ASME B32.100-2005
(Consolidation of ASME B32.3M and B32.4M)

Preferred Metric Sizes for Flat, Round, Square, Rectangular, and Hexagonal Metal Products

AN AMERICAN NATIONAL STANDARD



The American Society of
Mechanical Engineers

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FOREWORD

The U.S. Department of Commerce, in its July 1971 report to Congress titled "A Metric America — A Decision Whose Time Has Come," recommended that the United States should change to the metric system of measurement through a coordinated national program. This action, along with subsequent increased metric activity in industry, resulted in a number of requests from producers and users that the B32 Committee develop preferred series of metric sizes for the various forms of wrought metal mill products.

The B32.100 standard is based on the previously published standards B32.3M-1984 and B32.4M-1980. Development of these Standards was started in 1973. The proposal received Standards Committee B32 approval on June 4, 1974. It was subsequently approved by the sponsor and submitted to the American National Standards Institute for designation as an American National Standard. This was granted on July 9, 1974. The last edition was approved by the American National Standards Institute on September 24, 1984 and reaffirmed in 1994.

The sizes in this Standard are derived from a list of preferred metric sizes in which each number is approximately 60% greater than the number preceding it (ANSI B4.2 or ISO 497 Series R5′). Second Choice sizes are in increments of 25% (Series R10′) and Third Choice sizes in increments of 12% (Series R20′). Some deviations from this principle occur as the result of minor rounding. The selected sizes also reflect standard material sizes in ISO and national standards in traditional metric countries.

In 2002, the B32 Committee established a Task Force to draft new metric standards for the following product groups:

(a) ASME B32.100-200X Preferred Metric Sizes for Flat, Round, Square, Rectangular, and Hexagonal Metal Products;

(b) ASME B32.200-200X Preferred Metric Sizes for Round, Square, and Rectangular Tubular Metal Products Other Than Pipe; and

(c) ASME B32.300-200X Preferred Metric Sizes for Equal and Unequal Leg Angles, T- and Channel-Sections, IPN- and Wide Flange-Beams Structural Steel.

Material tolerances must be included in order to fully define the size of a product. International or leading national metric standards data were used as the basis for the tolerance data included in this Standard. References to the sources of these tolerances have been made, and a list of related standards are shown in Nonmandatory Appendix A. Figures are shown throughout the Standard to help speed up the search for the material type needed.

The present edition was approved by the American National Standards Institute on February 11, 2005.

ACKNOWLEDGEMENT

Figures in this Standard are copied from the book, *Metric Standards*, for Worldwide Manufacturing, with the permission of the publishers, ASME Press and *KOK* metric*USA*.org, Inc. Data shown in this Standard were developed with the help of the global standards material published in the same publication.

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Metal and Metal Alloy
Wrought Mill Product Nominal Sizes

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

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Secretary, B32 Standards Committee
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Three Park Avenue
New York, NY 10016-5990

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The Committee welcomes proposals for revisions to this Code. 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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PREFERRED METRIC SIZES FOR FLAT, ROUND, SQUARE, RECTANGULAR, AND HEXAGONAL METAL PRODUCTS

1 SCOPE

This Standard establishes a preferred series of metric thicknesses, widths, and lengths for flat metal products of rectangular cross-section. The thicknesses and widths shown in this Standard are also applicable to base metals that may be coated in later operations. This Standard also establishes a preferred series of metric sizes for round, square, rectangular, and hexagonal metal products.

2 GENERAL

The sizes in this Standard provide an orderly series of thicknesses for all flat metal products and widths for rectangular cross-section metal products. The series was developed to provide a reasonable selection of metal thicknesses from 0.050 mm to 300 mm and of metal widths from 10 mm to 5000 mm. In each case, the series provides for some second, third, and sometimes fourth choice sizes (thicknesses and widths) to cover instances where selection from the primary preferred sizes may be inadequate. Sufficient coverage in logical steps is presented in the tables to adequately serve most of the general purpose requirements of industry for flat metal products. The Standard also provides an orderly series of lengths for flat metal products.

This Standard also provides a series of sizes for each of round, square, rectangular, and hexagonal forms of metal products used for general applications. The series was developed to provide a reasonable selection of metal diameters from 0.020 mm to 320 mm for rounds and distance across flats from 3 mm to 300 mm for squares, various cross-section sizes from 1.6 mm by 2 mm to 100 mm by 200 mm for rectangles, and from 1.5 mm to 150 mm for hexagons. The series provides for some second, third, and fourth choice diameters for rounds and second and third choice distance-across-flats for squares and hexagons where selection from the primary preferred sizes may be inadequate. The series also provides for preferred lengths of rounds, squares, rectangles, and hexagons. Sufficient coverage in logical steps is presented in the tables to adequately serve most of the general purpose requirements of industry for round, square, rectangular, and hexagonal metal products.

It is recognized that for some applications, particularly large volume requirements in some metals for specific end uses, precise engineering requirements dictate a need for sizes other than those presented in this Standard. This Standard is in no way meant to preclude the use of such sizes where they are required. However, for general purpose applications or where requirements permit some latitude in the selection of thickness or thickness/width/length combinations, the simplified preferred sizes given in this Standard should facilitate interchangeability of metals in design, reduce inventories, and increase the availability of warehouse stocks of those sizes commonly used for general purpose applications. In such instances, the use of sizes listed in this Standard is to be encouraged.

All of the sizes included in this Standard are not necessarily produced in all metals and grades. Producers or distributors should be consulted to determine availability of a particular thickness or thickness/width combination for a given metal product.

3 USE OF TABLES

Wherever possible, sizes should be selected from the columns headed "First Choice." Only if no size in the preferred list is suitable should a selection be made from the columns headed "Second Choice" or "Third Choice." Lengths should be selected from the preferred list.

4 BASIS OF TABLES

The sizes in this Standard are derived from a list of preferred metric sizes in which each number is approximately 60% greater than the number preceding it (ANSI B4.2 or ISO 497 Series R5′). Second Choice sizes are in increments of 25% (Series R10′) and Third Choice sizes in increments of 12% (Series R20′). Some deviations from this principle occur as the result of minor rounding. The selected sizes also reflect standard material sizes in ISO and national standards in traditional metric countries.

5 TOLERANCES

Material product tolerances are shown in applicable international or national product standards. Normal tolerances shown in international standards are generally larger and could be up to twice as large for metric material compared with customary inch tolerances used in

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Table 1 Preferred Thicknesses, *D* (mm), for All Flat Metal Products

First Choice	Second Choice	Third Choice	First Choice	Second Choice	Third Choice
...	0.05	...	4	...	...
0.06	...	...	...	...	4.5
...	0.08	...	...	5	...
0.1	...	...	...	...	5.5
...	...	0.11	6	...	...
...	0.12	...	...	...	7
...	...	0.14	...	...	7.5
0.16	...	...	...	8	...
...	...	0.18	...	...	9
...	0.2	...	10	...	...
...	...	0.22	...	...	11
0.25	...	...	...	12	...
...	...	0.28	...	...	14
...	0.3	...	...	...	15
...	...	0.35	16	...	...
0.4	...	...	...	...	18
...	...	0.45	...	20	...
...	0.5	...	...	...	22
...	...	0.55	25	...	...
0.6	...	...	...	...	28
...	...	0.65	...	30	...
...	...	0.7	...	...	32
...	...	0.75	...	...	35
...	0.8	...	...	...	38
...	...	0.9	40	...	...
1	...	...	...	...	45
...	...	1.1	...	50	...
...	1.2	...	...	...	55
...	...	1.4	60	...	...
...	...	1.5	...	...	70
1.6	...	...	...	80	...
...	...	1.7	...	...	90
...	...	1.8	100	...	...
...	2	...	...	...	110
...	...	2.2	...	120	...
...	...	2.3	...	...	130
2.5	...	...	...	...	140
...	...	2.6	...	...	150
...	...	2.8	160	...	...
...	3	...	...	...	180
...	...	3.2	...	200	...
...	...	3.5	250		
...	...	3.8	...	300	...

Table 2 Preferred Widths (mm) for Flat Metal Products

First Choice	Second Choice	Third Choice	First Choice	Second Choice	Third Choice
...	2	...	...	...	130
2.5	...	...	...	140	...
...	3	...	...	...	150
4	...	...	160	...	...
...	5	...	...	...	180
6	...	...	...	200	...
...	8	...	...	...	225
10	...	...	250	...	...
...	12	...	...	...	280
16	...	...	...	300	...
...	20	...	400	...	...
25	...	...	...	500	...
...	30	...	600	...	...
...	...	35	...	...	700
40	...	...	...	800	...
...	...	45	...	...	900
...	50	...	1 000	...	...
...	...	55	...	1 200	...
60	...	...	1 600	...	1 500
...	...	70	...	2 000	...
...	80	...	2 500	...	...
...	...	90	...	3 000	...
100	...	...	...	...	3 500
...	...	110	4 000	...	...
...	120	...	...	5 000	...

Table 3 Preferred Lengths (mm) for Flat Metal Products

First Choice	Second Choice	Third Choice
...	2 000	...
2 500	...	...
...	3 000	...
...	...	3 500
4 000	...	...
...	...	4 500
...	5 000	...
6 000	...	...
...	8 000	...
10 000	...	...
...	12 000	...
...	...	14 000
16 000	...	...
...	...	18 000

the U.S. Only a few major product groups will be covered by this Standard, and they are specified in paras. 5.1 through 5.8.

5.1 Hot-Rolled Steel Sheets

Preferred sizes for hot-rolled steel sheets are shown in Tables 1 through 3. Tolerances for hot-rolled steel sheets are specified in ISO 4995 and ISO 5002 and shown in Table 9.

5.2 Cold-Rolled Steel Sheets

Preferred sizes for cold-rolled steel sheets are shown in Tables 1 through 3. Tolerances for cold-rolled steel sheets are specified in ISO 4997 and shown in Table 10.

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Table 4 Preferred Diameters, *D* (mm), of Round Metal Products

First Choice	Second Choice	Third Choice	First Choice	Second Choice	Third Choice	First Choice	Second Choice	Third Choice
...	0.02	...	...	...	2.4	...	...	45
...	...	0.022	2.5	...	...	...	...	48
0.025	...	...	...	...	2.6	...	50	...
...	...	0.028	...	...	2.8	...	...	55
...	0.03	...	...	3	...	...	...	56
...	...	0.035	...	...	3.2	60	...	...
0.04	...	...	...	...	3.5	...	...	63
...	...	0.045	...	...	3.8	...	...	65
...	0.05	...	4	...	...	...	...	70
...	...	0.055	...	...	4.5	...	...	75
0.06	...	...	...	...	4.8	...	80	...
...	...	0.065	...	5	...	...	...	85
...	...	0.07	...	...	5.5	...	...	90
...	0.08	...	6	...	...	...	...	95
...	...	0.09	...	...	6.5	100	...	...
0.1	...	...	...	...	7	...	...	105
...	...	0.11	...	...	7.5	...	...	110
...	0.12	...	...	8	...	...	120	...
...	...	0.14	...	...	8.5	...	...	125
0.16	...	...	...	...	9	...	...	130
...	...	0.18	...	...	9.5	...	...	140
...	0.2	...	10	...	...	...	...	150
...	...	0.22	...	...	11	160	...	...
0.25	...	...	...	12	...	...	...	170
...	...	0.28	...	...	13	...	...	180
...	0.3	...	...	...	14	...	...	190
...	...	0.35	...	...	15	...	200	...
0.4	...	...	16	...	...	...	...	220
...	...	0.45	...	...	17	...	...	240
...	0.5	...	...	...	18	250	...	...
...	...	0.55	...	...	19	...	...	260
0.6	...	...	...	20	...	...	...	280
...	...	...	...	...	21	...	300	...
...	...	0.7	...	...	22	...	...	320
...	0.8	...	...	...	23	...	...	340
...	...	0.9	...	...	24	...	...	350
1	...	...	25	...	...	...	...	360
...	...	1.1	...	...	26	...	...	380
...	1.2	...	...	...	28	400	...	...
...	...	...	...	30	...	...	...	420
...	...	1.4	...	...	32	...	...	440
1.6	...	...	...	...	35	...	...	450
...	...	1.8	...	...	36	...	...	460
...	2	...	...	...	38	...	...	480
...	...	...	40	...	...	...	500	...
...	...	2.2	...	...	42	...	...	...

GENERAL NOTE: Hot-finished round material sizes made to this Standard are interchangeable with those made to the ISO 1035-1 standard.

5.3 Hot-Rolled Steel Bars

Preferred sizes for hot-rolled steel bars are shown in Tables 4 through 8. Tolerances for hot-rolled steel bars are specified in ISO 1035-4 and shown in Table 11.

5.4 Cold-Finished Round Steel Bars

Preferred sizes for cold-finished round steel bars are shown in Tables 4 and 7. Cold-finished round steel bars held to the ISO tolerances h11, h9, h7, and h6 are cov-

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Table 5 Preferred Across Flat Sizes, *D* (mm), of Square Metal Products

First Choice	Second Choice	Third Choice	First Choice	Second Choice	Third Choice
...	3	...	...	...	45
4	...	...	...	50	...
...	5	...	...	...	55
6	...	...	60	...	...
...	8	...	...	...	70
10	...	...	...	80	...
...	12	...	...	...	90
...	...	14	100	...	...
16	...	...	...	...	110
...	...	18	...	120	...
...	20	...	...	...	140
...	...	22	160	...	...
25	...	...	...	...	180
...	...	28	...	200	...
...	30	...	...	...	220
...	...	35	250	...	...
40	...	...	...	300	...

GENERAL NOTE: Hot-finished square material sizes made to this Standard are interchangeable with those made to the ISO 1035-2 standard.

Table 6 Preferred Across Flat Sizes, *D* (mm), of Hexagonal Metal Products

First Choice	Second Choice	Third Choice	First Choice	Second Choice	Third Choice
...	1.5	...	30	...	...
...	2	...	...	32	...
...	2.5	...	34	...	...
3	...	...	36	...	...
...	3.2	...	41	...	...
4	...	...	46	...	...
5	...	...	50	...	...
...	5.5	...	55	...	...
6	...	...	60	...	...
...	7	...	65	...	...
8	...	...	70	...	...
10	...	...	75	...	...
12	...	...	80	...	...
...	13	...	85	...	...
14	...	...	90	...	...
...	15	...	95	...	...
16	...	...	100	...	...
...	17	...	105	...	...
18	...	...	110	...	...
...	19	...	115	...	...
21	...	...	120	...	...
...	22	...	130	...	...
24	...	...	135	...	...
27	...	...	145	...	...
...	...	...	150	...	...

Table 7 Preferred Lengths (mm) of Round, Square, Rectangular, and Hexagonal Metal Products

First Choice	Second Choice	Third Choice
1 000	...	...
...	2 000	...
2 500	...	...
...	3 000	...
...	...	3 500
...	...	3 700
4 000	...	...
...	...	4 500
...	5 000	...
6 000	...	...
...	8 000	...
10 000	...	...
...	12 000	...
...	...	14 000
16 000	...	...
...	...	18 000

ered in national standards in all major industrial countries (see Table 13).

5.5 Cold-Finished Square Steel Bars

Preferred sizes for cold-finished square steel bars are shown in Tables 5 and 7. Cold-finished square steel bars held to the ISO tolerances h11 up to and including 65 mm and h12 for larger sizes (see Table 13).

5.6 Cold-Finished Hex Steel Bars

Preferred sizes for cold-finished square steel bars are shown in Tables 6 and 7. Cold-finished hex steel bars held to the ISO tolerances h11 up to and including 65 mm and h12 for larger sizes (see Table 13).

5.7 Hot-Rolled Rectangular Steel Bars

Preferred sizes for hot-rolled rectangular steel bars are shown in Tables 7 and 8. Tolerances for hot-rolled steel bars are specified in ISO 1035-4 and shown in Table 12.

5.8 Cold-Finished Rectangular Steel Bars

Cold-finished rectangular steel bars held to the ISO tolerances h11 for thicknesses from 1.5 mm to 30 mm and widths from 5 mm to 100 mm. Select ISO tolerances h13 for thicknesses over 30 mm. For widths over 100 mm, consult supplier (see Table 13).

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Table 8 Preferred Across Flat Sizes (mm) of Rectangular Metal Products

			Thicknesses, *B*																			
First Choice			1.6		2.5		4		6		10	16 [Note (1)]		25		40		60		100		
Second Choice				2		3		5		8		12		20		30		50		80		
Choice of Width, *A*																						
First	Second	Third																				
...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2.5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	5	...		C	C	C	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	...	...		C	C	C	C	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	8	...	C	C	C	X	X	C	C	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10	...	...	C	C	C	X	X	C	X	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	12	...	C	C	C	X	X	C	X	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16	...	...	C	C	C	X	X	C	X	X	X	...	...	...	...	...	...	...	...	...	...	...	...
...	20	...	C	C	C	X	X	X	X	X	X	X	C	...	...	...	...	...	...	...	...	...	...
25	...	...	...	C	C	X	X	X	X	X	X	X	C	C	...	...	...	...	...	...	...	...	...
...	30	...	...	C	C	X	X	X	X	X	X	X	X	X	C	...	...	...	...	...	...	...	...
...	...	35	...	C	C	C	C	X	X	X	X	X	X	X	C	...	...	...	...	...	...	...	...
40	...	...	...	C	...	C	C	X	X	X	X	X	X	X	X	C	...	...	...	...	...	...	...
...	...	45	...	C	...	C	C	X	X	X	X	X	X	X	X	C	...	...	...	...	...	...	...
...	50	...	...	C	...	C	C	X	X	X	X	X	X	X	X	X	...	...	...	...	...	...	...
60	...	...	...	...	...	C	C	X	X	X	X	X	X	X	X	X	C	...	...	...	...	...	...
...	...	70	...	...	...	...	...	X	X	X	X	X	X	X	X	X	C	...	...	...	...	...	...
...	80	...	...	...	...	...	...	X	X	X	X	X	X	X	X	X	X	X	...	...	...	...	...
...	...	90	...	...	...	...	...	X	X	X	X	X	X	X	X	X	X	X	...	...	...	...	...
100	...	...	...	...	...	...	...	X	X	X	X	X	X	X	X	X	X	X	...	...	...	...	...
...	...	110	...	...	...	...	...	H	H	H	H	H	H	H	H	H	H	H	...	...	...	...	...
...	120	...	...	...	...	...	...	H	H	H	H	H	H	H	H	H	H	H	...	...	...	...	...
...	...	130	...	...	...	...	...	H	H	H	H	H	H	H	H	H	H	H	...	...	...	...	...
...	...	140	...	...	...	...		H	H	H	H	H	H	H	H	H	H	H	...	...	...	...	...
...	...	150	...	...	...	...	...	H	H	H	H	H	H	H	H	H	H	H	...	...	...	...	...
160	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	180	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	200	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

GENERAL NOTES:

(a) Hot-finished rectangular material sizes made to this Standard are interchangeable with that made to the ISO 1035-3 standard.

(b) X = hot and cold finished, C = cold finished, and H = hot finished.

NOTE:

(1) The ISO 1035-3 standard specifies the 15-mm thicknesses.

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Table 9 Thickness Tolerances (mm) for Hot-Rolled Steel Sheet of Structural Qualities (ISO 4995, ISO 5002)

	Thickness					
Width	Over 1.6 to 2	Over 2 to 2.5	Over 2.5 to 3	Over 3 to 4	Over 4 to 5	Over 5 to 6
Over 600 to 1200	0.17	0.18	0.20	0.22	0.24	0.26
Over 1200 to 1500	0.19	0.21	0.22	0.24	0.26	0.28
Over 1500 to 1800	0.21	0.23	0.24	0.26	0.28	0.29
Over 1800	. . .	0.25	0.26	0.27	0.29	0.31

Table 10 Thickness Tolerances (mm) for Cold-Rolled Steel Sheet of Structural Qualities (ISO 4997)

	Thickness								
Width	Over 0.36 to 0.4	Over 0.4 to 0.6	Over 0.6 to 0.8	Over 0.8 to 1	Over 1 to 1.2	Over 1.2 to 1.6	Over 1.6 to 2	Over 2 to 2.5	Over 2.5 to 3
Over 600 to 1200	0.05	0.06	0.08	0.09	0.10	0.12	0.14	0.17	0.20
Over 1200 to 1500	0.06	0.07	0.09	0.10	0.11	0.13	0.15	0.18	0.21
Over 1500 to 1800	. . .	0.09	0.10	0.11	0.13	0.15	0.18	0.20	0.23

Table 11 Tolerance (mm) for Hot-Rolled, Round, Square, and Hex Steel Bars (ISO 1035-4)

Nominal Sizes [Note (1)]		Tolerance on Size for Classes		
Over	Up to and Including	N	F	S [Note (2)]
	15	± 0.4	± 0.3	± 0.2
15	25	± 0.5	± 0.4	± 0.25
25	35	± 0.6	± 0.5	± 0.3
35	50	± 0.8	± 0.6	± 0.4
50	80	± 1	± 0.8	± 0.5 [Note (3)]
80	100	± 1.3	± 1	. . .
100	120	± 1.6	± 1.3	. . .
120	160	± 2	± 1.6	. . .
160	200	± 2.5	± 2	. . .
200	. . .	± 1.5% of size	± 1.2% of size	. . .

NOTES:
(1) Diameter of round bars, distance-across-flats of square and hex bars.
(2) Applicable to round bars only.
(3) Applicable only to sizes up to and including 65 mm. For larger sizes, the tolerances should be agreed on at the time of ordering.

Table 12 Tolerances (mm) for Hot-Rolled Flat Bars (ISO 1035-4)

Nominal Widths			Nominal Thicknesses		Tolerances on Thicknesses for Nominal Widths, *b*	
Over	Up to and Including	Tolerances on Width	Over	Up to and Including	$b \leq 50$ mm	50 mm $< b \leq$ 150 mm
. . .	50	± 0.8	. . .	20	± 0.4	± 0.5
50	75	± 1.2	20	40	± 0.8	± 1
75	100	± 1.5	40	. . .	. . .	± 1.5
100	125	± 2				
125	150	± 2.5				

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Table 13 Tolerance (mm) for Cold-Finished, Round, Square, and Hex Steel Bars (ANSI B4.2)

Size		h12	h11	h9	h7	h6
Over	0	0.000	0.000	0.000	0.000	0.000
to	3	−0.100	−0.060	−0.025	−0.010	−0.006
Over	3	0.000	0.000	0.000	0.000	0.000
to	6	−0.120	−0.075	−0.030	−0.012	−0.008
Over	6	0.000	0.000	0.000	0.000	0.000
to	10	−0.150	−0.090	−0.036	−0.015	−0.009
Over	10	0.000	0.000	0.000	0.000	0.000
to	14	−0.180	−0.110	−0.043	−0.018	−0.011
Over	14	0.000	0.000	0.000	0.000	0.000
to	18	−0.180	−0.110	−0.043	−0.018	−0.011
Over	18	0.000	0.000	0.000	0.000	0.000
to	24	−0.210	−0.130	−0.052	−0.021	−0.013
Over	24	0.000	0.000	0.000	0.000	0.000
to	30	−0.210	−0.130	−0.052	−0.021	−0.013
Over	30	0.000	0.000	0.000	0.000	0.000
to	40	−0.250	−0.160	−0.062	−0.025	−0.016
Over	40	0.000	0.000	0.000	0.000	0.000
to	50	−0.250	−0.160	−0.062	−0.025	−0.016
Over	50	0.000	0.000	0.000	0.000	0.000
to	65	−0.300	−0.190	−0.074	−0.030	−0.019
Over	65	0.000	0.000	0.000	0.000	0.000
to	80	−0.300	−0.190	−0.074	−0.030	−0.019
Over	80	0.000	0.000	0.000	0.000	0.000
to	100	−0.350	−0.220	−0.087	−0.035	−0.022
Over	100	0.000	0.000	0.000	0.000	0.000
to	120	−0.350	−0.220	−0.087	−0.035	−0.022
Over	120	0.000	0.000	0.000	0.000	0.000
to	140	−0.400	−0.250	−0.100	−0.040	−0.025
Over	140	0.000	0.000	0.000	0.000	0.000
to	160	−0.400	−0.250	−0.100	−0.040	−0.025
Over	160	0.000	0.000	0.000	0.000	0.000
to	180	−0.400	−0.250	−0.100	−0.040	−0.025
Over	180	0.000	0.000	0.000	0.000	0.000
to	200	−0.460	−0.290	−0.115	−0.046	−0.029
Over	200	0.000	0.000	0.000	0.000	0.000
to	225	−0.460	−0.290	−0.115	−0.046	−0.029
Over	225	0.000	0.000	0.000	0.000	0.000
to	250	−0.460	−0.290	−0.115	−0.046	−0.029
Over	250	0.000	0.000	0.000	0.000	0.000
to	280	−0.520	−0.320	−0.130	−0.052	−0.032
Over	280	0.000	0.000	0.000	0.000	0.000
to	315	−0.520	−0.320	−0.130	−0.052	−0.032
Over	315	0.000	0.000	0.000	0.000	0.000
to	355	−0.570	−0.360	−0.140	−0.057	−0.036
Over	355	0.000	0.000	0.000	0.000	0.000
to	400	−0.570	−0.360	−0.140	−0.057	−0.036
Over	400	0.000	0.000	0.000	0.000	0.000
to	450	−0.630	−0.400	−0.155	−0.063	−0.040
Over	450	0.000	0.000	0.000	0.000	0.000
to	500	−0.630	−0.400	−0.155	−0.063	−0.040

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NONMANDATORY APPENDIX A
RELATED STANDARDS

The following is a list of standards and specifications referenced in this Standard, showing the year of approval.

ISO 3:1973, Preferred numbers — Series of preferred numbers

ISO 17:1973, Guide to the use of preferred numbers and series of preferred numbers

ISO 286-1:1988, ISO system of limits and fits — Part 1: Bases of tolerances, deviations, and fits

ISO 286-2:1988, ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts

ISO 497:1973, Guide to the choice of series of preferred numbers and series containing more rounded values of preferred numbers

ISO 630:1995, Structural steels — Plates, wide flats, bars, sections, and profiles

ISO 657-1:1989, Hot-rolled steel sections — Part 1: Equal-leg angles — Dimensions

ISO 657-2:1989, Hot-rolled steel sections — Part 2: Unequal-leg angles — Dimensions

ISO 657-5:1976, Hot-rolled steel sections — Part 5: Equal-leg angles and unequal-leg angles — Tolerances for metric and inch series

ISO 657-11:1980, Hot-rolled steel sections — Part 11: Sloping flange channel sections (Metric series) — Dimensions and sectional properties

ISO 657-15:1980, Hot-rolled steel sections — Part 15: Sloping flange beam sections (Metric series) — Dimensions and sectional properties

ISO 657-16:1980, Hot-rolled steel sections — Part 16: Sloping flange column sections (metric series) — Dimensions and sectional properties

ISO 657-18:1980, Hot-rolled steel sections — Part 18: L sections for shipbuilding (metric series) — Dimensions, sectional properties, and tolerances

ISO 657-21:1983, Hot-rolled steel sections — Part 21: T-sections with equal depth and flange width — Dimensions

ISO 1035-1:1980, Hot-rolled steel bars — Part 1: Dimensions of round bars

ISO 1035-2:1980, Hot-rolled steel bars — Part 2: Dimensions of square bars

ISO 1035-3:1980, Hot-rolled steel bars — Part 3: Dimensions of flat bars

ISO 1035-4:1982, Hot-rolled steel bars — Part 4: Tolerances

ISO 1052:1982, Steels for general engineering purposes

ISO 1127:1992, Stainless steel tubes — Dimensions, tolerances, and conventional masses per unit length

ISO 1829:1975, Selection of tolerance zones for general purposes

ISO 2937:1974, Plain-end seamless steel tubes for mechanical application

ISO 2938:1974, Hollow steel bars for machining

ISO 3573:1999, Hot-rolled carbon steel sheet of commercial and drawing qualities

ISO 3574:1999, Cold-reduced carbon steel sheet of commercial and drawing qualities

ISO 3575:1996, Continuous hot-dip, zinc-coated carbon steel sheet of commercial, lock-forming, and drawing qualities

ISO 4019:2001, Structural steels — Cold-formed, welded, structural hollow sections — Dimensions and sectional properties

ISO 4200:1991, Plain-end steel tubes, welded and seamless — General tables of dimensions and masses per unit length

ISO 4960:1999, Cold-reduced carbon steel strip with a carbon content over 0.25%

ISO 4995:2001, Hot-rolled steel sheet of structural quality

ISO 4996:1999, Hot-rolled steel sheet of high-yield stress structural quality

ISO 4997:1999, Cold-reduced steel sheet of structural quality

ISO 4998:1996, Continuous hot-dip, zinc-coated carbon steel sheet of structural quality

ISO 4999:1999, Continuous hot-dip terne (lead alloy) coated, cold-reduced carbon steel sheet of commercial drawing and structural qualities

ISO 5000:1993, Continuous hot-dip aluminium/silicon-coated, cold-reduced carbon steel sheet of commercial and drawing qualities

ISO 5001:1999, Cold-reduced carbon steel sheet for vitreous enamelling

ISO 5002:1999, Hot-rolled and cold-reduced electrolytic zinc-coated carbon steel sheet of commercial and drawing qualities

ISO 5252:1991, Steel tubes — Tolerance systems

ISO 5950:2000, Continuous electrolytic tin-coated, cold-reduced carbon steel sheet of commercial and drawing qualities

ISO 5951:2001, Hot-rolled steel sheet of higher yield strength with improved formability

ISO 5952:1998, Continuously hot-rolled steel sheet of

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structural quality with improved atmospheric corrosion resistance

ISO 5954:1998, Cold-reduced carbon steel sheet according to hardness requirements

ISO 6316:2000, Hot-rolled steel strip of structural quality

ISO 6317:2000, Hot-rolled carbon steel strip of commercial and drawing qualities

ISO 6932:2001, Cold-reduced carbon steel strip with a maximum carbon content of 0.25%

ISO 7452:1984, Hot-rolled structural steel plates — Tolerances on dimensions and shape

ISO 8457-1:1989, Steel wire rod — Part 1: Dimensions and tolerances

ISO 8458-1:2002, Steel wire for mechanical springs — Part 1: General requirements

ISO 8458-2:2002, Steel wire for mechanical springs — Part 2: Patented cold-drawn nonalloy steel wire

ISO 9034:1987, Hot-rolled structural steel wide flats — Tolerances on dimensions and shape

ISO 9364:2001, Continuous hot-dip aluminium/zinc-coated steel sheet of commercial, drawing, and structural qualities

ISO 10384:2001, Hot-rolled carbon steel sheet as defined by chemical composition

ISO 13887:1995, Cold-reduced steel sheet of higher yield strength with improved formability

ISO 13976:1998, Hot-rolled steel sheet in coils of structural quality and heavy thickness

ISO 14590:1999, Cold-reduced steel sheet of high-tensile strength and low-yield point with improved formability

ISO 14788:1998, Continuous hot-dip zinc-5%/aluminium alloy-coated steel sheets and coils

ISO 15812:2001, Continuous mill flat-rolled products — Guidelines for improved ordering communication

ISO 16160:2000, Continuously hot-rolled steel sheet products — Dimensional and shape tolerances

ISO 16162:2000, Continuously cold-rolled steel sheet products — Dimensional and shape tolerances

ISO 16163:2000, Continuously hot-dipped coated steel sheet products — Dimensional and shape tolerances

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