Designation: F681 – 82 (Reapproved 2022)

Standard Practice for
Use of Branch Connections[1]

1. Scope

1.1 This practice lists commonly used types of branch connections for carbon steel, chromium-molybdenum steel pipe and copper-nickel alloy tubing. Branch to run size applications are given in Table 1, Table 2, and Table 3. Other types of branch connections (Fig. 1) may be used provided they comply with the requirements of Title 46 CFR Subparts 56.07-10(f) and 56.70-15(g) of the USCG Regulations.

1.2 The values stated in inch-pound units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

F722 Specification for Welded Joints for Shipboard Piping Systems

2.2 *ASME Standard:*[3]

B31.1 Power Piping

2.3 *Other Document:*[4]

Title 46 Code of Federal Regulations (CFR) Shipping, Parts 41 to 69

3. General Requirements

3.1 Weld joint designs shall be in accordance with Specification F722 and the limitations therein.

3.2 Fabricated branch connections shall meet the reinforcement requirements of Section 104.3 of ASME B31.1 as modified by Title 46, CFR Subparts 56.07-10(f) and 56.70-15(g) of the USCG regulations.

3.3 Threaded fittings shall be subject to the limitations of Title 46 CFR, Subpart 56.30-20 of the USCG Regulations.

4. Keywords

4.1 branch connnections; carbon steel connections; chromium-molybdenum steel pipe; copper-nickel alloy tubing
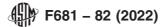
TABLE 1 Branch Connection Matrix for Carbon Steel Piping
LEGEND (see Fig. 1)

1 = Tee or lateral (butt weld)
2 = Tee or lateral (socket weld or threaded)
3 = Welded outlet (butt weld end)
4 = Welded outlet (socket weld or threaded end)
5 = Fabricated joint (cut-in branch)

BRANCH SIZE (NPS), in.

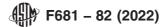| MAIN OR RUN SIZE (NPS), in.	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18
¼	2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
⅜	2	2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
½	2	2	2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
¾	2	2	2	2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1	2	2	2	2	2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1¼	2/4	2/4	2/4	2	2	2	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1½	2/4	2/4	2/4	2/4	2/4	2/4	2/4	X	X	X	X	X	X	X	X	X	X	X	X	X
2	2/4	2/4	2/4	2/4	2/4	2/4	2/5	2/5	X	X	X	X	X	X	X	X	X	X	X	X
2½	4	4	4	4	4	4	4/5	1/5	1/5	X	X	X	X	X	X	X	X	X	X	X
3	4	4	4	4	4	4	1/4,5	1/5	1/5	1/5	X	X	X	X	X	X	X	X	X	X
3½	4	4	4	4	4	4	1/4,5	1/5	1/5	1/5	1/5	X	X	X	X	X	X	X	X	X
4	4	4	4	4	4	4	1/4,5	1/4,5	1/5	1/5	1/5	1/5	X	X	X	X	X	X	X	X
5	4	4	4	4	4	4	1/4,5	1/4,5	1/5	1/5	1/5	1/5	1/5	X	X	X	X	X	X	X
6	4	4	4	4	4	4	4/5	1/4,5	1/5	1/5	1/5	1/5	1/5	1/5	X	X	X	X	X	X
8	4	4	4	4	4	4	4/5	1/4,5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	X	X	X	X	X
10	4	4	4	4	4	4	4/5	4/5	3/5	3/5	3/5	3/5	1/5	1/5	1/5	1/5	X	X	X	X
12	4	4	4	4	4	4	4/5	4/5	3/5	3/5	3/5	3/5	1/5	1/5	1/5	1/5	1/5	X	X	X
14	4	4	4	4	4	4	4/5	4/5	3/5	3/5	3/5	3/5	3/5	1/5	1/5	1/5	1/5	1/5	X	X
16	4	4	4	4	4	4	4/5	4/5	3/5	3/5	3/5	3/5	3/5	3/5	1/5	1/5	1/5	1/5	1/5	X
18	4	4	4	4	4	4	4/5	4/5	3/5	3/5	3/5	3/5	3/5	3/5	3/5	1/5	1/5	1/5	1/5	1/5

TABLE 2 Branch Connection Matrix for Chrome Moly Piping
LEGEND (see Fig. 1)

1 = Tee or lateral (butt weld)
2 = Tee or lateral (socket weld)
3 = Welded outlet (butt weld end)
4 = Welded outlet (socket weld end)
5 = Fabricated joint (cut-in branch)

BRANCH SIZE (NPS), in.

MAIN OR RUN SIZE (NPS), in.

Main \ Branch	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18
¼	2																			
⅜	2	2																		
½	2	2	2																	
¾	2	2	2	2																
1	2	2	2	2	2															
1¼	2/4	2/4	2/4	2	2	2														
1½	2/4	2/4	2/4	2/4	2	2	2													
2	4	4	4	4	2/4	2/4	2/4	2												
2½	4	4	4	4	4	2/4	2/4	2/4	1											
3	4	4	4	4	4	4	4	4	1/3	1										
3½	4	4	4	4	4	4	4	4	1/3	1/3	1									
4	4	4	4	4	4	4	4	4	1/5,3	1/5,3	1/5	1								
5	4	4	4	4	4	4	4	4	1/5,3	1/5,3	1/5	1/5	1							
6	4	4	4	4	4	4	4	4	1/5,3	1/5,3	1/5	1/5	1/5	1						
8	4	4	4	4	4	4	4	4	1/5,3	1/5,3	1/5	1/5	1/5	1/5	1					
10																				
12																				
14																				
16																				
18																				