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Socket Welding Reducer Inserts

Standard Practice
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The SI (metric) units and U.S. customary units in this Standard Practice are regarded separately as the standard; each should be used independently of the other. Combining or converting values between the two systems may result in non-conformance with this Standard Practice.

This document has been substantively revised from the previous 2009 edition. It is suggested that if the user is interested in knowing what changes have been made, direct page by page comparison should be made of this document and that of the previous edition.

Non-toleranced dimensions in this Standard Practice are nominal, and, unless otherwise specified, shall be considered "for reference only".

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FOREWORD

This document establishes a Standard Practice for Socket Welding Reducer Inserts produced for a number of years by various manufacturers to varying dimensions although basically similar in principle. Users should note reducers furnished from existing stocks may have slightly different dimensions than shown in Table 3.

Table 3M has been added to this 2011 edition for (SI) metric dimensioned fittings. Other (SI) metric dimensions and the 2010 Errata Sheet have also been incorporated into this 2011 edition.

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SOCKET WELDING AND REDUCER INSERTS

PURPOSE

To provide a Standard Practice establishing requirements for insert type fittings, which effectively, after welded installation, creates a socket welded reduced end fitting, such as a Tee, 90-degree Ell, Cross, 45-degree Ell, Coupling, etc.

1. SCOPE

1.1 ***General*** This Standard Practice covers ratings, dimensions, tolerances, finish, marking and material requirements for socket welding reducer inserts for use with ASME B16.11, Class 3000 and 6000 socket welding fittings. U.S. customary unit dimensions for these reducer inserts are shown in Table 3 and (SI) metric dimensions are shown in Table 3M.

1.1.1 ***Fitting Sizes/Pipe Correlation*** Fittings covered by this Standard Practice are shown in Table 1, by class, size range and correlation to the schedule number or wall designation of pipe for calculation of ratings.

1.1.2 ***Partial Compliance Fittings*** Fittings with special dimensions and fittings made from non-standard materials may be designed and manufactured by agreement between the manufacturer and the purchaser, provided they are marked in accordance with the requirements for partial compliance fittings of Section 5.1.1(e).

1.1.3 ***Welding*** Except for the CAUTIONARY NOTE (see Section 12) and the GAP RECOMMENDATIONS (see Figures 1 and 2), installation welding requirements are not within the scope of this Standard Practice. Installation welding shall be done in accordance with the applicable piping system into which the fittings are to be installed.

2. GENERAL

2.1 ***Referenced Standards*** Standards and specifications referenced in this Standard Practice are shown in Annex A, which is a normative part of this Standard Practice. It is not considered practical to identify the specific edition of each standard and specification in the individual references. Instead, the specific edition reference is identified in Annex A. A fitting made in conformance and conforming to this Standard Practice in all other respects will be considered to be in conformance with this Standard Practice, even though the edition reference may have changed in a subsequent addendum to or revision of the standard.

2.2 ***Codes of Regulations*** A fitting used under the jurisdiction of the ASME Boiler and Pressure Vessel Code, the ASME B31 Codes for Pressure Piping, or a governmental regulation is subject to any limitation of that code or regulation. This includes any maximum temperature limitation, or rule governing the use of material at low temperature, or provisions for operation at a pressure exceeding the pressure ratings in this Standard Practice.

2.3 ***Service Conditions*** Criteria for selection of fitting type and materials suitable for particular fluid service are not within the scope of this Standard Practice.

2.4 ***Standard Units*** The values stated in either U.S. customary units or (SI) metric units are to be regarded separately as standard. Within the text, the metric units are shown in parentheses. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in non-conformance with this Standard Practice.

3. RATINGS

3.1 ***General*** These fittings shall be designated as Class 3000 and Class 6000.

3.1.1 ***Rating Basis*** The schedule of pipe corresponding to each Class of fitting for rating purposes is shown in Table 1. Design temperature and other service conditions shall be limited as provided by the applicable piping code of regulation for the material of construction of the fitting. Within these limits the maximum allowable pressure of a fitting shall be that computed for straight seamless pipe of equivalent material (as shown by comparison of composition and mechanical properties in the respective material specifications). The wall thickness used in such computation shall be that tabulated in ASME B36.10M for the size and applicable manufacturing tolerances and other allowances.

Any corrosion allowance and any variation in allowable stress due to temperature or other design shall be applied to the pipe and the fitting alike.

3.1.2 ***Non-Standard Pipe Wall Thickness*** Since ASME B36.10M does not include Schedule 160 thickness for NPS $^{1}/_{4}$ (DN 8), and NPS $^{3}/_{8}$ (DN 10); the values in Table 2 may be used as the nominal wall thickness of the pipe for rating purposes.

3.2 ***Pressure Test Capability*** Pressure testing is not required by this Standard Practice; however, the fitting shall be capable of withstanding hydrostatic test pressure required by the applicable piping code for the seamless pipe material equivalent to the fitting and of the schedule or wall thickness correlated with fitting class.

4. SIZE

4.1 ***General*** The reducer insert size is identified by its nominal pipe size (NPS). NPS is related to the reference nominal diameter, DN, used in international standards. The relationship is as shown in the table below:

NPS	1/4	3/8	1/2	3/4	1	1¼	1½	2	2½	3	4
DN	8	10	15	20	25	32	40	50	65	80	100

The largest pipe size of the reducer insert shall be listed first, followed by the smaller pipe size.

5. MARKING

5.1 ***General*** Each fitting shall be permanently marked with the required identification by stamping, electro-etching, or vibro-tool marking. Fittings shall be marked on the O.D., at the reduced opening end of the fitting, in a location such that the marking will not be obliterated as a result of welding installation.

5.1.1 ***Specific Marking*** The marking shall include (but not limited to) the following:

a) Manufacturer's Name or Trademark

b) Material Identification

Fittings shall be marked in accordance with requirements of either the applicable ASTM Fitting Specification(s) A234, A403, and A420, or the appropriate ASTM Forging Specification(s) A105, A182, and A350.

The material log or heat number traceable to the material shall be part of the material identification.

c) Class Designation 3000 or 6000 as applicable

Alternatively, the designation 3M or 6M, as applicable, may be used where M indicates 1000.

d) Size

The nominal pipe size(s), (NPS or DN), related to the end connections.

e) Product Conformance

Full compliance fittings shall be marked with the symbol "SP79" to denote conformance with this Standard Practice.

Partial compliance fittings covered in Section 1.1.2 shall not be marked "SP79" and if marked with an ASTM designation, the marking shall include the number of the applicable "Supplementary Requirement" (S58) for special or non-standard fittings, as per ASTM 960-S58.

5.2 ***Omission of Markings*** Where size and type of fitting do not permit all of the above markings, they may be omitted in the reverse order given above.

6. MATERIAL

6.1 The material for fittings shall consist of forgings, bar, seamless pipe, or tubular products, which conform to requirements for the melting process, and chemical composition requirements of the forging product form as listed in ASME B16.34,Table 1; including applicable notes from Table 2 or Table VII-2 of the aforementioned standard.

6.2 ***Non-Standard Materials*** When fittings of other materials reference this Standard Practice for Non-Standard coverage, they shall be marked as agreed between the manufacturer and purchaser and shall not include the identification specified in Section 5.1.1(b) and (c) of this Standard Practice.

7. DESIGN AND CAPABILITY

These reducers are to be used as a reducing adapter between a straight size socket weld fitting and a smaller size pipe. By the nature of the part configuration, the minimum body wall thickness at the shank end will always be greater than the nominal wall thickness of the pipe, as established by ASME B36.10M with which they are used.

8. DIMENSIONS AND TOLERANCES

8.1 ***General*** The dimensions and tolerances for reducer inserts capable of meeting these requirements are shown in Table 3 (U.S. customary units) or Table 3M (SI metric units).

8.1.1 Reducer ends shall be at right angles to the axis and provide adequate surface against which to weld (see Figure 2).

8.1.2 ***Socket Depth*** The socket depth shall be no less than the minimum values shown in Table 3 or Table 3M.

8.1.3 ***Socket Bore*** The inside surface of the socket bore shall present a workmanlike finish that is free of burrs.

8.1.4 ***Minimum Wall*** In order to provide the required shoulder for the fillet weld, the socket wall thickness at the welding end shall be at least 1.25 times the nominal thickness of the corresponding pipe shown in Table 3 or Table 3M, under column heading "Wall Min C".

U.S. customary inch tolerances are shown at the bottom of Table 3 and (SI) metric tolerances at the bottom of Table 3M.

8.2 ***Additional Tolerances*** Tolerances in addition to those listed in Table 3 or Table 3M are as follows:

(a) ***Concentricity of Bores***
The socket and fitting bores shall be concentric within a tolerance of 0.03 inches (0.8 mm).

(b) ***Concentricity of Axes***
The maximum allowable variation in the alignment of the fitting bore and socket bore axes shall be 0.06 inches in 1 foot (1.5 mm in 300 mm).

9. TESTING

9.1 ***Proof Testing*** Proof testing for fittings made from standard materials are not required by this Standard Practice.

10. FINISH

10.1 Surfaces must be free of sharp burrs and have a workmanship like finish.

11. CORROSION PROTECTION

11.1 Fittings shall be effectively protected against corrosion. Excess oils shall be considered unacceptable as corrosion protective media. Specialty protection shall be a matter of agreement between the manufacturer and purchaser.

12. CAUTIONARY NOTE REGARDING INSTALLATION OF SOCKET WELDED JOINTS

12.1 To minimize the possibility of cracking of the fillet welds, it is recommended that the shank portion of the reducer insert be withdrawn approximately 0.06 inches (1.5 mm) away from contact with the bottom of the socket before starting the weld. Likewise the pipe is to be kept away from contacting the bottom of the reducer insert socket before welding (see Figure 2).

12.2 To facilitate effective penetration in the fillet weld, it is further recommended that the Type 1 reducer insert be positioned to provide a root standoff of a minimum of 0.12 inches (3.0 mm), (see Figure 1).

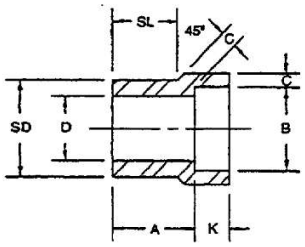
TABLE 1
Fitting Sizes/Pipe Correlation

Class Designation	Sizes		Pipe Used For Rating Purposes	Wall Designation
	NPS	DN		
3000	3/8 – 4	10 – 100	Schedule 80	XS
6000	3/8 – 3	10 – 80	Schedule 160	—

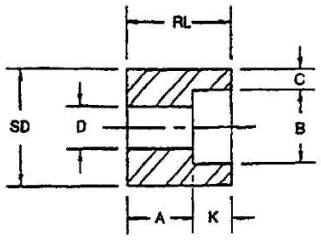
General Note: This table is not included to restrict the use of pipe of thinner walls with the Reducer Inserts.

TABLE 2
Nominal Wall Thickness of Schedule 160 Pipe, NPS 1/4 (DN 8) and NPS 3/8 (DN 10)

Sizes		Nom. Wall (in.)	Nom. Wall (mm)
NPS	DN		
1/4	8	0.145	3.68
3/8	10	0.158	4.01



TYPE 1



TYPE 2[(a)]

TABLE 3
Steel Socket Welding Reducer Insert Dimensions and Tolerances

Dimensions are in inches

Nominal Pipe Size (NPS)	Type[(a)]		Socket		Shank Dia. SD	Laying Length A		Bore D		Wall (Min.) C		Length			
			Dia. B	Depth (Min.) K								SL		RL (Min.)	
	3M	6M				3M	6M	3M	6M	3M	6M	3M	6M	3M	6M
3/8 x 1/4	1	1	.565	.38	.675	.75	.84	.364	.250	.149	.181	.56	.62	–	–
1/2 x 3/8	1	1	.700	.38	.840	.81	.91	.493	.359	.158	.198	.62	.62	–	–
x 1/4	1	1	.565	.38	.840	.81	.81	.364	.250	.149	.181	.62	.62	–	–
3/4 x 1/2	1	1	.865	.38	1.050	.88	1.00	.622	.464	.184	.235	.69	.75	–	–
x 3/8	2	1	.700	.38	1.050	.62	.88	.493	.359	.158	.198	–	.75	1.06	–
x 1/4	2	2	.565	.38	1.050	.69	.88	.364	.250	.149	.181	–	–	1.06	1.26
1 x 3/4	1	1	1.075	.50	1.315	.94	1.12	.824	.612	.193	.274	.75	.81	–	–
x 1/2	2	1	.865	.38	1.315	.62	1.12	.622	.464	.184	.235	–	.81	1.12	–
x 3/8	2	2	.700	.38	1.315	.69	.88	.493	.359	.158	.198	–	–	1.12	1.31
x 1/4	2	2	.565	.38	1.315	.75	.94	.364	.250	.149	.181	–	–	1.12	1.31
1 1/4 x 1	1	1	1. 340	.50	1.660	1.00	1.19	1.049	.815	.224	.312	.81	.88	–	–
x 3/4	2	2	1.075	.50	1.660	.69	.81	.824	.612	.193	.274	–	–	1.25	1.37
x 1/2	2	2	.865	.38	1.660	.75	.88	.622	.464	.184	.235	–	–	1.25	1.37
x 3/8	2	2	.700	.38	1.660	.81	.94	.493	.359	.158	.198	–	–	1.25	1.37
x 1/4	2	2	.565	.38	1.660	.88	1.00	.364	.250	.149	.181	–	–	1.25	1.37
1 1/2 x 1 1/4	1	1	1.685	.50	1.900	1.12	1.38	1.380	1.160	.239	.312	.88	1.00	–	–
x 1	2	1	1.340	.50	1.900	.69	1.15	1.049	.815	.224	.312	–	1.00	1.31	–
x 3/4	2	2	1.075	.50	1.900	.75	1.00	.824	.612	.193	.274	–	–	1.31	1.56
x 1/2	2	2	.865	.38	1.900	.81	1.06	.622	.464	.184	.235	–	–	1.31	1.56
x 3/8	2	2	.700	.38	1.900	.88	1.12	.493	.359	.158	.198	–	–	1.31	1.56

Note: (a) At the option of the manufacturer, Type 2 Reducers may be furnished in Type 1 configuration.

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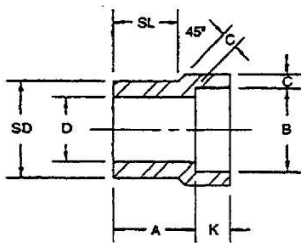
General Note: 3M and 6M symbols denote 3000 and 6000 Classes.



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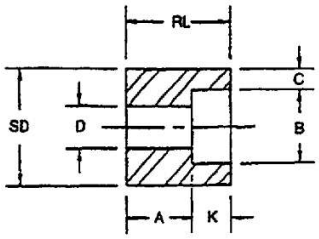


TYPE 2[a]

TABLE 3 (Continued)
Steel Socket Welding Reducer Insert Dimensions and Tolerances

Dimensions are in inches

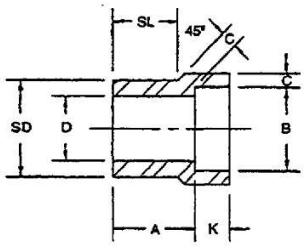
Nominal Pipe Size (NPS)	Type[a]		Socket		Shank Dia. SD	Laying Length A		Bore D		Wall (Min.) C		Length			
			Dia. B	Depth (Min.) K								SL		RL (Min.)	
	3M	6M				3M	6M	3M	6M	3M	6M	3M	6M	3M	6M
2 x 1½	1	1	1.925	.50	2.375	1.25	1.53	1.610	1.338	.250	.351	1.00	1.13	–	–
x 1¼	2	2	1.685	.50	2.375	.81	.94	1.380	1.160	.239	.312	–	–	1.50	1.62
x 1	2	2	1.340	.50	2.375	.88	1.00	1.049	.815	.224	.312	–	–	1.50	1.62
x 3/4	2	2	1.075	.50	2.375	.94	1.06	.824	.612	.193	.274	–	–	1.50	1.62
x 1/2	2	2	.865	.38	2.375	1.00	1.12	.622	.464	.184	.235	–	–	1.50	1.62
2½ x 2	1	1	2.416	.62	2.875	1.81	1.68	2.067	1.687	.273	.430	1.50	1.25	–	–
x 1½	2	2	1.925	.50	2.875	1.38	1.38	1.610	1.338	.250	.351	–	–	2.12	2.12
x 1¼	2	2	1.685	.50	2.875	1.44	1.44	1.380	1.160	.239	.312	–	–	2.12	2.12
x 1	2	2	1.340	.50	2.875	1.50	1.50	1.049	.815	.224	.312	–	–	2.12	2.12
x 3/4	2	2	1.075	.50	2.875	1.56	1.50	.824	.612	.193	.274	–	–	2.12	2.12
3 x 2½	1	1	2.916	.62	3.500	1.50	2.25	2.469	2.125	.345	.469	1.25	1.75	–	–
x 2	2	2	2.416	.62	3.500	1.00	1.25	2.067	1.687	.273	.430	–	–	1.87	2.12
x 1½	2	2	1.925	.50	3.500	1.12	1.25	1.610	1.338	.250	.351	–	–	1.87	2.12
x 1¼	2	2	1.685	.50	3.500	1.19	1.25	1.380	1.160	.239	.312	–	–	1.87	2.12
x 1	2	2	1.340	.50	3.500	1.25	1.25	1.049	.815	.224	.312	–	–	1.87	2.12
4 x 3	2	1	3.545	.62	4.500	1.31	–	3.068	–	.375	–	–	–	2.38	–
x 2½	2	2	2.916	.62	4.500	1.50	–	2.469	–	.345	–	–	–	2.38	–
x 2	2	2	2.416	.62	4.500	1.50	–	2.067	–	.273	–	–	–	2.38	–
x 1½	2	2	1.925	.50	4.500	1.62	–	1.610	–	.250	–	–	–	2.38	–
x 1¼	2	2	1.685	.50	4.500	1.69	–	1.380	–	.239	–	–	–	2.38	–

Note: (a) At the option of the manufacturer, Type 2 Reducers may be furnished in Type 1 configurations.

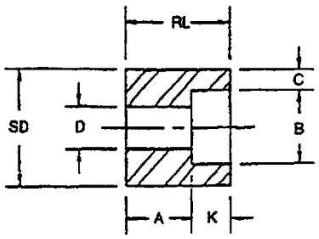
General Note: 3M and 6M symbols denote 3000 and 6000 Classes. NPS 4, Class 6000 Reducer inserts are available. Dimensions on application from manufacturer(s).

TOLERANCES

Laying Length A —	Sizes 3/8 – 3/4	+0.06"/-0.00"'	Shank Dia. SD —	Sizes 3/8 – 1½	+0.010"/-0.010"
	Sizes 1 – 2	+0.08"/-0.00"		Sizes 2 – 3	+0.02"/-0.02"
	Sizes 2½ – 4	+0.10"/-0.00"		Size 4	+0.03"/-0.03"
Socket Dia. B —	Sizes 1/4 – 2	+0.010"/-0.010"	Shank Length SL —	Sizes 3/8 – 3/4	+0.00"/-0.06"
	Sizes 2½ – 3	+0.015"/-0.010"		Sizes 1 – 2	+0.00"/-0.08"
Bore D —	Sizes 1/4 – 2	+0.03"/-0.03"		Sizes 2½ – 4	+0.00"/-0.10"
	Sizes 2½ – 3	+0.06"/-0.06"			



TYPE 1



TYPE 2[(a)]

TABLE 3M
Steel Socket Welding Reducer Insert Dimensions and Tolerances – (SI) Metric

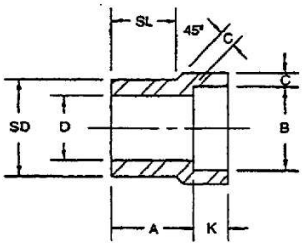
Dimensions are in millimeters

Nominal Pipe Size		Type[(a)]		Socket		Shank Dia. SD	Laying Length A		Bore D		Wall (Min.) C		Length			
				Dia. B	Depth (Min.) K								SL		RL (Min.)	
DN	NPS	3M	6M				3M	6M	3M	6M	3M	6M	3M	6M	3M	6M
10 x 8	$^3/_8$ x $^1/_4$	1	1	14.4	9.5	17.1	19.0	21.3	9.2	6.3	3.78	4.60	14.2	15.7	–	–
15 x 10	$^1/_2$ x $^3/_8$	1	1	17.8	9.5	21.3	20.6	23.1	12.5	9.1	4.01	5.03	15.7	15.7	–	–
x 8	x $^1/_4$	1	1	14.4	9.5	21.3	20.6	20.6	9.2	6.3	3.78	4.60	15.7	15.7	–	–
20 x 15	$^3/_4$ x $^1/_2$	1	1	22.0	9.5	26.7	22.4	25.4	15.8	11.7	4.67	5.97	17.5	.19.0	–	–
x 10	x $^3/_8$	2	1	17.8	9.5	26.7	15.7	22.4	12.5	9.1	4.01	5.03	–	19.0	26.9	–
x 8	x $^1/_4$	2	2	14.4	9.5	26.7	17.5	22.4	9.2	6.3	3.78	4.60	–	–	26.9	32.0
25 x 20	1 x $^3/_4$	1	1	27.4	12.5	33.4	23.9	28.4	20.9	15.5	4.90	6.96	19.0	20.6	–	–
x 15	x $^1/_2$	2	1	22.0	9.5	33.4	15.7	28.4	15.8	11.7	4.67	5.97	–	20.6	28.4	–
x 10	x $^3/_8$	2	2	17.8	9.5	33.4	17.5	22.4	12.5	9.1	4.01	5.03	–	–	28.4	33.2
x 8	x $^1/_4$	2	2	14.4	9.5	33.4	19.0	23.9	9.2	6.3	3.78	4.60	–	–	28.4	33.2
32 x 25	1¼ x 1	1	1	34.1	12.5	42.2	25.4	30.2	26.6	20.7	5.69	7.92	20.6	22.4	–	–
x 20	x $^3/_4$	2	2	27.4	12.5	42.2	17.5	20.6	20.9	15.5	4.90	6.96	–	–	31.7	34.7
x 15	x $^1/_2$	2	2	22.0	9.5	42.2	19.0	22.4	15.8	11.7	4.67	5.97	–	–	31.7	34.7
x 10	x $^3/_8$	2	2	17.8	9.5	42.2	20.6	23.9	12.5	9.1	4.01	5.03	–	–	31.7	34.7
x 8	x $^1/_4$	2	2	14.4	9.5	42.2	22.4	25.4	9.2	6.3	3.78	4.60	–	–	31.7	34.7
40 x 32	1½ x 1¼	1	1	42.9	12.5	48.2	28.4	35.0	35.0	29.4	6.07	7.92	22.4	25.4	–	–
x 25	x 1	2	1	34.1	12.5	48.2	17.5	29.2	26.6	20.7	5.69	7.92	–	25.4	33.2	–
x 20	x $^3/_4$	2	2	27.4	12.5	48.2	19.0	25.4	20.9	15.5	4.90	6.96	–	–	33.2	39.6
x 15	x $^1/_2$	2	2	22.0	9.5	48.2	20.6	26.9	15.8	11.7	4.67	5.97	–	–	33.2	39.6
x 10	x $^3/_8$	2	2	17.8	9.5	48.2	22.4	28.4	12.5	9.1	4.01	5.03	–	–	33.2	39.6

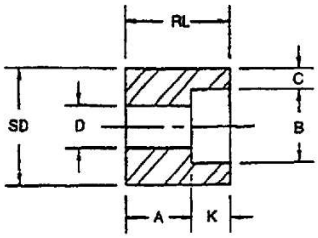
Note: (a) At the option of the manufacturer, Type 2 Reducers may be furnished in Type 1 configuration.

continued on next page

General Note: 3M and 6M symbols denote 3000 and 6000 Classes.



TYPE 1



TYPE 2[a]

TABLE 3M (Continued)
Steel Socket Welding Reducer Insert Dimensions and Tolerances – (SI) Metric

Dimensions are in millimeters

Nominal Pipe Size		Type[a]		Socket		Shank Dia. SD	Laying Length A		Bore D		Wall (Min.) C		Length			
				Dia. B	Depth (Min.) K								SL		RL (Min.)	
DN	NPS	3M	6M				3M	6M	3M	6M	3M	6M	3M	6M	3M	6M
50 x 40	2 x 1½	1	1	49.0	12.5	60.3	31.8	38.9	40.8	33.9	6.35	8.92	25.4	28.7	–	–
x 32	x 1¼	2	2	42.9	12.5	60.3	20.6	23.9	35.0	29.4	6.07	7.92	–	–	38.1	41.1
x 25	x 1	2	2	34.1	12.5	60.3	22.4	25.4	26.6	20.7	5.69	7.92	–	–	38.1	41.1
x 20	x 3/4	2	2	27.4	12.5	60.3	23.9	26.9	20.9	15.5	4.90	6.96	–	–	38.1	41.1
x 15	x 1/2	2	2	22.0	9.5	60.3	25.4	28.4	15.8	11.7	4.67	5.97	–	–	38.1	41.1
65 x 50	2½ x 2	1	1	61.4	16.0	73.0	46.0	42.7	52.4	42.8	6.93	10.92	38.1	31.8	–	–
x 40	x 1½	2	2	49.0	12.5	73.0	35.0	35.0	40.8	33.9	6.35	8.92	–	–	53.8	53.8
x 32	x 1¼	2	2	42.9	12.5	73.0	36.6	36.6	35.0	29.4	6.07	7.92	–	–	53.8	53.8
x 25	x 1	2	2	34.1	12.5	73.0	38.1	38.1	26.6	20.7	5.69	7.92	–	–	53.8	53.8
x 20	x 3/4	2	2	27.4	12.5	73.0	39.6	38.1	20.9	15.5	4.90	6.96	–	–	53.8	53.8
80 x 65	3 x 2½	1	1	74.1	16.0	88.9	38.1	57.2	62.7	54.0	8.76	11.91	31.8	44.4	–	–
x 50	x 2	2	2	61.4	16.0	88.9	25.4	31.8	52.4	42.8	6.93	10.92	–	–	47.4	53.8
x 40	x 1½	2	2	49.0	12.5	88.9	28.4	31.8	40.8	33.9	6.35	8.92	–	–	47.4	53.8
x 32	x 1¼	2	2	42.9	12.5	88.9	30.2	31.8	35.0	29.4	6.07	7.92	–	–	47.4	53.8
x 25	x 1	2	2	34.1	12.5	88.9	31.8	31.8	26.6	20.7	5.69	7.92	–	–	47.4	53.8
100 x 80	4 x 3	2	1	90.0	16.0	114.3	33.3	–	77.9	–	9.52	–	–	–	60.4	–
x 65	x 2½	2	2	74.1	16.0	114.3	38.1	–	62.7	–	8.76	–	–	–	60.4	–
x 50	x 2	2	2	61.4	16.0	114.3	38.1	–	52.4	–	6.93	–	–	–	60.4	–
x 40	x 1½	2	2	49.0	12.5	114.3	41.1	–	40.8	–	6.35	–	–	–	60.4	–
x 32	x 1¼	2	2	42.9	12.5	114.3	42.9	–	35.0	–	6.07	–	–	–	60.4	–

Note: (a) At the option of the manufacturer, Type 2 Reducers may be furnished in Type 1 configuration.

General Note: 3M and 6M symbols denote 3000 and 6000 Classes. NPS 4 (DN 100), Class 6000 Reducer inserts are available. Dimensions on application from manufacturer(s).

TOLERANCES

Laying Length A —	Sizes 3/8 – 3/4	+1.5/-0.00	Shank Dia. SD —	Sizes 3/8 – 1½	+0.25/-0.25
	Sizes 1 – 2	+2.0/-0.00		Sizes 2 – 3	+0.50/-0.50
	Sizes 2½ – 4	+2.5/-0.00		Size 4	+0.80/-0.80
Socket Dia. B —	Sizes 1/4 – 1½	+0.20/-0.20	Shank Length SL —	Sizes 3/8 – 3/4	+0.00/-1.50
	Sizes 2 – 3	+0.30/-0.20		Sizes 1 – 2	+0.00/-2.00
Bore D —	Sizes 1/4 – 2	+0.80/-0.80		Sizes 2½ – 4	+0.00/-2.50
	Sizes 2½ – 3	+1.5/-1.5			

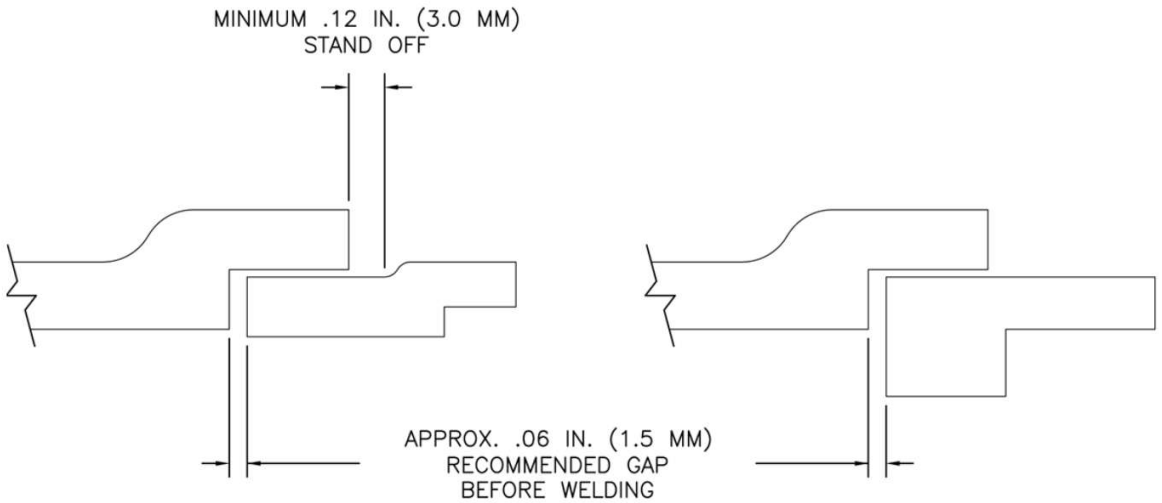


FIGURE 1
Gap Recommendations

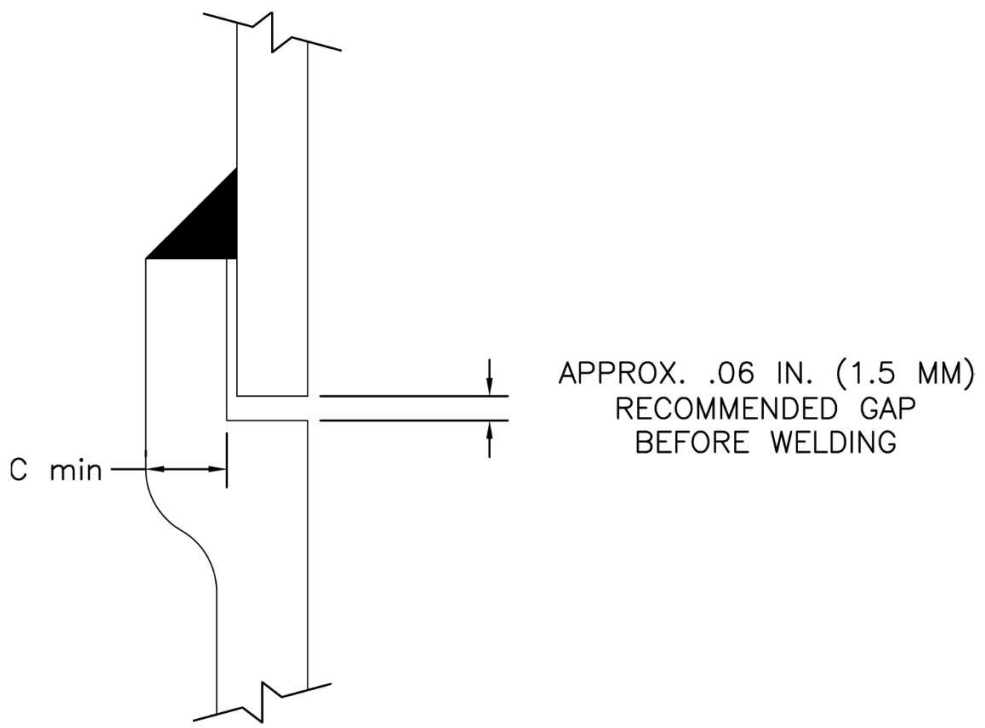


FIGURE 2
Welding Gap and Minimum Socket Wall Thickness

ANNEX A

Referenced Standards and Applicable Dates

This Annex is an integral part of this Standard Practice and is placed after the main text for convenience.

Standard Name	Description
ASME; ANSI/ASME	
B31	Codes for Pressure Piping (including Sectional Code Standards)
B36.10M-2004 (R2010)	Welded and Seamless Wrought Steel Pipe
B16.11-2009	Forged Fittings, Socket-Welding and Threaded
B16.34-2009	Valves Flanged, Threaded and Welding End; including Supplement (2010)
BPVC	Boiler and Pressure Vessel Code
ASTM	**Standard Specification for:**
A105/A105M-11	Carbon Steel Forgings for Piping Applications
A182/A182M-11	Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service
A234/A234M-11	Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High-Temperature Service
A350/A350M-10	Carbon and Low-Alloy Steel Forgings, Requiring Notch Toughness Testing for Piping Components
A403/A403M-10a	Wrought Austentic Stainless Steel Piping Fittings
A420/A420M-10a	Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-Temperature Service
A960/A960M-10	Common Requirements for Wrought Steel Piping Fittings

The following organizations appear in the above list:

ANSI	American National Standards Institute 25 West 43rd Street, Fourth Floor New York, NY 10036-7406
ASME	American Society of Mechanical Engineers (ASME International) Three Park Avenue New York, NY 10016-5990
ASTM	ASTM International 100 Bar Harbor Drive, P.O. Box C700 West Conshohocken, PA 19428-2959

Listing of MSS Standard Practices

TITLE	
SP-6-2007	Standard Finishes for Contact Faces of Pipe Flanges and Connecting-End Flanges of Valves and Fittings
SP-9-2008	Spot Facing for Bronze, Iron and Steel Flanges
SP-25-2008	Standard Marking System for Valves, Fittings, Flanges, and Unions
SP-42-2009	Corrosion Resistant Gate, Globe, Angle and Check Valves with Flanged and Butt Weld Ends (Classes 150, 300 & 600)
SP-43-2008	Wrought and Fabricated Butt-Welding Fittings for Low Pressure, Corrosion Resistant Applications (Incl. 2010 Errata Sheet)
SP-44-2010	Steel Pipeline Flanges (incl. 2011 Errata Sheet)
SP-45-2003	(R 2008) Bypass and Drain Connections
SP-51-2007	Class 150LW Corrosion Resistant Flanges and Cast Flanged Fittings
SP-53-1999	(R 2007) Quality Standard for Steel Castings and Forgings for Valves, Flanges, and Fittings and Other Piping Components – Magnetic Particle Examination Method
SP-54-1999	(R 2007) Quality Standard for Steel Castings and Forgings for Valves, Flanges, and Fittings and Other Piping Components – Radiographic Examination Method
SP-55-2011	Quality Standard for Steel Castings for Valves, Flanges, Fittings, and Other Piping Components – Visual Method for Evaluation of Surface Irregularities **(ANSI-approved American National Standard)**
SP-58-2009	Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation (incorporates content of SP-69, 77*, 89*, and 90*) **(ANSI-approved American National Standard)**
SP-60-2004	Connecting Flange Joint between Tapping Sleeves and Tapping Valves
SP-61-2009	Pressure Testing of Valves
SP-65-2008	High Pressure Chemical Industry Flanges and Threaded Stubs for Use with Lens Gaskets
SP-67-2011	Butterfly Valves
SP-68-2011	High Pressure Butterfly Valves with Offset Design
SP-69-2003	Pipe Hangers and Supports – Selection and Application **(ANSI-approved American National Standard)**
SP-70-2011	Gray Iron Gate Valves, Flanged and Threaded Ends
SP-71-2011	Gray Iron Swing Check Valves, Flanged and Threaded Ends
SP-72-2010	Ball Valves with Flanged or Butt-Welding Ends for General Service
SP-75-2008	Specification for High-Test, Wrought, Butt-Welding Fittings
SP-78-2011	Gray Iron Plug Valves, Flanged and Threaded Ends
SP-79-2011	Socket Welding Reducer Inserts
SP-80-2008	Bronze Gate, Globe, Angle, and Check Valves
SP-81-2006a	Stainless Steel, Bonnetless, Flanged Knife Gate Valves
SP-83-2006	Class 3000 Steel Pipe Unions Socket Welding and Threaded
SP-85-2011	Gray Iron Globe & Angle Valves, Flanged and Threaded Ends
SP-86-2009	Guidelines for Metric Data in Standards for Valves, Flanges, Fittings, and Actuators (Incl. 2011 Errata Sheet)
SP-87-1991	(R 1996 – Reinstated 2011) Factory-Made Butt-Welding Fittings for Class I Nuclear Piping Applications
SP-88-2010	Diaphragm Valves
SP-91-2009	Guidelines for Manual Operation of Valves
SP-92-1999	MSS Valve User Guide
SP-93-2008	Quality Standard for Steel Castings and Forgings for Valves, Flanges, Fittings, and Other Piping Components – Liquid Penetrant Examination Method
SP-94-2008	Quality Standard for Ferritic and Martensitic Steel Castings for Valves, Flanges, Fittings, and Other Piping Components – Ultrasonic Examination Method
SP-95-2006	Swage(d) Nipples and Bull Plugs
SP-96-2011	Guidelines on Terminology for Valves and Fittings
SP-97-2006	Integrally Reinforced Forged Branch Outlet Fittings – Socket Welding, Threaded, and Buttwelding Ends
SP-98-2001	(R 2005) Protective Coatings for the Interior of Valves, Hydrants, and Fittings
SP-99-2010	Instrument Valves
SP-100-2009	Qualification Requirements for Elastomer Diaphragms for Nuclear Service Diaphragm Valves
SP-101-1989	(R 2001) Part-Turn Valve Actuator Attachment – Flange and Driving Component Dimensions and Performance Characteristics
SP-102-1989	(R 2001) Multi-Turn Valve Actuator Attachment – Flange and Driving Component Dimensions and Performance Characteristics
SP-104-2003	Wrought Copper Solder Joint Pressure Fittings
SP-105-2010	Instrument Valves for Code Applications
SP-106-2003	Cast Copper Alloy Flanges and Flanged Fittings Class 125, 150 and 300
SP-108-2002	Resilient-Seated Cast-Iron Eccentric Plug Valves
SP-109-1997	(R 2006) Welded Fabricated Copper Solder Joint Pressure Fittings
SP-110-2010	Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends (Incl. 2010 Errata Sheet)
SP-111-2001	(R 2005) Gray-Iron and Ductile-Iron Tapping Sleeves
SP-112-2010	Quality Standard for Evaluation of Cast Surface Finishes – Visual and Tactile Method. This SP must be used with a 10-surface, three dimensional Cast Surface Comparator, which is a necessary part of the standard. Additional Comparators available separately.
SP-113-2001	(R 2007) Connecting Joint between Tapping Machines and Tapping Valves
SP-114-2007	Corrosion Resistant Pipe Fittings Threaded and Socket Welding Class 150 and 1000 **(ANSI-approved American National Standard)**
SP-115-2010	Excess Flow Valves, 1¼ NPS and Smaller, for Fuel Gas Service
SP-116-2011	Service-Line Valves and Fittings for Drinking Water Systems
SP-117-2011	Bellows Seals for Globe and Gate Valves
SP-118-2007	Compact Steel Globe & Check Valves – Flanged, Flangeless, Threaded & Welding Ends (Chemical & Petroleum Refinery Service)
SP-119-2010	Factory-Made Wrought Belled End Pipe Fittings for Socket-Welding
SP-120-2011	Flexible Graphite Packing System for Rising Stem Valves – Design Requirements
SP-121-2006	Qualification Testing Methods for Stem Packing for Rising Stem Steel Valves
SP-122-2005	Plastic Industrial Ball Valves
SP-123-1998	(R 2006) Non-Ferrous Threaded and Solder-Joint Unions for Use with Copper Water Tube
SP-124-2001	Fabricated Tapping Sleeves
SP-125-2010	Gray Iron and Ductile Iron In-Line, Spring-Loaded, Center-Guided Check Valves
SP-126-2007	Steel In-Line Spring-Assisted Center Guided Check Valves
SP-127-2001	Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, Application
SP-128-2006	Ductile Iron Gate Valves
SP-129-2003	(R 2007) Copper-Nickel Socket-Welding Fittings and Unions
SP-130-2003	Bellows Seals for Instrument Valves
SP-131-2010	Metallic Manually Operated Gas Distribution Valves
SP-132-2010	Compression Packing Systems for Instrument Valves
SP-133-2010	Excess Flow Valves for Low Pressure Fuel Gas Appliances
SP-134-2010	Valves for Cryogenic Service Including Requirements for Body/Bonnet Extensions
SP-135-2010	High Pressure Knife Gate Valves
SP-136-2007	Ductile Iron Swing Check Valves
SP-137-2007	Quality Standard for Positive Material Identification of Metal Valves, Flanges, Fittings, and Other Piping Components
SP-138-2009	Quality Standard Practice for Oxygen Cleaning of Valves & Fittings
SP-139-2010	Copper Alloy Gate, Globe, Angle, and Check Valves for Low Pressure/Low Temperature Plumbing Applications

(R *YEAR*) Indicates year standard reaffirmed without substantive changes • **Price List Available Upon Request**

* SP-77, 89, and 90 have been withdrawn effective 8/23/2010; however, the contents of these "historical" SPs are now part of newly revised SP-58-2009.

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