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FEDERAL SPECIFICATION

WRENCH, SOCKET; (AND SOCKETS, HANDLES, AND ATTACHMENTS FOR SOCKET WRENCHES; HAND)

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 the more generally used socket wrenches, sockets, handles, and attachments for socket wrenches utilized by mechanics in the repair and maintenance of vehicles, machinery, and other items.

1.1.1 Federal specification coverage. This specification does not include all types, classes, and styles of sockets, handles, and attachments and socket wrenches for maintenance of vehicles, machinery, and other items, or which are commercially available, but are intended to cover the types, classes, and styles which are generally used by the Federal Government.

1.2 Classification. Socket wrenches, sockets, handles, and attachments for socket wrenches shall be of the following types, classes, and styles, as specified (see 6.1).

Type I - Wrenches, socket (handled).
  Class 1 - Offset.
  Class 2 - Tee-handled.
  Class 4 - Double socket T-type, hexagon and square female sockets.

Type II - Sockets.
  Class 1 - Hexagon (6-point).
    Style A - Regular length.
    Style B - Long length.
  Class 2 - Double hexagon (12-point).
    Style A - Regular length.
    Style B - Long length.
  Class 3 - Square and double square (4 and 8-point).
  Class 4 - Universal joint (hexagon or double hexagon).
  Class 5 - Spark plug (single or double hexagon).

Type III - Handles.
  Class 1 - Hinged.
  Class 2 - Ratchet, reversible.
  Class 3 - Speeder.
    Style A - Brace type, single revolving grip.
    Style B - Spin type, screwdriver grip.
  Class 4 - Tee.
    Style A - Sliding.
    Style B - Rigid.
  Class 5 - Impact.
  Class 6 - Handle, socket wrench, extension, torque transmitting, 90° head, square drive.

Type IV - Attachments.
  Class 2 - Universal joint.
  Class 3 - Socket wrench, internal (socket head set and cap screw).
    Style A - Short bit point.
    Style B - Long bit point.
  Class 4 - Bar, extension.
    Style A - Solid.
    Style B - Flexible.
  Class 5 - Adapter.
    Style A - Socket wrench.
    Style B - Ratchet, socket wrench.

2. APPLICABLE DOCUMENTS

2.1 The following documents, 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 Specification:

VV-I-530 - Insulating Oil, Electrical (For Transformers, Switches, and Circuit Breakers).

Federal Standards:

Fed. Std. No. 346 - Gauges, Wrench Openings.

(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 Superintendant of Documents, U. S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, WA.

(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-S-3136 - Standard Test Fluids Hydrocarbon and Iso-Octane.

Military Standard:

MIL-STD-105 - Sampling Procedures and Tables For Inspection By Attributes.

(Copies of Military Specifications and Standards required by suppliers 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 to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM) Standard:

E18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials, Standard Methods of Test For.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

Department of Commerce (SP) Publication:

B220.46 - Table 10, Open-End and Box Wrenches.

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

American National Standards Institute (ANSI), Inc., Standards:

B46.1 - Surface Texture.
B107.4 - Driving and Spindle Ends for Portable Hand, Air and Electric Tools.

(Application for copies should be addressed to the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.)

3. REQUIREMENTS

3.1 Illustrations. The illustrations shown herein are descriptive and not restrictive and are included for the convenience of requisitioning and purchasing officers and manufacturers, and are not intended to preclude the purchase of socket wrenches, sockets, handles, and attachments which are otherwise in accordance with this specification.

3.2 Materials. Unless otherwise specified hereinafter, the material used in the manufacture of the tools shall be steel, the chemical composition and heat treatment of which shall be such as to produce tools conforming to the physical requirements hereinafter specified.

3.3 Marking. Socket wrenches, sockets, handles, attachments, and containers for sets shall be marked in a permanent manner with the manufacturer's name or with a trademark of such known character that the source of manufacture may be readily determined. In addition, socket wrenches and sockets shall be marked in a permanent manner with the nominal wrench opening (distance across flats) for the nut or bolt end.

3.4 Manufacture and design.

3.4.1 Drive and dimensions. Male and female drive end dimensions shall conform to ANSI B107.4.

3.4.1.1 Male drive tangs. Male drive tangs shall be designed for square drive. The drive tangs shall have a smooth machined engaging surface. Each male drive tang shall be provided with a spring-loaded steel ball permanently staked in place and arranged to hold the mating sockets and attachments. Each male drive tang shall be shouldered at the flats to provide a positive stop for the tang, except type III, class 1, hinge handles 1/4 and 3/8 inch drive shall be permitted to stop against the hinge form. The hinge handle fork shall be suitably rounded for this purpose (see figure 1).

3.4.1.2 Female drive openings. All female drive openings shall be broached or punched in a smooth and well defined manner. Tools having female drive openings shall be firmly attachable to corresponding size male drive tangs by the following methods.

3.4.1.2.1 On 3/8 inch and larger drive openings. One or more faces of the female drive opening shall be drilled or recessed so that any recess or drilled hole shall engage the spring-loaded steel ball on the corresponding male drive. If only one or two faces of the female opening are recessed, the sockets shall be marked indicating the face of the opening which is recessed.

3.4.1.2.2 On 1/4 inch drive openings. One or more faces of the female drive opening may or may not be drilled or recessed, however, the minimum force required to remove tang as specified in ANSI B107.4 shall be met.

3.4.2 Edges and corners. All edges and corners, capable of causing injury, not otherwise covered herein, shall be rounded, chamfered, or sharp edges removed. The inside edges (nut end) of type II sockets shall be chamfered (optional for 1/4 inch size and smaller).

3.4.3 Tang engagement and disengagement. All detachable sockets, handles, and attachments shall be so designed that male tangs can be inserted into the corresponding female openings without undue force and shall be manually detachable without the use of any tools or keys, and meet the minimum force requirements to remove tang as specified in applicable tables of ANSI B107.4. Binding between surfaces and corners shall not be evident.

3.4.4 Nut or bolt engaging surfaces. Nut or bolt engaging surfaces of all socket wrenches, sockets, and attachments shall be smooth and well-defined and with the corners also well-defined.

3.5 Hardness. Unless otherwise specified herein, socket wrenches, drive tangs of handles, and attachments shall be hardened throughout to a Rockwell hardness of not less than 38 nor more than 54 on the "C" scale. The tang need not be hardened over more than the dimension "CM" (see table X of ANSI B107.4).

3.6 Powdered metal. Powdered metal tools or components shall be hardened to not less than 30 nor more than 50 on the Rockwell "C" scale, determined by averaging the readings of at least three tests taken at close proximity to one another.

3.7 Test loads. When tested as specified in 4.4.2.1, tools shall withstand the test loads specified in the applicable tables without injury or permanent deformation (set) which might affect the durability or serviceability of the tools.

3.8 Bolt and nut and opening tolerances. Bolt and nut and opening tolerances shall be such as to insure acceptance when gaged with gages conforming to Fed. Std. No. 146.

3.9 Sets. When sets of socket wrenches, sockets, handles, and attachments are required, the type, class, and size of the tools for the particular set should be specified in the contract or order (see 6.1). The components of the sets shall conform to the requirements of the respective items in this specification.

3.9.1 Cases for socket wrench sets. Unless otherwise specified (see 6.1), a case shall be furnished with each socket wrench set, and shall be designed to contain a set of wrench sockets and drivers in an orderly manner for easy selection of the socket size needed. When necessary, a separator or divider strip shall be secured to the inside bottom of the case and continue on an angle to the longitudinal centerline forming a tapered compartment for the sockets.

3.9.1.1 Dimensions. The overall dimensions of the case shall be the minimum necessary to contain the set or the size normally furnished by the supplier.

3.9.1.2 Material. Cases having a dimension no greater than 10 inches shall be made of polypropylene or ABS plastic, or 22 gage (0.0299 inch) minimum thickness sheet steel. Larger cases shall be made of 20 gage (0.0359 inch) minimum thickness sheet steel.

3.9.1.3 Construction. Lids shall be flanged 90° to overlap the sides of the case body. Bodies of cases shall be seamless (drawn construction), or seamed with welded or lock-seamed joints.

3.9.1.4 Hardware. Cases with the largest dimension not greater than 10 inches shall be furnished with continuous type hinges, and a snap catch or luggage type closure. Cases with the largest dimension between 10 and 20 inches shall have a continuous or butt type hinges, and one handle on top. Larger cases shall have a continuous or butt type hinges, and one handle on each end of the case. All hardware shall be of a size and weight suitable for the size of the case when loaded with wrench sockets and drivers.

3.9.1.5 Finish. All surfaces shall be suitably protected to prevent normal environmental corrosion.

3.9.1.6 Marking. The inside surface of the lid shall be marked or have a decal or label with a list of the component parts of the set by item name and NSN.

3.10 Finish.

3.10.1 Surface roughness. All external surfaces shall be free from pits, nodules, forge flash, burrs, cracks, and other detrimental defects. The external forge flash shall be completely removed to blend smoothly with adjacent surfaces. Maximum surface roughness values shall be determined by microinch values. Determination of microinch values shall be taken on a representative surface. Areas that are ground and buffed, or otherwise finished by an equivalent method, and provided with a coating finish of chromium (see 6.1), shall have a uniform bright finish with a maximum surface roughness in microinches using a 0.030 inch roughness width cutoff on the surface measuring instrument, conforming to chart no. 1. All surface roughness values shall be rated as the arithmetical average. Surface roughness for items oxide or phosphate coated shall not exceed 150 microinches. Definitions and nomenclature used herein can be found in ANSI B46.1.

CHART No. 1. Specific areas of finish for all drive sizes

Figure number	Minimum areas of finish
4 through 9 and 21 through 24	Outer longitudinal surfaces or major diameter thereof shall be bright with 30 microinches maximum, except where knurled or grooved. The remaining exterior longitudinal socket surface shall be 150 microinches maximum.
10	Outer longitudinal surfaces of the fork shall be bright with 30 microinches maximum. The remaining surfaces, except where knurled or grooved, shall be 150 microinches maximum.
11 and 17	At least 180° of the periphery of the head shall be bright with 30 microinches maximum. The remaining surfaces, except where knurled or grooved, shall be 150 microinches maximum.
12, 13 and 15	Surfaces, other than knurled, shall be 150 microinches maximum.
14	1/4, 3/8, and 1/2 - Surfaces, other than knurled, shall be 100 microinches maximum. 3/4 and 1 - Surfaces, other than knurled, shall be 200 microinches maximum.

CHART No. 1. Specific areas of finish for all drive sizes (con.)

Figure number	Minimum areas of finish
16A and 16B	Surfaces, other than knurled or grooved, shall be 150 microinches maximum.
18, 19, and 20	The outer longitudinal surfaces shall be bright with 30 microinches maximum. When chromium plated, except where knurled or grooved, outer longitudinal surfaces or major diameter thereof shall be bright with 30 microinches maximum. The remaining exterior longitudinal surfaces shall be 150 microinches maximum.

3.10.2 Coatings. The coatings shall be adherent, smooth, continuous and free from pits, blisters, nodules, and any other defects which would interfere with their protective value and serviceability. The minimum thickness of the coating shall be as specified in 3.10.2.1 on all external visible surfaces which can be touched by a ball 0.750 inch in diameter.

3.10.2.1 Chromium plate. The coating shall be electrodeposited metals consisting of nickel, followed by chromium, the minimum thickness shall be 0.0002 inch for nickel or iron-nickel and 0.00001 inch for chromium.

3.10.2.2 Oxide coating. The coating shall consist of a chemically produced oxide, followed with a coating of preservative oil.

3.10.2.3 Type I socket wrenches shall be oxide coated (see 3.10.2.2).

3.10.2.4 Unless otherwise specified (see 6.1), the following tools shall have a chromium plating as specified in 3.10.2.1.

(a) All type II, sockets.
(b) Type III, handles (on ratchet handles either plating or oxide coating will be accepted on moving parts except ball and spring).
(c) Type IV, classes 2, 4, and 5 attachments (on ratchet adapters either plating or oxide coating will be accepted on moving parts except ball and spring).

3.10.2.5 Type IV, class 3 may be chromium plated or oxide coated.

3.11 Type I, wrench, socket (handled).

3.11.1 Class 1, offset. Class 1 socket wrenches shall be offset having a hexagon opening and a rounded shank bent at a right angle to the axis of the opening. The socket wrenches shall be similar to figure 1 and shall conform to table I for the size specified (see 6.1).

3.11.2 Class 2, tee-handled. Class 2 wrenches shall be tee-shaped having a hexagon-nut opening at one end and a rounded shank terminating in a hexagon tang into which is fitted a removable steel rod. The tang shall be of such size as to permit a wrench to serve as a driver. The length of the removable steel rod shall correspond approximately with the overall length of the wrench. The wrench shall be similar to figure 2 and shall conform to table II for the size specified (see 6.1).

3.11.3 Class 4, double socket T-type, hexagon and square socket. Each class 4 wrench shall have a hexagonal-cut opening on one end and a square-cut opening on the opposite end. The shank shall be provided with two holes. One hole shall be located adjacent to one head end and the other hole adjacent to the opposite head end. Each hole shall be of the same size so as to accommodate a removable steel rod. The steel rod shall be at least 13-1/2 inches in length and of such diameter as to apply the test loads as specified in table III without breaking or bending to the extent of taking a permanent set. The wrenches shall be similar to figure 3 and conform to table III.

3.12 Type II, sockets.

3.12.1 Bolt clearance hole. In addition to the requirement of 3.4, a bolt clearance hole shall be provided in all type II sockets except class 4. The minimum depth for the bolt clearance hole shall be not less than 1.5 times the minimum depth of the nut opening as set forth in the respective tables for each class, style and wall thickness for regular length sockets, and not less than 70 percent of the overall length for long length sockets as measured from the face of the wrench end.

3.12.2 Class 1, hexagon (6-point).

3.12.2.1 Styles A and B, regular and long length. Styles A and B sockets shall be similar to figures 4 and 5 and shall conform to the applicable requirements shown in tables IV, V, VI, VII, and VIII for the size specified (see 6.1).

3.12.3 Class 2, double hexagon (12-point).

3.12.3.1 Styles A and B, regular and long length. Styles A and B sockets shall be similar to figures 6 and 7 and shall conform to the applicable requirements of tables IV, V, VI, VII, and VIII.

3.12.4 Class 3, square (4-point), double square (8-point). Class 3 sockets shall be similar to figure 8 and shall conform to the applicable requirements of tables IX through XI.

3.12.5 Class 4, universal joint (hexagon and double hexagon). Class 4 sockets shall be hexagon or double hexagon design. Sockets shall be provided with a friction type tension device which will hold the drive end and socket end in any set position with a force adequate to hold the socket against gravity. The tension device shall be self-compensating for normal moderate wear. Class 4 universal joint shall be capable of rotation in a complete arc when the angular deviation of either member from the common centerline is 40°. Hinge pins shall not extend beyond the periphery of the universal joint for more than 1/16 inch. If the hinge pin extends beyond the periphery, it shall not interfere with the regular operation of the universal joint. The portion of the hinge pin that extends beyond the periphery shall not have sharp edges. Class 4 universal joint sockets shall be similar to figure 9 and shall conform to tables XII and XIII for the size and drive specified (see 6.1).

3.12.6 Class 5, spark plug. Class 5 sockets shall be of the long length type and, at the option of the manufacturer, of either single hexagon or double hexagon design. A replaceable oil- and heat-resisting rubber retaining bushing or other equally suitable device shall be installed inside the socket to prevent damaging the spark plug porcelain and for aligning the spark plug for easy installation. The socket shall be similar to figure 4 or figure 7 except for the following: (1) The retaining bushing is not shown and (2) the drive end may be reduced in diameter for marking purposes and, at the option of the manufacturer, a male hexagon drive may be provided on the drive end, in addition to the female drive specified herein. The socket shall be finished in accordance with chart no. 1. The socket shall be provided with a 3/8 inch or 1/2 inch female square drive, as specified (see 6.1). The sockets shall conform to table XIV for the size of square drive specified.

3.13 Type III, handles.

3.13.1 Class 1, hinged. The class 1, hinged handle shall consist of a steel handle having a hinged socket holder permanently attached to a fork. The handle shall be integral with or detachable from the fork and provided with a comfortable and adequate handgrip. The hinged socket holder shall be suitable for operation at an angle within a range of 90° from either side of the longitudinal axis of the handle. The handle shall be provided with a friction type tension device which will hold the socket holder in any position set with a force adequate to hold the socket holder against gravity. This device shall be compensating for wear by means of spring action, but shall not be the pivot pin for the socket holder. The free end of the handle may have a transverse hole suitable for accommodating a slide rod. The hinge pin shall not extend beyond the periphery (or flat) of the fork by more than 1/16 inch. If the hinge pin extends beyond the fork, it shall not interfere with the normal operation of the head handle. The portion of the pin head that does extend beyond the fork shall not have sharp edges. The class 1 handle shall be similar to figure 10 and shall conform to table XV for the drive and length specified.

3.13.2 Class 2 handle, ratchet, reversible. Class 2 ratchet handle shall be either a gear head or clutch head type and shall consist of a handle, a head for housing the ratchet mechanism, ratchet mechanism and drive tang. The handle shall be integral with or detachable from the head and provided with a comfortable and adequate handgrip. The head shall be designed to provide a suitable housing for the ratchet mechanism and shall provide a shoulder completely around the cavity of the head for seating the plate or plates enclosing the ratcheting mechanism. Means shall be provided in the housing design so that the horizontal or side movement and vertical up and down movement of the gear shall be held within the limits of table XVI. The plate or plates shall be secured to the head in a manner which will preclude their loosening under hard usage. When screws are used for this purpose, they shall not loosen in service, but shall be capable of being readily removed, without destroying the threads, for servicing the ratchet. The housing plate shall not distort when the housing screws are tightened. Ratcheting action shall be attained by means of a completely enclosed gear having hardened teeth engaging a hardened pawl or pawls or by means of a completely enclosed clutch mechanism. Ratcheting action shall be reversible by manual movement of a shifting lever, button, or knob which permits ratcheting operation of the drive tang in either direction of rotation. The ratcheting mechanism shall be assembled to provide ease of operation and withstand the reverse torque test of 4.4.5 and the drop test of 4.4.5.2. The shifting lever, button, or knob shall be of sufficient strength to assure long life under hard usage. The shifting lever, knob, or button shall be installed in such a manner that it will not accidentally come off during use. The ratchet handle shall withstand the test loads specified without permanent angular distortion (set) of more than 5° and shall show no indication of damage or adverse effect on the ratcheting mechanism and the handle after removal of the test load. If an opening is provided for lubricating the ratchet mechanism, it shall be constructed in such a manner that dirt will not enter. The class 2 ratchet handle shall be similar to figure 11 and shall conform to table XVI.

3.13.3 Class 3, speeder.

3.13.3.1 Style A brace. Style A handles shall have a square male tang at one end, a permanently attached rotatable metal handgrip or knob at the other end, and an offset or crank between the ends having a span not less than 3-3/4 inches long for 1/2 inch drive and 3-3/8 inches long for 3/8 inch and 1/4 inch drive. The handgrip or knobs shall be constructed so that they will rotate freely without bending when subjected to the thrust loads specified in table XVI. The shank shall not extend through the end of the handgrip or knob. The handgrip and knob shall be provided with a comfortable and adequate handgrip precluding the possibility of the hand slipping or the handgrip coming off. Handles shall have a single or double revolving handgrip, be similar to figure 12, and shall conform to table XVII for the drive specified (see 6.1).

3.13.3.2 Style B, grip type, screwdriver grip. Style B handles shall consist of a steel shank having a square drive tang at one end and a handle grip at the other end. The handle grip shall be shaped so as to afford a comfortable grip and shall be secured to the shank in a manner that separation will not occur under the pulling load specified in table XXII. A square female drive shall be provided by securely fastening a metal insert into and flush with the butt end of the handle grip. A minimum of 5/32 inch nonmetallic material shall be maintained between the metal insert and the bottom of the flutes in the handle grip. The handle grip shall be made of a durable nonmetallic composition. No round handle shall have more than 6 nor less than 4 flutes. The tolerance for the handle dimensions shall be ±1/32 inch for the diameter, and ±1/16 inch for the length. The handle shall be transparent amber or yellow in color. The handle shall be chemically polished or suitably finished to provide a comfortable grip, and be free from rough edges, sharp corners, or tool marks that affect the appearance of the tool. The torsion test shall be run within one minute after the complete item has been uniformly heated to 125° F. The tang of the shank shall be firmly fixed into but not entirely through the handle grip. Style B handles shall be similar to figure 13 and shall conform to table XVIII.

3.13.4 Class 4, tee.

3.13.4.1 Style A, sliding. Style A handles shall consist of a socket holder and steel rod. The socket holder shall have a transverse hole to accommodate the rod and form a T- or L-handled tool as required. The socket holder shall have a spring-loaded steel ball or plunger detent, except that the socket holder for the 1/4 inch drive may have a durable, permanently secured steel spring. The detent or spring shall retain the socket holder at any desired point on the rod. Each end of the rod shall have a steel ball staked in place or other means of preventing the socket holder from sliding off, except that this shall not be accomplished by flattening or crimping ends of bar. Sliding T-handles shall be similar to figure 14 and shall conform to table XIX for the drive specified (see 6.1).

3.13.4.2 Style B, rigid. Style B handles shall consist of an integral T-grip shank and square drive tang, with or without a shank handgrip unless otherwise specified (see 6.1). Style B handles shall conform to table XX for the drive specified (see 6.1) and shall be similar to figure 15.

3.13.5 Class 5, impact type, nut, bolt and screw loosener and tightener. Class 5 impact type handles shall consist essentially of a handle, a square male drive tang, and a mechanism suitable for producing rotary motion at the drive tang. The design shall be such as to produce a suitable combination of torque and rotary impact in response to an axial impact blow on the end of the handle. A means shall be provided for setting the direction of the rotary motion. All working parts shall be suitably heat-treated and the handle shall be knurled on one or more bands. The design shall be such that the working parts are enclosed and that the entry of dirt and moisture and the escape of the lubricating medium shall be minimized. One-quarter and 3/8 inch square drive handles shall be similar to figure 16A. One-half inch square drive handles shall be provided with inertia weights mounted transversely similar to figure 16B which shall be capable of absorbing the reaction torque caused by a sharp blow from a 3-pound hammer. Class 5 handles shall conform to table XXI for the drive specified (see 6.1).

3.13.6 Class 6 handle, socket wrench, extension, torque transmitting, 90° head, square drive. Class 6 handles shall consist of a rotating handle that will transmit torque through the inside of the center section of handle and through a head to a square drive set at 90° to the handle. The handle shall be round and knurled and the rotating end section shall have a female square drive in the end of the same size as the male drive in the head. The handle shall also be drilled near the head for a sliding tee bar capable of transmitting the torque required. The wrench shall be designed to permit disassembly for repair and replacement of parts. Finish shall be in accordance with 3.10. The wrench shall be similar to figure 17 and shall conform to the dimensions and tests loads of table XXII.

3.14 Type IV attachments.

3.14.1 Class 2, universal joint. The class 2 attachment shall consist of a square male tang and a square female socket, each permanently attached to an intermediate member in a manner so as to form a universal type of joint. The universal joint shall be provided with a friction type tension device which will hold the drive end and socket end in any set position with a force adequate to hold the universal joint against gravity. It shall be capable of rotation in a complete arc when the angular deviation of either end member from the common center line is 40°. Hinge pins shall not extend beyond the periphery of the universal joint for more than 1/16 inch. If the hinge pin extends beyond the periphery, it shall not interfere with the regular operation of the universal joint. The portion of the hinge pin that extends beyond the periphery shall not have sharp edges. Class 2 universal joint attachments shall be similar to figure 18 and shall conform to table XXIII for the drive specified (see 6.1).

3.14.2 Class 3, attachments, socket wrench, internal (socket head set and cap screws). Class 3 socket wrench attachment shall have a square female drive at one end and a male hexagonal drive for internal wrenching at the other end. Class 3 socket wrench attachments shall be either a one piece or two piece design. The body of the attachment shall be either cylindrical or hexagonal in shape. In the two piece design, means shall be provided to secure the unit in a manner that will preclude the possibility of the parts coming loose under normal service conditions. The bit point shall show a hardness of not less than 45 nor more than 55 on a Rockwell "C" scale. Socket wrench attachments having "F" lengths of 5/32 through 3/8 inch length, the reading shall be taken approximately 1/8 inch from tip end. On longer "F" length the reading shall be taken within 1/4 inch from the tip end. The bit end shall show no distortion nor shall the corners be rounded under test load specified in table XXIV and XXV.

3.14.2.1 Style A, short bit point. Style A socket wrench attachment, in nominal sizes 9/16 through 1-1/2 inches, shall have a bolt clearance hole from the base of the square drive through the hexagon drive point. Style A attachment shall conform to table XXIV for the drive size and wrench end specified (see 6.1) and figure 19.

3.14.2.2 Style B, long bit point. Style B socket wrench attachment shall conform to table XIV for the drive and wrench end specified (see 6.1), and shall be similar to figure 20.

3.14.3 Class 4, bar extension. Class 4 extension bar shall have a square female socket at one end and a square male drive tang at the opposite end.

3.14.3.1 Style A, solid. Style A extension bar may be provided with or without a transverse hole at the female socket end for accommodating a slide rod. Style A extension bar shall conform to table XXVI for the drive size specified (see 6.1), and shall be similar to figure 21.

3.14.3.2 Style B, flexible. Style B extension shall be capable of bending 90° and returning to within 5° of its original alignment when released. Style B extension shall be capable of meeting the test load (without permanent deformation) in both clockwise and counterclockwise directions. Style B extension shall conform to table XXVII for the drive and length specified (see 6.1), and shall be similar to figure 22.

3.14.4 Class 5, adapter.

3.14.4.1 Style A, socket wrench. Style A attachment shall have a square male drive tang at one end and a square female socket at the other. Style A attachment shall conform to table XXVIII for the drive sizes specified (see 6.1), and shall be similar to figure 23.

3.14.4.2 Style B, ratchet, socket wrench. Style B ratchet adapter shall have a square male drive tang at one end and a square female socket on the other end. The ratchet mechanism shall be the reversible type permitting ratcheting operation of the drive tang in either direction of rotation. The ratchet mechanism shall be completely enclosed and assembled to provide ease of operation and shall withstand the torque test of 4.4.5. Style B ratchet adapter shall conform to table XXIX for the drive specified (see 6.1), and shall be similar to figure 24.

3.15 Workmanship. Tools and boxes shall be free from rust, fins, burrs, external sharp or rough edges, corners, surfaces, and defects which may impair their serviceability, durability, or appearance. Boxes shall have no paint runs, or unpainted surfaces, be square on all sides within 1/16 inch, and have a lid that opens and closes freely.

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 requirements, 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.

4.1.1 Inspection of materials and components. In accordance with 4.1 above, the supplier is responsible for insuring that materials and components used were manufactured, tested, and inspected in accordance with the requirements of referenced subsidiary specifications and standards to the extent specified herein, or, if none, in accordance with this specification.

4.2 Sampling for lot acceptance inspection.

4.2.1 Lot. All wrenches offered for delivery at one time shall be considered a lot for the purpose of acceptance, inspections, and tests.

4.2.2 Sampling for inspection and tests. A random sample shall be selected from each lot in accordance with the provisions of MIL-STD-105. Sampling shall be as stated in table XXI, defects are listed in table XXII.

4.2.3 Lot acceptance inspection. Lot acceptance inspection shall be applied to each item selected in accordance with 4.2.1 and 4.2.2 prior to being offered for acceptance under the contract. Lot acceptance inspection shall consist of the following:

(a) Examination (see 4.3).
(b) Tests (see 4.4).
(c) Inspection of preparation for delivery (see 4.5).

4.3 Examination and testing.

4.3.1 Examination and testing of components.

4.3.1.1 Visual and dimensional examination. An inspection lot shall consist of all like components submitted for inspection at one time. Each sample unit shall be examined for any nonconformance in design, material, dimension, finish, coating, construction, marking, and workmanship.

4.3.1.2 Testing. Each sample unit shall be tested to determine conformance with specified requirements. When specific test procedures are shown herein, these procedures shall be followed. When specific test procedures are not cited, all such procedures used shall have the approval of the Government.

4.3.2 Examination and testing of sets. An inspection lot shall consist of all sets submitted for inspection at one time. Examination and testing shall be accomplished by considering the inspection lot as being divided into sub-lots (for example, a lot of 300 sets each containing 19 components and one box shall be examined as 20 sub-lots of 300 each). A sub-lot shall consist of all like components, such as, like tools of a specific type, class, and size. Each sub-lot shall be inspected as individual components, and 4.2.3 will apply. Rejection of any sub-lot, based on the specified Acceptable Quality Level (AQL), shall constitute rejection of the entire lot.

4.4 Test procedures.

4.4.1 Hardness. Wrenches for which hardness requirements are specified shall be tested on a Rockwell tester using the procedures outline in ASTM E18 unless otherwise specified (see 3.6). If necessary, plating, decarburization, and hardened cases shall be removed before testing. When grinding to prepare the test surface, the thickness of material removed shall be 0.007 inch maximum on all machined or polished surfaces and 0.016 inch maximum on all other surfaces.

4.4.2 Load. Load tests shall be conducted on the sample sockets and tools to determine conformance with the applicable test load requirements specified in section 3.

4.4.2.1 Application of test loads. The loads shall be applied either with suitable torque-producing machines or by means of a suitable lever with dead weights or testing machine. The load shall be applied for 10 seconds and then removed. Levers and lever members, where used in testing, may have a shallow V-groove filed to make the point of load application. Care shall be exercised to maintain accuracy in applying the load and in measuring the effective lever arm through which the load acts. The effective lever arm, when the load is vertical and lever is employed, is the shortest distance in inches, between two vertical lines passing, respectively, through the point of load application and the center of the mandrel fitting the wrench opening. The specified test load shall be the product of the effective lever arm, in inches, and the applied load, in pounds. The test load shall be applied as follows.

4.4.2.1.1 Sockets. A square test plug of suitable strength and complying with the dimensional requirements of the drive tang specified in ANSI B107.4 shall be employed. The test plug may be driven by any suitable manual or mechanical means. The socket shall then be engaged on the end of a mandrel to a maximum depth in accordance with tables XXXI and/or XXXII. A stop may be set at the outer end of the test plug to prevent slippage of the socket end-wise from the mandrel.

4.4.2.1.2 Adapters. Adapter tests shall be made in the same manner as specified in 4.4.2.1.1, except that the male drive tang shall be inserted in a female drive socket and secured in a mandrel.

4.4.2.1.3 Internal wrench. Tests shall be made in the same manner as specified in 4.4.2.1.1, except that the screw engagement end of the wrench shall be inserted into a suitable mandrel. The maximum depth of the socket in the mandrel shall be equal to the depth of the socket for the size screw corresponding to the wrench.

4.4.2.1.4 Extensions.

4.4.2.1.4.1 Rigid extensions. Tests shall be made in the manner specified in 4.4.2.1.1, with the addition that the extension shall be supported against loading across its axis by a support placed at a distance near the outer end of the extension equal to two-thirds of the overall length of the extension.

4.4.2.1.4.2 Driver and extension handle. Tests shall be made in the manner specified in 4.4.2.1.4.1.

4.4.2.1.5 Sliding T-handles and ratchets. The male drive tang shall be inserted into a female drive socket secured in a mandrel. The pawl of the ratchet shall be engaged with the teeth of the gear by a normal rotation of the handle, without the need of manual adjustment of the ratcheting mechanism for seating. The load shall be applied near the free end of the handle after a stop has been set at the outer end of the driving head to prevent slippage of the driving tang endwise from the socket.

4.4.2.1.6 Speeders. Brace-type speeders shall be tested by inserting the male drive tang into the female drive socket secured in a mandrel, and supporting the end handle in line with the drive end. The load shall be applied to the crank centrally between the throws. The lever arm shall be the throw of the crank as measured by the distance between the center of the offset and the center of the body of the tool. The load in pounds that is applied shall be calculated from the throw so as to produce the required test load. Hinged swing-head-type handle test shall be made by combining the tests specified in 4.4.2.1.8 and 4.4.2.1.5. Spin-type speeders shall be tested in a manner similar to that specified in 4.4.2.1.5, with the handle gripped in the jaws of a chuck to which the test load shall be applied.

4.4.2.1.7 Hinged handles. Tests shall be made at 90° as specified in 4.4.2.1.5.

4.4.2.1.8 Universal joints. Tests shall be made in the same manner as specified in 4.4.2.1.1, except that the male drive tang shall be inserted into a female drive socket, secured in a mandrel. In addition, means shall be provided to keep the parts of the universal joint assembly in the axis about which the load is applied.

4.4.3 Measurements and preparation of reference lines for determination of permanent set. Where applicable, each sample wrench, socket, handle, or attachment shall be securely fixed in a definite position on a vertical faceplate attached to a horizontal faceplate, and a straight line shall be scribed on each sample by means of a surface gage. After the application and removal of the test load, the sample shall be placed in the same position as before on the vertical faceplate and examination for permanent set shall be made by noting any changes in the location of the reference lines. Measurements shall also be made on the samples, as stated, and changes in the dimensions after applications and removal of the test load shall be determined.

4.4.3.1 Extension (see 3.14.3). Straight lines, 90° apart, shall be scribed along the full length of the extension. The external diameter of the female socket end shall be measured with a micrometer for determination of spreading or deformation after removal of load. Observation of scribed lines shall be made for permanent deformation of the bar across its axis as well as twist about its axis.

4.4.3.2 Sliding T-handles and ratchets. Straight lines shall be scribed centrally along the full length of the assembly and along the axis of the driving head.

4.4.3.3 Universal joints. All parts of the assembly shall be arranged to be on the same axis of rotation. A reference line shall be scribed along the axis so as to mark each part of the assembly, after which the assembly shall be rotated 90° and a second line scribed.

4.4.4 Mandrels for wrench openings. Sockets and bit holders shall be tested on mandrels. Six-point hexagonal or 12-point double-hexagonal sockets shall be tested on hexagonal mandrels; 4-point square or 8-point double-square sockets on square mandrels. The size of all mandrels shall conform to dimensions and tolerances of table XXXVI. Mandrels shall be hardened to show a Rockwell number of not less than 55 on the "C" scale and shall be smoothly finished in the wrench openings. (Note: The nominal size of wrench openings shall be considered to be the same as the basic width across flats of hexagonal or square boltheads and nuts.)

4.4.5 Reverse torque, ratcheting, type III, class 2, handle, ratchet, reversible and type IV, class 5, style B attachment, adapter, ratchet, socket wrench. A test shall be applied to sample ratchet handles and adapters to determine conformance with the reverse torque ratcheting torsional moment requirements of the applicable drive size of table XX and table XXXIII respectively. Before applying the test on the sample handles and adapters, the ratchet mechanism should be revolved several times by hand.

4.4.5.1 The test load shall be conducted either by the following or by some other suitable method. A spool 2 inches in diameter shall be securely mounted in ball bearings so that the outside diameter is tangent to and in line with the pull of a securely mounted ounce measuring scale. A suitable connection shall be securely affixed to the pull of the scale and at the point of tangency of the spool. The spool shall be provided with a female square socket, applicable to the male drive tang of the tool being tested. The female socket shall be concentric with the diameter of the spool. The male drive tang shall be inserted in the female socket and the reverse action on the ratchet handle or adapter slowly applied. The maximum torsional moment of each ratchet action will be indicated in inch-ounces on the scale. Care shall be exercised to maintain accuracy in measuring the torsional moment.

4.4.5.2 Drop test for type III, class 2 ratchet handles. The ratchet handle shall be dropped on a concrete floor from a height of 6 feet, a minimum of 12 times in random positions. However, the ratchet (button) mechanism shall strike (first) on the concrete at least twice. During this test, all component parts shall remain properly assembled and the ratchet mechanism shall work satisfactorily after the last drop has been completed.

4.5 Inspection of preparation for delivery. Unless otherwise specified, inspection to determine compliance with preparation for delivery requirements shall be accomplished in accordance with PPP-P-40.

5. PREPARATION FOR DELIVERY

5.1 Preservation, packaging, packing, and marking. Preservation, packaging, packing, and marking shall be in accordance with PPP-P-40. The level of preservation, packaging, and packing shall be level A, B, or C, as specified (see 6.1).

6. NOTES

6.1 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

(a) Title, number, and date of this specification.
(b) Type, class, style, and size of tool required (see 1.2 and applicable tables and paragraph).
(c) The number of parts comprising a set, the drive size of the tools, and the size of the sockets when sets are required (see 3.9).
(d) If a case is required so specify (see 3.9.1).
(e) Length of sockets, if lengths other than shown in the tables are required.
(f) Size of square drive required for type II, class 5, spark plug socket (see 3.12.6).
(g) If socket holder or steel rod will be furnished separately (see 3.13.4.1).
(h) If shank handgrip is required for type III, class 4, style B handles (see 3.13.4.2).
(i) Applicable levels of preservation, packaging, and Packing (see 5.1).

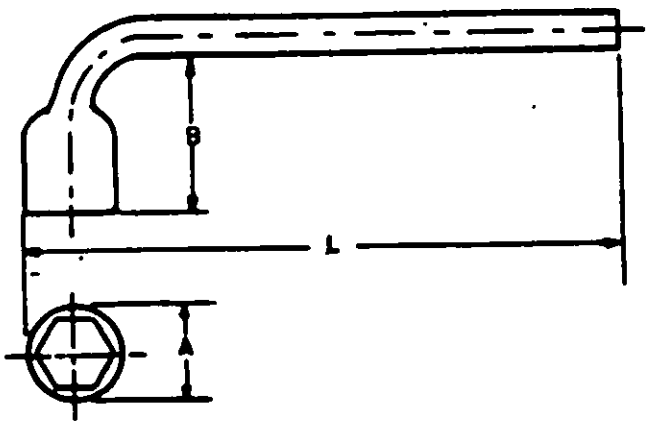

FIGURE 1. Type I, class 1 wrenches, socket (handled) offset.

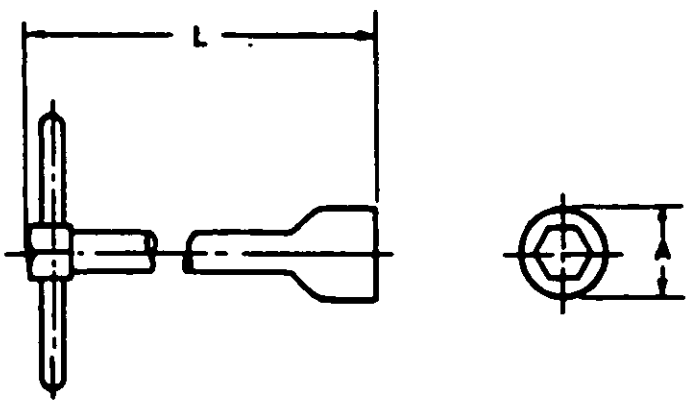

FIGURE 2. Type I, class 2 wrenches, socket tee-handled.

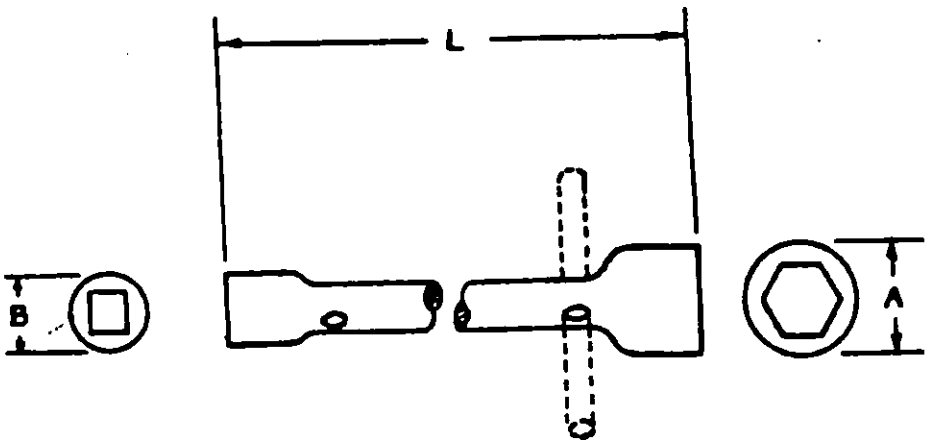

FIGURE 3. Type I, class 4 wrench, socket double socket T-type, hexagon and square female sockets.

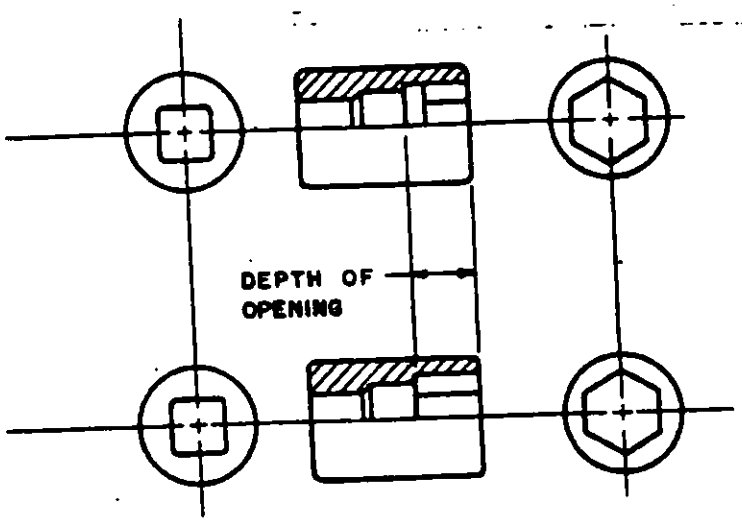

FIGURE 4. Type II, class 1, style A sockets, hexagon (6-point), regular length.

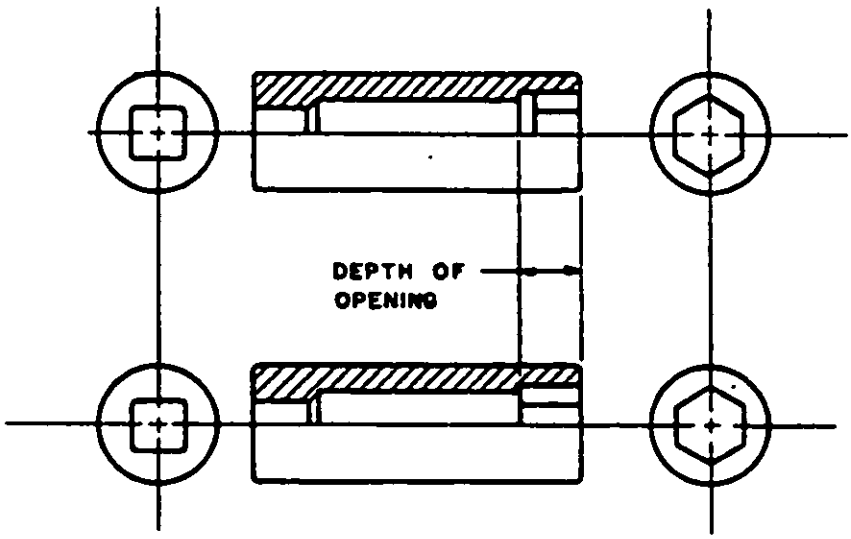

FIGURE 5. Type II, class 1, style B sockets, hexagon (6-point), long length, 1/4 inch drive.

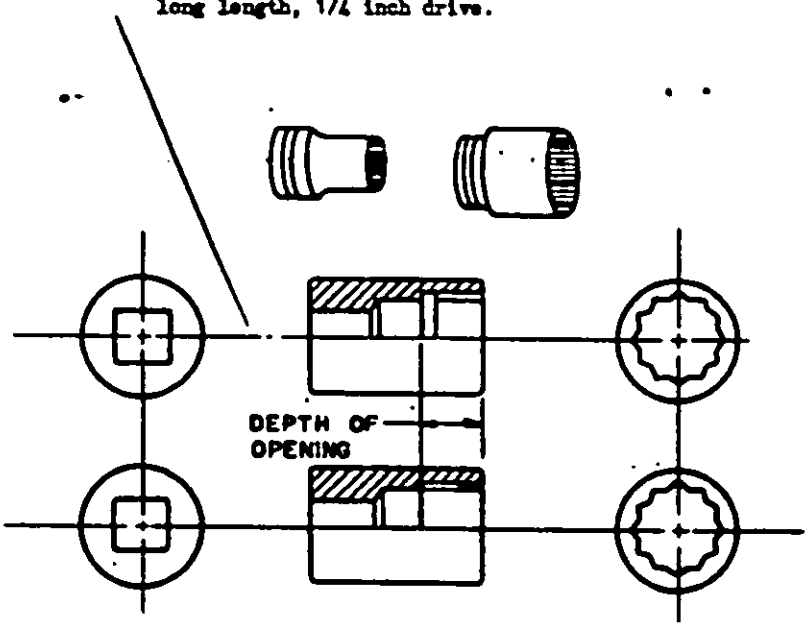

FIGURE 6. Type II, class 2, style A sockets, double hexagon (12-point), regular length.

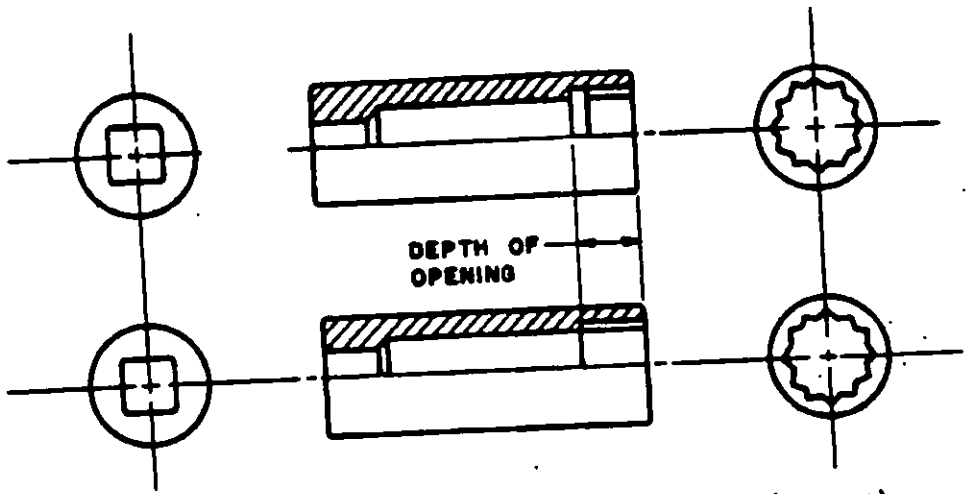

FIGURE 7. Type II, class 2, style B sockets, double hexagon (12-point), long length.

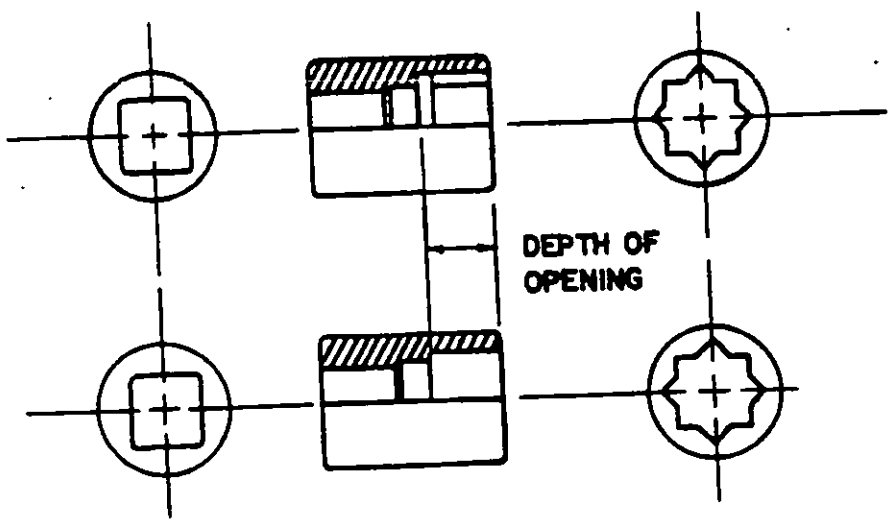

FIGURE 8. Type II, class 3 sockets, double square (8-point).

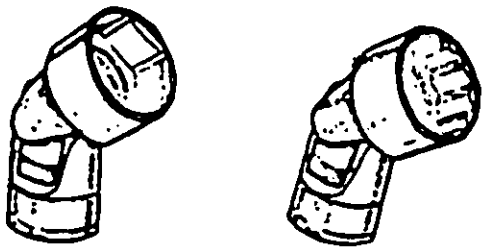

FIGURE 9. Type II, class 4 sockets, universal joint (hexagon or double hexagon).

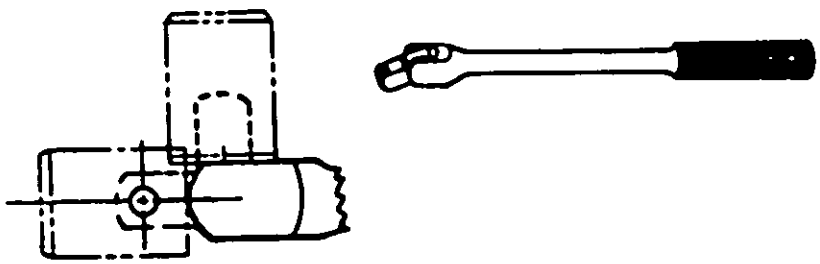

FIGURE 10. Type III, class 1 handles, hinged.

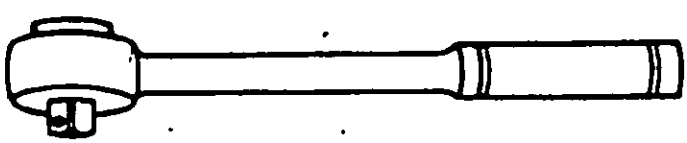

FIGURE 11. Type III, class 2 handles, ratchet, reversible.

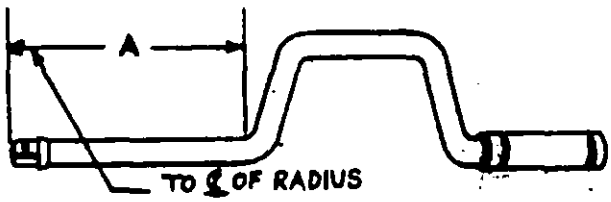

FIGURE 12. Type III, class 3, style A handle, speeder, brace type, single revolving handgrip.

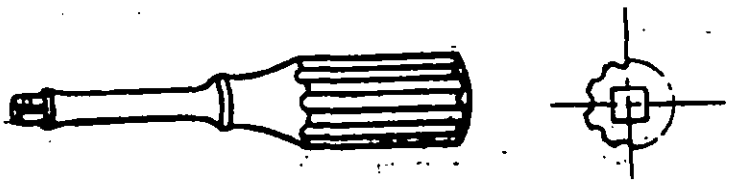

FIGURE 13. Type III, class 3, style B handles, spin type, screwdriver grip.

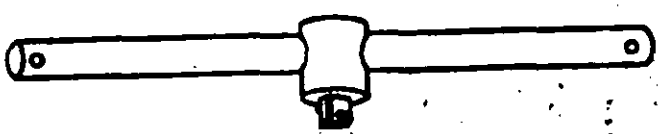

FIGURE 14. Type III, class 4, style A handles, tee, sliding.

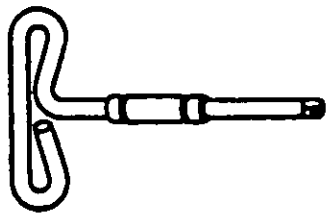

FIGURE 15. Type III, class 4, style B handles, tee, rigid.

FIGURE 16A. Type III, class 5 handles, impact, 1/4 and 3/8 inch square drive.

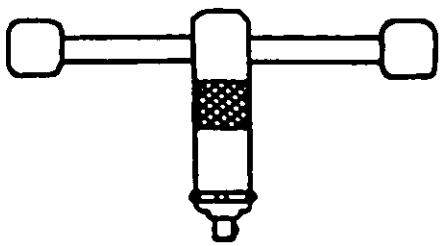

FIGURE 16B. Type III, class 5 handles, impact type, bolt, nut, and screw loosener and tightener, 1/2 inch square drive with inertia weights transversely mounted.

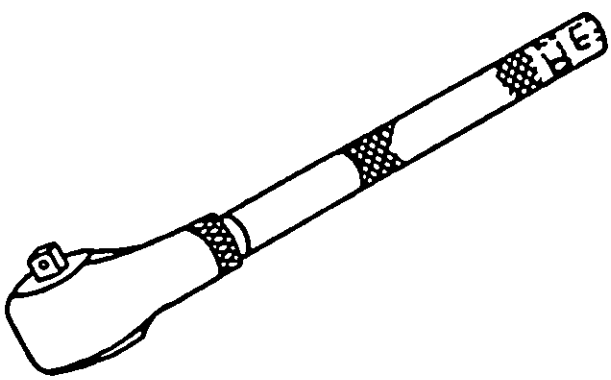

FIGURE 17. Type III, class 6 handles, socket wrench, extension, torque transmitting, 90° head, square drive.

FIGURE 18. Type IV, class 2 universal joint attachments.

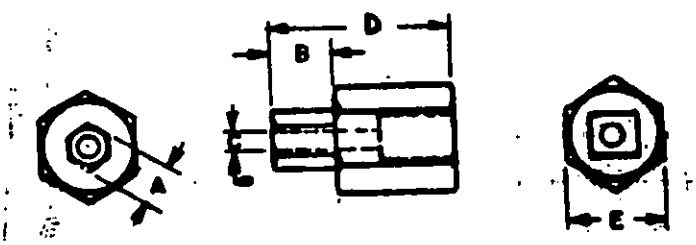

FIGURE 19. Type IV, class 3, style A attachments, socket wrench, internal (socket head set and cap screw), short bit point.

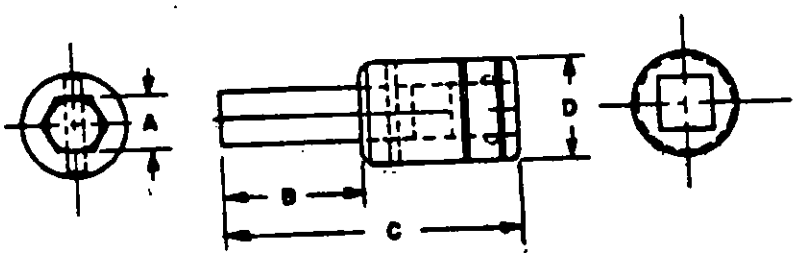

FIGURE 20. Type IV, class 3, style B attachment, socket wrench, internal (socket head set and cap screws), long bit point.

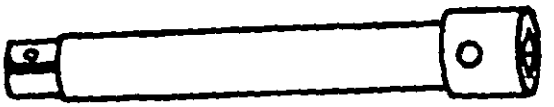

FIGURE 21. Type IV, class 4, style A attachment, bar, extension, solid.

FIGURE 22. Type IV, class 4, style B attachment, extension bar, flexible.

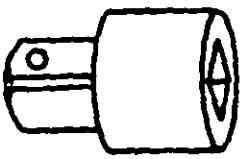

FIGURE 23. Type IV, class 5, style A attachments, adapter, socket wrench.

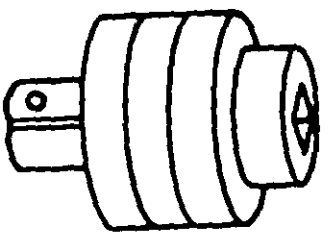

FIGURE 24. Type IV, class 5, style B attachment, adapter, ratchet, socket wrench.

TABLE I. Type I, class 1 wrenches, socket (handled) offset

Wrench opening (distance across flats)	Allowance between bolt head or nut and socket opening	Wrench opening		Overall length L	Diameter of head A	Clearance of handle from face of wrench B	Test load
		Minimum	Maximum	Minimum	Maximum	Minimum	Minimum
Inches	Inch	Inches	Inches	Inches	Inches	Inches	Inch-pounds
5/16	0.004	0.317	0.323	3-1/4	17/32	11/16	100
3/8	.004	.379	.385	3-3/4	21/32	13/16	200
7/16	.004	.441	.449	4-1/4	23/32	15/16	300
1/2	.006	.506	.512	5-1/8	25/32	1-1/4	500
9/16	.006	.568	.575	5-7/8	29/32	1-3/8	700
19/32	.006	.600	.608	5-7/8	29/32	1-3/8	800
5/8	.006	.631	.639	6-1/4	1-1/32	1-1/2	900
11/16	.006	.694	.704	6-3/4	1-5/32	1-5/8	1,100
3/4	.007	.757	.767	6-3/4	1-5/32	1-5/8	1,300
25/32	.007	.788	.798	7-1/2	1-9/32	1-3/4	1,450
13/16	.007	.820	.831	7-1/2	1-9/32	1-3/4	1,600
7/8	.007	.882	.893	8	1-13/32	2	1,900
15/16	.008	.946	.957	9	1-17/32	2-1/8	2,200
1	.008	1.008	1.020	9	1-17/32	2-1/8	2,500
1-1/16	.008	1.070	1.085	10	1-21/32	2-1/4	2,800
1-1/8	.010	1.135	1.147	10	1-21/32	2-1/4	3,500
1-1/4	.010	1.260	1.273	11	1-29/32	2-1/2	4,250
1-5/16	.011	1.323	1.337	11	1-29/32	2-1/2	5,000
1-7/16	.011	1.449	1.465	13	2-3/16	3	5,800
1-1/2	.011	1.511	1.527	13	2-3/16	3	6,500
1-5/8	.012	1.637	1.655	14-1/2	2-1/2	3-1/2	7,500
1-11/16	.012	1.699	1.717	14-1/2	2-1/2	3-1/2	8,500
1-13/16	.014	1.827	1.844	16	2-11/16	3-7/8	10,500
1-7/8	.014	1.889	1.906	16	2-11/16	3-7/8	13,000
2	.016	2.016	2.033	18	2-15/16	4-1/4	15,000
2-1/4	.017	2.267	2.284	20	3-1/16	4-3/4	17,500

TABLE II. Type I, class 2 wrenches, socket tee-handled

Nominal size of wrench (suitable for hexagon shapes of the following distances across flats)	Allowance between bolt head or nut and socket opening	Wrench openings		Overall length L	Diameter of head A	Test load
		Minimum	Maximum	Minimum	Maximum	Minimum
Inches	Inch	Inches	Inches	Inches	Inches	Inch-pounds
5/16	0.004	0.317	0.323	4	17/32	100
3/8	.004	.379	.385	4-1/4	21/32	200
7/16	.004	.441	.449	4-1/2	23/32	300
1/2	.006	.506	.512	5-1/4	25/32	500
9/16	.006	.568	.575	5-3/4	29/32	700
19/32	.006	.600	.608	5-3/4	29/32	800
5/8	.006	.631	.639	6	1-1/32	900
11/16	.006	.694	.704	6-1/8	1-5/32	1,100
3/4	.007	.757	.767	6-1/8	1-5/32	1,300
25/32	.007	.788	.798	7	1-9/32	1,450
13/16	.007	.820	.831	7	1-9/32	1,600
7/8	.007	.882	.893	7-1/16	1-13/32	1,900
15/16	.009	.946	.957	7-3/4	1-17/32	2,200
1	.009	1.009	1.020	7-3/4	1-17/32	2,500
1-1/16	.009	1.071	1.085	8-1/4	1-21/32	2,800
1-1/8	.010	1.135	1.147	8-1/4	1-21/32	3,500
1-1/4	.010	1.260	1.273	9	1-29/32	4,250
1-5/16	.011	1.323	1.337	9	1-29/32	5,000
1-7/16	.011	1.449	1.465	10	2-3/16	5,800
1-1/2	.011	1.511	1.527	10	2-3/16	6,500
1-5/8	.012	1.637	1.655	10-3/8	2-1/2	7,500
1-11/16	.012	1.699	1.717	10-3/8	2-1/2	8,500
1-13/16	.014	1.827	1.844	10-7/8	2-11/16	10,500
1-7/8	.014	1.889	1.906	10-7/8	2-11/16	13,000
2	.016	2.016	2.033	11-1/4	2-15/16	15,000
2-3/16	.016	2.203	2.222	11-1/4	3-1/16	17,500
2-1/4	.017	2.267	2.284	11-1/4	3-1/16	17,500

TABLE III. Type I, class 4 wrench, socket double socket T-type, hexagon and square female sockets

Nominal size of wrench (distance across flats)		Outside diameter		Overall length L	Test load	
					Hexagon end	Square end
Hexagon opening	Square opening	Hexagon end A	Square end B	Minimum	Minimum	Minimum
Inches	Inch	Inches	Inches	Inches	Inch-pounds	Inch-pounds
1-1/2	13/16	2-1/8	1-1/4	14-7/8	6,000	1,500

TABLE IV. Type II, class 1, styles A and B, single hexagon (6-point), regular and long length sockets, end type II, class 2, styles A and B double hexagon (12-point), regular and long length sockets, 1/4 inch drive

Nominal opening	Overall length			Outside diameter		Depth of opening nut end	Diameter of bolt clearance hole	Test load
	Regular		Long	Nut end	Drive end			
	Minimum	Maximum	Minimum	Maximum	Maximum	Minimum	Minimum	Minimum
Inches	Inch	Inches	Inches	Inch	Inch	Inch	Inch	Inch-pounds
5/32	0.750	1.010	1.930	0.281	0.510	0.094	0.093	100
3/16	.750	1.010	1.930	.315	.510	.094	.125	125
7/32	.750	1.010	1.930	.356	.510	.109	.125	150
1/4	.750	1.010	1.930	.397	.510	.125	.141	200
9/32	.750	1.010	1.930	.438	.510	.141	.172	250
5/16	.750	1.010	1.930	.510	.510	.141	.172	300
11/32	.750	1.010	1.930	.519	.519	.156	.203	450
3/8	.750	1.010	1.930	.580	.580	.156	.281	500
7/16	.750	1.010	1.930	.683	.683	.219	.281	500
1/2	.750	1.010	1.930	.697	.697	.266	.344	500

TABLE V. Type II, class 1, styles A and B, single hexagon (6-point), regular and long length sockets, and type II, class 2, styles A and B double hexagon (12-point), regular and long length sockets, 3/8 inch drive

Nominal opening	Overall length			Outside diameter		Depth of opening nut end	Diameter of bolt clearance hole	Test load
	Regular		Long	Nut end	Drive end			
	Minimum	Maximum	Minimum	Maximum	Maximum	Minimum	Minimum	Minimum
Inch	Inch	Inches	Inches	Inches	Inches	Inch	Inch	Inch-pounds
1/4	0.860	1.260	1.750	0.400	0.690	0.125	0.141	250
9/32	.860	1.260	1.750	.435	.690	.141	.156	325
5/16	.860	1.260	1.750	.470	.690	.141	.172	400
11/32	.860	1.260	1.750	.499	.690	.156	.203	675
3/8	.860	1.260	1.750	.568	.690	.156	.281	900
7/16	.860	1.260	1.750	.665	.690	.219	.281	1,250
1/2	.860	1.260	1.750	.751	.880	.266	.344	1,450
9/16	.860	1.260	1.875	.814	.880	.328	.406	1,600
5/8	.860	1.260	2.000	.890	.890	.375	.469	2,000
11/16	.980	1.260	2.125	.968	.968	.375	.469	2,000
3/4	.980	1.260	2.125	1.110	1.110	.437	.531	2,000
13/16	.980	1.406	2.500	1.141	1.141	.453	.594	2,000
7/8	.980	1.406	2.500	1.250	1.250	.500	.656	2,000

TABLE VI. Type II, class 1, styles A and B, single hexagon (6-point), regular and long lengths and type II, class 2, styles A and B, double hexagon (12-point), regular and long length sockets, 1/2 inch drive

Nominal opening	Overall length			Outside diameter		Depth of opening nut end	Diameter of bolt clearance hole	Test load
	Regular		Long	Nut end	Drive end			
	Minimum	Maximum	Minimum	Maximum	Maximum	Minimum	Minimum	Minimum
Inches	Inches	Inches	Inches	Inches	Inches	Inch	Inch	Inch-pounds
3/8	1.250	1.510	3.000	.586	.880	0.156	0.281	1,200
7/16	1.250	1.510	3.000	.720	.940	.219	.281	1,700
1/2	1.250	1.510	3.000	.757	.940	.266	.344	2,000
9/16	1.250	1.572	3.000	.820	.940	.328	.406	2,700
5/8	1.250	1.572	3.000	.892	.940	.375	.469	3,500
11/16	1.250	1.572	3.000	.974	.974	.375	.469	4,300
3/4	1.250	1.572	3.000	1.067	1.067	.437	.531	5,200
13/16	1.375	1.635	3.000	1.130	1.130	.453	.594	5,200
7/8	1.490	1.760	3.000	1.218	1.218	.500	.656	5,200
15/16	1.490	1.760	3.000	1.300	1.300	.535	.656	5,200
1	1.490	1.760	3.000	1.375	1.375	.547	.656	5,200
1-1/16	1.490	1.853	3.000	1.480	1.480	.625	.656	5,000
1-1/8	1.625	1.947	3.000	1.540	1.540	.656	.781	5,000
1-3/16	1.625	1.947	3.000	1.675	1.675	.656	.781	5,000
1-1/4	1.625	2.015	3.000	1.750	1.750	.750	.781	5,000

TABLE VII. Type II, class 1, style A, single hexagon (6-point), and class 2, styles A and B, double hexagon (12-point), regular and long length sockets, 3/4 inch drive

Nominal opening	Overall length			Outside diameter		Depth of opening nut end	Diameter of bolt clearance hole	Test load
	Regular		Long	Nut end	Drive end			
	Minimum	Maximum	Minimum	Maximum	Maximum	Minimum	Minimum	Minimum
Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inch-pounds
7/8	1.620	2.010	3.250	1.385	1.500	.500	.656	4,500
15/16	1.620	2.010	3.250	1.450	1.575	.546	.656	5,000
1	1.620	2.072	3.250	1.510	1.575	.546	.656	5,000
1-1/16	1.620	2.135	3.437	1.575	1.575	.625	.656	5,400
1-1/8	1.870	2.322	3.437	1.635	1.635	.656	.781	5,900
1-3/16	1.870	2.322	3.437	1.700	1.700	.656	.781	5,900
1-1/4	1.870	2.385	3.437	1.825	1.825	.750	.781	7,250
1-5/16	2.100	2.510	3.437	1.920	1.920	.765	.906	8,000
1-3/8	2.100	2.635	3.437	1.980	1.980	.781	.906	8,800
1-7/16	2.100	2.635	3.437	2.075	2.075	.850	.906	9,550
1-1/2	2.100	2.635	3.437	2.135	2.135	.850	1.031	10,450
1-9/16	2.100	2.760	3.437	2.260	2.260	.850	1.031	11,000
1-5/8	2.100	2.760	3.437	2.325	2.325	1.000	1.031	11,750
1-11/16	2.400	3.135	3.437	2.400	2.400	1.000	1.156	13,700
1-3/4	2.400	3.135	3.437	2.510	2.510	1.093	1.156	14,000
1-13/16	2.400	3.260	3.437	2.575	2.575	1.125	1.156	14,000
1-7/8	2.400	3.385	3.437	2.695	2.695	1.125	1.281	14,000
1-15/16	2.400	3.447	3.437	2.790	2.790	1.125	1.281	14,000
2	2.670	3.510	3.500	2.885	2.885	1.218	1.281	14,000
2-1/16	2.670	3.697	3.500	3.025	3.025	1.218	1.406	14,000
2-1/8	2.670	3.697	3.750	3.075	3.075	1.218	1.406	14,000
2-3/16	2.670	3.760	3.750	3.150	3.150	1.375	1.515	14,000
2-1/4	2.670	3.885	3.875	3.260	3.260	1.375	1.515	14,000
2-5/16	2.670	3.947	3.875	3.300	3.300	1.375	1.531	14,000
2-3/8	2.670	4.010	3.875	3.333	3.333	1.375	1.531	14,000

TABLE VIII. Type II, class 1, style A, single hexagon (6-point), and type II, class 2, style A, double hexagon (12-point), regular length sockets, 1 inch drive

Nominal opening	Overall length		Outside diameter		Depth of opening nut end	Diameter of ball clearance hole	Test load
	Regular		Nut end	Drive end			
	Minimum	Maximum	Maximum	Maximum	Minimum	Minimum	Minimum
Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inch-pounds
1-1/16	2.375	3.010	1.812	2.188	.625	.781	5,600
1-1/8	2.375	3.010	2.000	2.188	.656	.906	5,900
1-3/16	2.375	3.010	2.000	2.188	.656	.906	5,900
1-1/4	2.375	3.010	2.125	2.188	.750	.906	7,250
1-5/16	2.375	3.010	2.125	2.250	.765	.906	8,000
1-3/8	2.375	3.010	2.250	2.250	.781	.906	8,800
1-7/16	2.375	3.010	2.250	2.250	.859	.906	9,500
1-1/2	2.500	3.072	2.260	2.250	.859	1.031	10,450
1-9/16	2.500	3.135	2.322	2.250	.859	1.031	11,000
1-5/8	2.620	3.260	2.416	2.375	1.000	1.031	11,750
1-11/16	2.620	3.260	2.572	2.500	1.000	1.156	13,700
1-3/4	2.750	3.260	2.635	2.625	1.093	1.156	18,000
1-13/16	2.750	3.385	2.760	2.750	1.125	1.156	18,000
1-7/8	2.750	3.385	2.760	2.875	1.125	1.281	20,000
1-15/16	2.750	3.385	2.885	2.875	1.125	1.281	20,000
2	2.750	3.510	2.947	2.947	1.218	1.281	20,000
2-1/16	3.000	3.510	3.046	3.046	1.218	1.281	20,000
2-1/8	3.000	3.635	3.135	3.135	1.218	1.406	20,000
2-3/16	3.000	3.760	3.135	3.135	1.375	1.531	20,000
2-1/4	3.000	3.885	3.260	3.260	1.375	1.531	20,000
2-5/16	3.000	3.947	3.325	3.325	1.375	1.531	20,000
2-3/8	3.000	4.010	3.385	3.385	1.375	1.531	20,000
2-7/16	3.250	4.135	3.447	3.447	1.375	1.656	20,000
2-1/2	3.250	4.385	3.572	3.572	1.375	1.656	20,000
2-9/16	3.250	4.447	3.572	3.572	1.375	1.656	20,000
2-5/8	3.500	4.635	3.760	3.760	1.500	1.781	20,000
2-3/4	3.500	4.885	3.885	3.885	1.750	1.781	20,000
2-13/16	3.500	4.885	4.010	4.010	1.750	1.906	20,000
2-15/16	3.500	4.885	4.135	4.135	1.750	1.906	20,000
3	3.750	5.010	4.135	4.135	2.000	2.031	22,000
3-1/8	3.750	5.010	4.385	4.385	2.000	2.031	22,000
3-1/4	3.750	5.010	4.510	4.510	2.000	2.281	22,000
3-3/8	3.750	5.010	4.635	4.635	2.200	2.281	22,000
3-1/2	4.250	5.510	4.760	4.760	2.200	2.281	22,000
3-3/4	4.250	5.510	5.135	5.135	2.200	2.531	22,000
3-7/8	4.250	5.510	5.260	5.260	2.500	2.531	22,000
4	4.250	6.010	5.437	5.437	2.500	2.781	22,000
4-1/8	4.250	6.010	5.640	5.640	2.500	2.781	22,000
4-1/4	4.250	6.010	5.828	5.828	2.500	3.031	22,000
4-1/2	4.250	6.010	6.010	6.010	2.500	3.031	22,000

TABLE IX. Type II, class 3 sockets, square and double square (4 and 8 point), 1/4 inch drive

Nominal opening		Overall length	Outside diameter		Depth of opening nut end	Diameter of bolt clearance hole	Test load
4 point	8 point		Nut end	Drive end			
		Maximum	Maximum	Maximum	Minimum	Minimum	Minimum
Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch-pounds
3/16	——	1	0.433	0.510	0.093	1/8	125
7/32	——	1	.471	.510	.109	1/8	150
——	1/4	1	.510	.510	.125	9/64	200
——	5/16	1	.572	.572	.140	11/64	300
——	3/8	1	.696	.696	.156	9/32	550

TABLE X. Type II, class 3 sockets, double square (8-point), 3/8 inch drive

Nominal opening	Overall length	Outside diameter		Depth of opening nut end	Diameter of bolt clearance hole	Test load
		Nut end	Drive end			
	Maximum	Maximum	Maximum	Minimum	Minimum	Minimum
Inch	Inches	Inches	Inches	Inch	Inch	Inch-pounds
1/4	1-1/4	0.572	0.690	0.125	9/64	250
5/16	1-1/4	.625	.690	.140	11/64	400
3/8	1-1/4	.739	.937	.156	9/32	900
7/16	1-1/4	.833	1.000	.218	9/32	1,250
1/2	1-1/4	.942	1.135	.265	11/32	1,450
9/16	1-1/4	1.051	1.135	.328	13/32	1,600
5/8	1-1/4	1.130	1.250	.375	15/32	2,000
11/16	1-1/4	1.190	1.310	.375	15/32	2,000

TABLE XI. Type II, class 3 sockets, double square (8-point), 1/2 inch drive

Nominal opening	Overall length	Outside diameter		Depth of opening nut end	Diameter of bolt clearance hole	Test load
		Nut end	Drive end			
	Maximum	Maximum	Maximum	Minimum	Minimum	Minimum
Inch	Inches	Inches	Inches	Inch	Inch	Inch-pounds
3/8	1-9/16	0.799	0.947	0.156	9/32	1,600
7/16	1-9/16	.833	1.010	.218	9/32	1,700
1/2	1-9/16	.942	1.135	.265	11/32	2,000
9/16	1-9/16	1.051	1.135	.328	13/32	2,700
5/8	1-3/4	1.130	1.260	.375	15/32	3,600
11/16	1-3/4	1.225	1.322	.375	15/32	4,300
3/4	1-3/4	1.317	1.385	.437	17/32	5,000
13/16	1-3/4	1.440	1.447	.453	19/32	5,000
7/8	1-7/8	1.523	1.572	.500	21/32	5,000
15/16	1-7/8	1.650	1.650	.546	21/32	5,000
1	2	1.760	1.760	.546	21/32	5,000

TABLE XII. Type II, class 4 sockets, universal joint hexagon or double hexagon), 3/8 inch drive

Nominal opening	Overall length	Outside diameter		Depth of opening nut end	Test load
		Nut end	Drive end		
	Maximum	Maximum	Maximum	Minimum	Minimum
Inch	Inches	Inches	Inch	Inch	Inch-pounds
3/8	1.813	0.690	0.790	0.156	450
7/16	1.843	.791	.790	.218	625
1/2	1.875	.791	.820	.265	725
9/16	1.937	.820	.820	.312	750
5/8	2.000	.885	.885	.343	750
11/16	2.015	1.070	.885	.375	750
3/4	2.062	1.070	.885	.406	750
7/8	2.125	1.220	.937	.500	750

TABLE XIII. Type II, class 4 sockets, universal joint (hexagon or double hexagon), 1/2 inch drive

Nominal opening	Overall length	Outside diameter		Depth of opening nut end	Test load
		Nut end	Drive end		
	Maximum	Maximum	Maximum	Minimum	Minimum
Inch	Inches	Inches	Inches	Inch	Inch-pounds
1/2	2.406	0.773	1.010	0.266	1,000
9/16	2.484	.854	1.010	.328	1,250
5/8	2.515	.947	1.010	.375	1,500
11/16	2.609	1.048	1.046	.375	1,750
3/4	2.875	1.105	1.125	.437	1,750
13/16	2.937	1.197	1.125	.453	1,750
7/8	2.937	1.273	1.125	.500	1,750

TABLE XIV. Type II, class 5 spark plug (single or double hexagon)

Nominal opening	Female square drive	Overall length	Depth of opening nut end	Diameter of spark plug clearance hole	Outside diameter	Test load
		Minimum	Minimum	Minimum	Maximum	Minimum
Inch	Inch	Inches	Inch	Inch	Inches	Inch-pounds
13/16	3/8	2-1/4	7/32	3/4	1.080	1,800
13/16	1/2	2-1/4	7/32	3/4	1.080	1,800
5/8	3/8	2-1/4	3/16	15/32	.880	1,500
5/8	1/2	2-1/4	3/16	15/32	.880	1,500

TABLE XV. Type III, class 1 handles, hinged

Drive	Overall length		Dimension across hinge	Handgrip		Test load	Shank-handle 1/ (cross-section or diameter)
	Minimum	Maximum	Maximum	Length	Diameter or width	Minimum	Maximum
Inch	Inches	Inches	Inches	Inches	Inch	Inch-pounds	Inch
1/4	4-7/8	6	5/8	1-1/2	3/8	600	9/16
3/8	7	10	7/8	2-1/4	1/2	1,200	25/32
1/2	9	13-1/2	1-3/16	3	11/16	4,000	29/32
1/2	14-1/2	19	1-3/16	3	11/16	4,000	29/32
3/4	17-3/4	23	1-25/32	3-1/2	3/4	9,000	1-1/4
1	22	———	2-1/4	3-1/2	13/16	15,000	1-1/4

1/Thir measurement shall be taken at the mid-point of the handle's overall length.

TABLE XVI. Type III, class 2 handles, ratchet, reversible

Drive	Overall length	Head dimensions		Hand grip	Gear head	Horizontal or side movement of gear in handle	Vertical or up and down movement of gear in gear	Reverse torque ratcheting starting (torsional moment for each tooth of gear)	Test load	Shank handle 1/ (diameter or cross-section)
		Width	Head thickness less tang and reverse lever	Diameter	Number of teeth in gear					
	Minimum	Maximum	Maximum	Minimum	Minimum	Maximum	Maximum	Maximum	Minimum	Maximum
Inch	Inches	Inches	Inches	Inch		Inch	Inch	Inch-ounces	Inch-pounds	Inch
1/4	4	1-1/8	9/16	9/32	18	0.012	0.020	10	450	9/16
3/8	6	1-7/8	7/8	1/2	18	.014	.020	25	1,800	25/32
1/2	9	1-15/16	1	1/2	24	.014	.028	50	5,000	29/32
3/4	17	2-7/8	1-3/8	3/4	24	.014	.034	200	12,000	1-9/16
1	20	3-7/8	1-3/4	3/4	24	.014	.034	300	22,000	1-11/16

1/ This measurement shall be taken at the mid-point of the handle's overall length.

TABLE XVII. Type III, class 3, style A handle, speeder, brace type

Drive	Diameter of rod	Overall length		Radius of crank sweep	Length extension A	Thrust load on end handle	Test load on offset handle rotating direction
	Maximum	Minimum	Maximum	Minimum	Minimum	Minimum	Minimum
Inch	Inch	Inches	Inches	Inches	Inches	Pounds	Inch-pounds
1/4	5/16	12	16-1/2	2-1/2	5	50	200
3/8	7/16	14	18	2-7/8	5	100	675
1/2	9/16	16	20	3-3/8	5-1/2	125	1,075

TABLE XVIII. Type III, class 3, style B handles, spin type, screwdriver grip

Drive	Length of shank beyond handle minimum	Handle length		Test loads, minimum	
		Minimum	Maximum	Pull load on shank	Torque load
Inch	Inches	Inches	Inches	Pounds	Inch-pounds
1/4	2	2-5/8	4	50	140

TABLE XIX. Type III, class 4, style A handles, tee, sliding

Drive	Sliding rod				Socket holder		Test load
	Diameter		Length		Overall length		
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
Inch	Inch	Inches	Inches	Inches	Inches	Inches	Inch-pounds
1/4	0.230	0.313	4	5	5/8	1	225
3/8	.355	.438	6	8	1	1-3/8	500
1/2	.480	.625	9	13	1-1/2	1-3/4	2,250
3/4	.730	.875	17	20	2	2-3/8	4,750
1	.855	1.125	20	32	2-3/4	3-1/2	7,500

TABLE XX. Type III, class 4, style B handles, tee, rigid

Drive	Overall length	Width at T-grip handle	Test load
	Minimum	Minimum	Minimum
Inch	Inches	Inches	Inch-pounds
1/4	6	3-1/2	250
3/8	12	4-1/2	1,050

TABLE XXI. Type III, class 5 handles, impact type, nut, bolt, and screw loosener and tightener

Drive	Handle diameter		Total length of knurl	Overall length	Weight	Nominal capacity hexagon socket	Torque test		
	Minimum	Maximum	Minimum	Maximum	Maximum		Cap screw size	Torque	Hammer
Inch	Inches	Inches	Inches	Inches	Pounds	Inches	Inch	Foot-pounds	Pounds
1/4	1-1/4	1-3/4	3/4	5-1/4	1-5/8	1/2	5/16	15	3/4
3/8	1-1/4	1-3/4	3/4	5-1/4	1-5/8	13/16	3/8	25	1
1/2	1-1/2	1-3/4	1-1/2	7	5	1-1/4	3/4	125	3

TABLE XXII. Type III, class 6 handle, socket wrench extension, torque transmitting, 90° head, square drive

Square drive	Overall length	Head dimensions		Handgrip diameter	Test load
		Head width	Head thickness less tang		
	Minimum	Maximum	Maximum	Minimum	Minimum
Inch	Inches	Inches	Inches	Inch	Inch-pounds
1/4	8-1/2	1-1/8	1-1/8	1/2	450
3/8	9-3/4	1-5/16	1-1/4	11/16	1,500
1/2	10-1/2	1-11/16	1-9/16	7/8	4,500

TABLE XXIII. Type IV, class 2 universal joint attachments

Drive	Overall length	Diameter	Test load
	Maximum	Maximum	Minimum
Inch	Inches	Inches	Inch-pounds
1/4	1.375	0.593	250
3/8	2.188	.750	750
1/2	2.781	1.000	1,750
3/4	4.250	1.625	4,000

TABLE XXIV. Type IV, class 3, style A attachments, socket wrench, internal (socket head set and cap screw), short bit point

Drive size	Wrench end					Adapter		Test load
	Distance across flats A			Length hexagon B	Bolt clearance hole C	Overall length D	Distance across flats or diameter of body approximate E	
	Nominal	Maximum	Minimum	Minimum	Minimum	Maximum		Minimum
Inch	Inches	Inches	Inches	Inch	Inches	Inches	Inches	Inch-pounds
1/4	1/8	0.1250	0.123	5/32	———	1-1/8	1/2	45
1/4	5/32	.1563	.153	3/16	———	1-1/8	1/2	85
3/8	3/16	.1875	.184	7/32	———	1-1/8	11/16	150
3/8	7/32	.2188	.215	7/32	———	1-1/8	11/16	250
3/8	1/4	.2500	.246	9/32	———	1-5/16	11/16	350
3/8	5/16	.3125	.308	9/32	———	1-5/16	11/16	750
3/8	3/8	.3750	.371	3/8	———	1-1/2	11/16	1,200
1/2	3/8	.3750	.371	3/8	———	1-1/2	31/32	1,200
1/2	7/16	.4375	.433	3/8	———	1-1/2	31/32	1,850
1/2	1/2	.5000	.495	———	———	1-1/2	31/32	2,700
1/2	9/16	.5625	.557	———	25/64	1-1/2	31/32	3,800
3/4	9/16	.5625	.557	———	25/64	1-1/2	1-11/16	3,800
3/4	5/8	.6250	.620	———	29/64	1-3/4	1-11/16	5,400
3/4	11/16	.6875	.681	———	29/64	1-3/4	1-11/16	7,200
3/4	3/4	.7500	.744	———	33/64	1-3/4	1-11/16	8,500
3/4	7/8	.8750	.869	———	33/64	1-3/4	1-11/16	9,000
1	1	1.0000	.993	———	41/64	2	2	9,500
1	1-1/8	1.1250	1.118	———	49/64	2	2	10,000
1	1-1/4	1.2500	1.243	———	49/64	2	2	15,600
1	1-5/16	1.3125	1.305	———	57/64	2	2	16,400
1	1-3/8	1.3750	1.368	———	57/64	2	2	20,000
1	1-1/2	1.5000	1.493	———	1-1/64	2	2	20,000

TABLE XXV. Type IV, class 3, style B attachment, socket wrench, internal (socket head set and cap screws), long bit point

Drive size	Wrench end				Overall length C	Test load
	Distance across flats A			Length hexagon B		
	Nominal	Maximum	Minimum	Minimum	Minimum	Minimum
Inch	Inch	Inch	Inch	Inch	Inches	Inch-pounds
1/4	1/8	0.125	0.122	15/16	1-15/16	50
1/4	5/32	.1562	.153	15/16	1-15/16	100
3/8	3/16	0.1875	0.184	15/16	1-15/16	200
3/8	7/32	.2188	.215	15/16	1-15/16	300
3/8	1/4	.2500	.246	15/16	1-15/16	400
3/8	5/16	.3125	.308	15/16	1-15/16	1,000
3/8	3/8	.3750	.371	15/16	1-15/16	1,900
1/2	3/8	.3750	.371	15/16	1-15/16	1,900
1/2	7/16	.4375	.433	15/16	2-3/8	3,500
1/2	1/2	.5000	.495	15/16	3	3,000
1/2	9/16	.5625	.557	15/16	3-1/4	5,400
3/4	7/16	.4375	.433	15/16	3-1/4	2,500
3/4	9/16	.5625	.557	15/16	3-1/2	5,400
3/4	5/8	.6250	.620	15/16	3-5/8	6,000
3/4	3/4	.7500	.744	15/16	4-1/4	8,500

TABLE XXVI. Type IV, class 4, style A attachment, bar, extension, solid

Drive and nominal length	Diameter shank	Overall length		Test load
	Maximum	Minimum	Maximum	Minimum
	Inches	Inches	Inches	Inch-pounds
1/4 inch drive:				
2 inches	11/32	2	3-1/2	500
6 inches	11/32	5	6-1/2	500
3/8 inch drive:				
1-3/4 inches	1/2	1-5/8	2	1,200
3 inches	1/2	2-1/2	3-3/4	1,200
6 inches	1/2	5-1/2	6-1/2	1,200
9 inches	1/2	7-1/2	10-1/2	1,200
11 inches	1/2	10-1/2	12-1/2	1,200
18 inches	1/2	17	20	1,200
1/2 inch drive:				
2 inches	21/32	2	3	3,500
5 inches	21/32	4-1/2	6	3,500
10 inches	21/32	9-1/2	10-1/2	3,500
20 inches	21/32	18	20-1/2	3,500
30 inches	21/32	28	32	3,500
36 inches	21/32	34	38	3,500
48 inches	21/32	46	50	3,500
3/4 inch drive:				
3 inches	1	2-1/2	4	9,000
8 inches	1	7-1/2	8-1/2	9,000
16 inches	1	15	17	9,000
1 inch drive:				
8 inches	1-3/8	7-1/2	9	15,000
17 inches	1-3/8	16	18	15,000

TABLE XXVII. Type IV, class 4, style B attachment, extension bar flexible

Drive size	Overall length		Test load
	Minimum	Maximum	Minimum
Inch	Inches	Inches	Inch-pounds
1/4	3-1/2	4-1/2	35
1/4	5-1/2	6-1/2	35

TABLE XXVIII. Type IV, class 5, style A attachments, adapter, socket wrench

Socket wrench					
Drive sizes		Overall length		Outside diameter	Test load
Male drive tang	Socket opening (female)	Minimum	Maximum	Maximum	Minimum
Inch	Inch	Inches	Inches	Inches	Inch-pounds
3/8	1/4	5/8	1	5/8	450
1/4	3/8	5/8	1-1/8	11/16	450
1/2	3/8	1-3/32	1-1/2	7/8	2,000
3/8	1/2	1-1/4	1-1/2	1	2,000
3/4	1/2	1-1/2	1-15/16	1-1/8	4,500
1/2	3/4	1-11/16	2-1/8	1-1/2	4,500
3/4	1	2-1/4	2-7/8	2	14,000
1	3/4	2	2-5/8	1-1/2	14,000

TABLE XXIX. Type IV, class 5, style B attachment, adapter, ratchet, socket wrench

Drive	Outside diameter socket end	Overall length	Number of teeth in gear	Reverse torque ratcheting-starting (torsional moment for each tooth of gear)	Weight	Test load
	Maximum	Maximum	Minimum	Maximum	Maximum	Minimum
Inch	Inches	Inches		Inch-ounces	Pounds	Inch-pounds
1/4	1-1/4	2	18	10	7/16	400
3/8	1-7/16	2-1/8	18	25	7/16	1,500
1/2	1-3/4	3	18	60	3/4	4,000
3/4	2-5/8	4	18	120	3	7,500
1	3-1/2	5-1/8	18	300	7	15,000

TABLE XXX. Sampling data

Category	Sample unit	Inspection level	AQL for major defectives	AQL for minor defectives	AQL expressed in terms of
Visual	One component each	S-4	4.0	6.5	Percent defective
Dimensional and testing	One component each	S-3	4.0	6.5	Percent defective

TABLE XXXI. Classification of defects

Defects	Classification	
	Major	Minor
Type, class, style, form, or size not as specified.	X	
Material, coating, marking not as specified.	X	
Roughness height value 20 percent greater than specified.	X	
Roughness height value greater than specified by less than 20 percent		X
Decimal dimensions for drive end dimensions out of tolerance (including fractions with decimal tolerance).	X	
Other dimensions out of tolerance by 5 percent or more of allowable dimension.	X	
Other dimensions out of tolerance by less than 5 percent of allowable dimension.		X
Discontinuity in coating.		X
Item marking readable but not clear.		X
Any failure to conform to specified requirements that may affect usability.	X	
Any failure to conform to specified requirements that is not likely to affect usability.		X

TABLE XXXII. Hexagon mandrel dimensions and maximum depth of mandrel insertion (inches)

Nominal size of wrench opening	Hexagon mandrel dimensions		Maximum depth of mandrel insertion
	Across flats tolerances	Across corners minimum	
5/32	+.001 -.002	.1745	.094
3/16	+.001 -.002	.2095	.094
7/32	+.001 -.002	.2440	.109
1/4	+.001 -.002	.2780	.125
9/32	+.001 -.002	.3133	.141
5/16	+.001 -.002	.3495	.141
11/32	+.001 -.002	.3860	.156
3/8	+.001 -.002	.4225	.156
7/16	+.001 -.002	.4935	.218
1/2	+.001 -.003	.5635	.265
9/16	+.001 -.003	.6339	.328
5/8	+.001 -.003	.7055	.375
11/16	+.001 -.003	.7769	.375
3/4	+.001 -.003	.8485	.437
13/16	+.001 -.003	.9201	.453
7/8	+.001 -.003	.9917	.500
15/16	+.001 -.003	1.0631	.546
1	+.001 -.003	1.1297	.546
1-1/16	+.001 -.003	1.2013	.625
1-1/8	+.001 -.003	1.2728	.656
1-3/16	+.001 -.003	1.3443	.656
1-1/4	+.001 -.003	1.416	.750
1-5/16	+.001 -.003	1.487	.765
1-3/8	+.001 -.003	1.559	.781
1-7/16	+.001 -.003	1.631	.875
1-1/2	+.001 -.003	1.702	.875
1-9/16	+.001 -.007	1.770	.875
1-5/8	+.001 -.007	1.841	1.000
1-11/16	+.001 -.007	1.912	1.000
1-3/4	+.001 -.007	1.983	1.093
1-13/16	+.001 -.007	2.054	1.125
1-7/8	+.001 -.007	2.124	1.125
1-15/16	+.001 -.007	2.195	1.125
2	+.001 -.007	2.266	1.218
2-1/16	+.001 -.007	2.337	1.218
2-1/8	+.001 -.007	2.408	1.218
2-3/16	+.001 -.007	2.479	1.375
2-1/4	+.001 -.007	2.549	1.375
2-5/16	+.001 -.007	2.621	1.375
2-3/8	+.001 -.007	2.691	1.375
2-7/16	+.001 -.007	2.762	1.375
2-1/2	+.001 -.007	2.833	1.375
2-9/16	+.001 -.008	2.903	1.375
2-5/8	+.001 -.008	2.974	1.500
2-3/4	+.001 -.008	3.116	1.750
2-13/16	+.001 -.008	3.187	1.750
2-15/16	+.001 -.008	3.328	1.750

TABLE XXXII. Hexagon mandrel dimensions and maximum depth of mandrel insertion (inches) (con.)

Nominal size of wrench opening	Hexagon mandrel dimensions		Maximum depth of mandrel insertion
	Across flats tolerances	Across corners minimum	
3	+.001 -.008	3.399	2.000
3-1/8	+.001 -.008	3.541	2.000
3-1/4	+.001 -.010	3.682	2.000
3-3/8	+.001 -.010	3.824	2.000
3-1/2	+.001 -.010	3.966	2.200
3-3/4	+.001 -.010	4.249	2.200
3-7/8	+.001 -.010	4.391	2.500
4	+.001 -.010	4.532	2.500
4-1/8	+.001 -.010	4.674	2.500
4-1/4	+.001 -.010	4.816	2.500
4-1/2	+.001 -.010	5.099	2.500
4-5/8	+.001 -.012	5.240	3.000
4-7/8	+.001 -.012	5.524	3.000
5	+.001 -.012	5.665	3.250

TABLE XXXIII. Square mandrel dimensions and maximum depth of mandrel insertion (inches)

Size across flats	Across flats tolerance	Across corners minimum	Maximum depth of mandrel insertion
3/16	±.001 -.003	0.2577	.093
7/32	±.001 -.003	.3006	.109
1/4	±.001 -.003	.3436	.125
5/16	±.001 -.003	.4294	.140
3/8	±.001 -.003	.5153	.156
7/16	±.001 -.003	.6012	.218
1/2	±.001 -.003	.687	.265
9/16	±.001 -.003	.773	.328
5/8	±.001 -.003	.859	.375
11/16	±.001 -.003	.945	.375
3/4	±.001 -.003	1.031	.437
13/16	±.001 -.003	1.117	.453
7/8	±.001 -.003	1.202	.500
15/16	±.001 -.003	1.288	.546
1	±.001 -.003	1.374	.546

MILITARY INTERESTS:

DOD has waived coordination on revisions and amendments to this Federal Specification until further notice.

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