thread shall be taped directly over the cutting edge and the other end shall be fastened to the rule of a carpenter's square or equivalent. With the thread held tight, the square shall be moved back and forth until the thread falls directly over the full length of the cutting edge. At this point, the distance from the edge of the square to which the thread is attached to the center of the handle knob shall be measured to the nearest  $\frac{1}{8}$  inch. The maximum allowable distance of this measurement shall be  $\frac{1}{2}$  inch.

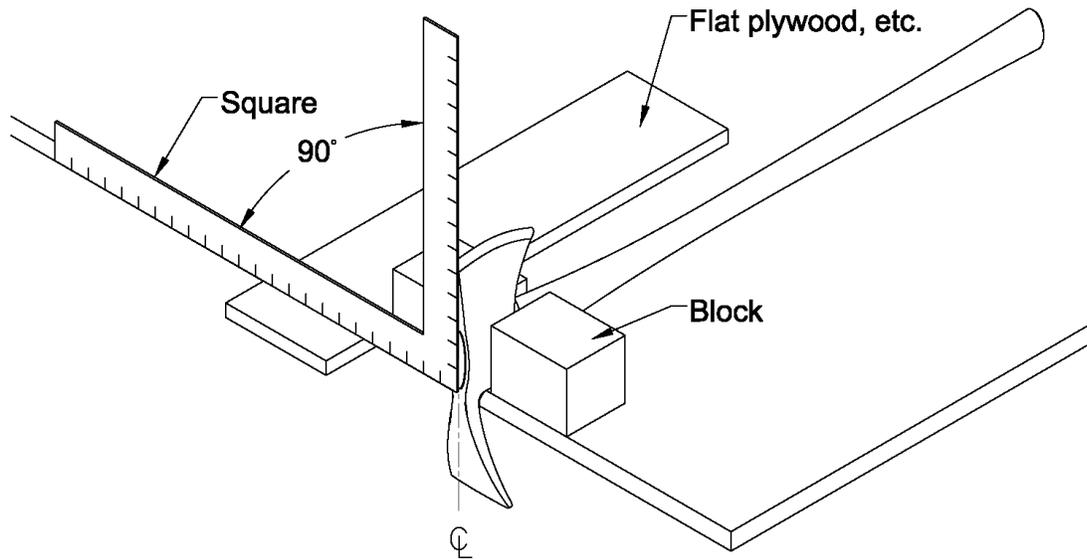


Figure 4—Step one of the alignment test—block the Pulaski head perpendicular to the table.

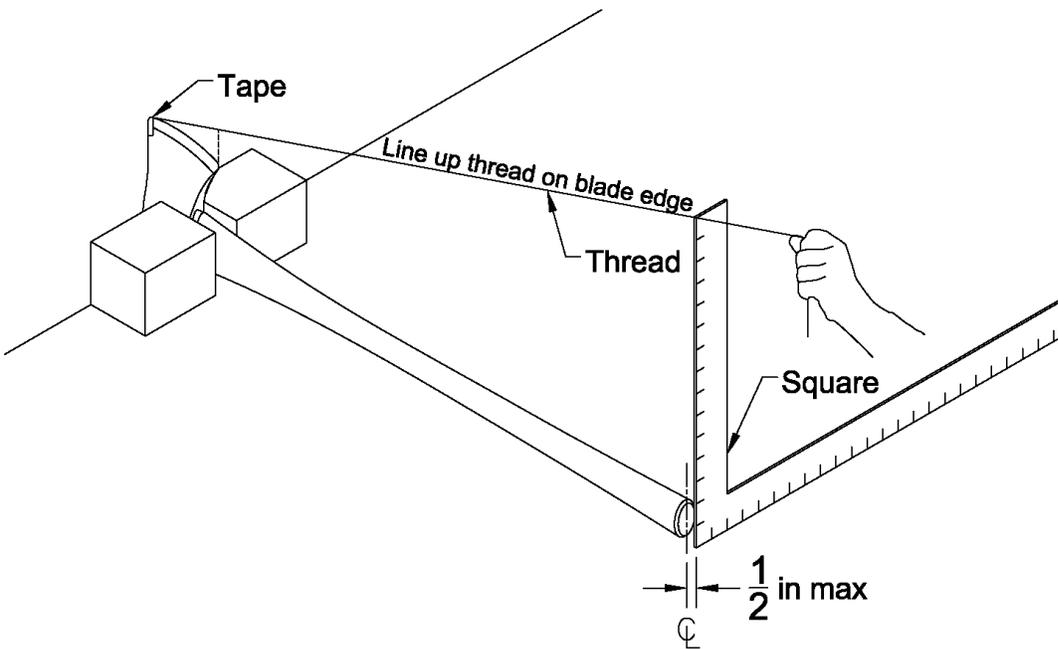


Figure 5—Step two of the alignment test—measure the handle for misalignment.

### 6.3.5 Practical cutting ability testing

The practical cutting test to determine compliance with 5.4.4 shall consist of striking hardwood knots of any size a minimum of 20 heavy blows (10 with the ax edge and 10 with the mattock edge).

## 7 Quality Assurance Provisions

### 7.1 *First article test (FAT) process*

Unless otherwise specified (8.2), FAT inspection shall be performed and approved on a product sample(s) in accordance with 7.7.1 and under the appropriate provisions of Federal Acquisition Regulation (FAR) 52.209. During the term of the contract, the contractor shall be required to notify the contracting officer in writing when a component or the component supplier changes in any way, when a major manufacturing process changes in any way, or when a manufacturing location changes. The contracting officer may require the contractor at any time to submit a new first article sample when substantive changes occur during the term of the contract. The contractor shall provide certificates of conformance for all materials and/or tests in accordance with 7.5.

### 7.2 *Responsibility for inspection*

Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein (7.7). Except as otherwise specified in the contract or purchase order, the contractor may use his or 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 or tests set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements. The Government shall have access to complete inspection records of the examination and tests.

#### 7.2.1 Testing with referenced documents

The contractor is responsible for ensuring that components and materials used were manufactured, examined, and tested in accordance with referenced specifications and standards unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

### 7.3 *Responsibility for compliance*

All items shall meet all requirements of section 5. The inspections 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 for 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.

#### **7.4 Responsibility for dimensional requirements**

Unless otherwise specified in the contract or purchase order, the contractor is responsible for ensuring that the product meets all specified dimensions. When the contractor cannot examine dimensions on the end item, the contractor shall inspect dimensions at any point or at all points in the manufacturing process necessary to ensure compliance with all dimensional requirements.

#### **7.5 Certifications of conformance**

Unless otherwise specified (7.7.1.2), as part of first article presentations and lot inspections, it shall be acceptable for the contractor to provide certificates of conformance (COC) for all materials and components in lieu of actual lot-by-lot testing. COCs shall meet the reporting requirements of USDA Forest Service Standard 5100-190 and be based on the testing of component materials; the component material supplier may perform the testing. In addition, when the contractor changes component or material suppliers, a new certification based on actual test results shall be required. Any failure in the reported test result data shall invalidate the COC. Where COCs are required, the Government reserves the right to verify testing of any such items to determine the validity of certification.

##### **7.5.1 Required certificates of conformance**

The contractor shall provide COCs for the following applicable materials: 5.2.1.3, 5.2.2.1, 5.2.2.1.1, 5.2.2.2, 5.2.2.2.1, 5.2.2.2.2, and 5.2.3.1.1. The contractor shall provide COCs and associated test data analysis for the following applicable materials and tests: 5.2.1.1, 5.2.1.2, 5.2.1.3.1, 5.2.2.1.2, 5.2.2.2.1, and 5.2.3.2.1.

#### **7.6 Classification of inspection**

The inspection requirements specified herein are as follows:

- First article test inspection (7.7.1)
- Component and material inspection (7.7.2)
- End item inspection (7.7.3)

#### **7.7 Inspections**

##### **7.7.1 First article inspection**

The Government shall inspect the first articles submitted as specified in 7.7.1.1, 7.7.3.1, and 7.7.3.2, and in accordance with Table 2. The presence of any nonconformity, whether major or minor, or failure to pass any test shall be cause for nonacceptance of the first article submission. All inspection and testing of the first article sample(s) shall stop upon a single failure. The Government shall inform the nature of the failure to the contractor, but the Government is not obligated to continue testing once an item is found to be noncompliant or when it is considered in the best interest of the Government.

##### **7.7.1.1 Sampling for first article inspection**

The contractor shall make items available to the Government for the selection of first article samples. The first article shall consist of three complete samples.

### 7.7.1.2 *First article inspection package*

The contractor shall submit to the Government—along with first articles selected as specified in 7.7.1.1—copies of: all certificates of conformance (7.5), company inspection records (7.2), all test results for the first article samples (5.4), and all other information necessary to perform the inspections identified in Table 2.

Table 2—*First article inspection*

<b>Nonconformance</b>	<b>Section</b>	<b>Classification</b>
Certificates of conformance missing or incomplete	7.5.1	Major
Performance requirements not as specified	5.4	Major
Visual requirements not as specified	Table 3	Major
Dimensional requirements not as specified	Table 4	Major

### 7.7.2 *Component and material inspection*

As specified in 7.2 and 7.5, the contractor shall inspect components and materials to meet all the requirements of referenced documents, drawings, and standards unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

#### 7.7.2.1 *In-process inspection*

The contractor shall perform an inspection at any point or during any phase of the manufacturing process to determine whether cut lengths, cut parts, markings for location of components, and location of assembled 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.

### 7.7.3 *End item inspection*

#### 7.7.3.1 *End item visual inspection*

When selected as specified in 7.7.3.1.1, the contractor shall inspect each sample item in accordance with Table 3 on a lot-by-lot basis to determine conformance with this specification. The lot size shall be expressed in units of complete Pulaski tools.

Table 3—End item visual nonconformities

Nonconformance	Section	Classification
Tool head: working and cutting surfaces not finished as specified	5.2.1	Major
Tool head: not free of cracks, laps, burrs, cupping, and rust	5.2.1	Major
Tool head: unbeveled portion not painted to provide rust-resistant finish	5.2.1.3	Minor
Tool head: beveled edges not protected with suitable rust preventive	5.2.1.3	Minor
Tool head: cutting edges not sharpened as specified	5.2.1.3.1	Major
Pulaski-36 plastic wedge: missing	5.2.3.1.1	Major
Pulaski-36 plastic wedge: not fully driven into wedging slit	5.2.3.1.1	Minor
Pulaski-36 plastic wedge: eye end of handle and wedge not cut off flush with tool head	5.2.3.1	Major
Pulaski-36 handle: no epoxy used in the head-to-handle joint	5.2.3.1	Major
Pulaski-36 handle: wood not as specified	5.2.2.1	Major
Pulaski-36 handle: not free of crooks, bows, cracks, splits, and other defects	5.2.2.1	Major
Pulaski-36 handle: centerline not parallel to cutting edge of ax blade	5.2.2.1	Major
Pulaski-36 handle: misaligned on tool head	5.4.3	Major
Pulaski-36 handle: finish not as specified	5.2.2.1.1	Major
Pulaski-36 handle: coating not free of defects such as sags, runs, and drips	5.2.2.1.1	Major
Pulaski-42 handle: centerline not parallel to cutting edge of ax blade	5.2.2.2	Major
Pulaski-42 handle: misaligned on tool head	5.4.3	Major
Pulaski-42 epoxy: voids, inclusions, cracks, peeling, or uncured	5.2.3.2.1	Major
Pulaski-42 handle sleeve: exposed fiberglass core, delamination, and material voids	5.2.2.2.2	Major
Tool head markings: omitted, incomplete, incorrect, illegible, misplaced, or size of characters not as specified	5.3.1	Minor
Pulaski-42 handle markings: omitted, incomplete, incorrect, illegible, misplaced, or size of characters not as specified	5.3.2	Minor

7.7.3.1.1 Sampling for end item visual inspection

The contractor shall select samples for end item visual inspection on units ready for delivery. When performing inspections and testing, sampling shall be in accordance with ANSI/ASQ Z 1.4. The inspection level shall be S-3. The acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 4.0 for major nonconformities and 15.0 for combined major and minor nonconformities. Unless otherwise specified, contractors shall score nonconformities on an individual basis.

7.7.3.2 End item dimensional inspection

When selected in accordance with 7.7.3.2.1, the contractor shall inspect each sample item in accordance with Table 4 on a lot-by-lot basis to determine conformance with this specification. The lot size shall be expressed in units of complete Pulaski tools.

Table 4—End item dimensional nonconformities

Nonconformance	Section	Classification
Tool head: dimensions and configuration not as specified	5.2.1	Major
Tool head: weight not as specified	5.2.1	Major
Tool head: hardness not as specified	5.2.1.2	Major
Tool head: cutting edge angles not as specified	5.2.1.3.1	Major
Markings: size not as specified	5.3	Minor
Pulaski-36 plastic wedge: dimensions and configuration not as specified	5.2.3.1.1	Major
Pulaski-36 handle: dimensions not as specified	5.2.2.1	Major
Pulaski-36 handle: high point of handle not as specified	5.2.2.1	Major
Pulaski-42 handle: dimensions not as specified	5.2.2.2	Major

7.7.3.2.1 Sampling for end item dimensional inspection

The contractor shall select samples for end item dimensional inspection on units ready for delivery. When performing inspections and testing, sampling shall be in accordance with ANSI/ASQ Z 1.4. The inspection level shall be S-3. An AQL, expressed in terms of nonconformities per hundred units, shall be 6.5.

## **8 Notes**

### **8.1 Preparation for delivery**

#### **8.1.1 Packaging**

The cutting edges of both the ax and mattock ends of each tool shall include a securely installed protective sleeve. A reusable, self-gripping, vinyl, edge trim with a metal core shall protect the cutting edges of both the ax and mattock ends of each tool per contract or purchase order.

#### **8.1.2 Packing**

Figure 6, Figure 7, and Figure 8 illustrate the packing of ten tools as specified in 8.1.1. As illustrated, the contractor shall pack tools for shipment in a Pulaski-36 replacement box (NSN 8115-00-139-0673) or a Pulaski-42 replacement box (NSN 8115-01-677-3059).

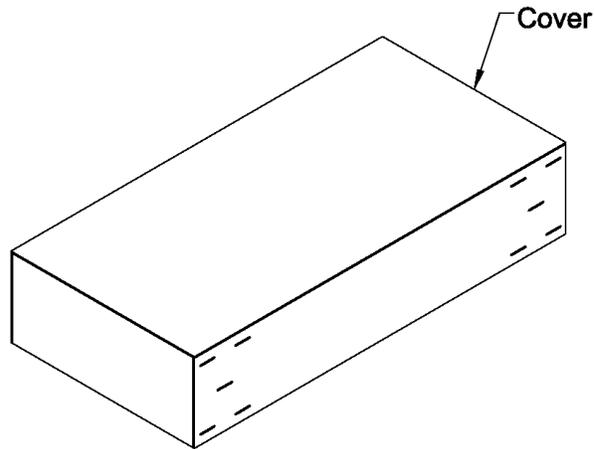


Figure 6—Cover of a Pulaski tool shipment box.

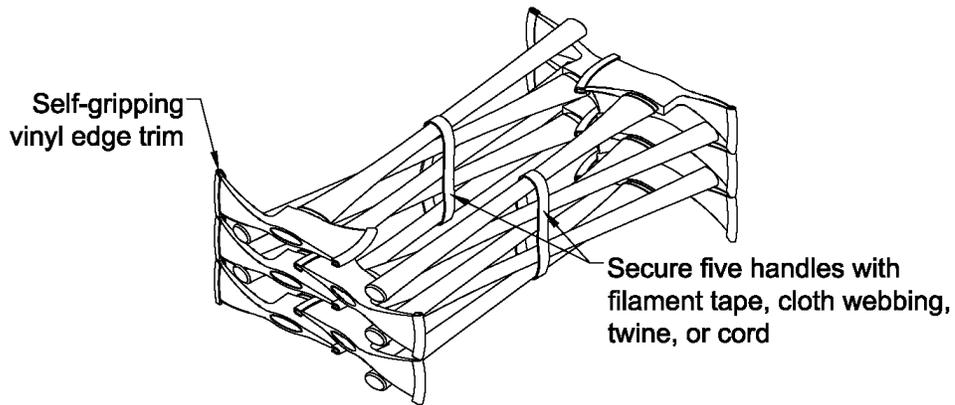


Figure 7—Securing and packaging of ten Pulaski tools for shipping.

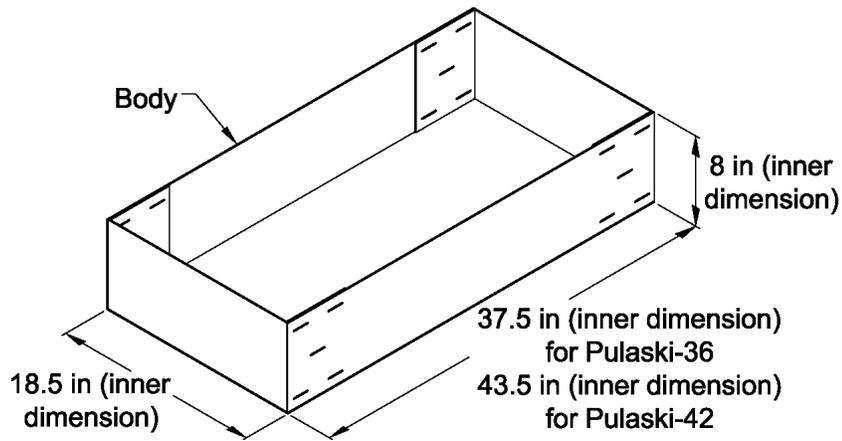


Figure 8—Body of a Pulaski tool shipment box.

### 8.1.2.1 *Pulaski-36 box dimensions*

The inside dimensions of each box shall be 37<sup>1</sup>/<sub>2</sub> inches long by 18<sup>1</sup>/<sub>2</sub> inches wide by 8 inches deep. Tolerances on all dimensions are -<sup>1</sup>/<sub>2</sub> inch, +1 inch.

### 8.1.2.2 *Pulaski-42 box dimensions*

The inside dimensions of each box shall be 43<sup>1</sup>/<sub>2</sub> inches long by 18<sup>1</sup>/<sub>2</sub> inches wide by 8 inches deep. Tolerances on all dimensions are -<sup>1</sup>/<sub>2</sub> inch, +1 inch.

## 8.2 **Acquisition requirements**

Acquisition requirements shall specify the following:

- The title, number, and date of this specification.
- Part numbers for the Pulaski tool: Pulaski-36 or Pulaski-42.
- Part number for the replacement handle: Pulaski-36-Handle.
- If a first article sample is not a requirement. Unless otherwise specified, the Government shall inspect and approve a first article sample in accordance with 7.1. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.
- Packaging and marking instructions in addition to those specified (8.1).