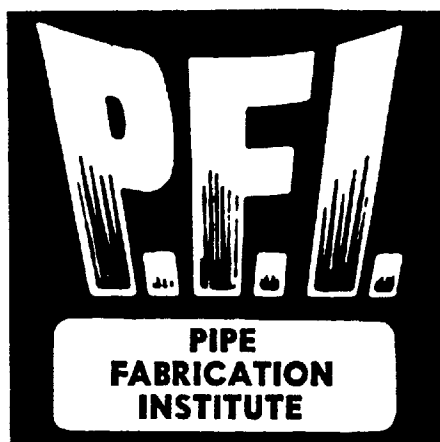


Minimum Length and Spacing for Welded Nozzles

Prepared by
Pipe Fabrication Institute Engineering Committee



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P. O. Box 173 ● Springdale, PA 15144

MINIMUM LENGTH AND SPACING FOR WELDED NOZZLES

METRIC CONVERSIONS

The conversion of quantities between systems of units involves a determination of the number of significant digits to be retained. All conversions depend upon the intended precision of the original and are rounded to the appropriate accuracy.

Pipe sizes together with applicable wall thicknesses are not shown with metric equivalents.

The SI (metric) values where included with the customary U. S. values in this Standard are the rounded equivalents of the U. S. values and are for reference only.

Metric units were derived utilizing the following conversion factor:

Conversion	Factor
inches to millimeter	25.4

1. Scope

- 1.1 This Standard covers the minimum recommended length, distance from open end on run, and spacing dimensions of adjacent welded nozzles.

2. Nozzles without Saddles or Reinforcement

- 2.1 Dimensions recommended for nozzles without saddles or reinforcements are as shown in Fig. 1 and Table 1.

3. Nozzles with Reinforcing Saddles or Rings

- 3.1 Dimensions recommended for nozzles with saddles or rings are as shown in Fig. 2 and Table 2.

4. Nozzles—Integrally Reinforced

- 4.1 Dimensions recommended for integrally reinforced nozzles are as shown in Fig. 3 and Table 3. These dimensions do not apply to integrally reinforced insert butt weld nozzles.

5. Design Considerations

- 5.1 Certain materials and combinations of nozzle and header pipe size and wall thickness to-

gether with multiple branch openings welded to a header may result in distortion of the header pipe. The elimination or reduction of such distortion is beyond the scope of this Standard.

- 5.2 All nozzle welds should be checked for compliance with the applicable Code requirements.
- 5.3 It is preferred that multiple branch openings of in-line nozzles be spaced so that their reinforcement zones do not overlap. If closer spacing is necessary, the reinforcement requirements of the applicable construction Code shall be met.
- 5.4 Some configurations of integrally reinforced nozzles in combination with certain header sizes may present a problem in the radiographic examination of the attachment weld due to inability to meet the geometric unsharpness requirements of the construction Code.
- 5.5 Where attachments such as flanges, fittings, valves and pipe insulation are involved, minimum dimensions tabulated may have to be increased to allow for required clearances.
- 5.6 In special cases, it may be possible to reduce the dimensions given in the tabulation. Such design should then be submitted to the fabricator for individual consideration, as close spacing may involve additional shop operations to prevent, or correct distortion.
- 5.7 Integrally reinforced nozzles are considered to be the commercially available types.
- 5.8 In cases of different nozzle diameters, dimension "C", (Fig. & Tables 1 thru 3) should be determined on the basis of the larger of the two adjacent nozzles.

NOMINAL PIPE SIZE OF NOZZLE (in)	MINIMUM RECOMMENDED DIMENSIONS FOR FIGURE 1		
	CENTER OF NOZZLE TO END OF RUN in "A" mm	O.D. OF RUN TO END OF NOZZLE in "B" mm	O.D. TO O.D. OF NOZZLE in "C" mm
2-1/2	4-1/2 (114)	3 (76)	3 (76)
3	5 (127)	3-1/2 (89)	3-1/2 (89)
4	6 (152)	4 (102)	4 (102)
5	7 (178)	4-1/2 (114)	4-1/2 (114)
6	8 (203)	5 (127)	5 (127)
8	10 (254)	6 (152)	6 (152)
10	12 (305)	7 (178)	7 (178)
12	14 (356)	8 (203)	8 (203)
14	15 (381)	8-1/2 (216)	8-1/2 (216)
16	17 (432)	9 (229)	9 (229)
18	19 (483)	10 (254)	10 (254)
20	21 (533)	11 (279)	11 (279)
24	24 (610)	12 (305)	12 (305)

TABLE 1

NOMINAL PIPE SIZE OF NOZZLE (in)	MINIMUM RECOMMENDED DIMENSIONS FOR FIGURE 2		
	CENTER OF NOZZLE TO END OF RUN in "A" mm	O.D. OF RUN TO END OF NOZZLE in "B" mm	O.D. TO O.D. OF NOZZLE in "C" mm
2-1/2	6 (152)	4-1/2 (114)	6 (152)
3	7 (178)	5 (127)	7 (178)
4	8 (203)	5-1/2 (140)	8 (203)
5	9-1/2 (241)	6 (152)	9-1/2 (241)
6	11 (279)	6-1/2 (165)	11 (279)
8	14 (356)	8 (203)	14 (356)
10	17 (432)	9-1/2 (241)	17 (432)
12	20 (508)	11 (279)	20 (508)
14	22 (559)	12 (305)	22 (559)
16	25 (635)	13 (330)	25 (635)
18	28 (711)	14 (356)	28 (711)
20	31 (787)	15 (381)	31 (787)
24	36 (914)	16 (406)	36 (914)

TABLE 2

NOMINAL PIPE SIZE OF NOZZLE (in)	MINIMUM RECOMMENDED DIMENSIONS FOR FIGURE 3		
	CENTER OF NOZZLE TO END OF RUN in "A" mm	O.D. OF RUN TO END OF NOZZLE in "B"	O.D. TO O.D. OF NOZZLE in "C" mm
2-1/2	5-1/2 (140)	MANUFACTURER'S STANDARDS	3 (76)
3	6 (152)		3 (76)
4	7 (178)		3-1/2 (89)
5	8 (203)		4 (102)
6	10 (254)		5 (127)
8	12 (305)		6 (152)
10	14 (356)		7 (178)
12	16 (406)		8-1/2 (216)
14	17 (432)		9 (229)
16	19 (483)		10 (254)
18	21 (533)		11 (279)
20	23 (584)		12 (305)
24	26 (660)		14 (356)

TABLE 3

*Minimum dimension "C" should be that tabulated for the larger of the two adjacent nozzles.
Dimensions: Inches (Millimeters).

NOZZLES WITHOUT SADDLES OR RING REINFORCEMENT

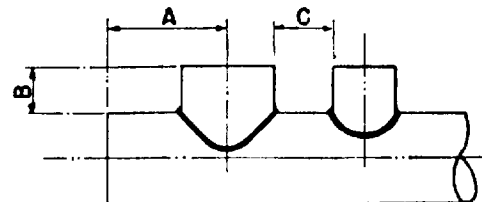


FIG. 1

NOZZLES WITH REINFORCING SADDLES OR RINGS

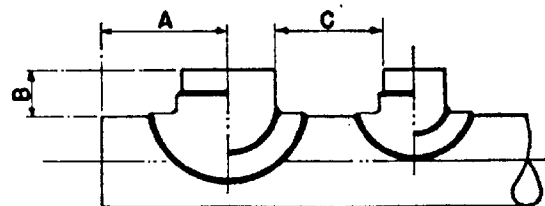


FIG. 2

NOZZLES - INTEGRALLY REINFORCED

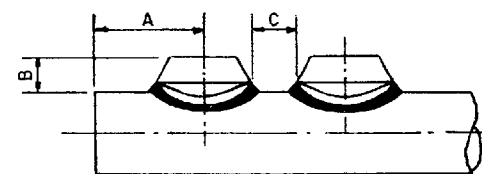


FIG. 3

A current index of the latest revised ES Standards and Technical Bulletins is available from the Pipe Fabrication Institute.

PFI Standards and Technical Bulletins are published to serve proven needs of the pipe fabricating industry at the design level and in actual shop operations. Hence, such needs are continually considered and reviewed by the Engineering Committee of the Pipe Fabrication Institute to provide recommended procedures which have been demonstrated by collective experiences to fulfill requirements in a manner for Code compliance. However, as the PFI Standards are for minimum requirements the designer or fabricator always has the option of specifying supplementary conditions in the form of requirements beyond the scope of the PFI publications.