ASME B107.17-2020
(Revision of ASME B107.17-2015)

Gages and Mandrels for Wrench Openings

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

ASME B107.17-2020
(Revision of ASME B107.17-2015)

Gages and Mandrels for Wrench Openings

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers
Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: April 3, 2020

This Standard will be revised when the Society approves the issuance of a new edition.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Interpretations are published on the Committee web page and under http://go.asme.org/InterpsDatabase. Periodically certain actions of the ASME B107 Committee may be published as Cases. Cases are published on the ASME website under the B107 Committee Page at http://go.asme.org/B107Committee as they are issued.

Errata to codes and standards may be posted on the ASME website under the Committee Pages to provide corrections to incorrectly published items, or to correct typographical or grammatical errors in codes and standards. Such errata shall be used on the date posted.

The B107 Committee Page can be found at http://go.asme.org/B107Committee. There is an option available to automatically receive an e-mail notification when errata are posted to a particular code or standard. This option can be found on the appropriate Committee Page after selecting "Errata" in the "Publication Information" section.

The American Society of Mechanical Engineers
Two Park Avenue, New York, NY 10016-5990

CONTENTS

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 covers commonly manufactured sizes.

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 2019 edition include alignment/correction of significant digits in tolerances with data columns and the conversion of mandrel dimensions from tolerances to minimum/maximum values.

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 February 24, 2020.

ASME B107 COMMITTEE
Hand Tools and Accessories

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

STANDARDS COMMITTEE OFFICERS

J. S. Foote, *Chair*
B. Price, *Vice Chair*
D. Papert, *Secretary*

STANDARDS COMMITTEE PERSONNEL

N. C. Cantlon, Jore Corp.
J. D. Davidson, IDEAL Industries, Inc.
D. M. Eggert, Snap-on, Inc.
J. S. Foote, Trade Association Management, Inc.
D. R. Kritikos, Channellock, Inc.
C. Kuznia, U.S. General Services Administration
B. List, Apex Tool Group, LLC
G. E. Olson, Gene Olson Engineering Consultant, Ltd.
W. T. Pagac, Forever Associates, LLC
D. Papert, The American Society of Mechanical Engineers
B. Price, Consultant
W. C. Snyder, Wright Tool Co.
H. Yin, Microalloying International, Inc.
C. J. Hyatt, *Contributing Member*, Air Force Metrology and Calibration
J. L. Reynertson, Jr., *Contributing Member*, Sturtevant Richmont Division of Snap-on, Inc.
D. D. Schmick, *Contributing Member*, Midwest Tool and Cutlery Co.

CORRESPONDENCE WITH THE B107 COMMITTEE

General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions or a case, and attending Committee meetings. Correspondence should be addressed to:

Secretary, B107 Standards Committee
The American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990
http://go.asme.org/Inquiry

Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

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.

Proposing a Case. Cases may be issued to provide alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the Standard and the paragraph, figure, or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the Standard to which the proposed Case applies.

Interpretations. Upon request, the B107 Standards Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B107 Standards Committee.

Requests for interpretation should preferably be submitted through the online Interpretation Submittal Form. The form is accessible at http://go.asme.org/InterpretationRequest. Upon submittal of the form, the Inquirer will receive an automatic e-mail confirming receipt.

If the Inquirer is unable to use the online form, he/she may mail the request to the Secretary of the B107 Standards Committee at the above address. The request for an interpretation should be clear and unambiguous. It is further recommended that the Inquirer submit his/her request in the following format:

Subject:	Cite the applicable paragraph number(s) and the topic of the inquiry in one or two words.
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. Please provide a condensed and precise question, composed in such a way that a "yes" or "no" reply is acceptable.
Proposed Reply(ies):	Provide a proposed reply(ies) in the form of "Yes" or "No," with explanation as needed. If entering replies to more than one question, please number the questions and replies.
Background Information:	Provide the Committee with any background information that will assist the Committee in understanding the inquiry. 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.

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

Moreover, ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Standard requirements. If, based on the inquiry information submitted, it is the opinion of the Committee that the Inquirer should seek assistance, the inquiry will be returned with the recommendation that such assistance be obtained.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

Attending Committee Meetings. The B107 Standards Committee regularly holds meetings and/or telephone conferences that are open to the public. Persons wishing to attend any meeting and/or telephone conference should contact the Secretary of the B107 Standards Committee. Future Committee meeting dates and locations can be found on the Committee Page at http://go.asme.org/B107committee.

INTENTIONALLY LEFT BLANK

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, 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 document is 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 Figure 4-1 for hex gages and Figure 4-2 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 4.2-1, 4.2-1M, 4.2-2, 4.2-2M, 4.2-3, and 4.2-3M. 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 the 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. A rounding method shall 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

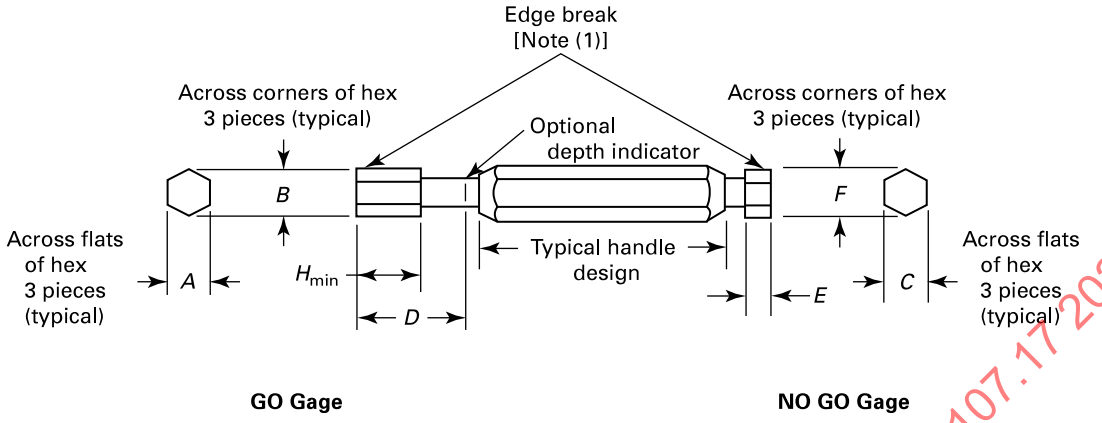
(b) 5 or more, the last digit to be retained is increased by one

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 4.3.1-1 and 4.3.1-1M. The square mandrels shall be of the size and tolerance given in Table 4.3.1-2. 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 4.3.1-1, 4.3.1-1M, and 4.3.1-2. The mandrel shall be fully engaged to the thickness of the wrench head.

Figure 4-1 Hex Gage Dimensions

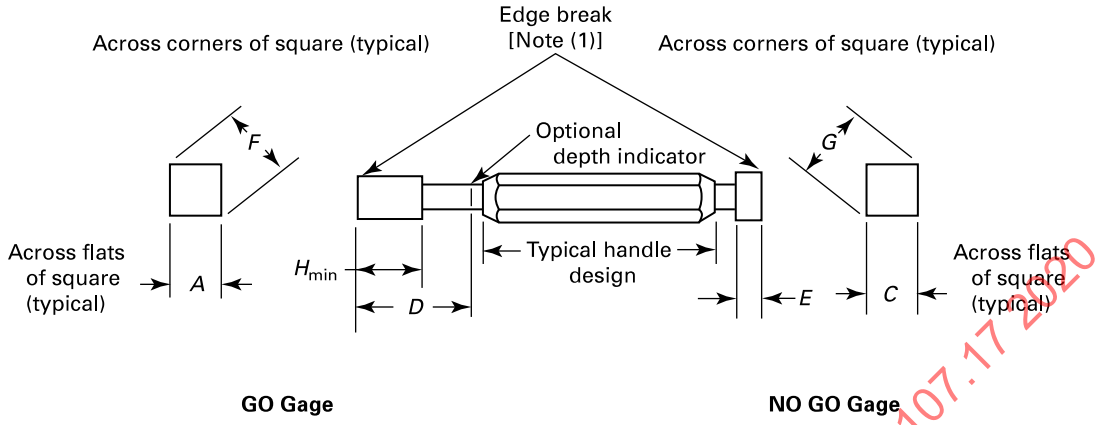


Legend:

A = across hex flats GO size (see Tables 4.2-1, 4.2-1M, 4.2-2, 4.2-2M, 4.2-3, and 4.2-3M)
B = 1.1550W tolerance = +0.0002 in./−0.0000 in. (+0.005 mm/−0.000 mm)
C = across hex flats NO GO size (see Tables 4.2-1, 4.2-1M, 4.2-2, 4.2-2M, 4.2-3, and 4.2-3M)
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 $C \le 1$ in. (25 mm)
= 0.167 in. (4.24 mm) for $C > 1$ in. (25 mm)
F = 1.1550W tolerance = +0.0000 in./−1% of F, in. (+0.000 mm/−1% of F, mm)
H_{min} = a minimum dimension
= 0.333A for $A \le 1$ in. (25 mm)
= 0.333 in. (8.46 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 4.2-1, 4.2-1M, 4.2-2, 4.2-2M, 4.2-3, and 4.2-3M)

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.

Figure 4-2 Square Gage Dimensions



Legend:

A = across square flats GO size (see Tables 4.2-1, 4.2-1M, 4.2-2, and 4.2-2M)
C = across square flats NO GO size (see Tables 4.2-1, 4.2-1M, 4.2-2, and 4.2-2M)
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 $C \le 1$ in. (25 mm)
= 0.167 in. (4.24 mm) for $C > 1$ in. (25 mm)
F = 1.4142W tolerance = +0.0002 in./−0.0000 in. (+0.005 mm/−0.000 mm)
G = 1.4142W tolerance = +0.0000 in./−1% of G, in. (+0.000 mm/−1% of G, mm)
H_{min} = a minimum dimension
= 0.333A for $A \le 1$ in. (25 mm)
= 0.333 in. (8.46 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 4.2-1, 4.2-1M, 4.2-2, 4.2-2M, 4.2-3, and 4.2-3M)

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.

Table 4.2-1 Hexagon or Square (Inch Series)

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

Table 4.2-1 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.

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

$$\text{tolerance}\ {}^{+0.0000}_{-0.0002}$$

(2) For W greater than 1 in.

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

$$\text{tolerance}\ {}^{+0.0000}_{-0.0002}$$

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 in para. 4.2.1.

(e) For additional sizes not listed in Table 4.2-1, 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 four decimal places, not rounded) + incremental amount from Table 4.2-2. Round GO Gage A value to four decimal places. Use the rounding method in para. 4.2.1.

Table 4.2-1M Hexagon or Square (Metric Series)

Nominal Size, *W*	GO Gage A Tolerance: +0.005 −0.000	NO GO Gage C Tolerance: +0.000 −0.005	Nominal Size, *W*	GO Gage A Tolerance: +0.005 −0.000	NO GO Gage C Tolerance: +0.000 −0.005
2	2.010	2.155	38	38.100	38.520
2.5	2.510	2.661	39	39.100	39.530
3	3.015	3.165	40	40.100	40.540
3.2	3.216	3.367	41	41.100	41.550
4	4.020	4.175	42	42.100	42.560
4.5	4.520	4.681	43	43.100	43.570
5	5.020	5.185	44	44.100	44.580
5.5	5.520	5.690	45	45.100	45.590
6	6.030	6.195	46	46.100	46.600
6.3	6.330	6.498	47	47.100	47.610
7	7.030	7.205	48	48.100	48.620
8	8.030	8.215	49	49.100	49.630
9	9.030	9.225	50	50.100	50.640
10	10.040	10.235	52	52.100	52.660
11	11.040	11.245	54	54.100	54.680
12	12.040	12.255	55	55.120	55.690
13	13.040	13.265	60	60.120	60.740
14	14.050	14.275	65	65.120	65.790
15	15.050	15.285	70	70.120	70.840
16	16.050	16.295	74	74.120	74.880
17	17.050	17.305	75	75.150	75.890
18	18.050	18.315	80	80.150	80.940
19	19.060	19.325	85	85.150	85.990
20	20.060	20.335	90	90.150	91.040
20.6	20.660	20.941	95	95.150	96.090
21	21.060	21.345	100	100.150	101.140
22	22.060	22.355	105	105.200	106.190
23	23.060	23.365	110	110.200	111.240
24	24.060	24.375	115	115.200	116.290
25	25.060	25.385	120	120.200	121.340
26	26.080	26.400	130	130.200	131.440
27	27.080	27.410	135	135.200	136.490
28	28.080	28.420	145	145.200	146.590
29	29.080	29.430	150	150.250	151.640
30	30.080	30.440	155	155.250	156.690
31	31.080	31.450	165	165.250	166.790
32	32.080	32.460	170	170.250	171.840
33	33.080	33.470	180	180.250	181.940
34	34.100	34.480	185	185.250	186.990
35	35.100	35.490	200	200.250	202.140
36	36.100	36.500	210	210.250	212.240
37	37.100	37.510			

Table 4.2-1M 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

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

$$\text{tolerance}\ {}^{+0.000}_{-0.005}$$

(2) For W greater than 25 mm

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

$$\text{tolerance}\ {}^{+0.000}_{-0.005}$$

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 in para. 4.2.1.

(e) For additional sizes not listed in Table 4.2-1M, 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 4.2-2M. Round GO Gage A value to three decimal places. Use the rounding method in para. 4.2.1.

Table 4.2-2 Incremental Amount (Inch Series)

Nominal Size, W	Increment 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 4.2-2M Incremental Amount (Metric Series)

Nominal Size, W	Incremental Amount Added to W
to less than 3	0.010
3 to less than 3.2	0.015
3.2 to less than 6	0.020
6 to less than 10	0.030
10 to less than 14	0.040
14 to less than 19	0.050
19 to less than 26	0.060
26 to less than 34	0.080
34 to less than 55	0.120
55 to less than 75	0.120
75 to less than 105	0.150

Table 4.2-3 Spark Plug Hexagon (Inch Series)

Nominal Size, *W*	Tolerance: +0.005/−0	Tolerance: +0/−0.005
5/8	0.6290	0.6373
11/16	0.6895	0.6993
3/4	0.7504	0.7608
13/16	0.8200	0.8293
7/8	0.8790	0.8883

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.

Table 4.2-3M Spark Plug Hexagon (Metric Series)

Nominal Size, *W*	Tolerance: +0.005/−0	Tolerance: +0/−0.005
12	12.040	12.255
14	14.050	14.275
16	15.977	16.187
17.5	17.513	17.762
18	18.050	18.315
19	19.060	19.325
20.8	20.828	21.064
22.2	22.327	22.563
25.5	25.560	25.860

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.

Table 4.3.1-1 Hexagon Mandrel Dimensions and Maximum Depth of Mandrel Insertion (Inch Series)

Nominal Size of Wrench Opening	Hexagon Mandrel Minimum Across Flats	Hexagon Mandrel Maximum Across Flats	Hexagon Mandrel Minimum Across Corners [Note (1)]	Maximum Depth of Mandrel Insertion [Note (2)]
1/8	0.1230	0.1255	0.1403	0.055
5/32	0.1543	0.1568	0.1745	0.069
3/16	0.1855	0.1880	0.2095	0.083
7/32	0.2168	0.2193	0.2440	0.096
1/4	0.2480	0.2505	0.2780	0.110
9/32	0.2793	0.2818	0.3133	0.133
5/16	0.3105	0.3130	0.3495	0.141
11/32	0.3418	0.3443	0.3860	0.156
3/8	0.3730	0.3760	0.4225	0.156
7/16	0.4355	0.4385	0.4935	0.198
1/2	0.4970	0.5010	0.5635	0.239
9/16	0.5595	0.5635	0.6339	0.265
5/8	0.6220	0.6260	0.7055	0.291
11/16	0.6845	0.6885	0.7769	0.317
3/4	0.7470	0.7510	0.8485	0.344
13/16	0.8100	0.8140	0.9200	0.370
7/8	0.8720	0.8760	0.9920	0.396
15/16	0.9350	0.9390	1.0630	0.422
1	0.997	1.001	1.130	0.479
1 1/16	1.060	1.064	1.201	0.505
1 1/8	1.122	1.126	1.273	0.531
1 3/16	1.185	1.189	1.343	0.557
1 1/4	1.247	1.251	1.416	0.583
1 5/16	1.310	1.314	1.487	0.609
1 3/8	1.372	1.376	1.559	0.635
1 7/16	1.435	1.439	1.631	0.661
1 1/2	1.497	1.501	1.702	0.687
1 9/16	1.556	1.564	1.770	0.713
1 5/8	1.618	1.626	1.841	0.739
1 11/16	1.681	1.689	1.912	0.765
1 3/4	1.743	1.751	1.983	0.791
1 13/16	1.806	1.814	2.054	0.817
1 7/8	1.868	1.876	2.124	0.843
1 15/16	1.931	1.939	2.195	0.869
2	1.993	2.001	2.266	0.958
2 1/16	2.056	2.064	2.337	0.984
2 1/8	2.118	2.126	2.408	1.010
2 3/16	2.181	2.189	2.479	1.036
2 1/4	2.243	2.251	2.549	1.063
2 5/16	2.306	2.314	2.621	1.089
2 3/8	2.368	2.376	2.691	1.115
2 7/16	2.431	2.439	2.762	1.141

Table 4.3.1-1 Hexagon Mandrel Dimensions and Maximum Depth of Mandrel Insertion (Inch Series) (Cont'd)

Nominal Size of Wrench Opening	Hexagon Mandrel Minimum Across Flats	Hexagon Mandrel Maximum Across Flats	Hexagon Mandrel Minimum Across Corners [Note (1)]	Maximum Depth of Mandrel Insertion [Note (2)]
2 1/2	2.493	2.501	2.833	1.167
2 9/16	2.555	2.564	2.903	1.193
2 5/8	2.617	2.626	2.974	1.219
2 3/4	2.742	2.751	3.116	1.271
2 13/16	2.805	2.814	3.187	1.297
2 15/16	2.930	2.939	3.328	1.349
3	2.992	3.001	3.399	1.375
3 1/8	3.117	3.126	3.541	1.427
3 1/4	3.240	3.251	3.682	1.479
3 3/8	3.365	3.376	3.824	1.531
3 1/2	3.490	3.501	3.966	1.583
3 3/4	3.740	3.751	4.249	1.688
3 7/8	3.865	3.876	4.391	1.740
4	3.990	4.001	4.532	1.855
4 1/8	4.115	4.126	4.674	1.907
4 1/4	4.240	4.251	4.816	1.959
4 1/2	4.490	4.501	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 1 1/2 in. nominal size.

(2) Depth of mandrel insertion is required when testing socket wrenches.