

ASME B107.17-2015
(Revision of ASME B107.17-2010)

Gages and Mandrels for Wrench Openings

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

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Two Park Avenue • New York, NY • 10016 USA

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FOREWORD

The American National Standards Committee B107 on Socket Wrenches and Drives was originally under the sponsorship of The American Society of Mechanical Engineers (ASME). It was subsequently reorganized as an ASME Standards Committee, and its title was changed to Hand Tools and Accessories. In 1996, the Committee's scope was expanded to include safety considerations.

The purpose of ASME B107.17 is to establish final inspection gage sizes and test mandrel sizes for wrench openings, and spark plug wrench openings for inch and metric sizes. This Standard does not cover every available size, but only those most commonly manufactured.

This Standard may also be used as a guide by state authorities or other regulatory bodies in the formulation of laws or regulations. It is also intended for voluntary use by establishments that use or manufacture the instruments covered.

Changes in the 2015 edition include removal of unused references, corrections to values in Table 4M, and increased significant digits in the plus tolerances in Tables 4 and 4M.

Members of the Hand Tools Institute Wrenches Standards Committee, through their knowledge and hard work, have been major contributors to the development of the B107 standards. Their active efforts in the promotion of these standards are acknowledged and appreciated.

This revision was approved as an American National Standard on June 19, 2015.

ASME B107 COMMITTEE

Hand Tools and Accessories

(The following is the roster of the Committee at the time of approval of this Standard.)

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The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

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Subject: Cite the applicable paragraph number(s) and the topic of the inquiry.
Edition: Cite the applicable edition of the Standard for which the interpretation is being requested.
Question: Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Request that are not in this format may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

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GAGES AND MANDRELS FOR WRENCH OPENINGS

1 SCOPE

This Standard establishes final inspection gage sizes and test mandrel sizes for wrench openings and spark plug wrench openings for inch and metric sizes. This Standard does not cover every available size, but only those most commonly manufactured.

2 APPLICATION

The gages covered by this Standard shall be used to ensure the manufacture of conforming products in inch and metric sizes.

3 REFERENCES

The following documents are referenced in this Standard. The latest edition shall be used.

ASTM E18, Standard Test Methods for Rockwell Hardness of Metallic Materials

Publisher: American Society for Testing and Materials (ASTM International), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959 (www.astm.org)

4 REQUIREMENTS

The gages shall be similar to those shown in Fig. 1 for hex gages and Fig. 2 for square gages. Dimensions in inch series tables are in inches, and dimensions in metric series tables are in millimeters, except as specified.

4.1 Material

4.1.1 Gages. The gages shall be made of steel, suitable for the purpose intended and hardened to 60 HRC minimum. The hardness shall be tested using procedures outlined in ASTM E18.

4.1.2 Mandrels. The mandrels shall be made of steel, suitable for the purpose intended, and hardened

to 56 HRC minimum. The hardness shall be tested using procedures outlined in ASTM E18.

4.2 Gage Use and Design

The gages shall be of the sizes and tolerances given in Tables 1, 1M, 2, 2M, 3, and 3M. Formulas are provided for sizes not listed.

The gages shall be used in accordance with accepted practices. Manufacturers may use gages with tighter dimensions than those shown herein.

The size for all limits (GO and NO GO) gages shall not exceed the extreme limits specified herein. All variations (manufacturing tolerance, calibration error, wear allowance, etc.) in the gages, whatever their cause or purpose, shall bring these gages within the extreme limits of this gage size specified within this Standard. Thus a gage that represents a minimum limit may be larger, but never smaller, than the minimum size specified; likewise, the gage that represents a maximum limit may be smaller, but never larger, than the maximum size specified.

4.2.1 Rounding Method. Rounding method is to be used for determining dimensions for gages. When the next digit beyond the last digit to be retained is

(a) less than 5, the last digit to be retained is not changed

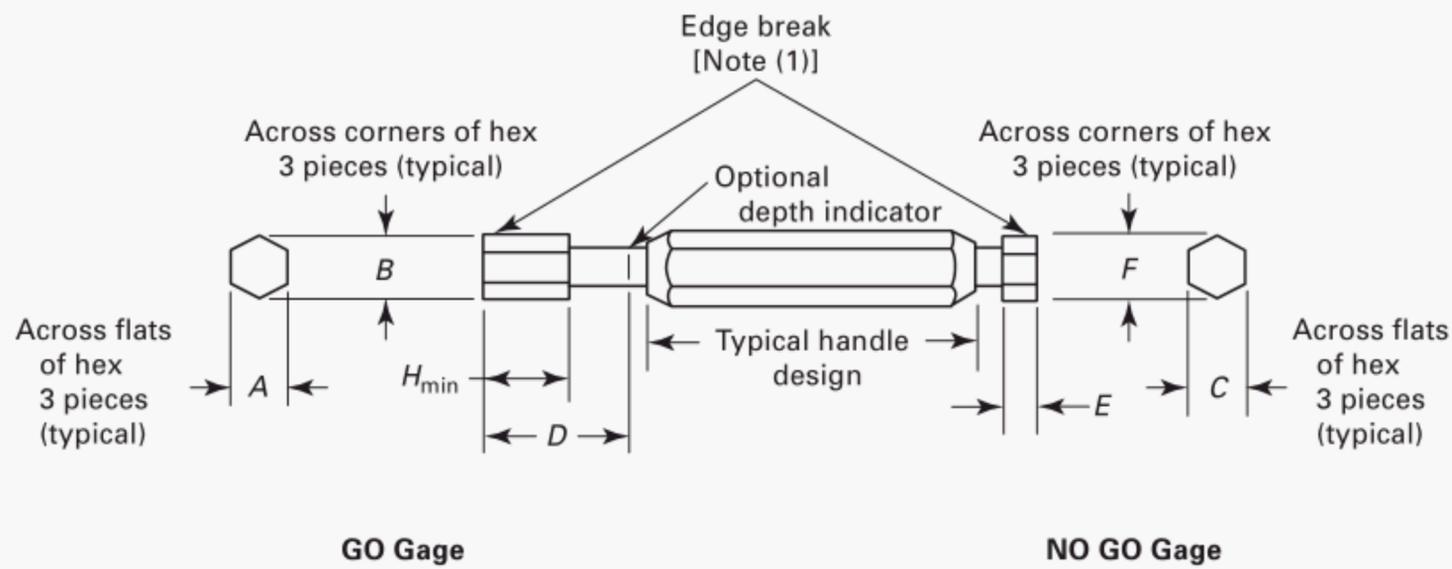
(b) 5 or more, the last digit to be retained is increased by one

4.3 Mandrels Use and Design

4.3.1 Mandrels for Nut End Socket Openings. The hexagon mandrels shall be of the size and tolerances given in Tables 4 and 4M. The square mandrels shall be of the size and tolerance given in Table 5. The mandrel shall be inserted into the nut end socket opening to the depth indicated in the applicable table.

4.3.2 Mandrels for Wrench Openings. The hexagon mandrels shall be of the size and tolerances given in Tables 4, 4M, and 5. The mandrel shall be fully engaged to the thickness of the wrench head.

Fig. 1 Hex Gage Dimensions



A = across hex flats GO size (see Tables 1, 1M, 2, 2M, 3, and 3M)

B = $1.1550W$ tolerance = $+0.0002$ in. / -0.0000 in. ($+0.006$ mm / -0.000 mm)

C = across hex flats NO GO size (see Tables 1, 1M, 2, 2M, 3, and 3M)

D = a minimum dimension tolerance = $+0.008$ in. / -0.000 in. ($+0.20$ mm / -0.00 mm)

= an optional indicator for the minimum wrench opening depth from the product specification or standard

E = a minimum dimension

= $0.167C$ for $C \leq 1$ in. (25 mm)

= 0.167 in. (4.18 mm) for $C > 1$ in. (25 mm)

F = $1.1550W$ tolerance = $+0.0000$ in. / -1% of F , in. ($+0.00$ mm / -1% of F , mm)

H_{min} = a minimum dimension

= $0.333A$ for $A \leq 1$ in. (25 mm)

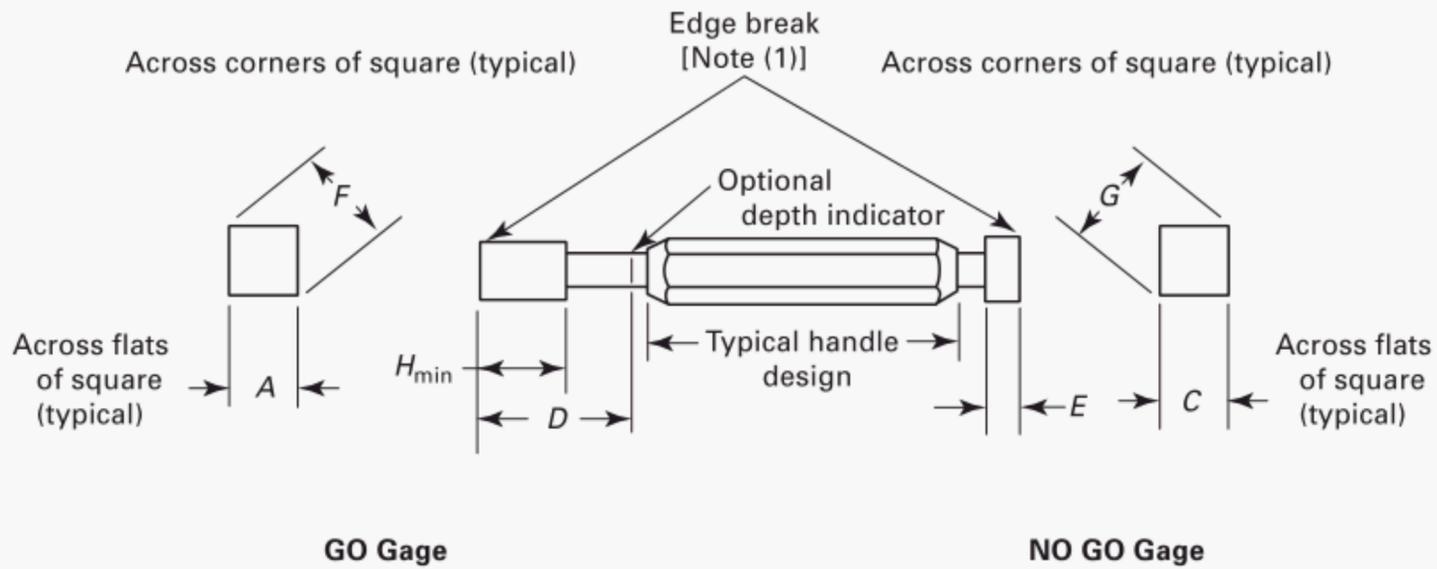
= 0.333 in. (8.33 mm) for $A > 1$ in. (25 mm). If H_{min} is made equal to D , then H_{min} can be used as the optional depth indicator.

W = nominal size of wrench (see Tables 1, 1M, 2, 2M, 3, and 3M)

NOTE:

- (1) Do not include the length of the edge break as part of the NO GO gaging procedure. If the edge break is more than 0.010 in. (0.25 mm), the difference must be added to D .

Fig. 2 Square Gage Dimensions



- A = across square flats GO size (see Tables 1, 1M, 2, and 2M)
- C = across square flats NO GO size (see Tables 1, 1M, 2, and 2M)
- D = a minimum dimension tolerance = +0.008 in. / -0.000 in. (+0.20 mm / -0.00 mm)
= an optional indicator for the minimum wrench opening depth from the product specification or standard
- E = a minimum dimension
= $0.167C$ for $C \leq 1$ in. (25 mm)
= 0.167 in. (4.18 mm) for $C > 1$ in. (25 mm)
- F = $1.4142W$ tolerance = +0.0002 in. / -0.0000 in. (+0.006 mm / -0.00 mm)
- G = $1.4142W$ tolerance = +0.0000 in. / -1% of G , in. (+0.00 mm / -1% of G , mm)
- H_{min} = a minimum dimension
= $0.333A$ for $A \leq 1$ in. (25 mm)
= 0.333 in. (8.33 mm) for $A > 1$ in. (25 mm). If H_{min} is made equal to D , then H_{min} can be used as the optional depth indicator.
- W = nominal size of wrench (see Tables 1, 1M, 2, and 2M)

NOTE:

- (1) Do not include the length of the edge break as part of the NO GO gaging procedure. If the edge break is more than 0.010 in. (0.25 mm), the difference must be added to D .

Table 1 Hexagon or Square (Inch Series)

Nominal Size, <i>W</i>	GO Gage A	NO GO Gage C	Nominal Size, <i>W</i>	GO Gage A	NO GO Gage C
	Tolerance: +0.0002 -0.0000	Tolerance: +0.0000 -0.0002		Tolerance: +0.0002 -0.0000	Tolerance: +0.0000 -0.0002
$\frac{5}{64}$	0.0789	0.0853	$2\frac{1}{8}$	2.1285	2.1525
$\frac{3}{32}$	0.0945	0.1013	$2\frac{3}{16}$	2.1910	2.2155
$\frac{7}{64}$	0.1100	0.1163	$2\frac{1}{4}$	2.2535	2.2775
$\frac{1}{8}$	0.1258	0.1323	$2\frac{5}{16}$	2.3160	2.3425
$\frac{5}{32}$	0.1570	0.1633	$2\frac{3}{8}$	2.3785	2.4045
$\frac{3}{16}$	0.1883	0.1953	$2\frac{7}{16}$	2.4410	2.4675
$\frac{13}{64}$	0.2039	0.2103	$2\frac{1}{2}$	2.5040	2.5315
$\frac{7}{32}$	0.2195	0.2263	$2\frac{9}{16}$	2.5665	2.5935
$\frac{15}{64}$	0.2350	0.2413	$2\frac{5}{8}$	2.6290	2.6565
$\frac{1}{4}$	0.2510	0.2573	$2\frac{11}{16}$	2.6915	2.7195
$\frac{17}{64}$	0.2666	0.2733	$2\frac{3}{4}$	2.7540	2.7835
$\frac{9}{32}$	0.2820	0.2883	$2\frac{13}{16}$	2.8165	2.8455
$\frac{19}{64}$	0.2978	0.3043	$2\frac{7}{8}$	2.8790	2.9085
$\frac{5}{16}$	0.3135	0.3223	$2\frac{15}{16}$	2.9415	2.9735
$\frac{11}{32}$	0.3447	0.3533	3	3.0050	3.0355
$\frac{3}{8}$	0.3762	0.3843	$3\frac{1}{16}$	3.0675	3.0985
$\frac{13}{32}$	0.4074	0.4153	$3\frac{1}{8}$	3.1300	3.1625
$\frac{7}{16}$	0.4387	0.4463	$3\frac{3}{16}$	3.1925	3.2255
$\frac{1}{2}$	0.5015	0.5103	$3\frac{1}{4}$	3.2550	3.2875
$\frac{17}{32}$	0.5327	0.5423	$3\frac{5}{16}$	3.3175	3.3525
$\frac{9}{16}$	0.5640	0.5733	$3\frac{3}{8}$	3.3800	3.4145
$\frac{19}{32}$	0.5952	0.6053	$3\frac{7}{16}$	3.4425	3.4775
$\frac{5}{8}$	0.6265	0.6363	$3\frac{1}{2}$	3.5060	3.5405
$\frac{21}{32}$	0.6577	0.6673	$3\frac{9}{16}$	3.5685	3.6045
$\frac{11}{16}$	0.6895	0.6993	$3\frac{5}{8}$	3.6310	3.6665
$\frac{3}{4}$	0.7520	0.7633	$3\frac{3}{4}$	3.7560	3.7935
$\frac{25}{32}$	0.7832	0.7943	$3\frac{13}{16}$	3.8185	3.8565
$\frac{13}{16}$	0.8145	0.8263	$3\frac{7}{8}$	3.8810	3.9185
$\frac{7}{8}$	0.8770	0.8883	$3\frac{15}{16}$	3.9435	3.9835
$\frac{15}{16}$	0.9395	0.9533	4	4.0070	4.0455
1	1.0025	1.0153	$4\frac{1}{16}$	4.0695	4.1085
$1\frac{1}{16}$	1.0650	1.0775	$4\frac{1}{8}$	4.1320	4.1725
$1\frac{1}{8}$	1.1275	1.1425	$4\frac{3}{16}$	4.1945	4.2355
$1\frac{3}{16}$	1.1900	1.2045	$4\frac{1}{4}$	4.2570	4.2975
$1\frac{1}{4}$	1.2525	1.2675	$4\frac{5}{16}$	4.3195	4.3625
$1\frac{5}{16}$	1.3150	1.3315	$4\frac{3}{8}$	4.3820	4.4245
$1\frac{3}{8}$	1.3775	1.3945	$4\frac{7}{16}$	4.4445	4.4875
$1\frac{7}{16}$	1.4400	1.4575	$4\frac{1}{2}$	4.5070	4.5505
$1\frac{1}{2}$	1.5030	1.5205	$4\frac{5}{8}$	4.6320	4.6765
$1\frac{9}{16}$	1.5655	1.5845	$4\frac{3}{4}$	4.7570	4.8035
$1\frac{5}{8}$	1.6280	1.6465	5	5.0070	5.0555
$1\frac{11}{16}$	1.6905	1.7085	$5\frac{1}{4}$	5.2580	5.3075
$1\frac{3}{4}$	1.7530	1.7735	$5\frac{3}{8}$	5.3830	5.4345
$1\frac{13}{16}$	1.8155	1.8355	$5\frac{7}{16}$	5.4455	5.4975
$1\frac{7}{8}$	1.8780	1.8985	$5\frac{1}{2}$	5.5080	5.5615
$1\frac{15}{16}$	1.9405	1.9635	$5\frac{5}{8}$	5.6330	5.6865
2	2.0035	2.0255	$5\frac{3}{4}$	5.7580	5.8135
$2\frac{1}{16}$	2.0660	2.0885	$6\frac{1}{8}$	6.1340	6.1925

Table 1 Hexagon or Square (Inch Series) (Cont'd)

GENERAL NOTES:

- (a) Minimum wrench opening = GO Gage A extreme limit minimum size.
 (b) Wrench opening tolerance = NO GO maximum Gage C, GO minimum Gage A.
 (c) Maximum wrench opening = NO GO Gage C extreme limit maximum size.
 (d) To determine inch series: NO GO Gage C dimension for W , nominal size. Use the following formulas where applicable (all calculations must be in inches).

NO GO Gage

- (1) For W equal to or less than 1 in.

$$C = W + (0.005W + 0.001) + (0.005W + 0.004) + 0.0003$$

tolerance $\begin{matrix} +0.0000 \\ -0.0002 \end{matrix}$

- (2) For W greater than 1 in.

$$C = W + (0.005W + 0.001) + (0.005W + 0.004) + 0.0005$$

tolerance $\begin{matrix} +0.0000 \\ -0.0002 \end{matrix}$

Rounding and determination of the NO GO Gage C value for inch series shall be as follows: W is rounded to three decimal places for all calculations, numbers within parentheses are rounded to three decimal places before adding to the formula, and W is added to the numbers within parentheses before adding the last value in the NO GO formula, with the gage dimension left as a four-place decimal. Use the rounding method outlined in para. 4.2.1.

- (e) For additional sizes not listed in Table 1, dimensions are determined as follows: To determine GO Gage A dimensions for W nominal sizes (all calculations must be done in inches), GO Gage A = W (value to 4 decimal places, not rounded) + incremental amount from Table 2. Round GO Gage A value to 4 decimal places. Use rounding method outlined in para. 4.2.1.

Table 1M Hexagon or Square (Metric Series)

Nominal Size, <i>W</i>	GO Gage A	NO GO Gage C	Nominal Size, <i>W</i>	GO Gage A	NO GO Gage C
	Tolerance: +0.006 -0.000	Tolerance: +0.000 -0.006		Tolerance: +0.006 -0.000	Tolerance: +0.000 -0.006
2	2.01	2.155	38	38.10	38.520
2.5	2.51	2.661	39	39.10	39.530
3	3.015	3.165	40	40.10	40.540
3.2	3.216	3.367	41	41.10	41.550
4	4.02	4.175	42	42.10	42.560
4.5	4.52	4.681	43	43.10	43.570
5	5.02	5.185	44	44.10	44.580
5.5	5.52	5.690	45	45.10	45.590
6	6.03	6.195	46	46.10	46.600
6.3	6.33	6.498	47	47.10	47.610
7	7.03	7.205	48	48.10	48.620
8	8.03	8.215	49	49.10	49.630
9	9.03	9.225	50	50.10	50.640
10	10.04	10.235	52	52.10	52.660
11	11.04	11.245	54	54.10	54.680
12	12.04	12.255	55	55.12	55.690
13	13.04	13.265	60	60.12	60.740
14	14.05	14.275	65	65.12	65.790
15	15.05	15.285	70	70.12	70.840
16	16.05	16.295	74	74.12	74.880
17	17.05	17.305	75	75.15	75.890
18	18.05	18.315	80	80.15	80.940
19	19.06	19.325	85	85.15	85.990
20	20.06	20.335	90	90.15	91.040
20.6	20.66	20.941	95	95.15	96.090
21	21.06	21.345	100	100.15	101.140
22	22.06	22.355	105	105.20	106.190
23	23.06	23.365	110	110.20	111.240
24	24.06	24.375	115	115.20	116.290
25	25.06	25.385	120	120.20	121.340
26	26.08	26.400	130	130.20	131.440
27	27.08	27.410	135	135.20	136.490
28	28.08	28.420	145	145.20	146.590
29	29.08	29.430	150	150.25	151.640
30	30.08	30.440	155	155.25	156.690
31	31.08	31.450	165	165.25	166.790
32	32.08	32.460	170	170.25	171.840
33	33.08	33.470	180	180.25	181.940
34	34.10	34.480	185	185.25	186.990
35	35.10	35.490	200	200.25	202.140
36	36.10	36.500	210	210.25	212.240
37	37.10	37.510			

Table 1M Hexagon or Square (Metric Series) (Cont'd)

GENERAL NOTES:

- (a) Minimum wrench opening = GO Gage A extreme limit minimum size.
 (b) Wrench opening tolerance = NO GO maximum Gage C, GO minimum Gage A.
 (c) Maximum wrench opening = NO GO Gage C extreme limit maximum size.
 (d) To determine metric series: NO GO Gage C dimension for W , nominal size. Use the following formulas where applicable (all calculations must be in millimeters).

NO GO Gage

- (1) For W equal to or less than 25 mm

$$C = W + (0.005W + 0.025) + (0.005W + 0.102) + 0.008$$

tolerance $\begin{matrix} +0.000 \\ -0.006 \end{matrix}$

- (2) For W greater than 25 mm

$$C = W + (0.005W + 0.025) + (0.005W + 0.102) + 0.013$$

tolerance $\begin{matrix} +0.000 \\ -0.006 \end{matrix}$

Rounding and determination of the NO GO Gage C value for metric series shall be as follows: All numbers within parentheses are rounded to three decimal places before adding to the formula, and W is added to the numbers within parentheses before adding the last value in the NO GO formula, with the gage dimension left as a three-place decimal. Use the rounding method outlined in para. 4.2.1.

- (e) For additional sizes not listed in Table 1, dimensions are determined as follows: To determine GO Gage A dimensions for W nominal sizes (all calculations must be done in millimeters), GO Gage A = W (not rounded) + incremental amount from Table 2M. Round GO Gage A value to 2 decimal places (see [Note (1)] from Table 2M). Use rounding method outlined in para. 4.2.1.

Table 2 Incremental Amount (Inch Series)

Nominal Size, W	Incremental Amount Added to W
$\frac{5}{64}$ to less than $\frac{1}{4}$	0.0008
$\frac{1}{4}$ to less than $\frac{3}{8}$	0.0010
$\frac{3}{8}$ to less than $\frac{1}{2}$	0.0012
$\frac{1}{2}$ to less than $\frac{11}{16}$	0.0015
$\frac{11}{16}$ to less than 1	0.0020
1 to less than $1\frac{1}{2}$	0.0025
$1\frac{1}{2}$ to less than 2	0.0030
2 to less than $2\frac{1}{2}$	0.0035
$2\frac{1}{2}$ to less than 3	0.0040
3 to less than $3\frac{1}{2}$	0.0050
$3\frac{1}{2}$ to less than 4	0.0060
4 to less than $5\frac{1}{16}$	0.0070
$5\frac{1}{16}$ to less than $6\frac{1}{8}$	0.0080
$6\frac{1}{8}$ to less than $7\frac{3}{16}$	0.0090
$7\frac{3}{16}$ to less than $8\frac{1}{4}$	0.0100
$8\frac{1}{4}$ to less than $9\frac{1}{4}$	0.0110
$9\frac{1}{4}$ to less than or equal to $10\frac{1}{4}$	0.0120

Table 2M Incremental Amount (Metric Series)

Nominal Size, W	Incremental Amount Added to W
2 to less than 3	0.01
3 to less than 3.2	0.015
3.2 to less than 6	0.02
6 to less than 10	0.03
10 to less than 14	0.04
14 to less than 19	0.05
19 to less than 26	0.06
26 to less than 34	0.08
34 to less than 55	0.10
55 to less than 75	0.12
75 to less than 105	0.15
105 to less than 150	0.20
150 to less than or equal to 210	0.25

GENERAL NOTE: Round GO Gage A to 3 decimal places when using 0.015 mm incremental amount.

Table 3 Spark Plug Hexagon (Inch Series)

Nominal Size, <i>W</i>	GO Gage A	NO GO Gage C
	Tolerance: +0.0002 -0.0000	Tolerance: +0.0000 -0.0002
$\frac{5}{8}$	0.6290	0.6373
$\frac{11}{16}$	0.6895	0.6993
$\frac{3}{4}$	0.7504	0.7608
$\frac{13}{16}$	0.8200	0.8293
$\frac{7}{8}$	0.8790	0.8883

GENERAL NOTES:

- Minimum wrench opening = GO Gage A extreme limit minimum size.
- Wrench opening tolerance = NO GO maximum Gage C – GO minimum Gage A.
- Maximum wrench opening = NO GO Gage C extreme limit maximum size.

Table 3M Spark Plug Hexagon (Metric Series)

Nominal Size, <i>W</i>	GO Gage A	NO GO Gage C
	Tolerance: +0.0002 -0.0000	Tolerance: +0.0000 -0.0002
12	12.04	12.255
14	14.05	14.275
16	15.977	16.187
17.5	17.513	17.762
18	18.05	18.315
19	19.06	19.325
20.8	20.828	21.064
22.2	22.327	22.563
25.5	25.56	25.86

GENERAL NOTES:

- Minimum wrench opening = GO Gage A extreme limit minimum size.
- Wrench opening tolerance = NO GO maximum Gage C – GO minimum Gage A.
- Maximum wrench opening = NO GO Gage C extreme limit maximum size.

Table 4 Hexagon Mandrel Dimensions and Maximum Depth of Mandrel Insertion (Inch Series)

Nominal Size of Wrench Opening	Hexagon Mandrel Dimensions			Maximum Depth of Mandrel Insertion [Note (2)]
	Across Flats Tolerances		Minimum Across Corners [Note (1)]	
	Plus	Minus		
$\frac{1}{8}$	0.0005	0.0020	0.1403	0.055
$\frac{5}{32}$	0.0005	0.0020	0.1745	0.069
$\frac{3}{16}$	0.0005	0.0020	0.2095	0.083
$\frac{7}{32}$	0.0005	0.0020	0.2440	0.096
$\frac{1}{4}$	0.0005	0.0020	0.2780	0.110
$\frac{9}{32}$	0.0010	0.0020	0.3133	0.133
$\frac{5}{16}$	0.0010	0.0020	0.3495	0.141
$\frac{11}{32}$	0.0010	0.0020	0.3860	0.156
$\frac{3}{8}$	0.0010	0.0020	0.4225	0.156
$\frac{7}{16}$	0.0010	0.0020	0.4935	0.198
$\frac{1}{2}$	0.0010	0.0030	0.5635	0.239
$\frac{9}{16}$	0.0010	0.0030	0.6339	0.265
$\frac{5}{8}$	0.0010	0.0030	0.7055	0.291
$\frac{11}{16}$	0.0010	0.0030	0.7769	0.317
$\frac{3}{4}$	0.0010	0.0030	0.8485	0.344
$\frac{13}{16}$	0.0010	0.0030	0.9201	0.370
$\frac{7}{8}$	0.0010	0.0030	0.9917	0.396
$\frac{15}{16}$	0.0010	0.0030	1.0631	0.422
1	0.0010	0.0030	1.1297	0.479
$1\frac{1}{16}$	0.0010	0.0030	1.2013	0.505
$1\frac{1}{8}$	0.0010	0.0030	1.2728	0.531
$1\frac{3}{16}$	0.0010	0.0030	1.343	0.557
$1\frac{1}{4}$	0.0010	0.0030	1.416	0.583
$1\frac{5}{16}$	0.0010	0.0030	1.487	0.609
$1\frac{3}{8}$	0.0010	0.0030	1.559	0.635
$1\frac{7}{16}$	0.0010	0.0030	1.631	0.661
$1\frac{1}{2}$	0.0010	0.0030	1.702	0.687
$1\frac{9}{16}$	0.0010	0.0070	1.770	0.713
$1\frac{5}{8}$	0.0010	0.0070	1.841	0.739
$1\frac{11}{16}$	0.0010	0.0070	1.912	0.765
$1\frac{3}{4}$	0.0010	0.0070	1.983	0.791
$1\frac{13}{16}$	0.0010	0.0070	2.054	0.817
$1\frac{7}{8}$	0.0010	0.0070	2.124	0.843
$1\frac{15}{16}$	0.0010	0.0070	2.195	0.869
2	0.0010	0.0070	2.266	0.958
$2\frac{1}{16}$	0.0010	0.0070	2.337	0.984
$2\frac{1}{8}$	0.0010	0.0070	2.408	1.010
$2\frac{3}{16}$	0.0010	0.0070	2.479	1.036
$2\frac{1}{4}$	0.0010	0.0070	2.549	1.063
$2\frac{5}{16}$	0.0010	0.0070	2.621	1.089
$2\frac{3}{8}$	0.0010	0.0070	2.691	1.115
$2\frac{7}{16}$	0.0010	0.0070	2.762	1.141
$2\frac{1}{2}$	0.0010	0.0070	2.833	1.167
$2\frac{9}{16}$	0.0010	0.0080	2.903	1.193
$2\frac{5}{8}$	0.0010	0.0080	2.974	1.219

Table 4 Hexagon Mandrel Dimensions and Maximum Depth of Mandrel Insertion (Inch Series) (Cont'd)

Nominal Size of Wrench Opening	Hexagon Mandrel Dimensions			Maximum Depth of Mandrel Insertion [Note (2)]
	Across Flats Tolerances		Minimum Across Corners [Note (1)]	
	Plus	Minus		
2 ³ / ₄	0.0010	0.0080	3.116	1.271
2 ¹³ / ₁₆	0.0010	0.0080	3.187	1.297
2 ¹⁵ / ₁₆	0.0010	0.0080	3.328	1.349
3	0.0010	0.0080	3.399	1.375
3 ¹ / ₈	0.0010	0.0080	3.541	1.427
3 ¹ / ₄	0.0010	0.0100	3.682	1.479
3 ³ / ₈	0.0010	0.0100	3.824	1.531
3 ¹ / ₂	0.0010	0.0100	3.966	1.583
3 ³ / ₄	0.0010	0.0100	4.249	1.688
3 ⁷ / ₈	0.0010	0.0100	4.391	1.740
4	0.0010	0.0100	4.532	1.855
4 ¹ / ₈	0.0010	0.0100	4.674	1.907
4 ¹ / ₄	0.0010	0.0100	4.816	1.959
4 ¹ / ₂	0.0010	0.0100	5.099	2.063

NOTES:

- (1) For sizes not listed, multiply nominal size by 1.133055 for mandrel dimensions across corners. Round result to three decimal places.
Applicable to mandrels over 1¹/₂ in. nominal size.
- (2) Depth of mandrel insertion is required when testing socket wrenches.

Table 4M Hexagon Mandrel Dimensions and Maximum Depth of Mandrel Insertion (Metric Series)

Nominal Size of Wrench Opening	Hexagon Mandrel Dimensions			Maximum Depth of Mandrel Insertion [Note (2)]
	Across Flats Tolerances		Minimum Across Corners [Note (1)]	
	Plus	Minus		
3.2	0.010	0.050	3.57	1.30
4	0.015	0.050	4.46	1.60
5	0.015	0.050	5.58	2.00
5.5	0.015	0.050	6.13	2.40
6	0.025	0.050	6.68	2.60
6.3	0.025	0.050	7.02	2.80
7	0.025	0.050	7.79	3.20
8	0.025	0.050	8.95	4.00
9	0.025	0.050	10.11	4.40
10	0.025	0.050	11.27	4.80
11	0.025	0.050	12.40	5.60
12	0.025	0.076	13.53	6.00
13	0.025	0.076	14.67	6.40
14	0.025	0.076	15.80	7.00
15	0.025	0.076	16.92	7.40
16	0.025	0.076	18.06	8.00
17	0.025	0.076	19.20	8.80
18	0.025	0.076	20.35	9.60
19	0.025	0.076	21.49	10.20
20	0.025	0.076	22.64	10.60
21	0.025	0.076	23.78	11.20
22	0.025	0.076	24.93	11.80
23	0.025	0.076	26.07	12.20
24	0.025	0.076	27.20	12.80
25	0.025	0.076	28.27	13.40
26	0.025	0.076	29.38	13.80
27	0.025	0.076	30.53	14.40
28	0.025	0.076	31.67	15.00
29	0.025	0.076	32.81	15.40
30	0.025	0.076	33.96	16.00
31	0.025	0.076	35.10	16.40
32	0.025	0.076	36.25	16.80
33	0.025	0.076	37.38	17.20
34	0.025	0.076	38.52	17.60
35	0.025	0.076	39.68	18.40
36	0.025	0.076	40.83	19.20
38	0.025	0.076	43.11	20.20
40	0.025	0.177	45.32	21.20
41	0.025	0.177	46.45	21.60
42	0.025	0.177	47.59	22.00
46	0.025	0.177	52.12	24.00
50	0.025	0.177	56.65	26.40
54	0.025	0.177	61.18	28.40
55	0.025	0.177	62.32	28.80
58	0.025	0.177	65.72	30.20
60	0.025	0.177	67.98	31.20

NOTES:

- (1) For sizes not listed, multiply nominal size by 1.133055 for mandrel dimensions across corners. Round result to two decimal places.
Applicable to mandrels over 38 mm nominal size.
- (2) Depth of mandrel insertion is required when testing socket wrenches.

Table 5 Square Mandrel Dimensions and Maximum Depth of Mandrel Insertion (Inch Series)
(For Testing of 4- or 8- Point Socket Wrenches)

Size Across Flats	Square Mandrel Dimensions, in.			
	Across Flats Tolerances		Minimum Across Corners	Maximum Depth of Mandrel Insertion
	Plus	Minus		
$\frac{3}{16}$	0.001	0.003	0.2577	0.093
$\frac{7}{32}$	0.001	0.003	0.3006	0.109
$\frac{1}{4}$	0.001	0.003	0.3436	0.125
$\frac{5}{16}$	0.001	0.003	0.4294	0.140
$\frac{3}{8}$	0.001	0.003	0.5153	0.156
$\frac{7}{16}$	0.001	0.003	0.6012	0.218
$\frac{1}{2}$	0.001	0.003	0.687	0.265
$\frac{9}{16}$	0.001	0.003	0.773	0.328
$\frac{5}{8}$	0.001	0.003	0.859	0.375
$\frac{11}{16}$	0.001	0.003	0.945	0.375
$\frac{3}{4}$	0.001	0.003	1.031	0.437
$\frac{13}{16}$	0.001	0.003	1.117	0.453
$\frac{7}{8}$	0.001	0.003	1.202	0.500
$\frac{15}{16}$	0.001	0.003	1.288	0.546
1	0.001	0.003	1.374	0.546

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