GGG-C-330c
May 15, 1967

SUPERSEDING
Int. Fed. Spec. GGG-C-00330b (Navy-Ships)
July 24, 1963 and
Fed. Spec. GGG-C-330a
January 16, 1957

FEDERAL SPECIFICATION

CHISELS, TOOLS BLANKS, CALKING TOOLS AND METAL-FORMING TOOLS, POWER HAMMER

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 chisels, chisel tool blanks, calking tools and metal-forming tools used in power-operated hammers for cutting, riveting, and calking leaks in metal and metal fabricated shapes, generally purchased by the Federal Government and is not intended to include all of the types and classes which are commercially available.

1.2 Classification.

1.2.1 *Types.* The tools and tool blanks shall be of the following types as specified (see 6.2):

Type:

I—Tool blank, round shank, calking and chipping, chisel.
II—Tool blank, hexagon shank, calking and chipping, chisel.
III—Tool blank, scaling chisel.
IV—Metal-forming tool, beading.
V—Metal-forming tool, butt.
VI—Chisel, cape.
VII—Chisel, cold.
VIII—Chisel, diamond-point.
IX—Calking tool, fuller, straight.
X—Calking tool, fuller, bent.
XI—Chisel, rivet-cutting (hot).
XII—Chisel, round-nose.
XIII—Chisel, ripper.
XIV—Chisel, rivet-buster.
XV—Chisel, scaling.
XVI—Chisel, side-cutting.
XVII—Chisel, splitting-tool, straight.
XVIII—Chisel, splitting-tool, bent.
XIX—Chisel, wide.
XX—Chisel, tight rivet-cutting.
XXI—Chisel, moil-point.
XXII—Drill, star, 4 point.
XXIII—Spade, digger.
XXIV—Tamper, backfill.

1.2.2 *Classes.* The tools and tool blanks shall be of the following classes as specified (see 6.2):

Class A—Carbon steel.
Class B—High-speed steel.

2. APPLICABLE DOCUMENTS

2.1 The following specifications and standards, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

Federal Standards:

Fed. Std. No. 123—Marking for Domestic Shipment (Civilian Agencies).
Fed. Test Method Std. No. 151—Metals; Test Methods.

(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 Specification:

MIL-H-15424—Hand Tools; Packaging of.

Military Standard:

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

(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.)

3. REQUIREMENTS

3.1 Material. All tools and tool blanks shall be forged of either class A or B steel, as specified (see 1.2 and 6.2). The supplier shall furnish certified test data for the chemical composition of each lot or batch used in the fabrication of the end item.

3.2 Tolerances. A plus or minus tolerance of 0.015 inch will be permitted in the cross-sectional dimensions of the body of the tools and tool blanks. A plus or minus tolerance of 0.010 inch for dimensions of 5/32 inch or less, and of 0.015 inch for dimensions over 5/32 inch will be permitted in the dimensions specified for the point or work end of all tools. Tolerances in dimensions which do not affect the utility of the tools, other than already outlined, such as the length of the taper at the work end of the tool, shall be within plus or minus 10 percent from the dimensions specified. Tolerances in overall length and lengths of shank or blank as shown in table I will be permitted.

TABLE I. *Tolerances in overall length or lengths of shank or blank*

Dimension	Plus	Minus
	Inch	*Inch*
Overall length of shank	1/64	1/64
Overall length of blank	1	1/8
Overall length of finished tool	1/2	1/2

3.3 Body shape. The body of the tools and tool blanks, except types III and XV, shall be octagonal, hexagonal, round, or a modification of round (maintaining maximum diameter) shape. The body of types III and XV shall be of square section.

3.4 Shanks. The shanks shall be concentric and in proper alignment with the body of the tool or tool blank. The striking end of all shanks of chisels shall be at right angles to the longitudinal axis of the shank, and shall be chamfered as shown on the applicable figures.

3.5 Finished state. The tools shall be furnished in a finished state ready to be placed in service. Types I, II, and III blanks shall be furnished with the shanks and striking ends in a finished state.

3.6 Rockwell hardness. The tools and striking ends of tool blanks shall have a Rockwell hardness as specified in table II.

TABLE II. *Rockwell hardness*

Class	Hardness—Rockwell C	
	Tool point	Striking end
A	58 to 61	45 to 55
B	59 to 62	45 to 55

3.7 Marking for identification. Each tool and tool blank shall be plainly and permanently marked with the manufacturer's name or with a trademark of such known character that the source of manufacture may be readily determined.

3.8 Class A. carbon steel.

3.8.1 *Chemical composition.* The chemical composition shall conform to table III.

TABLE III. *Chemical composition of class A, carbon steel tools*

Element	Minimum	Maximum
	Percent	*Percent*
Carbon	0.45	0.65
Manganese	.30	1.10
Silicon[1]	.60	2.25
Molybdenum	—	0.75
Chromium	—	.50
Vanadium	—	.40
Phosphorus	—	.030
Sulfur	—	.030

[1] The silicon content of any individual sample shall be not less than 1.8 times the manganese content, nor more than 2.75 times the manganese content of that sample.

3.8.2 *Heat-treatment.* The tools and tool blanks shall respond to the following heat-treating operations to produce the hardness specified in 3.6 when tested as specified in 4.4.1.

3.8.2.1 *Normalizing.* (Applies to the points of finished tools and finished tools after redressing and the points of blanks after forging.) The points shall be uniformly heated to 1625° to 1675°F. and cooled in still air at room temperature.

3.8.2.2 *Hardening and tempering.* After normalizing, points shall be heated to 1550° to 1600°F. and shall be quenched in water, removed from the quenching bath when the points have reached a temperature of 100° to 200°F. The entire chisel shall be reheated to 300° to 350°F., shall be held for at least 1 hour, and then cooled in air.

3.8.3 *Marking.* In addition to the marking specified in 3.7, each class A tool and tool blank shall be stamped in a plain and permanent manner on the body, near the shank end, to indicate the particular manufacturer's heat-treatment to which it should be subjected in dressing the point or work end (meaning heat-treatment applicable to the steel from which the tool is made). The letters used for this purpose shall be of appropriate size, and stamping shall be legible, and arranged as shown in the example below:

HEAT-1600; WATER-DRAW-350

3.9 Class B, high-speed steel.

3.9.1 *Chemical composition.* The chemical composition shall conform to table IV.

TABLE IV. *Chemical composition of class B, high-speed steel tools*

Element	Minimum	Maximum
	Percent	*Percent*
Carbon	—	0.86
Manganese	0.15	.40
Phosphorus	—	.03
Sulfur	—	.03
Silicon	0.15	.40
Chromium	3.90	4.40
Tungsten	6.00	6.75
Vanadium	1.70	2.10
Molybdenum	4.75	5.25
Copper	—	0.25
Nickel	—	.25
Tin	—	.05

3.9.2 *Heat-treatment.* The tools and tool blanks shall respond to the following heat-treatment operations to produce the hardness specified in 3.6 when tested as specified in 4.4.1.

3.9.2.1 *Annealing.* (Applies to points of finished tools, or finished tools after redressing and the points of blanks after forging.) The points of the tools shall be uniformly heated to 1500° to 1600°F., held for 15 minutes, and cooled slowly in lime or mica.

3.9.2.2 *Hardening and tempering.* (Applies to the points of finished and redressed tools after annealing, and the points of blanks after forging.) Points shall be heated to 2050° to 2100°F. and cooled in still air at room temperature. The entire tool shall be reheated to 1050°F., held for 1 hour, and cooled in still air at room temperature. The entire tool shall then be reheated to 1050°F., held for 1 hour, and cooled in still air at room temperature.

3.9.2.3 *Magnetic particle inspection.* Magnetic particle inspection shall be performed

on each class B tool and tool blank and certification furnished to assure that tools and tool blanks are free from cracks.

3.9.3 *Marking.* Marking for class B tools and tool blanks shall be in accordance with 3.8.3, except that the stamping shall be arranged as follows:

HEAT-2100; AIR-DRAW 1050;
REDRAW-1050

3.10 Performance.

3.10.1 *Class A.* When specified (see 6.2), three out of four type XVI side-cutting chisels forged from type II chipping chisel blanks and heat-treated in accordance with 3.8.2, shall remove by chipping 2500 grams (g.) of metal at an average rate of not less than 70 g. per minute before failure or necessity for regrinding when tested as specified in 4.4.4.

3.10.2 *Class B.* When specified (see 6.2), three out of four type XVI side-cutting chisels forged from type II chipping chisel blanks and heat-treated in accordance with 3.9.2, shall remove by chipping 7500 g. of metal at an average rate of not less than 70 g. per minute before failure or necessity for regrinding, when tested as specified in 4.4.4.

3.11 Type I, tool blank, round shank, calking and chipping chisel. Round shank calking and chipping chisel tool blanks shall be suitable for use in power calking and chipping hammers. They shall conform to the shape and the dimensions shown on figure 1. The shank diameter shall be either 0.580 ± 0.002 inch or 0.680 ± 0.002 inch, as specified (see 6.2).

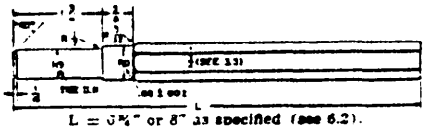

FIGURE 1. Type I, tool blank, round shank, calking and chipping chisel.

3.12 Type II, tool blank, hexagon shank, calking and chipping, chisel. Hexagon shank chipping and calking chisel blanks shall be suitable for use in pneumatic chipping and calking hammers. They shall conform to the shape and dimensions shown on figure 2. The shank dimensions across flats shall be either 0.580 ± 0.002 inch.

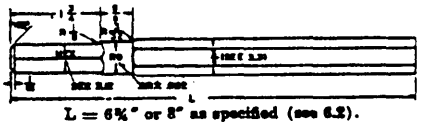

FIGURE 2. Type II, tool blank, hexagon shank, calking and chipping chisel.

3.13 Type III, tool blank, scaling chisel. Scaling chisel tool blanks shall be suitable for use in pneumatic scaling hammers. They shall conform to the shape and the dimensions shown on figure 3.

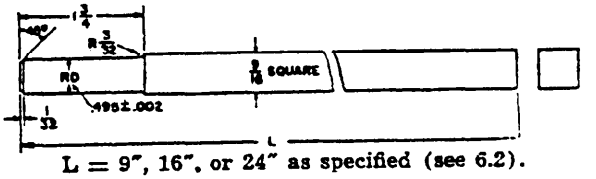

FIGURE 3. Type III, tool blank, scaling chisel.

3.14 Type IV, metal-forming tool, beading. The end opposite the shank end of beading tools shall be ground smooth all over, but need not be polished. These tools shall conform to the shape and the dimensions shown on figure 4. The shank diameter shall be either 0.580 ± 0.002 inch or 0.680 ± 0.002 inch, as specified (see 6.2).

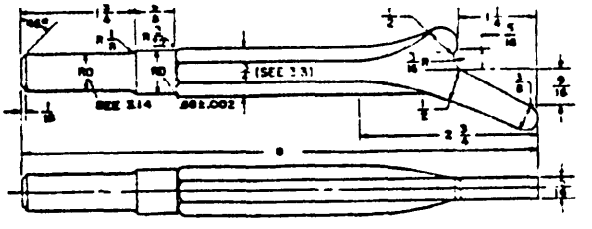

FIGURE 4. Type IV, metal-forming tool, beading.

3.15 **Type V, metal-forming tool, butt.** Butt tools shall conform to the shape and the dimensions shown on figure 5. The shank diameter shall be either 0.580 ± 0.002 inch or 0.680 ± 0.002 inch, as specified (see 6.2).

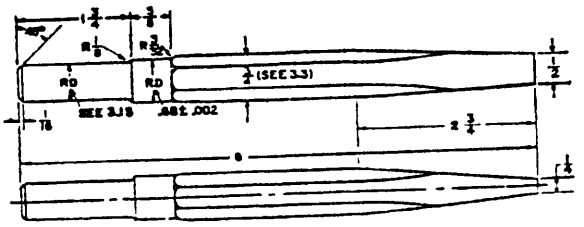

FIGURE 5. Type V, metal-forming tool, butt.

3.16 **Type VI, chisel, cape.** Cape chisels shall conform to the shape and the dimensions shown on figure 6. The shank dimensions across flats shall be 0.580 ± 0.002 inch.

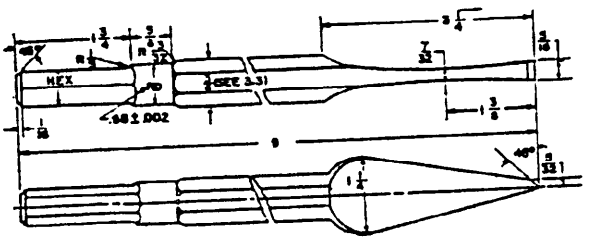

FIGURE 6. Type VI, chisel, cape.

3.17 **Type VII, chisel, cold.** Cold chisels shall conform to the shape and the dimensions shown on figure 7. The shank shall be either hexagon or round. If hexagon, the dimension across flats shall be 0.580 ± 0.002 inch. If round, the diameter shall be either 0.580 ± 0.002 inch or 0.680 ± 0.002 inch, as specified (see 6.2).

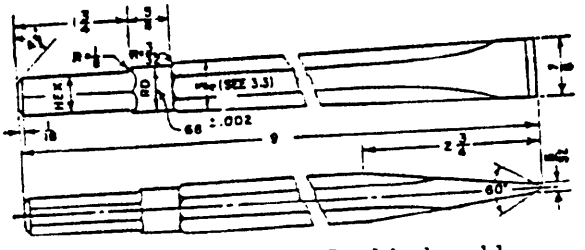

FIGURE 7. Type VII, chisel, cold.

3.18 **Type VIII, chisel, diamond-point.** Diamond-point chisels shall conform to the shape and the dimensions shown on figure 8. The shank dimensions across flats shall be 0.580 ± 0.002 inch.

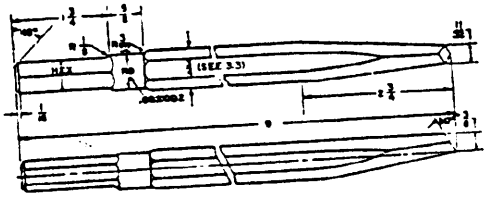

FIGURE 8. Type VIII, chisel, diamond point.

3.19 **Type IX, calking tool, fuller, straight.** Straight fuller calking tools shall conform to the shape and dimensions shown on figure 9 and the dimensions shown in table V for the size specified (see 6.2). The shank diameter shall be either 0.580 ± 0.002 inch or 0.680 ± 0.002 inch, as specified (see 6.2).

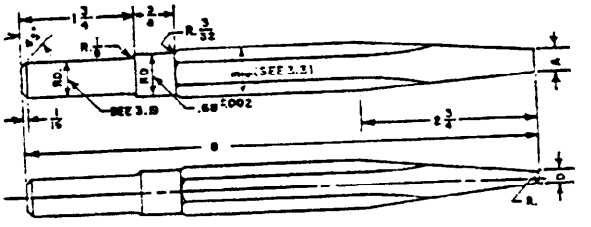

FIGURE 9. Type IX, calking tool, fuller, straight.

TABLE V. *Dimensions for types IX and X*

Size	Width of point A	Thickness of point D	Radius of point R
Inch	*Inch*	*Inch*	*Inch*
3/16	3/8	3/16	3/32
1/4	1/2	1/4	1/8

3.20 **Type X, calking tool, fuller, bent.** Bent fuller calking tools shall conform to the shape and dimensions shown on figure 10 and the dimensions shown in table V for the size specified (see 6.2). The shank diameter shall be either 0.580 ± 0.002 inch or 0.680 ± 0.002 inch, as specified (see 6.2).

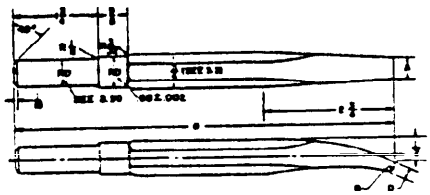

FIGURE 10. Type X, calking tool, fuller, bent.

3.21 Type XI, chisel, rivet-cutting (hot). Rivet-cutting chisels shall conform to the shape and the dimensions shown on figure 11. The shank diameter shall be either 0.580 ± 0.002 inch or 0.680 ± 0.002 inch, as specified (see 6.2).

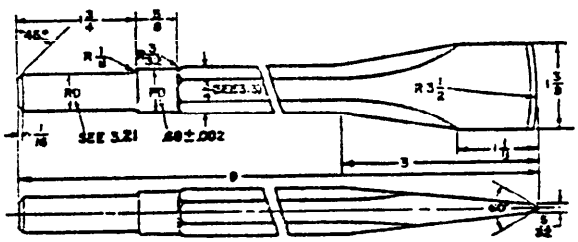

FIGURE 11. Type XI, chisel, rivet-cutting (hot).

3.22 Type XII, chisel, round-nose. Round-nose chisels shall conform to the shape and the dimensions shown on figure 12. The shank dimensions across flats shall be 0.580 ± 0.002 inch.

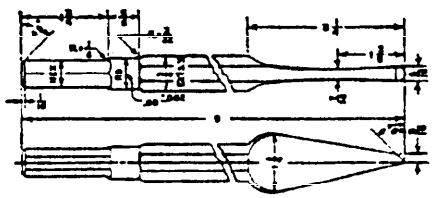

FIGURE 12. Type XII, chisel, round-nose.

3.23 Type, XIII, ripper. Ripper chisels shall conform to the shape and the dimensions shown on figure 13. The shank shall be either hexagon or round. If hexagon, the dimensions across flats shall be 0.580 ± 0.002 inch. If round, the diameter shall be either 0.580 ± 0.002 inch, or 0.680 ± 0.002 inch as specified (see 6.2).

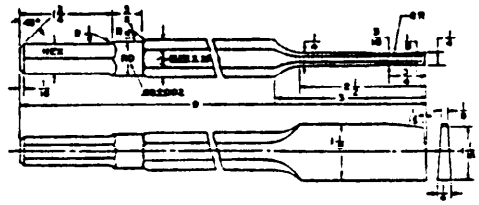

FIGURE 13. Type XIII, chisel, ripper.

3.24 Type XIV, chisel, rivet-buster. Rivet-buster chisels shall conform to the shape and dimensions shown on figure 14 and the dimensions shown in table VI for the size specified (see 6.2). The shank diameter shall be either 0.580 ± 0.002 inch or 0.680 ± 0.002 inch, as specified (see 6.2).

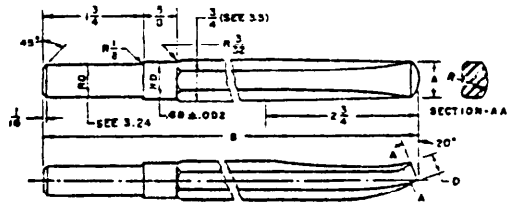

FIGURE 14. Type XIV, chisel, rivet-buster.

TABLE VI. *Dimensions for type XIV*

Size	Width of point A	Thickness of point D	Radius of section AA-R
Inch	*Inch*	*Inch*	*Inch*
5/8	5/8	5/16	5/8
3/4	3/4	3/8	3/4

3.25 Type XV, chisel, scaling. Scaling chisels shall conform to the shape and the dimensions shown on figure 15.

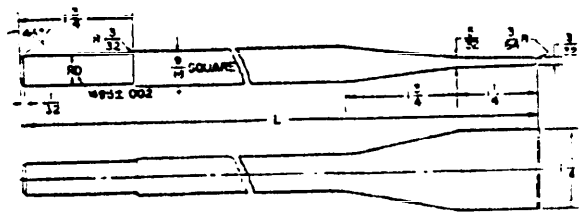

FIGURE 15. Type XV, chisel, scaling.

3.26 Type XVI, chisel, side-cutting. Side-cutting chisels shall conform to the shape

and the dimensions shown on figure 16. The shank dimensions across flats shall be 0.580 ± 0.002 inch.

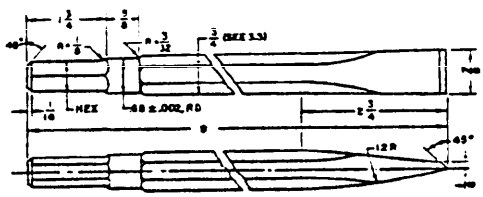

FIGURE 16. Type XVI, chisel, side-cutting.

3.27 **Type XVII, chisel, splitting-tool, straight.** Straight splitting tools shall conform to the shape and dimensions shown on figure 17 and the dimensions shown in table VII for the size specified (see 6.2). The shank diameter shall be either 0.580 ± 0.002 inch or 0.680 ± 0.002 inch, as specified (see 6.2).

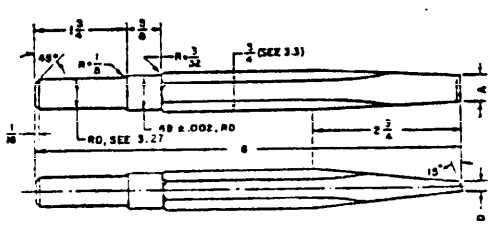

FIGURE 17. Type XVII, chisel, splitting-tool, straight.

TABLE VII. *Dimensions for type XVII*

Size	Width of point A	Thickness of point D
Inch	*Inch*	*Inch*
3/16	1/2	3/16
1/4	5/8	1/4

3.28 **Type XVIII, chisel, splitting-tool, bent.** Bent splitting-tool chisels shall conform to the shape and dimensions shown on figure 18 and the dimensions shown in table VIII for the size specified (see 6.2). The shank diameter shall be either 0.580 ± 0.002 inch or 0.680 ± 0.002 inch, as specified (see 6.2).

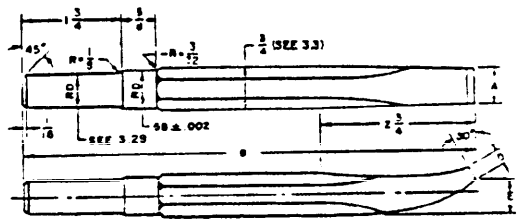

FIGURE 18. Type XVIII, chisel, splitting-tool, bent.

TABLE VIII. *Dimensions for type XVIII*

Size	Width of point A	Thickness of point D	Nominal bend E
Inch	*Inch*	*Inch*	*Inch*
3/16	1/2	3/16	1/2
1/4	5/8	1/4	3/4

3.29 **Type XIX, chisel, wide.** Wide chisels shall conform to the shape and the dimensions shown on figure 19. The shank dimensions across flats shall be 0.580 ± 0.002 inch.

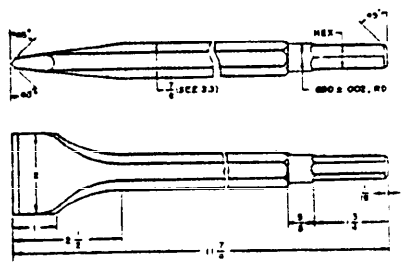

FIGURE 19. Type XIX, chisel, wide.

3.30 **Type XX, chisel, tight rivet-cutting.** Tight rivet-cutting chisels shall conform to the shape and the dimensions shown on figure 20. The shank dimensions across flats shall be 0.580 ± 0.002 inch.

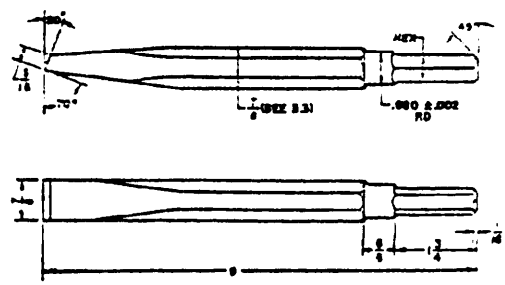

FIGURE 20. Type XX, chisel, tight rivet-cutting.

3.31 **Type XXI, chisel, moil-point.** Moil-point chisels shall conform to the shape and the dimensions shown on figure 21. The shank dimensions across flats shall be 0.580 ± 0.002 inch.

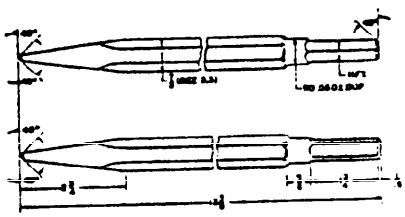

FIGURE 21. Type XXI, chisel, moil-point.

3.32 **Type XXII, drill, star, 4 point.** Star drills shall conform to the shape shown on figure 22 and the dimensional requirements shown on table IX. The shank shall be either hexagon or round. If hexagon, the dimensions across flats shall be 0.580 ± 0.002 inch. If round, the diameter shall be either 0.580 ± 0.002 inch or 0.680 ± 0.002 inch, as specified (see 6.2).

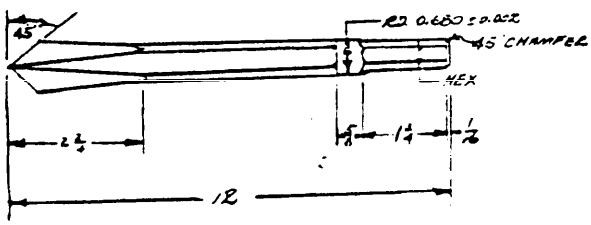

FIGURE 22. Type XXII, drill, star, 4 point.

TABLE IX. *Dimensional requirements for type XXII drills, star, 4-point*

Point diameter	Overall length	Body thickness
Inches	*Inches*	*Inch*
5/8	12	7/8
2	12	7/8

3.33 **Type XXIII, spade, digger.** Digger spades shall have a round shank conforming to the dimensional requirements shown on figure 23. The spade end shall conform to the shape and dimensions shown on figure 24.

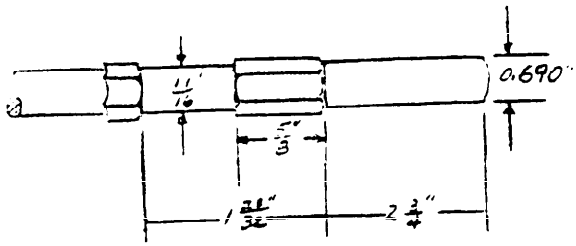

FIGURE 23. Shank end for digger spade.

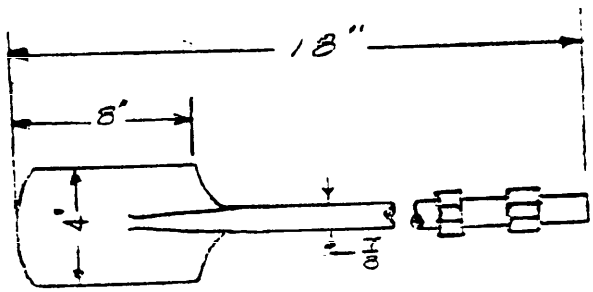

FIGURE 24. Type XXIII, spade, digger.

3.34 **Type XXIV tamper, backfill.** Backfill tampers shall have a round shank conforming to the dimensional requirements of figure 23. The tamping pad shall conform to the shape and dimensions shown on figure 25.

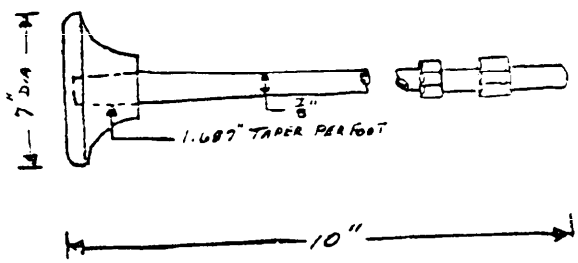

FIGURE 25. Type XXIV, tamper, backfill.

3.35 **Workmanship.** The tool blanks or finished tools shall be free from cracks, laps, flaws, blisters, or other deterimental defects which may affect their appearance, durability, and serviceability.

4. QUALITY ASSURANCE PROVISIONS

4.1 **Responsibility for inspection.** Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection require-

ments as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory 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 quality conformance inspection. Sampling for quality conformance inspection shall be performed in accordance with the provisions set forth in MIL-STD-105, except where otherwise indicated herein.

4.2.1 *Lot.* A lot shall consist of all tools of the same type and class offered.

4.2.2 *Sample.* A random sample of chisels shall be selected from each lot offered for quality conformance inspection in accordance with MIL-STD-105, at the inspection levels specified herein.

4.3 Quality conformance inspection. Each of the chisels selected in accordance with 4.2.2 shall be inspected to verify compliance with this specification. Inspection for quality conformance shall be as follows:

(a) Examination (see 4.3.1).
(b) Tests (see 4.3.2 and 4.4).
(c) Inspection of preservation, packaging, packing, and marking (see 4.5).

4.3.1 *Examination.* Each of the chisels selected shall be examined for conformance with the requirements of this specification at inspection level II, with an AQL of 4.0 percent defective. Examination shall be conducted as specified in table X. If the number of nonconforming chisels exceeds the acceptance number for the sample, this shall be cause for rejection of the lot represented by the sample.

TABLE X. *Classification of defects*

Classification	Defects
1	Dimensions not as specified.
2	Material composition data sheet not as specified in 3.1.
3	Not cleaned.
4	Indication of rust.
5	Not type and class specified.
6	Fractured, split, malformed, or otherwise defective.
7	Burrs, fins, sharp edges, or projections that may cause injury.
8	Marking missing, incomplete, not legible.

4.3.2 *Tests.* Each of the sample chisels selected in accordance with 4.2.2 shall be tested in accordance with 4.4.1 and 4.4.2 for class B. For lots identifiable as having been heat-treated as a batch or under the same process and control, the inspection level shall be S-4 with the acceptable quality level (AQL) of 2.5 defects per hundred units. For lots not identifiable as having been heat-treated as a batch, the inspection level shall be S-2 with an AQL of 1.5 defects per hundred units. Two representative tools or blanks shall be selected from each sample and tested as specified in 4.4.3. Failure to meet the hardening and rehardening test shall be cause for lot rejection. When specified in the contract or order (see 6.2), performance tests shall be conducted in accordance with 4.4.4. Failure to comply with performance specified in section 3 shall be cause for rejection.

4.4 Test methods.

4.4.1 *Hardness.* Hardness testing shall be performed in accordance with method 243.1 of Fed. Test Method Std. No. 151. The tests shall be performed on the striking end and cutting end of sample tool.

4.4.2 *Magnetic particle inspection.* Magnetic particle inspection shall be performed on class B tools to determine quality of forging and heat-treatment. Evidence of cracks shall be cause for rejection.

4.4.3 *Hardening and rehardening tests.*

4.4.3.1 In order to determine the suitability of the material for hardening or rehardening, representative tools shall be subjected to the tests specified in 4.4.3.2 or 4.4.3.3, whichever is applicable.

4.4.3.2 *Class A.* When blanks are involved, the samples shall be forged and the points heat-treated as specified in 3.8.2. When finished tools are involved, the points shall be heat-treated as specified in 3.8.2. After heat-treatment, the points of the tools shall be tested for hardness as specified in 4.4.1, to determine conformance with the applicable requirements shown in table II.

4.4.3.3 *Class B.* When blanks are involved, the points shall be forged and heat-treated as specified in 3.9.2. When finished tools are involved, the points shall be heat treated as specified in 3.9.2. After heat-treatment, the points of the tools shall be tested for hardness as specified in 4.4.1, to determine conformance with the applicable requirements shown in table II.

4.4.4 *Performance test.* When specified (see 6.2), chisels shall be performance tested in accordance with 4.4.3.1 through 4.4.3.3, to determine compliance with the requirements specified in 3.10 for the class of chisels furnished.

4.4.4.1 *Preparation of samples.* Four type II chipping chisel blanks made from the same melt of steel as the chisels offered, shall be forged and the points heat-treated in accordance with 3.8.2 or 3.9.2, whichever is applicable. The chisels shall be machine ground to the size and shape of the type XVI side cutting chisel, figure 16, except that the width of the cutting edge shall be 1 inch and the length shall be 8-1/2 = 1/4 inch to permit evaluation in the chisel-testing machine. The angle between the two faces intersecting at the cutting edge shall be 60°. The thickness of the chisel 1/8 inch back from the cutting edge shall be 0.158 ± 0.002 inch.

4.4.4.2 *Machine-cutting tests.*

4.4.4.2.1 *Machine-cutting tests.* The chisels shall be evaluated in a testing apparatus capable of performing the following requirements. Each chisel shall be set up with a No. 3 Keller chipping hammer, or equivalent, at a 15° cutting angle and under 100 pounds feed pressure and evaluated by chipping the edge of 1/2-inch thick special treatment steel plate having an analysis similar to that for SAE 3335 and a Brinell hardness of 243 to 255. The length of the cut shall be 19-5/8 inches and the thickness of the cut shall be 0.080 inch to give a total weight of metal removed per cut of 100 g. The air pressure at the inlet of a 10-foot length of 5/8-inch inside diameter hose shall be 90 p.s.i. and the air consumption of the hammer shall be 22 to 23 cubic feet of free air per minute. The chisels shall be tested without cutting fluid.

4.4.4.2.2 Each chisel shall be tested to failure. Failure shall be considered to have occurred when the cutting edge chips or wears to such an extent the chisel cuts up and out of the normal path of the cut and can no longer be used in the machine.

4.4.4.3 *Performance.* Data on the weight of chip removed from each cut, the time for each cut, number of cuts, and mode of failure shall be collected for each chisel evaluated, to determine conformance with the performance requirements of 3.10.

4.5 **Inspection of preparation for delivery.** Chisels, blanks, calking tools and packages shall be inspected to verify conformance to the requirements of section 5, as specified.