

# BOLT CHART

NUMBER AND SIZE OF BOLTS FOR FLANGED JOINTS – ASME B16.5

| PRIMARY SERVICE PRESSURE RATING | BOLTING               | FLANGE FACING | NOMINAL PIPE SIZE |       |       |       |       |       |       |       |       |        |        |        |        |        |        |        |        |        |        |        |
|---------------------------------|-----------------------|---------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                 |                       |               | 1/2               | 3/4   | 1     | 1 1/4 | 1 1/2 | 2     | 2 1/2 | 3     | 3 1/2 | 4      | 5      | 6      | 8      | 10     | 12     | 14     | 16     | 18     | 20     | 24     |
| Class 150                       | Number                |               | 4                 | 4     | 4     | 4     | 4     | 4     | 4     | 4     | 8     | 8      | 8      | 8      | 8      | 12     | 12     | 12     | 16     | 16     | 20     | 20     |
|                                 | Diameter              |               | 1/2               | 1/2   | 1/2   | 1/2   | 1/2   | 5/8   | 5/8   | 5/8   | 5/8   | 5/8    | 3/4    | 3/4    | 3/4    | 7/8    | 7/8    | 1      | 1      | 1 1/8  | 1 1/8  | 1 1/4  |
|                                 | Length of Stud Bolts  | 1/16" RF      | 2 1/4             | 2 1/2 | 2 1/2 | 2 3/4 | 2 3/4 | 3 1/4 | 3 1/2 | 3 1/2 | 3 1/2 | 3 1/2  | 3 3/4  | 4      | 4 1/4  | 4 1/2  | 4 3/4  | 5 1/4  | 5 1/4  | 5 3/4  | 6 1/4  | 6 3/4  |
|                                 |                       | RTJ           |                   |       | 3     | 3 1/4 | 3 1/4 | 3 3/4 | 4     | 4     | 4     | 4      | 4 1/4  | 4 1/2  | 4 3/4  | 5      | 5 1/4  | 5 3/4  | 5 3/4  | 6 1/4  | 6 3/4  | 7 1/4  |
|                                 | Length of Mach. bolts | 1/16" RF      | 2                 | 2     | 2 1/4 | 2 1/4 | 2 1/2 | 2 3/4 | 3     | 3     | 3     | 3      | 3 1/4  | 3 1/4  | 3 1/2  | 4      | 4      | 4 1/2  | 4 1/2  | 5      | 5 1/2  | 6      |
|                                 | Ring No.              |               |                   | R15   | R17   | R19   | R22   | R25   | R29   | R33   | R36   | R40    | R43    | R48    | R52    | R56    | R59    | R64    | R68    | R72    | R76    |        |
| Class 300                       | Number                |               | 4                 | 4     | 4     | 4     | 4     | 8     | 8     | 8     | 8     | 8      | 8      | 12     | 12     | 16     | 16     | 20     | 20     | 24     | 24     | 24     |
|                                 | Diameter              |               | 1/2               | 5/8   | 5/8   | 5/8   | 3/4   | 5/8   | 3/4   | 3/4   | 3/4   | 3/4    | 3/4    | 3/4    | 7/8    | 1      | 1 1/8  | 1 1/8  | 1 1/4  | 1 1/4  | 1 1/4  | 1 1/2  |
|                                 | Length of Stud Bolts  | 1/16" RF      | 2 1/2             | 3     | 3     | 3 1/4 | 3 1/2 | 3 1/2 | 4     | 4 1/4 | 4 1/4 | 4 1/4  | 4 3/4  | 4 3/4  | 5 1/2  | 6 1/4  | 6 3/4  | 7      | 7 1/2  | 7 3/4  | 8      | 9      |
|                                 |                       | RTJ           | 3                 | 3 1/2 | 3 1/2 | 3 3/4 | 4     | 4     | 4 1/2 | 4 3/4 | 5     | 5      | 5 1/4  | 5 1/2  | 6      | 6 3/4  | 7 1/4  | 7 1/2  | 8      | 8 1/4  | 8 3/4  | 10     |
|                                 | Length of Mach. bolts | 1/16" RF      | 2 1/4             | 2 1/2 | 2 1/2 | 2 3/4 | 3     | 3     | 3 1/4 | 3 1/2 | 3 3/4 | 3 3/4  | 4 1/4  | 4 1/4  | 4 3/4  | 5 1/2  | 5 3/4  | 6 1/4  | 6 1/2  | 6 3/4  | 7 1/4  | 8      |
|                                 | Ring No.              |               | R11               | R13   | R16   | R18   | R20   | R23   | R26   | R31   | R34   | R37    | R41    | R45    | R49    | R53    | R57    | R61    | R65    | R69    | R73    | R77    |
| Class 400                       | Number                |               | 4                 | 4     | 4     | 4     | 4     | 8     | 8     | 8     | 8     | 8      | 8      | 12     | 12     | 16     | 16     | 20     | 20     | 24     | 24     | 24     |
|                                 | Diameter              |               | 1/2               | 5/8   | 5/8   | 5/8   | 3/4   | 5/8   | 3/4   | 3/4   | 7/8   | 7/8    | 7/8    | 7/8    | 1      | 1 1/8  | 1 1/4  | 1 1/4  | 1 3/8  | 1 3/8  | 1 1/2  | 1 3/4  |
|                                 | Length of Stud Bolts  | 1/4" RF       | 3                 | 3 1/2 | 3 1/2 | 3 3/4 | 4 1/4 | 4 1/4 | 4 3/4 | 5     | 5 1/2 | 5 1/2  | 5 3/4  | 6      | 6 3/4  | 7 1/2  | 8      | 8 1/4  | 8 3/4  | 9      | 9 1/2  | 10 1/2 |
|                                 |                       | M & F T & G   | 2 3/4             | 3 1/4 | 3 1/4 | 3 1/2 | 4     | 4     | 4 1/2 | 4 3/4 | 5 1/4 | 5 1/4  | 5 1/4  | 5 3/4  | 6 1/2  | 7 3/4  | 7 3/4  | 8      | 8 1/2  | 8 3/4  | 9 1/4  | 10 1/4 |
|                                 | Length of Mach. bolts | RTJ           | 3                 | 3 1/2 | 3 1/2 | 3 3/4 | 4 1/4 | 4 1/4 | 4 3/4 | 5     | 5 1/2 | 5 1/2  | 5 3/4  | 6      | 6 3/4  | 7 1/2  | 8      | 8 1/4  | 8 3/4  | 9      | 9 3/4  | 11     |
|                                 | Ring No.              |               | R11               | R13   | R16   | R18   | R20   | R23   | R26   | R31   | R34   | R37    | R41    | R45    | R49    | R53    | R57    | R61    | R65    | R69    | R73    | R77    |
| Class 600                       | Number                |               | 4                 | 4     | 4     | 4     | 4     | 8     | 8     | 8     | 8     | 8      | 8      | 12     | 12     | 16     | 20     | 20     | 20     | 20     | 24     | 24     |
|                                 | Diameter              |               | 1/2               | 5/8   | 5/8   | 5/8   | 3/4   | 5/8   | 3/4   | 3/4   | 7/8   | 7/8    | 1      | 1      | 1 1/8  | 1 1/4  | 1 1/4  | 1 3/8  | 1 1/2  | 1 5/8  | 1 5/8  | 1 7/8  |
|                                 | Length of Stud Bolts  | 1/4" RF       | 3                 | 3 1/2 | 3 1/2 | 3 3/4 | 4 1/4 | 4 1/4 | 4 3/4 | 5     | 5 1/2 | 5 3/4  | 6 1/2  | 6 3/4  | 7 1/2  | 8 1/2  | 8 3/4  | 9 1/4  | 10     | 10 3/4 | 11 1/4 | 13     |
|                                 |                       | M & F T & G   | 2 3/4             | 3 1/4 | 3 1/4 | 3 1/2 | 4     | 4     | 4 1/2 | 4 3/4 | 5 1/4 | 5 1/2  | 6 1/4  | 6 1/2  | 7 1/4  | 8 1/4  | 8 1/2  | 9      | 9 3/4  | 10 1/2 | 11     | 12 3/4 |
|                                 | Length of Mach. bolts | RTJ           | 3                 | 3 1/2 | 3 1/2 | 3 3/4 | 4 1/4 | 4 1/4 | 4 3/4 | 5     | 5 1/2 | 5 3/4  | 6 1/2  | 6 3/4  | 7 3/4  | 8 1/2  | 8 3/4  | 9 1/4  | 10     | 10 3/4 | 11 1/2 | 13 1/4 |
|                                 | Ring No.              |               | R11               | R13   | R16   | R18   | R20   | R23   | R26   | R31   | R34   | R37    | R41    | R45    | R49    | R53    | R57    | R61    | R65    | R69    | R73    | R77    |
| Class 900                       | Number                |               | 4                 | 4     | 4     | 4     | 4     | 8     | 8     | 8     |       | 8      | 8      | 12     | 12     | 16     | 20     | 20     | 20     | 20     | 24     | 24     |
|                                 | Diameter              |               | 3/4               | 3/4   | 7/8   | 7/8   | 1     | 7/8   | 1     | 7/8   |       | 1 1/8  | 1 1/4  | 1 1/8  | 1 3/8  | 1 3/8  | 1 3/8  | 1 1/2  | 1 5/8  | 1 7/8  | 2      | 2 1/2  |
|                                 | Length of Stud Bolts  | 1/4" RF       | 4 1/4             | 4 1/2 | 5     | 5     | 5 1/2 | 5 3/4 | 6 1/4 | 5 3/4 |       | 6 3/4  | 7 1/2  | 7 1/2  | 8 3/4  | 9 1/4  | 10     | 10 3/4 | 11 1/4 | 12 3/4 | 13 3/4 | 17 1/4 |
|                                 |                       | M & F T & G   | 4                 | 4 1/4 | 4 3/4 | 4 3/4 | 5 1/4 | 5 1/2 | 6     | 5 1/2 |       | 6 1/2  | 7 1/4  | 7 1/4  | 8 1/2  | 9      | 9 3/4  | 10 1/2 | 11     | 12 1/2 | 13 1/2 | 17     |
|                                 | Length of Mach. bolts | RTJ           | 4 1/4             | 4 1/2 | 5     | 5     | 5 1/2 | 5 3/4 | 6 1/4 | 5 3/4 |       | 6 3/4  | 7 1/2  | 7 3/4  | 8 3/4  | 9 1/4  | 10     | 11     | 11 1/2 | 13 1/4 | 14 1/4 | 18     |
|                                 | Ring No.              |               | R12               | R14   | R16   | R18   | R20   | R24   | R27   | R31   |       | R37    | R41    | R45    | R49    | R53    | R57    | R62    | R66    | R70    | R74    | R78    |
| Class 1500                      | Number                |               | 4                 | 4     | 4     | 4     | 4     | 8     | 8     | 8     |       | 8      | 8      | 12     | 12     | 16     | 16     | 16     | 16     | 16     | 16     | 16     |
|                                 | Diameter              |               | 3/4               | 3/4   | 7/8   | 7/8   | 1     | 7/8   | 1     | 1 1/8 |       | 1 1/4  | 1 1/2  | 1 3/8  | 1 5/8  | 1 7/8  | 2      | 2 1/4  | 2 1/2  | 2 3/4  | 3      | 3 1/2  |
|                                 | Length of Stud Bolts  | 1/4" RF       | 4 1/4             | 4 1/2 | 5     | 5     | 5 1/2 | 5 3/4 | 6 1/4 | 7     |       | 7 3/4  | 9 3/4  | 10 1/4 | 11 1/2 | 13 1/4 | 14 3/4 | 16     | 17 1/2 | 19 1/2 | 21 1/4 | 24 1/4 |
|                                 |                       | M & F T & G   | 4                 | 4 1/4 | 4 3/4 | 4 3/4 | 5 1/4 | 5 1/2 | 6     | 6 3/4 |       | 7 1/2  | 9 1/2  | 10     | 11 1/4 | 13     | 14 1/2 | 15 3/4 | 17 1/4 | 19 1/4 | 21     | 24     |
|                                 | Length of Mach. bolts | RTJ           | 4 1/4             | 4 1/2 | 5     | 5     | 5 1/2 | 5 3/4 | 6 1/4 | 7     |       | 7 3/4  | 9 3/4  | 10 1/2 | 12 3/4 | 13 1/2 | 15 1/4 | 16 3/4 | 18 1/2 | 20 3/4 | 22 1/4 | 25 1/2 |
|                                 | Ring No.              |               | R12               | R14   | R16   | R18   | R20   | R24   | R27   | R35   |       | R39    | R44    | R46    | R50    | R54    | R58    | R63    | R67    | R71    | R75    | R79    |
| Class 2500                      | Number                |               | 4                 | 4     | 4     | 4     | 4     | 8     | 8     | 8     |       | 8      | 8      | 8      | 12     | 12     | 12     |        |        |        |        |        |
|                                 | Diameter              |               | 3/4               | 3/4   | 7/8   | 1     | 1 1/8 | 1     | 1 1/8 | 1 1/4 |       | 1 1/2  | 1 3/4  | 2      | 2      | 2 1/2  | 2 3/4  |        |        |        |        |        |
|                                 | Length of Stud Bolts  | 1/4" RF       | 4 3/4             | 5     | 5 1/2 | 6     | 6 3/4 | 7     | 7 3/4 | 8 3/4 |       | 10     | 11 3/4 | 13 1/2 | 15     | 19 1/4 | 21 1/4 |        |        |        |        |        |
|                                 |                       | M & F T & G   | 4 1/2             | 4 3/4 | 5 1/4 | 5 3/4 | 6 1/2 | 6 3/4 | 7 1/2 | 8 1/2 |       | 9 3/4  | 11 1/2 | 13 1/4 | 14 3/4 | 19     | 21     |        |        |        |        |        |
|                                 | Length of Mach. bolts | RTJ           | 4 3/4             | 5     | 5 1/2 | 6     | 6 3/4 | 7     | 8     | 9     |       | 10 1/4 | 12 1/4 | 14     | 15 1/2 | 20     | 22     |        |        |        |        |        |
|                                 | Ring No.              |               | R13               | R16   | R18   | R21   | R23   | R26   | R28   | R32   |       | R38    | R42    | R47    | R51    | R55    | R60    |        |        |        |        |        |

Stud-Bolt lengths do not include the height of the points.  
Lengths of studs and bolts, when used with lap joint flanges,  
are dependent upon the thickness of the lap of the stub end.

