

Agenda item: 650-588

Title: Clarification of Figure 3-5

Date: Dec. 08, 2004

Revision: 2

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Purpose: To determine if it is appropriate to add flanged nozzles to Figure 3-5.

Source: Bob Elliott email 5/27/03

Impact: Business impact is low. This agenda item clarifies acceptable practice.

Rationale: Connection details in Panel 4 are acceptable for small diameter pipe. Footnote f under Table 3-6 states that flanged nozzles under 3"Ø do not need repads.

It is not clear what is acceptable for flanged nozzles wall thickness under 1.5"Ø. Language can be added to state, as a footnote under panel 4 either

- a) that nozzle neck thickness must be 0.200" or thicker [or other limit]
or
b) that flanged nozzles under 1.5"Ø or not allowed.

Proposal: Modify Figure 3.5 per attached figure.

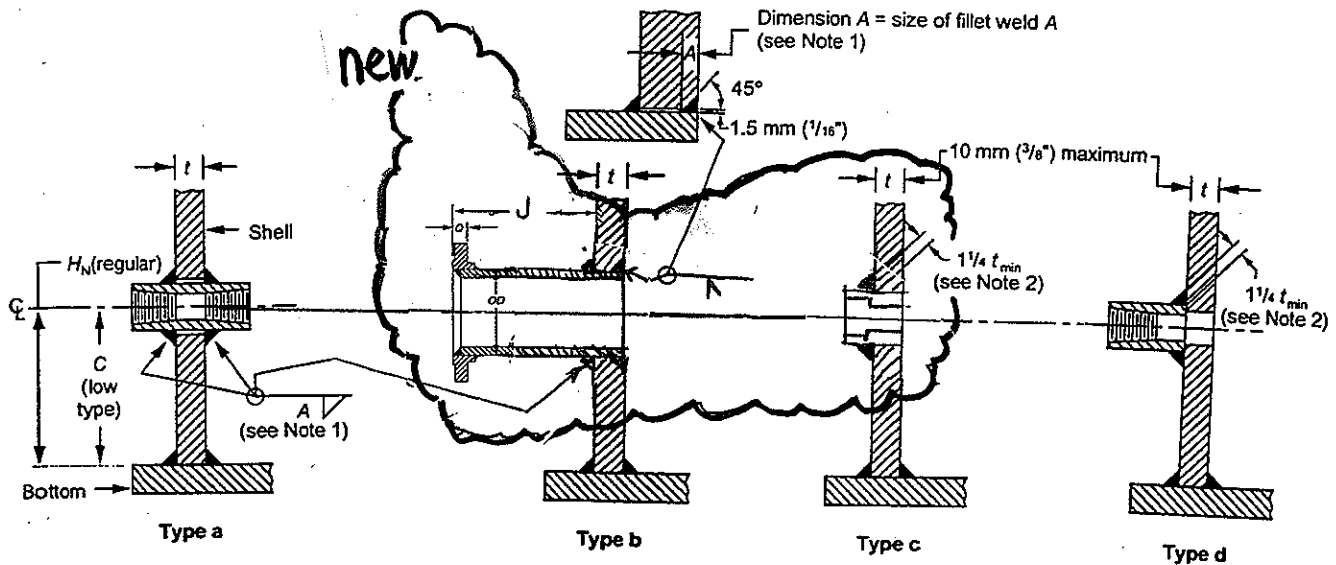
First ballot: Based on the comments received from Summer 2004 balloting, the following modifications were made to the proposed wording:

1. Modified Note 3 wording to incorporate comments from B Roberts, and B Mistry. Also the word "non-threaded" was added to cover socket weld couplings. B Mistry's comment suggesting changing "nozzles" to read "non reinforced nozzles" has not been included because note f under Table 3-6 says "Reinforcing plates may be used if desired."
2. Added the superscript "f" on the 1" and ¾" sizes in the body of Table 3-6.
3. Revised Table 3-7, column 6 header from "NPS 2, 1 ½, 1 ¾" to read " NPS ¾ to 2 ".

2nd ballot: Based on the comments received from Fall 2004 CRE Meeting, the following modifications have been made to the proposed wording:

1. Figure 3-5 revised to show one of the figures as a nozzle neck and one with a socket weld as clarification of the intent.
2. The Title of Figure 3-5 (on page 3-17) should be "Couplings and Flanged Fittings, NPS 3/4 Through NPS 2 ".
3. The header for the lower part of Table 3-6 is " Couplings" instead of "Threaded Fittings"
4. Where threaded nozzles or threaded fittings are referenced (example - notes f and g to table 3-6) change to couplings.

1 of 3



THREADED-TYPE SHELL NOZZLES, NPS 1/4 THROUGH NPS 2
COUPLINGS AND FLANGED FITTINGS, NPS 1/4 THROUGH NPS 2 (SEE NOTE 3)

Notes:

1. See Table 3-7, Column 6.
2. t_{min} shall be 19 mm (3/4 in.) or the thickness of either part joined by the fillet weld, whichever is less.
3. The construction details apply to unreinforced threaded, non-threaded, and flanged nozzles.

NEW

NEW

Figure 3-5—Shell Nozzles (continued)

Table 3-7—Dimensions for Shell Nozzles: Pipe, Plate, and Welding Schedules [mm (in.)]

Column 1 Thickness of Shell and Reinforcing Plate ^a t and T	Column 2 Minimum Pipe Wall Thickness of Flanged Nozzles ^{b,c} t_n	Column 3 Maximum Diameter of Hole in Shell Plate (D_p) Equals Outside Diameter of Pipe Plus	Column 4 Size of Fillet Weld B	Column 5 Size of Fillet Weld A		Column 6
				Nozzles Larger Than NPS 2	NPS 1 1/2, 1 3/4	3/4 to 2
5 (3/16)	12.5 (1/2)	16 (5/8)	5 (3/16)	6 (1/4)	6 (1/4)	6 (1/4)
6 (1/4)	12.5 (1/2)	16 (5/8)	6 (1/4)	6 (1/4)	6 (1/4)	6 (1/4)
8 (5/16)	12.5 (1/2)	16 (5/8)	8 (5/16)	6 (1/4)	6 (1/4)	6 (1/4)
10 (3/8)	12.5 (1/2)	16 (5/8)	10 (3/8)	6 (1/4)	6 (1/4)	6 (1/4)
11 (1/16)	12.5 (1/2)	16 (5/8)	11 (1/16)	6 (1/4)	6 (1/4)	6 (1/4)
12.5 (1/2)	12.5 (1/2)	16 (5/8)	13 (1/2)	6 (1/4)	8 (5/16)	8 (5/16)

change

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Table 3-6—Dimensions for Shell Nozzles [mm (in.)]

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7 ^a	Column 8 ^c	Column 9 ^c
NPS (Size of Nozzle)	Outside Diameter of Pipe	Nominal Thickness of Flanged Nozzle Pipe Wall ^{a,b} <i>t_n</i>	Diameter of Hole in Reinforcing Plate <i>D_R</i>	Length of Side of Reinforcing Plate ^b or Diameter <i>L = D_R</i>	Width of Reinforcing Plate <i>W</i>	Minimum Distance from Shell to Flange Face <i>J</i>	Minimum Distance from Bottom of Tank to Center of Nozzle Regular Type ^d <i>H_N</i>	Low Type <i>C</i>
Flanged Fittings								
48	1219.2 (48)	e	1222 (48 1/8)	2455 (96 3/4)	2970 (117)	400 (16)	1325 (52)	1230 (48 3/8)
46	1168.4 (46)	e	1172 (46 1/8)	2355 (92 3/4)	2845 (112)	400 (16)	1275 (50)	1180 (46 3/8)
44	1117.6 (44)	e	1121 (44 1/8)	2255 (88 3/4)	2725 (107 1/4)	375 (15)	1225 (48)	1125 (44 3/8)
42	1066.8 (42)	e	1070 (42 1/8)	2155 (84 3/4)	2605 (102 1/2)	375 (15)	1175 (46)	1075 (42 3/8)
40	1016 (40)	e	1019 (40 1/8)	2050 (80 3/4)	2485 (97 3/4)	375 (15)	1125 (44)	1025 (40 3/8)
38	965.2 (38)	e	968 (38 1/8)	1950 (76 3/4)	2355 (92 3/4)	350 (14)	1075 (42)	975 (38 3/8)
36	914.4 (36)	e	918 (36 1/8)	1850 (72 3/4)	2235 (88)	350 (14)	1025 (40)	925 (36 3/8)
34	863.6 (34)	e	867 (34 1/8)	1745 (68 3/4)	2115 (83 1/4)	325 (13)	975 (38)	875 (34 3/8)
32	812.8 (32)	e	816 (32 1/8)	1645 (64 3/4)	1995 (78 1/2)	325 (13)	925 (36)	825 (32 3/8)
30	762.0 (30)	e	765 (30 1/8)	1545 (60 3/4)	1865 (73 1/2)	300 (12)	875 (34)	770 (30 3/8)
28	711.2 (28)	e	714 (28 1/8)	1440 (56 3/4)	1745 (68 3/4)	300 (12)	825 (32)	720 (28 3/8)
26	660.4 (26)	e	664 (26 1/8)	1340 (52 3/4)	1625 (64)	300 (12)	750 (30)	670 (26 3/8)
24	609.6 (24)	12.7 (0.50)	613 (24 1/8)	1255 (49 1/2)	1525 (60)	300 (12)	700 (28)	630 (24 3/8)
22	558.8 (22)	12.7 (0.50)	562 (22 1/8)	1155 (45 1/2)	1405 (55 1/2)	275 (11)	650 (26)	580 (22 3/8)
20	508.0 (20)	12.7 (0.50)	511 (20 1/8)	1055 (41 1/2)	1285 (50 1/2)	275 (11)	600 (24)	525 (20 3/8)
18	457.2 (18)	12.7 (0.50)	460 (18 1/8)	950 (37 1/2)	1160 (45 3/4)	250 (10)	550 (22)	475 (18 3/8)
16	406.4 (16)	12.7 (0.50)	410 (16 1/8)	850 (33 1/2)	1035 (40 3/4)	250 (10)	500 (20)	425 (16 3/8)
14	355.6 (14)	12.7 (0.50)	359 (14 1/8)	750 (29 1/2)	915 (36)	250 (10)	450 (18)	375 (14 3/8)
12	323.8 (12 3/4)	12.7 (0.50)	327 (12 3/8)	685 (27)	840 (33)	225 (9)	425 (17)	345 (13 3/8)
10	273.0 (10 3/4)	12.7 (0.50)	276 (10 3/8)	585 (23)	720 (28 1/4)	225 (9)	375 (15)	290 (11 1/8)
8	219.1 (8 5/8)	12.7 (0.50)	222 (8 3/4)	485 (19)	590 (23 1/4)	200 (8)	325 (13)	240 (9 1/2)
6	168.3 (6 5/8)	10.97 (0.432)	171 (6 3/4)	400 (15 3/4)	495 (19 1/2)	200 (8)	275 (11)	200 (7 1/2)
4	114.3 (4 1/2)	8.56 (0.337)	117 (4 5/8)	305 (12)	385 (15 1/4)	175 (7)	225 (9)	150 (6)
3	89.0 (3 1/2)	7.62 (0.300)	92 (3 3/8)	265 (10 1/2)	345 (13 1/2)	175 (7)	200 (8)	135 (5 1/4)
2 ^f	63.5 (2 1/2)	5.54 (0.218)	63 (2 1/2)	—	—	150 (6)	175 (7)	—
1 1/2 ^f	48.3 (1.90)	5.08 (0.200)	51 (2)	—	—	150 (6)	150 (6)	—
1 ^f	33.4 (1.315)	6.35 (0.250)	—	—	—	150 (6)	150 (6)	—
3/4 ^f	26.7 (1.05)	5.54 (0.218)	—	—	—	150 (6)	150 (6)	—
Threaded Fittings								
COUPLINGS								
3 ^g	108.0 (4.250)	Coupling	111.1 (4 3/8)	285 (11 1/4)	360 (14 1/4)	—	225 (9)	145 (5 5/8)
2 ^g	76.2 (3.000)	Coupling	79.4 (3 1/8)	—	—	—	175 (7)	—
3 1/2 ^g	63.5 (2.500)	Coupling	66.7 (2 5/8)	—	—	—	150 (6)	—
1 ^g	44.5 (1.750)	Coupling	47.6 (1 7/8)	—	—	—	125 (5)	—
3/4 ^g	35.0 (1.375)	Coupling	38.1 (1 1/2)	—	—	—	100 (4)	—

add 1/4"

Delete "3"

Add 1/4" & 3/4" φ

Threaded Fittings COUPLINGS

^aFor extra-strong pipe, refer to ASTM A 53 or A 106 for other wall thicknesses; however, piping material must conform to 2.5.
^bThe width of the shell plate shall be sufficient to contain the reinforcing plate and to provide clearance from the girth joint of the shell course.
^cUnless otherwise specified by the purchaser, the nozzle shall be located at the minimum distance but shall also meet the weld spacing requirements of 3.7.3.
^dThe *H_N* dimensions given in this table are for Appendix A tank designs only; refer to 3.7.3 to determine minimum *H_N* for basic tank designs.
^eSee Table 3-7, Column 2.
^fFlanged nozzles and threaded nozzles in pipe sizes NPS 2 or smaller do not require reinforcing plates. *D_R* will be the diameter of the hole in the shell plate, and Weld A will be as specified in Table 3-7, Column 6. Reinforcing plates may be used if...

replace "threaded nozzle" with "coupling" Add

the construction details comply with reinforced nozzle details.

^gA threaded nozzle in an NPS 3 requires reinforcement.
^hAny specified corrosion allowance shall, by agreement between the purchaser and the manufacturer, be added to either the nominal thickness shown or the minimum calculated thickness required for pressure head and mechanical strength. In no case shall the thickness provided be less than the nominal thickness shown.
 Refer to 3.7.3.
 Note: See Figure 3-5.

Editor's Note: 1" and 3/4" pipe neck wall thickness is Sched 160, as discussed @ meeting.