

GGG-W-660A
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 SUPERSEDING
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 November 29, 1954

FEDERAL SPECIFICATION

SOCKET, SOCKET WRENCH AND ATTACHMENTS

(FOR POWER DRIVEN IMPACT WRENCHES)

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 sockets and attachments used with power driven impact wrenches and nut runners.

1.1.1 Federal specification coverage. This Federal specification does not include all types of sockets or attachments as indicated by the title or which are commercially available, but is intended to cover the types generally used for Federal Government requirements.

1.2 Classification.

1.2.1 Types, classes, styles, and sizes. Sockets and attachments shall be of the following types, classes, styles, and sizes as specified (see 6.1):

Sockets:

Type I - Sockets.

- Class 1 - Hexagon (6-point).
 - Style A - Regular length.
 - Style B - Long length.
- Class 2 - Double square (8-point).
 - Style A - Regular length.
 - Style B - Long length.
- Class 3 - Single square (4-point).
 - Style A - Regular length.
 - Style B - Long length.
- Class 4 - Universal joint, hexagon (6-point).
- Class 5 - Tapping screw, hexagon (6-point).
 - Style A - Regular length.
 - Style B - Long length.

Sizes - The size of all type I sockets shall be the size of the square drive end and the nominal size of socket as shown in the applicable tables.

Attachments:

- Type II - Bars, extension.
- Type III - Adaptors.
- Type IV - Universal-joint attachment.
- Type V - Double male adapter.

Sizes - The size of the attachments shall include the following data as shown in the applicable tables.

- Type II - Size of drive end and nominal length.
- Type III - Size of male drive end and female drive end.
- Type IV - Size of drive end.
- Type V - Size of square drive end.

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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:

PPP-P-40 - Packaging and Packing of Hand Tools.

Federal Standard:

Fed. Std. No. 346 - Gages, Wrench Opening.

(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, 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 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 specified, the issue in effect on the date of invitation for bids or request for proposal shall apply.

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

B46.1 - Surface Texture.

(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 herein are descriptive and not restrictive and are not intended to preclude the purchase of sockets and attachments otherwise conforming to this specification.

3.2 Material. The material used in the manufacture of the sockets and attachments shall be alloy steel conforming to specified requirements except the type I, class 5 wrenches may be made of alloy steel with carbide inserts.

3.2.1 Izod impact values. The average izod impact values of materials for sockets and attachments, except for type I, class 5, shall be as shown in table I.

TABLE I. Izod impact values¹

Rockwell C	Izod foot-pounds
Minimum	Minimum
35	37
38	28
40	22
45	12
50	7

¹Intermediate izod values are to be interpolated.

3.3 Hardness. Sockets and attachments, except for type I, class 5, shall be hardened and tempered, and shall have a hardness value for the various sizes within the range shown in table II.

TABLE II. Hardness

Drive size	Rockwell C	
	Minimum	Maximum
<u>Inches</u>		
1/4 thru 5/8	38	55
3/4 thru 1-1/2	35	48

3.3.1 Hardness of type I, class 5 sockets. Type I, class 5 sockets shall be either hardened and tempered or casehardened having a hardness equivalent to Rockwell C 50 to 68.

3.4 Finish.

3.4.1 Surface roughness. All surfaces shall be free from pits, nodules, burrs, cracks, machine marks, or other defects that may effect appearance or serviceability. All external surfaces shall have a roughness height value of 200 microinches or better (see 4.4.3).

3.4.2 Coating. The sockets and attachments shall be coated with a heavy chemically produced phosphate or oxide coating followed with a coating of rust-preventative oil. The coatings shall be adherent, smooth, continuous, and free from uncoated areas, pits, blisters, nodules, and any other defects which would interfere with their protective value and serviceability.

3.5 Marking for identification. Sockets and attachments shall be marked in a plain and permanent manner with the manufacturer's name or with a U. S. registered trademark of such known character that the source of manufacture may be readily determined. In addition, sockets shall be marked in a like manner with the nominal size of the socket as shown in the applicable tables.

3.6 Drive ends. The drive ends of all sockets and attachments, except the type V attachments, shall be square shaped and either male or female style and of the size as specified (see 6.2), be similar to figure 1, and conform to the dimensions shown in table III. It is intended that the data shown in this table agrees with ANSI B107.4. The drive ends shall be capable of being inserted into and detached from the mating end by applying a force as shown for the applicable size in table III.

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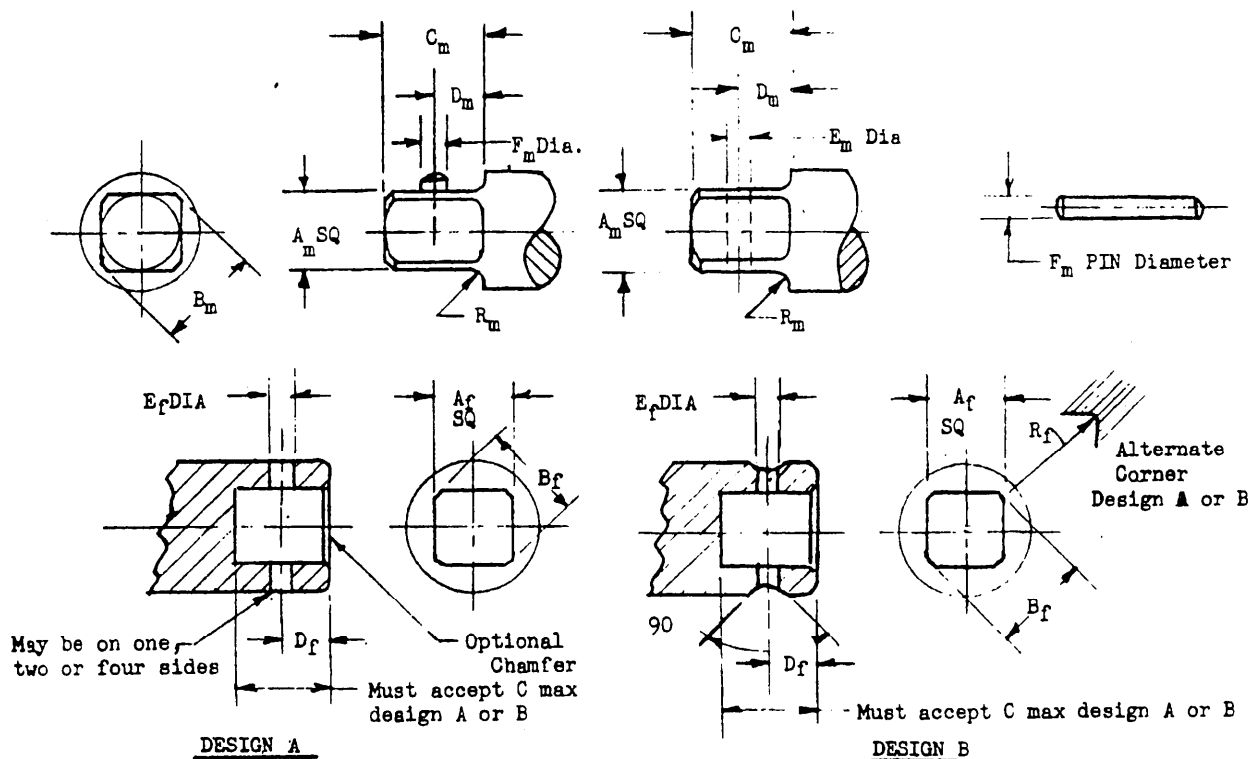


FIGURE 1. Drive end dimensions.

TABLE III. Drive-end dimensions (in inches)

Drive size inch	Design	A _f		B _f	D _f		E _f	R _f
		Max.	Min.	Min.	Max.	Min.	Min.	Max.
1/4	A	0.258	0.253	0.335	0.159	0.150	0.118	--
3/8	A	0.383	0.378	0.508	0.221	0.209	0.204	--
1/2	A	0.508	0.503	0.673	0.315	0.303	0.220	--
5/8	A	0.633	0.628	0.843	0.315	0.303	0.250	--
3/4	B	0.758	0.753	1.008	0.403	0.391	0.250	0.047
1	B	1.009	1.004	1.350	0.590	0.578	0.280	0.062
1-1/2	B	1.510	1.505	1.984	0.645	0.633	0.337	0.125

Drive size inch	A _m		B _m	C _m		D _m		E _m	F _m	R _m		Min. force to remove tang in lbs.
	Max.	Min.	Max.	Max.	Min.	Max.	Min.	Min.	Max.	Max.	Min.	
1/4	0.252	0.247	0.330	0.312	0.265	0.165	0.156	--	0.078	0.031	0.015	1.5
3/8	0.377	0.372	0.500	0.438	0.406	0.230	0.218	--	0.140	0.051	0.031	4.0
1/2	0.502	0.497	0.665	0.625	0.531	0.324	0.312	--	0.156	0.062	0.031	6.0
5/8	0.627	0.622	0.834	0.656	0.594	0.334	0.322	--	0.156	0.062	0.047	8.0
3/4	0.752	0.747	1.000	0.938	0.750	0.421	0.409	0.250	0.188	0.094	0.047	10.0
1	1.001	0.997	1.340	1.125	1.000	0.608	0.596	0.250	0.188	0.125	0.063	12.0
1-1/2	1.503	1.498	1.968	1.625	1.562	0.653	0.641	0.345	0.250	0.125	0.094	--

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3.6.1 Male end drives. The type II, III, IV, and V attachments shall incorporate, on the male end, the following method to assure positive retention of the socket or other attachment:

Drive tangs $1/4$ to $5/8$ inch, inclusive, shall be provided with a spring-loaded plunger permanently secured in place.

Drive tangs $3/4$ to $1-1/2$ inches, inclusive, shall be provided with a transverse hole to accommodate the socket retaining pin.

Each drive tang shall be shouldered to provide a positive stop for the socket or attachment.

3.6.2 Female end drives. The female end drives shall be broached, punched, or machined in a well-defined manner. Drive openings $1/4$ to $5/8$ inch, inclusive, shall be firmly attachable to the corresponding size male drive end by the following method:

One or more faces of the drive opening shall have a drilled hole to engage the spring-loaded steel ball or plunger of the corresponding drive tang.

Drive openings $3/4$ to $1-1/2$ inches, inclusive, shall be firmly attachable to the corresponding size male drive end by the following method:

Two opposing faces of the drive opening shall be provided with an aligned transverse hole to accommodate the socket retaining pin.

3.6.3 Retaining pin and ring. One retaining pin and one retaining ring shall be attached to each socket or attachment with a female end drive $3/4$ inch size or larger.

3.6.3.1 Retaining pin. Retaining pin shall be of steel. Pin diameters shall be as specified in table III. Overall length of pins shall not exceed root diameters of retaining grooves shown in table III.

3.6.3.2 Retaining ring. Retaining ring shall be of synthetic rubber impervious to oil and of such size as to fit around the socket and to hold the retaining pin in place.

3.7 Type I sockets.

3.7.1 Internal surfaces. All internal surfaces of the nut or bolt end and the female drive end shall be machined finished in a smooth and well defined manner. The lead-in edges of these surfaces shall be chamfered on all sockets except the class 5 sockets.

3.7.2 Bolt clearance hole. All type I, classes 1, 2, and 3, and styles A and B sockets shall have a bolt clearance hole concentric with the axis center line of the socket (see figure 2). The size of the hole shall be as specified in the applicable table for the type, class, style, and size of socket specified. The depth of the hole, for style A sockets, shall be 1.5 times the depth of socket (D), and for the style B sockets, it shall be 70 percent (minimum) of the overall length of the socket (A).

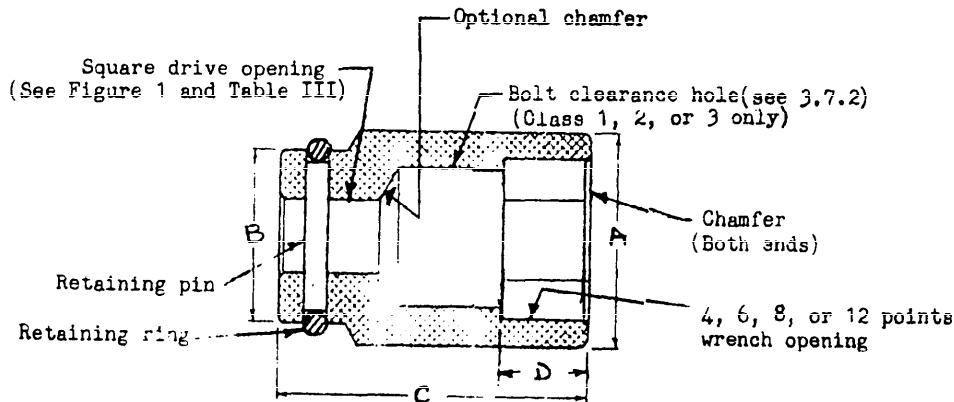


FIGURE 2. Typical socket dimensions.

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3.7.3 Nut or bolt end openings. The distance across flats of the nut or bolt end openings for all sockets of all different drive sizes shall be the nominal size (inch) as specified (see 6.1) and shall be tested as specified in 4.3.1.

3.7.4 Class 1, hexagon (6-point).

3.7.4.1 Style A, regular length; style B, long length. Style A and style B sockets shall be similar to figure 2 and shall conform to the applicable dimensions shown in tables IV through X.

TABLE IV. Type I, class 1, styles A and B, hexagon (6-point), regular-length and long length sockets, 1/4 inch drive

Nominal size of socket	Overall length C		Outside diameter				Depth of socket D	Diameter bolt clearance hole
	Style A	Style B	Nut end A		Drive end B			
	Maximum	Minimum	Minimum	Maximum	Minimum	Maximum	Minimum	Minimum
<u>Inch</u>	<u>Inches</u>	<u>Inches</u>	<u>Inch</u>	<u>Inch</u>	<u>Inch</u>	<u>Inch</u>	<u>Inch</u>	<u>Inch</u>
		...	0.30	0.36	0.42	0.50	0.05	0.12
3/16	1.01	...	.37	.44	.42	.50	.08	.15
1/4	1.01	1.93	.44	.50	.49	.50	.10	.17
5/16	1.01	1.93	.44	.53	.49	.53	.11	.21
11/32	1.01	...	.49	.56	.49	.56	.11	.28
3/8	1.01	1.93	.52	.63	.49	.63	.20	.28
7/16	1.01	...	.61	.63	.49	.63	.20	.34
1/2	1.01	...	.67	.71	.67	.71	.20	

TABLE V. Type I, class 1, styles A and B, hexagon (6-point), regular-length and long length sockets, 3/8 inch drive

Nominal size of socket	Overall length C		Outside diameter				Depth of socket D	Diameter bolt clearance hole
	Style A	Style B	Nut end A		Drive end B			
	Maximum	Minimum	Minimum	Maximum	Minimum	Maximum	Minimum	Minimum
<u>Inch</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inch</u>	<u>Inches</u>	<u>Inch</u>	<u>Inch</u>
5/16	1.19	1.43	0.47	0.51	0.67	0.76	0.10	0.171
11/32	1.19	1.43	.49	.55	.67	.76	.11	.219
3/8	1.19	1.43	.52	.60	.67	.76	.11	.281
7/16	1.19	1.43	.61	.69	.67	.76	.20	.281
1/2	1.19	1.43	.69	.82	.70	.82	.20	.343
9/16	1.26	1.43	.77	.88	.77	.88	.24	.406
5/8	1.26	1.43	.86	.94	.86	.94	.28	.469
11/16	1.26	1.43	.86	1.01	.86	1.01	.31	.469
3/4	1.26	1.43	1.02	1.07	.86	1.07	.35	.531

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TABLE VI. Type I, class 1, styles A and B, hexagon (6-point), regular-length and long length sockets, 1/2 inch drive

Nominal size of socket	Overall length C		Outside diameter				Depth of socket D	Diameter bolt clearance hole
	Style A	Style B	Nut end A		Drive end B			
	Maximum	Minimum	Minimum	Maximum	Minimum	Maximum	Minimum	Minimum
<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inch</u>	<u>Inch</u>
3/8	1.80	3.18	0.59	0.66	0.86	1.13	0.11	0.281
7/16	1.80	3.18	.67	.73	.86	1.13	.20	.281
1/2	1.80	3.18	.75	.81	.86	1.13	.20	.344
9/16	1.80	3.18	.83	.89	.86	1.13	.24	.406
5/8	1.80	3.18	.91	1.01	.92	1.13	.28	.469
11/16	1.80	3.18	.99	1.13	.99	1.13	.31	.469
3/4	1.80	3.18	1.09	1.26	1.09	1.26	.35	.531
13/16	1.81	3.18	1.17	1.26	1.11	1.26	.41	.594
7/8	1.96	3.43	1.24	1.32	1.11	1.32	.47	.594
15/16	2.10	3.43	1.33	1.44	1.24	1.44	.49	.656
1	2.10	3.43	1.42	1.51	1.29	1.51	.49	.656
1-1/16	2.41	3.43	1.49	1.57	1.30	1.57	.49	.687
1-1/8	2.41	3.43	1.55	1.63	1.30	1.63	.63	.781
1-1/4	2.41	...	1.67	1.78	1.30	1.79	.63	.812

TABLE VII. Type I, class 1, styles A and B, hexagon (6-point), regular-length and long-length sockets, 5/8 inch drive

Nominal size of socket	Overall length C		Outside diameter				Depth of socket D	Diameter bolt clearance hole
	Style A	Style B	Nut end A		Drive end B			
	Maximum	Minimum	Minimum	Maximum	Minimum	Maximum	Minimum	Minimum
<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inch</u>	<u>Inches</u>
1/2	1.88	3.18	0.80	0.88	1.05	1.32	0.20	0.344
9/16	1.88	3.18	.84	.94	1.05	1.32	.24	.406
5/8	1.88	3.18	.92	1.02	1.11	1.32	.28	.469
11/16	1.88	3.18	1.01	1.13	1.11	1.32	.31	.469
3/4	1.88	3.18	1.10	1.22	1.18	1.32	.35	.531
13/16	1.88	3.18	1.18	1.27	1.18	1.32	.41	.594
7/8	2.04	3.18	1.26	1.38	1.26	1.38	.47	.594
15/16	2.19	3.43	1.34	1.44	1.30	1.46	.49	.656
1	2.19	3.43	1.42	1.51	1.34	1.53	.49	.656
1-1/16	2.57	3.43	1.49	1.63	1.39	1.63	.49	.687
1-1/8	2.57	3.43	1.55	1.69	1.39	1.69	.63	.781
1-1/4	2.57	3.43	1.74	1.82	1.49	1.82	.63	.812
1-5/16	2.66	3.43	1.85	1.94	1.49	1.86	.74	.937
1-3/8	2.66	3.43	1.92	2.01	1.49	2.01	.74	.937
1-7/16	2.82	3.43	1.99	2.13	1.49	2.13	.74	1.000
1-1/2	2.97	3.43	2.0	2.15	1.49	2.15	.84	1.062

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TABLE VIII. Type I, class 1, styles A and B, hexagon (6-point), regular-length and long length sockets, 3/4 inch drive

Nominal size of socket	Overall length C		Outside diameter				Depth of socket D	Diameter bolt clearance hole
	Style A	Style B	Nut end A		Drive end B			
	Maximum	Minimum	Minimum	Maximum	Minimum	Maximum	Minimum	Minimum
<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inch</u>	<u>Inches</u>
1/2	2.13	2.93	0.80	0.94	1.49	1.63	0.20	0.344
9/16	2.13	2.93	.99	1.01	1.49	1.63	.24	.406
5/8	2.13	2.93	1.08	1.10	1.49	1.63	.28	.469
11/16	2.13	2.93	1.14	1.16	1.49	1.63	.31	.469
3/4	2.13	2.93	1.14	1.26	1.49	1.69	.35	.531
13/16	2.26	2.93	1.14	1.38	1.49	1.69	.41	.594
7/8	2.26	2.93	1.23	1.63	1.49	1.69	.47	.594
15/16	2.38	2.93	1.30	1.63	1.49	1.82	.49	.656
1	2.38	2.93	1.42	1.63	1.49	1.94	.49	.656
1-1/16	2.51	2.93	1.48	1.70	1.49	1.94	.49	.687
1-1/8	2.51	2.93	1.62	1.76	1.49	2.07	.63	.781
1-1/4	2.63	3.18	1.74	2.19	1.67	2.19	.63	.812
1-5/16	2.63	3.18	1.79	2.19	1.67	2.19	.74	.937
1-3/8	2.76	3.18	1.93	2.19	1.67	2.19	.74	.937
1-7/16	2.76	3.18	1.93	2.32	1.67	2.32	.74	1.000
1-1/2	2.76	3.43	2.05	2.38	1.67	2.39	.84	1.062
1-5/8	2.76	3.43	2.24	2.51	1.67	2.51	.84	1.125
1-11/16	2.76	...	2.49	2.51	1.67	2.63	.97	1.187

TABLE IX. Type I, class 1, styles A and B, hexagon (6-point), regular-length and long length socket, 1 inch drive

Nominal size of socket	Overall length C		Outside diameter				Depth of socket D	Diameter of bolt clearance hole
	Style A	Style B	Nut end A		Drive end B			
	Maximum	Minimum	Minimum	Maximum	Minimum	Maximum	Minimum	Minimum
<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>
3/4	2.44	2.93	1.28	1.44	1.99	2.13	0.35	0.531
13/16	2.51	2.93	1.36	1.51	1.99	2.13	.41	.594
7/8	2.51	2.93	1.41	1.54	1.99	2.13	.47	.594
15/16	2.57	2.93	1.48	1.60	1.99	2.13	.49	.656
1	2.57	2.93	1.49	1.76	1.99	2.13	.49	.656
1-1/16	2.69	2.93	1.52	1.76	1.99	2.19	.49	.687
1-1/8	2.69	2.93	1.55	1.82	1.99	2.19	.63	.781
1-1/4	2.76	2.93	1.99	2.19	1.99	2.19	.63	.812
1-5/16	2.88	3.18	2.05	2.19	1.99	2.19	.74	.937
1-3/8	2.94	3.18	2.11	2.32	1.99	2.32	.74	.937
1-7/16	2.94	3.18	2.11	2.32	1.99	2.32	.74	1.000
1-1/2	3.01	3.43	2.24	2.38	1.99	2.38	.84	1.062
1-5/8	3.07	3.43	2.36	2.51	1.99	2.51	.84	1.125
1-11/16	3.26	3.43	2.49	2.63	1.99	2.63	.97	1.187
1-13/16	3.26	3.43	2.74	2.82	2.24	2.82	.99	1.250
1-7/8	3.26	3.43	2.74	2.82	2.24	2.82	1.06	1.312
2	3.44	3.68	2.86	3.07	2.24	3.07	1.06	1.375
2-1/16	3.51	3.68	2.90	3.07	2.24	3.07	1.16	1.437
2-3/16	3.57	3.93	3.11	3.26	2.36	3.26	1.19	1.500
2-1/4	3.63	3.93	3.24	3.38	2.36	3.26	1.27	1.562
2-3/8	3.76	4.06	3.36	3.51	2.36	3.38	1.30	1.562
2-7/16	3.88	4.31	3.49	3.51	2.36	3.51	1.35	1.687
2-9/16	4.01	4.68	3.61	3.76	2.36	3.63	1.38	1.750
2-5/8	4.01	4.68	3.61	3.76	2.36	3.76	1.46	1.812
2-3/4	4.26	4.81	3.74	4.01	2.36	4.01	1.49	1.875
2-13/16	4.38	4.93	3.99	4.01	2.36	4.13	1.55	1.937
2-15/16	4.63	5.06	3.99	4.13	2.36	4.13	1.60	1.937
3	4.63	5.06	4.11	4.26	2.36	4.26	1.67	2.125
3-1/8	4.76	5.31	4.11	4.38	2.36	4.26	1.70	2.125
3-3/8	4.76	5.43	4.24	4.76	2.36	4.63	1.87	2.375
3-1/2	5.38	5.56	4.74	4.76	2.36	4.76	1.91	2.375

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TABLE X. Type I, class 1, style $\frac{1}{2}$, hexagon (6-point), regular-length socket, 1-1/2 inch drive

Nominal size of socket	Overall length C	Outside diameter				Depth of socket D	Diameter of bolt clearance hole
		Nut end A		Drive end B			
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Minimum
<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>
1-3/8	4.38	2.36	2.76	2.99	3.26	0.74	0.937
1-7/16	4.38	2.42	2.76	2.99	3.26	.74	1.000
1-1/2	4.38	2.49	2.88	2.99	3.26	.84	1.062
1-5/8	4.38	2.74	3.01	2.99	3.26	.84	1.125
1-11/16	4.38	2.80	3.01	2.99	3.26	.97	1.187
1-13/16	4.38	3.11	3.14	3.11	3.26	.99	1.250
1-7/8	4.38	3.11	3.14	3.11	3.26	1.06	1.312
2	5.26	3.24	3.26	3.24	3.26	1.06	1.375
2-1/16	5.45	3.24	3.51	3.24	3.51	1.16	1.437
2-3/16	5.45	3.24	3.51	3.24	3.51	1.19	1.500
2-1/4	5.72	3.36	3.76	3.24	3.76	1.27	1.562
2-3/8	5.78	3.49	3.88	3.24	3.88	1.30	1.562
2-7/16	5.78	3.49	3.88	3.24	3.88	1.35	1.687
2-9/16	5.78	3.74	4.01	3.24	4.01	1.38	1.750
2-5/8	5.78	3.86	4.14	3.24	4.13	1.46	1.812
2-3/4	6.15	4.11	4.26	3.24	4.26	1.49	1.875
2-13/16	6.15	4.24	4.38	3.24	4.26	1.56	1.937
2-15/16	6.30	4.49	4.51	3.24	4.51	1.60	1.937
3	6.48	4.49	4.76	3.24	4.51	1.67	2.125
3-1/8	6.48	4.74	4.76	3.24	4.76	1.70	2.125
3-3/8	6.48	4.99	5.01	3.24	5.13	1.87	2.375
3-1/2	6.48	5.11	5.26	3.24	5.13	1.91	2.375

3.7.5 Class 2, double square (8-point).

3.7.5.1 Style A, regular length; style B, long length. Style A and style B sockets shall be similar to figure 2 and shall conform to the applicable dimensions shown in tables XI through XIV.

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TABLE XI. Type I, class 2, styles A and B, double square (8-point), regular and long length, and class 3, style B, single square (4-point), long length, 1/2 inch drive

Nominal size of socket	Overall length C			Outside diameter				Depth of socket D	Diameter bolt clearance hole
	Class 2 (8-point)		Class 3 (4-point)	Nut end A		Drive end B			
	Style A	Style B	Style B						
	Maximum	Minimum	Minimum	Minimum	Maximum	Minimum	Maximum		
<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inch</u>	<u>Inch</u>
3/8	1.80	3.18	3.18	0.69	0.76	0.86	1.01	0.11	0.281
7/16	1.80	3.18	3.18	.80	.86	.92	1.01	.20	.281
1/2	1.80	3.18	3.18	.89	.97	.92	1.04	.20	.344
9/16	1.80	3.18	3.18	.99	1.04	.99	1.13	.24	.406
5/8	1.80	3.18	...	1.09	1.16	1.10	1.19	.28	.469
11/16	1.80	3.18	...	1.17	1.26	1.17	1.26	.31	.469
3/4	1.80	3.18	...	1.30	1.34	1.11	1.38	.35	.531
13/16	1.80	3.18	...	1.36	1.44	1.11	1.44	.41	.594
7/8	1.80	3.18	...	1.49	1.57	1.24	1.57	.47	.594
15/16	2.10	3.43	...	1.60	1.66	1.30	1.69	.49	.656
1	2.10	3.43	...	1.67	1.76	1.30	1.76	.49	.656
1-1/16	2.10	...	...	1.82	1.84	1.82	1.84	.49	.687

TABLE XII. Type I, class 2, styles A and B, double square (8-point), regular and long length, and class 3, styles A and B, single square (4-point), regular and long length, 5/8 inch drive

Nominal size of socket	Overall length				Outside diameter				Depth of socket D	Diameter bolt clearance hole
	Class 2 (8-point)		Class 3 (4-point)		Nut end A		Drive end B			
	Style A	Style B	Style A	Style B						
	Maximum	Minimum	Maximum	Minimum	Minimum	Maximum	Minimum	Maximum		
<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inch</u>	<u>Inch</u>	
9/16	1.88	3.18	1.88	3.18	1.00	1.13	1.17	1.32	0.24	0.406
5/8	1.88	3.18	1.88	3.18	1.11	1.22	1.17	1.32	.28	.469
11/16	1.88	3.18	...	...	1.20	1.32	1.24	1.32	.31	.469
3/4	1.88	3.18	...	...	1.30	1.38	1.30	1.38	.35	.531
13/16	1.88	3.18	...	...	1.39	1.51	1.30	1.51	.41	.594
7/8	1.88	3.18	...	...	1.49	1.63	1.30	1.63	.47	.594
15/16	2.19	3.43	...	...	1.60	1.69	1.49	1.76	.49	.656
1	2.19	3.43	1.70	1.82	1.49	1.88	.49	.656
1-1/16	2.51	3.43	1.83	1.88	1.49	2.01	.49	.687
1-1/8	2.51	3.43	1.92	2.01	1.49	2.13	.63	.781

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TABLE XIII. Type I, class 2, styles A and B, double square (8-point), regular and long length, and class 3, styles A and B, single square (4-point), regular and long length, 3/4 inch drive

Nominal size of socket	Overall length C				Outside diameter				Depth of socket D	Diameter bolt clearance hole
	Class 2 (8-point)		Class 3 (4-point)		Nut end A		Drive end B			
	Style A	Style B	Style A	Style B						
	Maximum	Minimum	Maximum	Minimum	Minimum	Maximum	Minimum	Maximum			Minimum
<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inch</u>	<u>Inches</u>
1/2	2.26	2.93	2.26	2.93	0.99	1.07	1.49	1.63	0.20	0.344
9/16	2.26	2.93	2.26	2.93	1.14	1.16	1.49	1.63	.24	.406
5/8	2.26	2.93	2.26	2.93	1.24	1.26	1.49	1.63	.28	.469
11/16	2.26	2.93	2.26	2.93	1.33	1.35	1.49	1.63	.31	.469
3/4	2.32	2.93	2.32	2.93	1.49	1.63	1.49	1.63	.35	.531
13/16	2.45	2.93	2.45	2.93	1.61	1.69	1.61	1.76	.41	.594
7/8	2.45	2.93	...	...	1.74	1.76	1.61	1.82	.47	.594
15/16	2.45	2.93	...	...	1.80	1.82	1.61	1.82	.49	.656
1	2.60	2.93	...	...	1.92	2.13	1.61	2.13	.49	.656
1-1/16	2.60	2.93	...	...	1.99	2.13	1.74	2.13	.49	.687
1-1/8	2.76	2.93	...	...	2.11	2.32	1.74	2.32	.63	.781
1-1/4	2.76	2.93	...	...	2.36	2.44	1.74	2.44	.63	.812
1-5/16	2.76	2.93	2.49	2.69	1.74	2.69	.74	.937
1-7/16	2.76	2.61	2.69	1.74	2.69	.74	1.000
1-1/2	2.76	2.74	2.82	1.74	2.82	.84	1.062

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TABLE XIV. Type I, class 2, styles A and B, double square (8-point), regular and long length, and class 3, styles A and B, single square (4-point), regular and long length, 1 inch drive

Nominal size of socket	Overall length C				Outside diameter				Depth of socket D	Diameter bolt clearance hole
	Class 2 (8-point)		Class 3 (4-point)		Nut end A		Drive end B			
	Style A	Style B	Style A	Style B						
	Maximum	Minimum	Maximum	Minimum	Minimum	Maximum	Minimum	Maximum			Minimum	Minimum
<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>
3/4	2.51	2.93	2.51	2.93	1.61	1.88	1.99	2.13	0.35	0.531
13/16	2.57	2.93	2.57	2.93	1.74	1.94	1.99	2.13	.41	.594
7/8	2.57	2.93	2.57	2.93	1.99	2.01	1.99	2.13	.47	.594
15/16	2.63	2.93	2.63	2.93	2.05	2.07	1.99	2.13	.49	.656
1	2.63	2.93	2.63	2.93	2.11	2.19	1.99	2.19	.49	.656
1-1/16	2.76	2.93	2.76	2.93	2.11	2.26	1.99	2.26	.49	.687
1-1/8	2.76	2.93	2.76	2.93	2.24	2.32	2.11	2.32	.63	.781
1-1/4	2.82	3.00	...	...	2.36	2.44	2.11	2.44	.63	.812
1-5/16	2.94	3.18	...	...	2.49	2.63	2.11	2.63	.74	.937
1-3/8	3.01	3.18	...	...	2.61	2.63	2.24	2.63	.74	.937
1-7/16	3.07	3.18	...	...	2.61	2.69	2.24	2.69	.74	1.000
1-1/2	3.07	3.43	...	...	2.74	2.76	2.24	2.76	.84	1.062
1-5/8	3.07	3.43	...	...	2.99	3.01	2.24	2.88	.84	1.125
1-11/16	3.26	3.43	...	...	3.11	3.13	2.24	2.88	.97	1.187
1-13/16	3.32	3.43	...	...	3.24	3.26	2.24	2.88	.99	1.250
1-7/8	3.37	3.43	...	...	3.36	3.38	2.24	2.88	1.06	1.312
2	3.37	3.43	...	...	3.61	3.63	2.24	2.88	1.06	1.375
2-1/16	3.44	3.68	...	...	3.61	3.63	2.24	2.88	1.16	1.437
2-3/16	3.57	3.81	...	...	3.86	3.88	2.24	2.88	1.19	1.500
2-1/4	3.57	3.93	...	...	3.86	3.88	2.24	2.88	1.27	1.562
2-3/8	3.69	3.93	...	...	4.11	4.13	2.36	3.13	1.30	1.562
2-9/16	3.88	...	...	...	4.36	4.38	2.36	3.38	1.38	1.750
2-3/4	4.07	...	...	...	4.49	4.63	2.36	3.51	1.49	1.875

3.7.6 Class 3, single square (4-point).

3.7.6.1 Style A, regular length; style B, long length. Style A and style B sockets shall be similar to figure 2 and shall conform to the applicable dimensions shown in tables XI through XIV.

3.7.7 Class 4, universal-joint, hexagon (6-point). Universal-joint sockets shall consist of a hexagon socket in one member and a square drive opening in the other member, designed to permit rotation in a complete arc with any angular deviation of at least 15° of either member from the center line of the other member. Joints shall be similar to figure 3 and shall conform to the applicable dimensions shown in tables XV and XVI.

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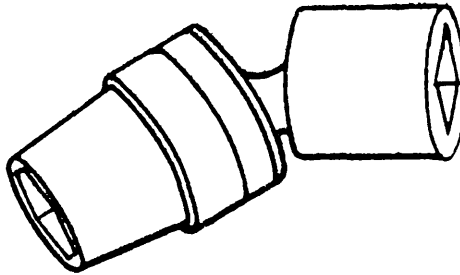


FIGURE 3. Type I, class 4, universal joint, hexagon (6-point), socket.

TABLE XV. Type I, class 4, universal joint, hexagon (6-point), 3/8 inch drive

Nominal size of socket	Overall length C	Outside diameter				Depth of socket D
		Nut end A		Drive end B		
		Maximum	Minimum	Maximum	Minimum	
<u>Inch</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inch</u>	<u>Inch</u>	<u>Inch</u>
3/8	2.51	0.52	0.76	0.67	0.88	0.117
7/16	2.51	.60	.76	.67	.88	.203
1/2	2.51	.67	.82	.67	.88	.209
9/16	2.51	.74	.88	.67	.88	.249
5/8	2.51	.85	.94	.73	.88	.281
11/16	2.51	.97	1.01	.73	.88	.318
3/4	2.51	1.03	1.13	.73	.88	.356

TABLE XVI. Type I, class 4, universal joint, hexagon (6-point), 1/2 inch drive

Nominal size of socket	Overall length C	Outside diameter				Depth of socket D
		Nut end A		Drive end B		
		Maximum	Minimum	Maximum	Minimum	
<u>Inch</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inch</u>	<u>Inches</u>	<u>Inch</u>
1/2	2.76	0.69	0.88	0.86	1.01	0.209
9/16	2.76	.76	1.01	.86	1.01	.249
5/8	2.76	.86	1.01	.86	1.01	.281
11/16	2.76	.99	1.07	.92	1.07	.318
3/4	2.88	1.02	1.26	.92	1.13	.356
13/16	2.94	1.17	1.26	.92	1.13	.418
7/8	2.94	1.24	1.32	.92	1.13	.479

3.7.8 Class 5, tapping screw, hexagon (6-point). Class 5 sockets shall have a 1/4 inch square drive and shall be designed to drive selftapping or sheet metal screws.

3.7.8.1 Style A, regular length; style B, long length. Style A and style B sockets shall be similar to figure 2, but without bolt clearance hole, and shall conform to the dimensions in table XVII.

TABLE XVII. Type I, class 5, styles A and B, tapping screw, hexagon (6-point), regular length and long length, alloy steel or steel with carbide insert, 1/4 inch drive

Nominal opening	Overall length C		Outside diameter								Depth of socket D
	Style A	Style B	Alloy steel				Steel with carbide insert				
			Nut end		Drive end		Nut end		Drive end		
	Maximum	Minimum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum		Minimum
<u>Inch</u>	<u>Inches</u>	<u>Inches</u>	<u>Inch</u>	<u>Inch</u>	<u>Inch</u>	<u>Inch</u>	<u>Inch</u>	<u>Inch</u>	<u>Inch</u>	<u>Inch</u>	<u>Inch</u>
3/16	1.01	1.76	0.30	0.38	0.42	0.51	0.40	0.45	0.46	0.52	0.057
1/4	1.01	1.76	.39	.45	.42	.51	.46	.52	.46	.52	.087
5/16	1.01	1.76	.44	.51	.48	.51	.52	.58	.50	.58	.102
11/32	1.01	1.76	.49	.54	.52	.57	.54	.61	.54	.58	.117
3/8	1.01	1.76	.55	.57	.55	.57	.55	.64	.55	.58	.117
7/16	1.01	1.76	.64	.66	.64	.69	.67	.77	.67	.77	.156
1/2	1.01	...	.67	.71	.66	.76	.72	.82	.70	.77	.156

3.8 Attachments.

3.8.1 Type II, bar, extension. Extension bars shall have a male square drive at one end and a female square drive of the same size at the other end. The extension bar shall be similar to figure 4 and shall conform to the dimensions in table XVIII.

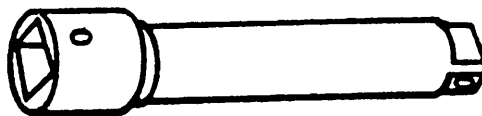


FIGURE 4. Type II, bar, extension.

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TABLE XVIII. Type II, bar, extension

Drive end size and nominal length	Diameter shank	Overall length	
	Maximum	Minimum	Maximum
<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>
1/4 inch drive:			
2	3/8	2	2-1/2
6	3/8	5	6-1/2
3/8 inch drive:			
3	1/2	2-1/2	3-1/2
6	1/2	5-1/2	6-1/2
12	1/2	11-1/2	12-1/2
1/2 inch drive:			
5	11/16	4-1/2	6
10	11/16	9-1/2	10-1/2
5/8 inch drive:			
6	7/8	5-1/2	6-1/2
12	7/8	9-1/2	12-1/2
3/4 inch drive:			
7	1-5/16	6-1/2	7-1/2
13	1-5/16	12-1/2	13-1/2
1 inch drive:			
7	1-9/16	5-1/2	7-1/2
13	1-9/16	11-1/2	13-1/2

3.8.2 Type III, adaptors. All type III adaptors shall have a male square drive at one end and a female square drive at the other end. Adaptors shall be similar to figure 5 and shall conform to the dimensions shown in table XIX.

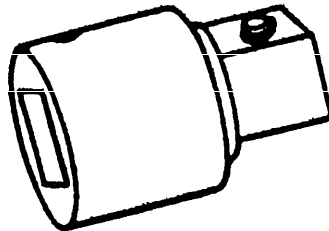


FIGURE 5. Type III, adaptor.

TABLE XIX. Type III, adaptor

Drive sizes		Overall length (maximum)	Outside diameter (maximum)
Male drive nominal	Female drive nominal		
<u>Inch</u>	<u>Inch</u>	<u>Inches</u>	<u>Inches</u>
1/2	3/8	1-9/16	1-1/16
3/8	1/2	1-5/8	1-3/16
5/8	1/2	1-13/16	1-3/8
1/2	5/8	1-7/8	1-3/8
3/4	5/8	2	1-9/16
5/8	3/4	2-1/4	1-11/16
1	3/4	2-11/16	2-1/16
3/4	1	3	2-1/4

3.8.3 Type IV, universal joint. The type IV, universal joint shall consist of a male square drive in one member and a female square drive of the same size in the other, designed to permit rotation in a complete arc with any angular deviation of at least 15° of either member from the common center line of the other member. These attachments shall be similar to figure 6 and shall conform to the dimensions shown in table XX.

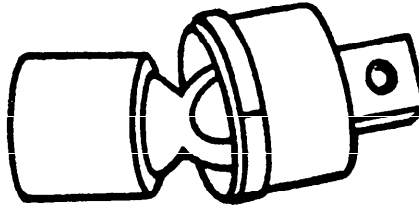


FIGURE 6. Type IV, universal joint attachment.

TABLE XX. Type IV, universal joint attachment

Male and female drive end size nominal	Overall length (maximum)	Diameter (maximum)
<u>Inch</u>	<u>Inches</u>	<u>Inches</u>
1/4	1-11/16	5/8
3/8	2-1/2	1
1/2	3-1/16	1-1/8
5/8	3-1/2	1-1/2
3/4	4-1/4	1-3/4
1	5-1/16	2-1/4

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3.8.4 Type V, double male adaptor. The double male adaptors shall have a male hexagon drive at one end and a male square drive at the other end, be similar to figure 7, and conform to the dimensions shown in table XXI. The male square drive end shall be similar to figure 1 and conform to the dimensions shown in table III.

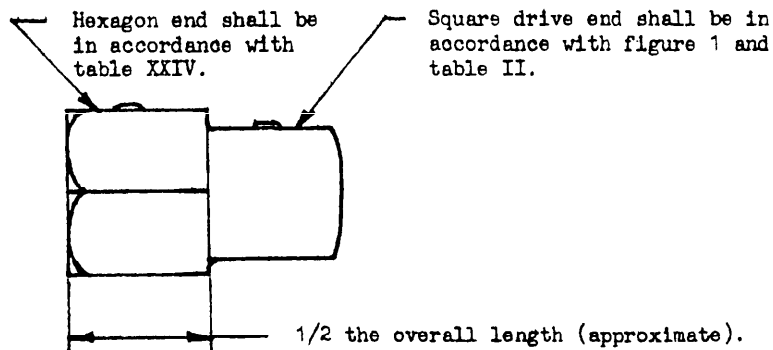


FIGURE 7. Type V, double male adaptor.

TABLE XXI. Type V, double male adaptor

Hexagon end + .000 - .002	Square drive end nominal	Overall length $\pm 1/32$ inch
<u>Inch</u>	<u>Inch</u>	<u>Inches</u>
7/16	1/4	1-1/16
7/16	3/8	1-1/16
7/16	1/2	1-5/16

3.9 Sets. When specified (see 6.1), sockets shall be furnished in sets. The size and quantity of sockets and attachments shall be as specified.

3.10 Carrying case. When specified (see 6.1), the sockets with the specified attachments shall be furnished in a rugged metal or molded polypropylene carrying case. The case shall be the grade and quality normally furnished to mechanics for use in repair shops and if made of metal shall have an enamel finish. The case shall have two or more separate compartments to contain the sockets and segregate the sockets from attachments. The lid of the metal case shall be securely attached by means of a piano type hinge, and if made of polypropylene, the lid shall be attached by a full length flexible hinge. The case shall have a friction type latch to prevent accidental opening of the lid.

3.11 Workmanship. Sockets and attachments shall be free from rust, fins, burrs, external sharp or rough edges, corners, or surfaces, or any defect which may impair serviceability, appearance, durability, or safety.

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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 the 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. When the Government exercises the right to perform inspection and tests, this is not limited to inspection and testing at the contractor's plant and may be performed at any laboratory designated by the Government regardless of the inspection point cited in the contract.

4.2 Sampling for examinations and tests.

4.2.1 Inspection lot. An inspection lot shall consist of all units of sockets or attachments of one type, class, style, and size offered for acceptance at one time. For sets, an inspection lot shall consist of all the sets offered for acceptance at one time. The inspection lot shall be divided into sub-lots consisting of all components of the same type, class, style, and size (i.e., a lot of 300 sets each containing 19 components and one case shall be examined as 20 sub-lots of 300 each). Each sub-lot shall be inspected as individual components and rejection of any sub-lot based on the specified Acceptable Quality Level (AQL) shall constitute rejection of the entire lot.

4.2.2 Sampling procedures. Sampling for all examinations and tests, except the izod test, shall be in accordance with MIL-STD-105. Data for sampling shall be as stated in table L-A, defects are listed in table L-B.

TABLE L-A. Sampling data

Category	Sample unit	Inspection level	AQL for major defectives	AQL for minor defectives	AQL expressed in terms of
Visual	One component each	II	4.0	6.5	Percent defective
Dimensional	One component each	II	2.5	4.0	Percent defective
Testing (Including dimensional requirements with 3 or more decimal places.)	One component each	S-4	2.5	4.0	Percent defective
Preparation for delivery	One shipping unit	II	2.5	4.0	Percent defective

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TABLE L-B. Defects

Defect	Classification	
	Major	Minor
Type, class, style, form, or size not as specified.	X	
Workmanship, 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 out of tolerance (including fractions with decimal tolerance).	X	
Fractional dimensions out of tolerance by 5 percent of allowable dimension.	X	
Fractional dimensions out of tolerance by less than 5 percent of allowable dimension.		X
Discontinuity in coating.		X
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

4.2.3 Sampling for izod impact test. One sample specimen shall be prepared for each inspection lot. Failure of this sample to comply with the values specified in 3.2.1 shall be cause for rejecting the lot represented by this sample specimen. At the option of the procuring agency, a certified report of the izod test conducted in accordance with 4.4.2 shall be acceptable.

4.3 Examinations.

4.3.1 Each sample selected in accordance with 4.2.2 shall be visually examined for conformance to the requirements for dimensions, coating, markings, and workmanship. The nut or bolt end openings shall be examined with the applicable gage specified in Fed. Std. No. 346. Any sample that does not comply with all requirements shall be classified as defective.

4.3.2 Examination of preparation for delivery. Examination shall be made to determine compliance with preservation and packaging, packing, and marking requirements in accordance with PPP-P-40.

4.4 Tests.

4.4.1 Hardness test. Each sample selected in accordance with 4.2.2 shall be tested for the hardness specified in 3.3 and 3.3.1. Test impressions may be taken at any location or depth. Any sample that does not conform shall be classified as defective.

4.4.2 Izod impact test. The izod impact test shall be conducted on a standard pendulum type impact machine. Izod specimens shall be in accordance with figures 8 or 9. The dimensions of the striking edge and its position relative to the specimen support vise shall be in accordance with figure 10. The test shall be conducted with the specimen at room temperature and securely clamped in smooth flat surfaces at test machine support vise. The test shall consist of three or more fractures or breaks on one or more than one specimen. The specimens shall consist of material within customary steel mill tolerances for its composition and shall be hardened under conditions similar to production conditions. The combination of steel and processing shall be approved if the average impact value meets or exceeds the value specified in 3.2.1 for the average hardness of the specimens tested.

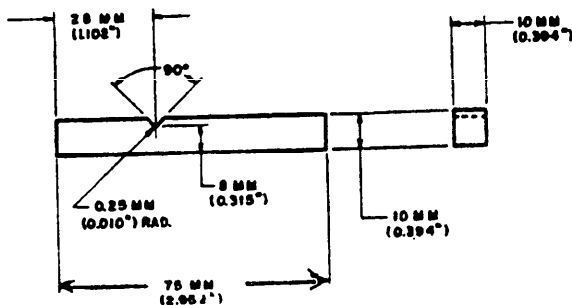


FIGURE 8. Cantilever beam impact test specimen.

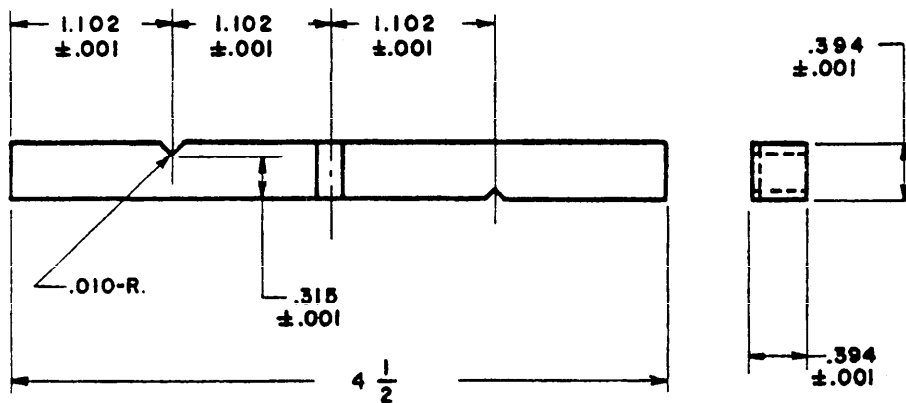


FIGURE 9. Cantilever beam impact test specimen.

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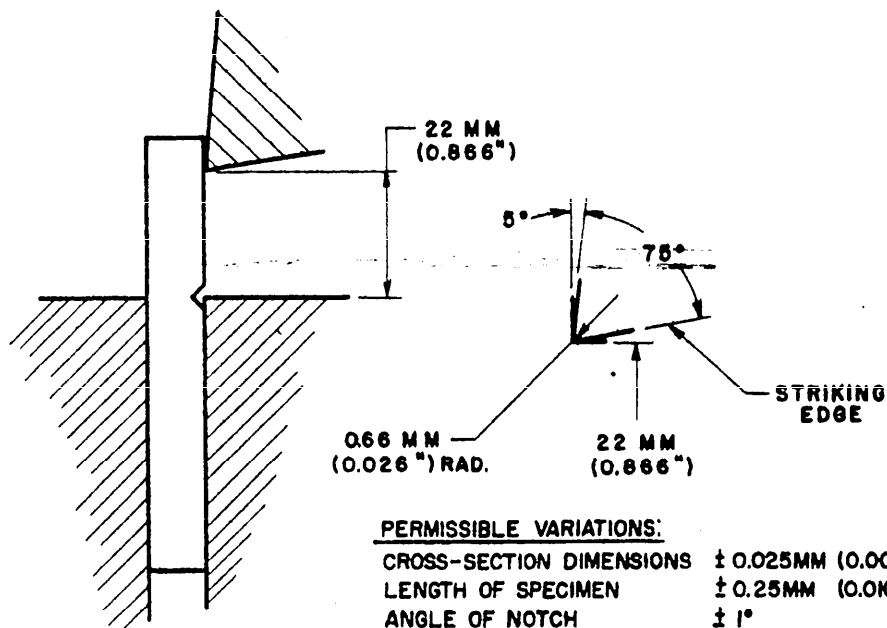


FIGURE 10. Cantilever beam test.

4.4.3 Surface roughness test. Each sample shall be tested for surface roughness in accordance with ANSI B46.1 to determine compliance with the requirements of 3.4.1.

5. PREPARATION FOR DELIVERY

5.1 Preservation, packaging, packing, and marking. Preservation, packaging, and packing shall be in accordance with PPP-P-40 and the level shall be A, B, or C, as specified (see 6.1). Marking shall be in accordance with PPP-P-40 and shall be military or civil 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, as applicable (see 1.2).
- (c) Specify quantity and size of sockets and attachments if sets are specified (see 3.9).
- (d) Specify if sets are furnished in carrying case (see 3.10).
- (e) Applicable level of preservation, packaging, and packing required (see 5.1).
- (f) Specify packaging, packing, and markings required (see 5.1).

MILITARY CUSTODIANS:

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

Preparing activity:

GSA-FSS

Orders for this publication are to be placed with the General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein. Price 20 cents each.