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June 4, 1964
SUPERSEDING
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October 28, 1963

FEDERAL SPECIFICATION

BAR, SINE; PLATE SINE (AND FIXTURES)

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers requirements for sine bars, plates, and fixtures. They are for use in inspection and layout work.

1.1.1 *Federal specification coverage.* Federal specifications do not include all varieties of the commodity as indicated by the title of the specification, or which are commercially available, but are intended to cover only those generally used by the Federal Government.

1.2 Classification.

1.2.1 *Types, grades, and classes.* Sine bars, plates, and fixtures covered by this specification shall be of the following types, grades, and classes, as specified (see 6.1):

Type I.—Sine bars.
- Grade A.—Laboratory.
  - Class 1.—Lapped.
  - Class 2.—Ground.
- Grade B.—Commercial.
  - Class 1.—Lapped.
  - Class 2.—Ground.

Type II.—Sine plates.
- Grade A.—Laboratory.
  - Class 1.—Lapped.
  - Class 2.—Ground.
- Grade B.—Commercial.
  - Class 1.—Lapped.
  - Class 2.—Ground.

Type III.—Sine bar fixtures.
- Grade A.—Laboratory.
  - Class 1.—Lapped.
  - Class 2.—Ground.
- Grade B.—Commercial.
  - Class 1.—Lapped.
  - Class 2.—Ground.

Type IV.—Sine plate fixtures.
- Grade A.—Laboratory.
  - Class 1.—Lapped.
  - Class 2.—Ground.
- Grade B.—Commercial.
  - Class 1.—Lapped.
  - Class 2.—Ground.

1.2.2 *Sizes.* Size of sine bars, plates, and fixtures shall be 5 inches, 10 inches, or 20 inches, as specified (see 6.1), except that special lengths may be specified (see 3.10).

2. APPLICABLE SPECIFICATIONS, STANDARDS, AND OTHER PUBLICATIONS

2.1 Specifications and standards. The following specifications and standards, of the issues in effect on date of invitation for bids, form a part of this specification:

Federal Specifications:
- PPP-B-566—Boxes, Folding Paperboard.
- PPP-B-591—Boxes, Fiberboard, Wood-Cleated.
- PPP-B-601—Boxes, Wood, Cleated-Plywood.
- PPP-B-621—Boxes, Wood, Nailed, and Lock Corner.
- PPP-B-636—Box, Fiberboard.
- PPP-B-676—Boxes, Set-Up Paperboard.

Federal Standards:
- Fed. Std. No. 102—Preservation, Packaging, and Packing.
- Fed. Std. No. 123—Marking for Domestic Shipment.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402.

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, and Seattle, Wash.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specifications:

JAN-P-100—Packaging and Packing for Overseas Shipment; General Specification.

MIL-P-116—Preservation, Methods of.

MIL-L-10547—Liners, Case, and Sheet, Overwrap, Water-Vaporproof, or Waterproof, Flexible.

Military Standards:

MIL-STD-10—Surface Roughness, Waviness, and Lay.

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

MIL-STD-129—Marking for Shipment and Storage.

MIL-STD-130—Identification Marking of U.S. Military Property.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 **Other publications.** The following documents form a part of this specification. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

National Bureau of Standards Handbook:

H28—Screw-Thread Standards for Federal Services.

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402.)

3. REQUIREMENTS

3.1 **Illustrations.** The illustrations shown herein are for convenience of identification and are not intended to preclude the purchase of sine bars, plates, and fixtures which are otherwise in accordance with this specification.

3.2 **Material.** All metal stock used in the fabrication of sine bars, plates, and fixtures covered by this specification shall have a properly refined structure with uniform elemental distribution, be sound and free of nonmetallic inclusions, injurious porosity, excess segregation, soft spots, hard spots, and other injurious defects.

3.2.1 *Tool steel.* The tool steel used in the construction of instruments of this type shall be made by the crucible or electric furnace process. Ingots from which the bar stock is made shall be sufficiently reduced in cross-section, and in such a manner as to assure proper refinement of structure and uniform carbide distribution.

3.2.2 *Cast iron.* Castings shall be of uniform quality, free from blowholes, porosity, hard spots, shrinkage defects, cracks, or other injurious defects. Strength and other essential physical properties of castings shall be adequate throughout for the purpose intended. Materials not specifically designated shall be entirely suitable for the purpose intended.

3.2.3 *Seasoning (dimensional stabilizing).* All tool steel and cast iron used in the construction of instruments of this type shall be appropriately treated for aging to minimize dimensional changes after finishing and to insure dimensional stability.

3.3 **Threads.** All threaded parts shall be in accordance with the applicable requirements of the National Bureau of Standards Handbook H28.

3.4 **Finish.** All sharp edges and corners shall be removed.

3.4.1 *Lapped surfaces.* All surfaces having a lapped finish shall be free from seams, scratches, cracks, rust spots, and other imperfections which may be detrimental to their use or durability. Lapped surfaces shall have a maximum of 8 roughness height value (r.h.v.) conforming to the applicable requirements of MIL-STD-10, and shall not vary from a true plane by an amount greater than the applicable tolerance specified in table I or II.

3.4.2 *Ground surfaces.* All surfaces having a ground finish shall be smooth and free from objectional defects such as chatter, tool marks, irregular wheel marks, burning, cracks, or scratches. Ground surfaces shall have a maximum of 16 r.h.v. conforming to the applicable requirements of MIL-STD-10 and shall not vary from a true plane by an amount greater than the applicable tolerance specified in table I or II.

TABLE I.—*Tolerances for sine bar, plates, and fixtures, laboratory grade*

Size	Bar	Buttons or cylinders		
	Working surface to be flat, square with sides and parallel (if double) within	Cylinders to be alike, round and straight, within	Cylinders to be parallel with each other and with working surface of bar within	Cylinders to be at nominal center distance (±)
Inch	*Inch*	*Inch*	*Inch*	*Inch*
5	0. 000050	0. 00002	0. 000050	0. 00010
10	. 000075	. 00002	. 000075	. 00015
20	. 000100	. 00002	. 000100	. 00020

TABLE II.—*Tolerances for sine bar, plates, and fixtures, commercial grade*

Size	Bar	Buttons or cylinders		
	Working surface to be flat, square with sides and parallel (if double) within	Cylinders to be alike, round and straight, within	Cylinders to be parallel with each other and with working surface of bar within	Cylinders to be at nominal center distance (±)
Inch	*Inch*	*Inch*	*Inch*	*Inch*
5	0. 00010	0. 00005	0. 00010	0. 0002
10	. 00015	. 00005	. 00015	. 0002
20	. 00020	. 00005	. 00020	. 0004

3.4.3 *Scraped surfaces.* A scraped surface shall be hand scraped so that the surface defined by the bearing areas will not vary from a true plane by an amount greater than the applicable tolerance specified in table I or II. The number of bearing areas or scraped relief spots shall be 15 to 18 per square inch. Bearing areas shall be uniformly distributed and shall be 20 to 40 percent of the area of the surface. Spotting cavities or scraped relief areas shall be from 0.0002 to 0.0003 inch in depth.

3.4.4 *Serrated surfaces.* All surfaces having a serrated finish shall have approximately 50 percent bearing, evenly distributed over the entire surface. The grooves shall be square cut. The surface of the lands shall be finished in accordance with 3.4.1, 3.4.2, and 3.4.3, as applicable.

3.5 Type I, grades A and B, class 1 and 2 sine bars.

3.5.1 *Construction.* Type I sine bars shall consist of a hardened steel bar and two hardened steel cylinders firmly attached, a fixed distance apart, on the side or under surface on the bar (see fig. 1). The side faces of the bar shall be ground square with the working surface or surfaces which may be lapped or ground.

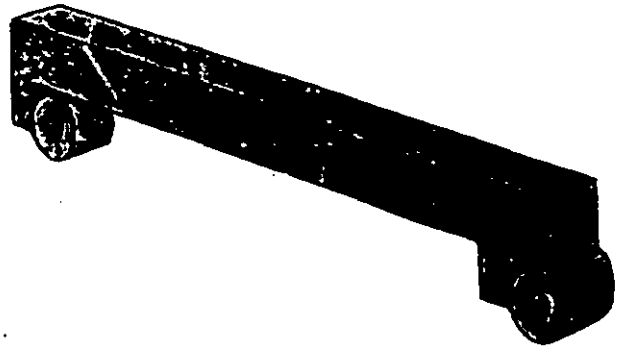

FIGURE 1.—Type I, sine bars.

3.5.2 *Material.* Sine bars and cylinders shall be tool steel, seasoned, as specified (see 3.2.1 and 3.2.3).

3.5.3 *Hardness.* Sine bars and cylinders shall have a hardness of not less than 60 nor more than 65 on the Rockwell C scale.

3.5.4 *Accuracy.* A sine bar shall conform in all respects to the accuracy requirements of its grade and size, as specified in table I or II.

3.5.4.1 *Bar tolerances.* Errors in flatness of the working face or faces of the bar, in squareness of working face to the sides of the bar and in parallelism of working faces (if double, that is, if upper and lower working faces are provided), shall not exceed the applicable tolerances specified in column 2 of tables I and II for laboratory and commercial grades respectively. Specified tolerances apply to all areas to within one thirty-second inch from the edge of the finished surfaces.

3.5.4.2 *Cylinder tolerances.* On any bar the cylinders shall be alike, round, and straight and shall not differ in diameter more than the applicable tolerance specified in column 3, table I or II. All cylinders shall have a lapped finish (see 3.4.1).

3.5.4.3. *Alignment of cylinder axis.* On any bar the errors in parallelism of cylinder axis in the length of the cylinders shall not exceed the applicable tolerance specified. Cylinder axis shall be parallel to the working surface within the applicable tolerance specified. The

two cylinder axis shall be the same distance from the working surface of the bar within the applicable tolerance specified (see tables I and II).

3.5.4.4 *Spacing of cylinder axis.* On any bar, errors in spacing of cylinder axis shall not exceed the applicable tolerance specified in column 5 of table I or II. Grade A, laboratory grade sine bars shall have the exact size marked on the bar or nameplate (see 3.12.1 and 3.12.2).

3.5.5 *Nominal sizes.* Unless otherwise specified (see 6.1), type I sine bars shall be of the sizes specified in table III.

TABLE III.—*Sizes, type I sine bars*

Size	Length	Width
	Minimum	Minimum
Inches	*Inches*	*Inches*
5	5¾	¾
10	11	1¼
20	21	3

3.6 Type II, grades A and B, classes 1 and 2, sine plates.

3.6.1 *Construction.* Type II sine plates shall consist of a hardened steel plate and two hardened steel cylinders firmly attached a fixed distance apart on the under surface of the plate (see fig. 2). The side and end faces of the plate shall be ground square with the working surface which may be ground or lapped, as specified in the invitation for bids (see 6.1).

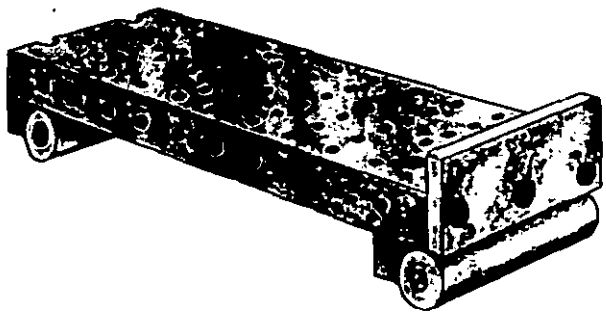

FIGURE 2.—Type II, sine plates.

3.6.1.1 *Accessories attachment.* Unless otherwise specified (see 6.1), facilities shall be provided for attachment of accessories or work pieces to the working surface, edges, and ends of the sine plate and short extensions (heels) constituting the legs of a right-angle iron.

3.6.2 *Material.* Sine plates and cylinders shall be tool steel, seasoned as specified (see 3.2.1 and 3.2.3).

3.6.3 *Hardness.* Sine plates and cylinders shall have a hardness of not less than 60 nor more than 65 on the Rockwell C scale.

3.6.4 *Accuracy.* A sine plate shall conform in all respects to the accuracy requirements of its grade and size, as specified in table I or II.

3.6.4.1 *Plate tolerances.* Sine plates shall meet the accuracy requirements specified in 3.5.4.1 and table I or II.

3.6.4.2 *Cylinder tolerances.* Cylinders for sine plates shall meet the accuracy requirements specified in 3.5.4.2 and table I or II.

3.6.4.3 *Alignment of cylinder axis.* The alignment of axis of cylinders for sine plates shall not exceed the applicable tolerance specified in 3.5.4.3 and table I or II.

3.6.4.4 *Spacing of cylinder axis.* Errors in spacing of cylinder axis shall not exceed the applicable tolerances specified in 3.5.4.4 and table I or II. Grade A, laboratory grade, sine plates, shall have the exact size marked on the sine plate or nameplate (see 3.12.1 and 3.12.2).

3.6.5 *Nominal sizes.* Unless otherwise specified (see 6.1), type II sine plates shall be of the sizes specified in table IV.

TABLE IV.—*Sizes, type II sine plates*

Size	Length	Width
	Minimum	Minimum
Inches	*Inches*	*Inches*
5	5¾	2
10	12	4
20	22	4

3.7 Type III, grades A and B, classes 1 and 2, sine bar fixtures.

3.7.1 *Construction.* Type III sine bar fixtures shall consist of a type I sine bar and a base (see figure 3). Construction shall be such as to provide for smooth adjustment of the sine bar, and if provided with clamping means, con-

struction shall be rigid when the sine bar is clamped in position above the working surface of the base. In the case of hinged fixtures, the diameter of the pivot cylinder may differ from that of the cylinder at the free end.

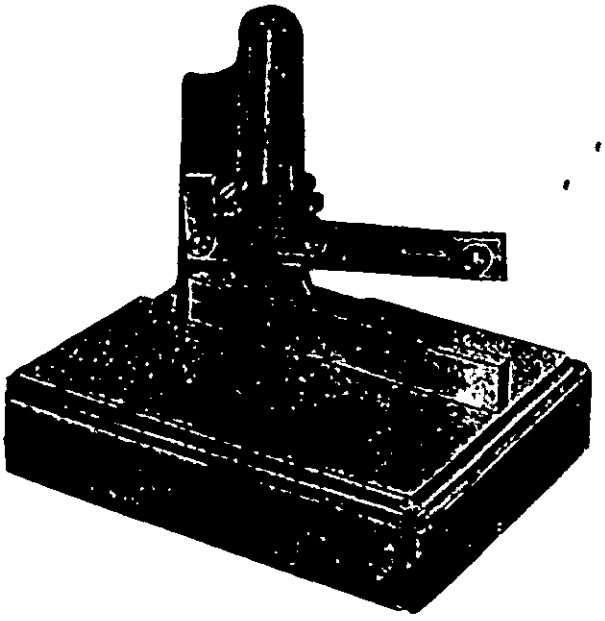

FIGURE 3.—Type III, sine bar fixtures.

3.7.2 *Base material.* The bases of sine bar fixtures shall be of seasoned cast iron conforming to 3.2.2 and 3.2.3, or seasoned tool steel conforming to 3.2.1 and 3.2.3.

3.7.3 *Hardness.* Cast iron bases of sine bar fixtures shall have a hardness of 180 to 220 Brinell or equivalent surface hardness; steel bases shall have a hardness of not less than 60 nor more than 65 on the Rockwell C scale.

3.7.4 *Accuracy.*

3.7.4.1 *Sine bar.* For any operating setting, including clamped settings, parallelism of cylinder axis to the working surface of the base shall be maintained within the applicable tolerance specified (see column 4, table I or II).

3.7.4.2 *Bases.* Reference surfaces of bases of sine bar fixtures shall be lapped, ground, or scraped as specified (see 6.1), flat and parallel within the applicable tolerances specified (see column 2, table I or II). Specific tolerances shall apply to all areas within one-sixteenth inch from the edges of the finished surfaces.

3.7.5 *Sizes.* Sine bar fixtures shall be furnished in the sizes specified in the invitation for bids (see 6.1).

3.8 Type IV, grades A and B, classes 1 and 2 sine plate fixtures.

3.8.1 *Construction.* Type IV sine plate fixtures shall consist of a type II sine plate and a base (see figure 4). Construction shall be such as to provide for smooth adjustment of the sine plate, and if provided with clamping means, construction shall be rigid when sine bar is clamped in position above working surface of the base. In the case of hinged fixtures, the diameter of the pivot cylinder may differ from that of the cylinder at the free end.

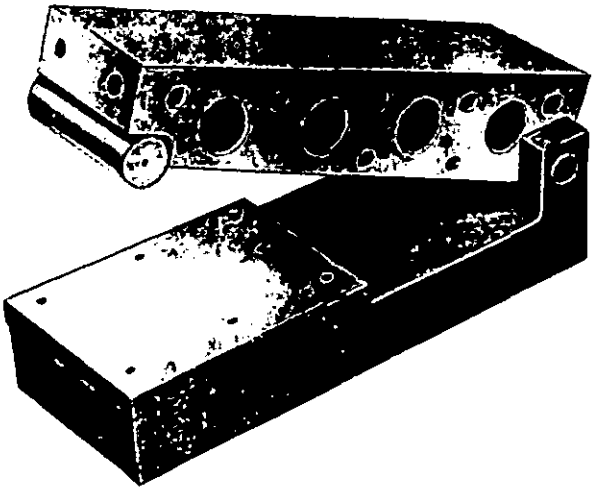

FIGURE 4.—Type IV, sine plate fixtures.

3.8.2 *Base material.* Material for sine plate fixture bases shall be in accordance with 3.7.2.

3.8.3 *Hardness.* Hardness of sine plate fixture bases shall be in accordance with 3.7.3.

3.8.4 *Accuracy.* Accuracy of sine plates for sine plate fixtures and bases for sine plate fixtures shall be in accordance with 3.7.4.1. and 3.7.4.2, respectively.

3.8.5 *Sizes.* Sine plate fixtures shall be furnished in the sizes specified in the invitation for bids (see 6.1).

3.9 Accessories. Accessories for sine bars, plates, or fixtures shall be as specified in the invitation for bids (see 6.1).

3.10 Tolerances for special sizes. For sizes smaller than 5 inches, tolerances for the 5-inch size of the designated grade shall apply.

For sizes above 5 inches, other than 10-inch and 20-inch sizes, applicable tolerances shall be obtained by straight line interpolation between the values in the table or by extrapolation on the straight lines determined by the 10-inch and 20-inch values in tables I and II.

3.11 Case. Sine bars and sine plates shall be furnished with cases of wood or other suitable material, with hinged cover, having metal hinges and clasps. The case shall be so designed that the sine bar, or plate shall rest securely on felt or other suitable material.

3.12 Identification of product.

3.12.1 *Civil agencies.* Sine bars, plates and fixtures shall be marked in a plain and permanent manner with the manufacturer's name or trademark of such known character that the source of manufacture may be readily determined. Special marking, as specified in 3.5.4.4 and 3.6.4.4 shall be provided for grade A sine bars and sine plates.

3.12.2 *Military agencies.* Sine bars, plates and fixtures shall be marked for identification in accordance with the requirements of MIL-STD-130. Special marking, as specified in 3.5.4.4 and 3.6.4.4, shall be provided for grade A sine bars and sine plates.

3.13 Lightening holes. Unless otherwise specified (see 6.1), at the option of the contractor, lightening holes may or may not be used.

3.14 Workmanship. The workmanship shall be in accordance with the best grade of commercial practice covering this class of equipment. All parts shall be free from defects or blemishes that might affect their serviceability or appearance.

4. SAMPLING, INSPECTION, AND TEST PROCEDURES

4.1 Inspection responsibility. Unless otherwise specified, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Sampling for lot acceptance inspection.

4.2.1 *Inspection lot.* All sine bars, sine plates, and fixtures of the same type, style, and size offered for delivery at one time shall be considered a lot for purposes of acceptance inspection.

4.2.2 *Sampling for visual and dimensional examination.* A random sample of sine bars, sine plates, and fixtures shall be selected from each inspection lot offered for examination in accordance with MIL-STD-105 at inspection level II. The acceptable quality level shall be equal to 1.5 percent defective.

4.2.3 *Sampling for lot acceptance test.* A random sample of sine bars, sine plates, and fixtures shall be selected from each inspection lot in accordance with MIL-STD-105 at inspection level I for the tests specified in 4.4 (the acceptable quality level shall be equal to 2.5 percent defective) except that 100 percent inspection is required for the accuracy tests in 4.4.1 on type I, grade A sine bars, and type II, grade A sine plates (see 3.12.1 and 3.12.2 for special marking requirements).

4.3 Lot acceptance test. Each of the sample sine bars, sine plates, and fixtures selected in accordance with 4.2.3 shall be tested as specified in 4.4. Any sample failing the tests shall be rejected, and if the number of nonconforming sine bars, sine plates, and fixtures in any sample exceeds the acceptance number for that sample, the lot represented by the sample shall be rejected.

4.4 Tests.

4.4.1 *Accuracy tests.* Accuracy tests specified in 4.4.1.1 to 4.4.1.8 inclusive, shall be conducted in controlled temperature of 68° F. (20° C.).

4.4.1.1 *Accuracy of working surface.* Accuracy of working surfaces of sine bars, plates, or fixtures shall be determined by means of an optical flat (where applicable), or by other suitable means, such as a precision reference surface of known accuracy and a precision indicator.

4.4.1.2 *Squareness.* Squareness of working surfaces of sine bars, plates, or fixtures shall be

tested by means of a cylindrical square, gage blocks, and surface plate, or by equivalent means.

4.4.1.3 *Parallelism.* Parallelism of working surfaces of sine bars, plates, or fixtures shall be tested by means of a precision flat and a precision indicator, or by equivalent means.

4.4.1.4 *Accuracy of cylinders.* Cylinders shall be tested for diameter, roundness, and straightness by means of a measuring machine or a vertical or horizontal comparator of suitable amplification, using gage blocks of known accuracy and with a 1-pound measuring load. An additional test for out-of-roundness, due to lobular shape of cylinder, shall be made with a multiple contact anvil such as a V-block. In making the above measurements, the error shall be not greater than 20 percent of the tolerance specified for the part being measured. Equivalent methods may be used.

4.4.1.5 *Alignment of cylinders.* Parallelism of cylinder axis with each other, and with the working surface of the bar or plate (and with the lower surface if a reference surface) shall be tested by means of a precision indicator, or by equivalent means.

4.4.1.6 *Axial spacing of cylinders.* Axial spacing of cylinders shall be determined by means specified in 4.4.1.4 or by equivalent means.

4.4.1.7 *Accuracy of bases.* Bases shall be tested for flatness of surface with an indicator-mounted, three-point comparator checked against a reference surface of known accuracy, or equivalent means, or by means of an optical flat if surface finish permits. On cast iron bases having a scraped surface, bearing area shall be determined by coating the surface with Prussian blue, or other suitable material, then rubbing the surface with another plate of known accuracy to reveal bearing areas. A plate of glass or other suitable transparent material that has previously been ruled into small squares of equal area, shall then be laid on the working surface and the percent of bearing area determined, as well as the number of spots per square inch.

4.4.1.8 *Accuracy of sine bar fixtures and sine plate fixtures.* Sine bar and sine plate fixtures shall be tested in each extreme position and at least one intermediate position, for parallelism of cylinder axis to the working surface of the base, by means of a precision indicator, or equivalent means.

4.4.2 *Hardness test.* The testing laboratory shall use either a noninjurious hardness test or an indentation type hardness test to determine conformance with 3.5.3, 3.6.3, 3.7.3, and 3.8.3. If the indentation type test is used, the indentations shall be made on a surface which will not affect the accuracy of the sine bar, plate, or fixture.

4.5 Test apparatus and instruments. Tests shall be conducted with suitable equipment of known accuracy, acceptable to the Government inspector and the procuring agency.

4.6 Inspection of preparation for delivery. Inspection to determine compliance with preparation for delivery requirements shall be accomplished in accordance with requirements in section 5.

5. PREPARATION FOR DELIVERY

(Civil agencies should refer to Fed. Std. No. 102 for definitions and applications of the various levels of packaging protection for supplies and equipment.)

5.1 Cleaning, preservation, and packaging.

5.1.1 *Level A.* Each sine bar, sine plate, or fixture shall be cleaned in accordance with method C–5, coated with P–6 preservative, and packaged in accordance with Method 1A–2 of MIL–P–116. Cushioning, blocking, and bracing shall be in accordance with JAN–P–100. When a case is provided (see 3.11), the sine bar or sine plate shall be wrapped in acid-free, greaseproof paper prior to placing them in the case. The clasps of the case shall be secured in the closed position and the sine bar or sine plate in the locked case shall be packaged as specified herein.

5.1.2 *Level B.* Each sine bar, sine plate, or fixture shall be cleaned, preserved and packaged as specified in 5.1.1, except that water-vapor proof packaging shall not be required. The wrapped sine bar or sine plate in the case shall be packaged in a box conforming to PPP–B–566; PPP–B–676; or to PPP–B–636, style and type optional. The wrapped fixture shall be packaged as specified herein.

5.1.3 *Level C.* Sine bars, sine plates, and fixtures shall be preserved and packaged in accordance with the supplier's commercial practice.

5.2 **Packing**

5.2.1 *Level A.* The sine bars, sine plates, and fixtures, preserved and packaged as specified in 5.1.1, shall be packed in wood cleated fiberboard, cleated plywood, nailed wood or wirebound boxes conforming to PPP-B-591, PPP-B-601 (domestic type), or PPP-B-621, respectively. The gross weight of the boxes shall not exceed approximately 200 pounds.

5.2.1.1 *Case liners.* Shipping containers shall be provided with case liners conforming to MIL-L-10547. Case liners shall be closed and sealed in accordance with the appendix to MIL-L-10547.

5.2.2 *Level B.* The sine bars, sine plates, and fixtures, preserved and packaged as specified in 5.1, shall be packed in a close-fitting box conforming to one of the following at the option of the contractor:

Specification	*Type or class*
PPP-B-621	Class 1.
PPP-B-601	Domestic type.
PPP-B-636	Type I, class 1.

The gross weight of the wood boxes shall not exceed 150 pounds, and the fiberboard boxes shall not exceed the weight limitation of the box specification.

5.2.3 *Level C.* Sine bars, sine plates, and fixtures shall be packed in a manner to insure acceptance by common carrier and safe delivery at destination. Shipping containers shall conform to the rules or regulations of carriers as applicable to the mode of transportation.

5.3 **Marking.**

5.3.1 *Civil agencies.* In addition to any special marking required by the contract or order, interior packages and exterior shipping containers shall be marked in accordance with Fed. Std. No. 123.

5.3.2 *Military agencies.* In addition to any special marking required by the contract or order, interior packages and exterior containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 **Ordering data.** Purchasers should exercise any desired options offered herein, and procurement documents should specify the following:

(*a*) Title, number, and date of this specification.
(*b*) Name, type, grade, and class of item required (see 1.2).
(*c*) Size (see 1.2.2).
(*d*) Nominal sizes (see 3.5.5 and 3.6.5).
(*e*) Specify working surface required (see 3.6.1).
(*f*) If accessories attachment is not required (see 3.6.1.1.).
(*g*) Finish of reference surfaces of bases (see 3.7.4.2).
(*h*) Accessories for sine bars, plates, and fixtures, if required (see 3.9).
(*i*) Lightening holes, if procuring agency option (see 3.13).
(*j*) Levels of preservation, packaging, and packing (see section 5).
(*k*) Marking, if different (see 5.3).

6.2 **Transportation description.** Transportation descriptions and minimum weights applicable to this commodity are:

Rail:

Tools, not otherwise indexed by name.
Carload minimum weight 30,000 pounds.

Motor:

Tools, not otherwise indexed.
Truckload minimum weight 30,000 pounds, subject to Rule 115, National Motor Freight Classification.

Preparing activity:
GSA-FSS

MILITARY CUSTODIANS:
Army—MU
Navy—Weps
Air Force—MAA

Copies of this specification may be purchased for 5 cents.