

## Charts (Section XI)

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## FRACTION, DECIMAL AND MILLIMETER CONVERSION CHART

Fraction (inches)	Decimal (inches)	Millimeter (mm)
1/64	0.015625	0.3969
1/32	0.03125	0.7938
3/64	0.046875	1.1906
1/16	0.0625	1.5875
5/64	0.078125	1.9844
3/32	0.09375	2.3813
7/64	0.109375	2.7781
1/8	0.125	3.1750
9/64	0.140625	3.5719
5/32	0.15625	3.9688
11/64	0.171875	4.3656
3/16	0.1875	4.7625
13/64	0.203125	5.1594
7/32	2.1875	5.5563
15/64	0.234375	5.9531
1/4	0.250	6.3500
17/64	0.265625	6.7469
9/32	0.28125	7.1438
19/64	0.296875	7.5406
5/16	0.3125	7.9375
21/64	0.328125	8.3344
11/32	0.34375	8.7313
23/64	0.359375	9.1282
3/8	0.375	9.5250
25/64	0.390625	9.9219
13/32	0.40625	10.3188
27/64	0.421875	10.7157
7/16	0.4375	11.1125
29/64	0.453125	11.5094
15/32	0.46875	11.9063
31/64	0.484375	12.3032
1/2	0.500	12.7001

Fraction (inches)	Decimal (inches)	Millimeter (mm)
33/64	0.515625	13.0969
17/32	0.53125	13.4938
35/64	0.546875	13.8907
9/16	0.5625	14.2876
37/64	0.578125	14.6844
19/32	0.59375	15.0813
39/64	0.609375	15.4782
5/8	0.625	15.8751
41/64	0.640625	16.2719
21/32	0.65625	16.6688
43/64	0.671875	17.0657
11/16	0.6875	17.4626
45/64	0.703125	17.8594
23/32	0.71875	18.2563
47/64	0.734375	18.6532
3/4	0.750	19.0501
49/64	0.765625	19.4470
25/32	0.78125	19.8438
51/64	0.796875	20.2407
13/16	0.8125	20.6376
53/64	0.828125	21.0345
27/32	0.84375	21.4313
55/64	0.859375	21.8282
7/8	0.875	22.2251
57/64	0.890625	22.6220
29/32	0.90625	23.0188
59/64	0.921875	23.4157
15/16	0.9375	23.8126
61/64	0.963125	24.2095
31/32	0.96875	24.6063
63/64	0.984375	25.0032
1	1.000	25.4001

**MEASUREMENT CHART (Metric & Standard)**

Linear Measure Metric Equivalents	
1 centimeter	0.3937 inch
1 inch	2.54 centimeters
1 foot	0.3048 meter
1 meter	39.97 inches
1 meter	1.0936 yards
1 yard	0.9144 meter
1 rod	5.029 meters
1 kilometer	0.621 mile
1 mile	1.609 kilometer
Measure of Volume	
1 cubic centimeter	0.061 cubic inch
1 cubic inch	16.39 cubic centimeters
1 cubic foot	0.0283 cubic meter
1 liter	1.0567 quarts liquid
1 quart dry	1.101 liters
1 quart liquid	0.9463 liters
1 liter	1.0567 quarts
1 gallon	3.78541 liters
1 peck	8.810 liters
1 hectoliter	2.8375 bushels
Weights	
1 gram	0.03527 ounce
1 ounce	28.35 grams
1 kilogram	2.2046 pounds
1 pound	0.4536 kilogram
1 metric ton	.98421 English ton
1 English ton	1.016 metric tons
Cubic Measure	
1,728 cubic inches	1 cubic foot
27 cubic feet	1 cubic yard
128 cubic feet	1 cord (wood)
2,150.42 cubic inches	1 standard bu.
231 cubic inches	1 U.S. standard gal.
Mariner's Measure	
6 feet	1 fathom
120 fathoms	1 cable length
5,280 feet	1 statue mile
6,076.11 feet	1 nautical mile
Dry Measure	
2 pints	1 quart
8 quarts	1 peck
4 pecks	1 bushel

Metric Square Measure	
1 sq. centimeter	0.1550 sq. inch
1 sq. inch	6.452 sq. centimeters
1 sq. foot	0.0929 sq. meters
1 sq. meter	1.196 sq. yards
1 sq. yard	0.8361 sq. meter
1 hectare	2.47 acres
1 acre	0.4047 hectare
1 sq. mile	3,097,600 sq. yards
1 sq. kilometer	0.386 sq. miles
1 sq. mile	2.59 sq. kilometers
Pressure	
1 psi	0.069 bar
1 bar	14.50 psi
1 psi	27.68 inches of H2O
1 inch of H2O	0.036 psi
1 psi	2.04 inches of Hg
1 inch of Hg	0.491 psi
1 Kpa	0.145 psi
1 psi	0.0681 atm
1 atm	14.696 psi
1 psi	0.0703 Kg/sq cm
1 Kg/sq cm	14.22 psi
Long Measure	
12 inches	1 foot
3 feet	1 yard
16.5 feet	1 rod
40 rods	1 furlong
8 furlongs	1 statue mile
3 land miles	1 league
Imperial Liquid Measure	
1 US gallon	0.833 Imperial gallon
1 US gallon	3.785 liters
1 Imperial gallon	1.201 US gallons
1 Imperial gallon	4.546 liters
1 Imperial gallon	0.264 US gallon
Liquid Measure	
4 gills	1 pint
2 pints	1 quart
4 quarts	1 gallon
42 gallons	1 barrel

**TEMPERATURE CONVERSIONS**

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 To convert Fahrenheit degrees into Celsius, subtract 32, multiply by 5, and divide by 9.  
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\*\*\*  
 To convert Celsius degrees into Fahrenheit, multiply by 9, divide by 5, and add 32.  
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 The freezing point of water is 32°F, 0°C. The boiling point of water is 212°F, 100°C.  
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**STANDARD (ANSI B16.5) FLANGE DIMENSION CHART**

**Key:**

Bolt Circle Diameter

Number of Bolt Holes x Hole Diameter

Flange Outside Diameter

1 Inch = 25.4 mm

1mm = 0.03937 Inches

Nom. Pipe Diameter inches/mm	150 lb.		300 lb.		600 lb.	
	inch	mm	inch	mm	inch	mm
<b>1/2</b>	2-3/8	60	2-5/8	67	2-5/8	67
	4x5/8	4x16	4x5/8	4x16	4x5/8	4x16
	3-1/2	89	3-3/4	95	3-3/4	95
<b>3/4</b>	2-3/4	70	3-1/4	83	3-1/4	83
	4x5/8	4x16	4x3/4	4x19	4x3/4	4x19
	3-7/8	98	4-5/8	117	4-5/8	117
<b>1</b>	3-1/8	79	3-1/2	89	3-1/2	89
	4x5/8	4x16	4x3/4	4x19	4x3/4	4x19
	4-1/4	108	4-7/8	124	4-7/8	124
<b>1-1/4</b>	3-1/2	89	3-7/8	98	3-7/8	98
	4x5/8	4x16	4x3/4	4x19	4x3/4	4x19
	4-5/8	117	5-1/4	133	5-1/4	133
<b>1-1/2</b>	3-7/8	98	4-1/2	114	4-1/2	114
	4x5/8	4x16	4x7/8	4x22	4x7/8	4x22
	5	127	6-1/8	156	6-1/8	156
<b>2</b>	4-3/4	121	5	127	5	127
	4x3/4	4x19	8x3/4	8x19	8x3/4	4x19
	6	152	6-1/2	165	6-1/2	165
<b>2-1/2</b>	5-1/2	140	5-7/8	149	5-7/8	149
	4x3/4	4x19	8x7/8	8x22	8x7/8	8x22
	7	178	7-1/2	191	7-1/2	191
<b>3</b>	6	152	6-5/8	168	6-5/8	168
	4x3/4	4x19	8x7/8	8x22	8x7/8	8x22
	7-1/2	191	8-1/4	210	8-1/4	210
<b>3-1/2</b>	7	178	7-1/4	184	7-1/4	184
	8x3/4	8x19	8x7/8	8x22	8x1	8x25
	8-1/2	216	9	229	9	229
<b>4</b>	7-1/2	191	7-7/8	200	8-1/2	216
	8x3/4	8x19	8x7/8	8x22	8x1	8x25
	9	229	10	254	10-3/4	273
<b>5</b>	8-1/2	216	9-1/4	235	10-1/2	267
	8x7/8	8x22	8x7/8	8x22	8x1-1/8	8x29
	10	254	11	279	13	330

Nom. Pipe Diameter inches/mm	150 lb.		300 lb.		600 lb.	
	inch	mm	inch	mm	inch	mm
<b>6</b>	9-1/2	241	10-5/8	270	11-1/2	292
	8x7/8	8x22	12x7/8	12x22	12x1-1/8	12x29
	11	279	12-1/2	318	14	356
<b>8</b>	11-3/4	298	13	330	13-3/4	349
	8x7/8	8x22	12x1	12x25	12x1-1/4	12x32
	13-1/2	343	15	381	16-1/2	419
<b>10</b>	14-1/4	362	15-1/4	387	17	432
	12x1	12x25	16x1-1/8	16x29	16x1-3/8	16x35
	16	406	17-1/2	445	20	508
<b>12</b>	17	432	17-3/4	451	19-1/4	489
	12x1	12x25	16x1-1/4	16x32	20x1-3/8	20x35
	19	483	20-1/2	521	22	559
<b>14</b>	18-3/4	476	20-1/4	514	20-3/4	527
	12x1-1/8	12x29	20x1-1/4	20x32	20x1-1/2	20x38
	21	533	23	584	23-3/4	603
<b>16</b>	21-1/4	540	22-1/2	572	23-3/4	603
	16x1-1/8	16x29	20x1-3/8	20x35	20x1-5/8	20x41
	23-1/2	597	25-1/2	648	27	686
<b>18</b>	22-3/4	578	24-3/4	629	25-3/4	654
	16x1-1/4	16x32	24x1-3/8	24x35	20x1-3/4	24x44
	25	635	28	711	29-1/4	743
<b>20</b>	25	635	27	686	28-1/2	724
	20x1-1/4	20x32	24x1-3/8	24x35	24x1-3/4	24x44
	27-1/2	699	30-1/2	775	32	813
<b>24</b>	29-1/2	749	32	813	33	838
	20x1-3/8	20x35	24x1-5/8	24x41	24x2	24x51
	32	813	36	914	37	940
<b>30</b>	36	914	39-1/4	997	40-1/2	1029
	28x1-3/8	28x35	28x1-7/8	28x48	28x2-1/8	28x54
	38-3/4	984	43	1092	44-1/2	1130
<b>36</b>	42-3/4	1086	46	1168	47	1194
	32x1-5/8	32x41	32x2-1/8	32x54	28x2-5/8	28x67
	46	1168	50	1270	51-3/4	1314

**METRIC FLANGE DIMENSION CHART**

**Key:**

Bolt Circle Diameter

Number of Bolt Holes x Hole Diameter

Flange Outside Diameter

1 Inch = 25.4 mm

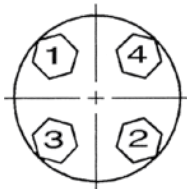
1mm = 0.03937 Inches

Nom. Pipe Dia. mm	DIN PN6	DIN PN10	DIN PN16	DIN PN25	DIN PN40	JIS 5K	JIS 10K	JIS 16K	JIS 20K	JIS 40K
10	50 4x11 75	60 4x14 90	60 4x14 90	60 4x14 90	60 4x14 90	55 4x12 75	65 4x15 90	65 4x15 90	65 4x15 90	75 4x19 110
15	55 4x11 80	65 4x14 95	65 4x14 95	65 4x14 95	65 4x14 95	60 4x12 80	70 4x15 95	70 4x15 95	70 4x15 95	80 4x19 115
20	65 4x11 90	75 4x14 105	75 4x14 105	75 4x14 105	75 4x14 105	65 4x12 85	75 4x15 100	75 4x15 100	75 4x15 100	85 4x19 120
25	75 4x11 100	85 4x14 115	85 4x14 115	85 4x14 115	85 4x14 115	75 4x12 95	90 4x19 125	90 4x19 125	90 4x19 125	95 4x19 130
32	90 4x14 120	100 4x18 140	100 4x18 140	100 4x18 140	100 4x18 140	90 4x15 115	100 4x19 135	100 4x19 135	100 4x19 135	105 4x19 140
40	100 4x14 130	110 4x18 150	110 4x18 150	110 4x18 150	110 4x18 150	95 4x15 120	105 4x19 140	105 4x19 140	105 4x19 140	120 4x23 160
50	110 4x14 140	125 4x18 165	125 4x18 165	125 4x18 165	125 4x18 165	105 4x15 130	120 4x19 155	120 8x19 155	120 8x19 155	130 8x19 165
65	130 4x14 160	145 4x18 185	145 4x18 185	145 8x18 185	145 8x18 185	130 4x15 155	140 4x19 175	140 8x19 175	140 8x19 175	160 8x23 200
80	150 4x18 190	160 8x18 200	160 8x18 200	160 8x18 200	160 8x18 200	145 4x19 180	150 8x19 185	160 8x23 200	160 8x23 200	170 8x23 210
100	170 4x18 210	180 8x18 220	180 8x18 220	190 8x22 235	190 8x22 235	165 8x19 200	175 8x19 210	185 8x23 225	185 8x23 225	205 8x25 250
125	200 8x18 240	210 8x18 250	210 8x18 250	220 8x26 270	220 8x26 270	200 8x19 235	210 8x23 250	225 8x25 270	225 8x25 270	250 8x27 300
150	225 8x18 265	240 8x22 285	240 8x22 285	250 8x26 300	250 8x26 300	230 8x19 265	240 8x23 280	260 12x25 305	260 12x25 305	295 12x33 355
175	--	270 8x22 315	270 8x22 315	280 12x26 330	295 12x30 350	260 8x23 300	265 12x23 305	--	--	--
200	280 8x18 320	295 8x22 340	295 12x22 340	310 12x26 360	320 12x30 375	280 8x23 320	290 12x23 330	305 12x25 350	305 12x25 350	345 12x33 405
250	335 12x18 375	350 12x22 395	355 12x26 405	370 12x30 425	385 12x33 450	345 12x23 385	355 12x25 400	380 12x27 430	380 12x27 430	410 12x33 475
300	395 12x22 440	400 12x22 445	410 12x26 460	430 16x30 485	450 16x33 515	390 12x23 430	400 16x25 445	430 16x27 480	430 16x27 480	470 16x39 540
350	445 12x22 490	460 16x22 505	470 16x26 520	490 16x33 555	510 16x36 580	435 12x25 480	445 16x25 490	480 16x33 540	480 16x33 540	515 16x39 585
400	495 16x22 540	515 16x26 565	525 16x30 580	550 16x36 620	585 16x39 660	495 16x25 540	510 16x27 560	540 16x33 605	540 16x33 605	570 16x39 645

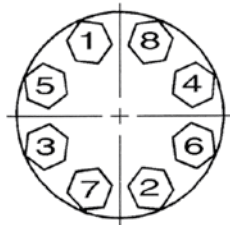
**Dimensions of Tank Truck Flanges - TTMA Drilling**

Nominal Pipe Size	Flange OD	Thickness	Bolt Circle Diameter	Number of Bolts	Diameter of Hole	Diameter of Bolts
3"	5-5/8"	3/8"	4-7/8"	8	7/16"	3/8"
4"	6-5/8"	3/8"	5-7/8"	8	7/16"	3/8"
6"	8-7/8"	3/8"	8-1/8"	8	7/16"	3/8"

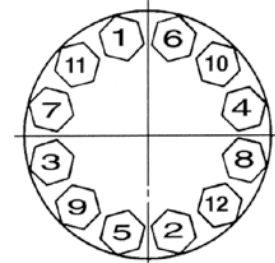
**Bolt Tightening Sequence for Flanges - Use appropriate gasket and bolts.**



**4 Bolt Pattern**



**8 Bolt Pattern**



**12 Bolt Pattern**

**Water Discharge Table**

**Flow of water through 100 foot of straight smooth bore hose, Gallons/Minute (GPM)**

This table is intended for general reference and general applicability only, and should not be relied upon as the sole or precise source of information available with respect to the subject covered. The user should also refer to and follow the manufacturer's specific instructions and recommendations with regard to such information, where they exist.

PSI at Hose Inlet	Nominal Hose ID - Inches							
	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	6"
20	26	47	76	161	290	468	997	2895
30	32	58	94	200	360	582	1240	3603
40	38	68	110	234	421	680	1449	4209
50	43	77	124	264	475	767	1635	4748
60	47	85	137	291	524	846	1804	5239
75	53	95	154	329	591	955	2035	5910
100	62	112	180	384	690	1115	2377	6904
125	70	126	203	433	779	1258	2681	7788
150	77	139	224	478	859	1388	2958	8593
200	90	162	262	558	1004	1621	3455	10038

**TEMPERATURE CONVERSION TABLES**

**\*\* Note** - The numbers in “**Bold**” face (middle #'s) refer to the temperatures either in degrees Centigrade or Fahrenheit, which it is desired to convert into the other scale. For example, to convert 40°F to °C, the column at left shows 4.4°C.

**For conversions not covered in the table, use the following formulas: °F=1.8°C+32; °C=(°F-32)/1.8.**

°C		°F	°C		°F	°C		°F	°C		°F	°C		°F
-17.8	<b>0</b>	32	13.3	<b>56</b>	132.8	44.4	<b>112</b>	233.6	75.6	<b>168</b>	334.4	106.7	<b>224</b>	435.2
-17.2	<b>1</b>	33.8	13.9	<b>57</b>	134.6	45	<b>113</b>	235.4	76.1	<b>169</b>	336.2	107.2	<b>225</b>	437
-16.7	<b>2</b>	35.6	14.4	<b>58</b>	136.4	45.6	<b>114</b>	237.2	76.7	<b>170</b>	338	107.8	<b>226</b>	438.8
-16.1	<b>3</b>	37.4	15	<b>59</b>	138.2	46.1	<b>115</b>	239	77.2	<b>171</b>	339.8	108.3	<b>227</b>	440.6
-15.6	<b>4</b>	39.2	15.6	<b>60</b>	140	46.7	<b>116</b>	240.8	77.8	<b>172</b>	341.6	108.9	<b>228</b>	442.4
-15	<b>5</b>	41	16.1	<b>61</b>	141.8	47.2	<b>117</b>	242.6	78.3	<b>173</b>	343.4	109.4	<b>229</b>	444.2
-14.4	<b>6</b>	42.8	16.7	<b>62</b>	143.6	47.8	<b>118</b>	244.4	78.9	<b>174</b>	345.2	110	<b>230</b>	446
-13.9	<b>7</b>	44.6	17.2	<b>63</b>	145.4	48.3	<b>119</b>	246.2	79.4	<b>175</b>	347	110.6	<b>231</b>	447.8
-13.3	<b>8</b>	46.4	17.8	<b>64</b>	147.2	48.9	<b>120</b>	248	80	<b>176</b>	348.8	111.1	<b>232</b>	449.6
-12.8	<b>9</b>	48.2	18.3	<b>65</b>	149	49.4	<b>121</b>	249.8	80.6	<b>177</b>	350.6	111.7	<b>233</b>	451.1
-12.2	<b>10</b>	50	18.9	<b>66</b>	150.8	50	<b>122</b>	251.6	81.1	<b>178</b>	352.4	112.2	<b>234</b>	453.2
-11.7	<b>11</b>	51.8	19.4	<b>67</b>	152.6	50.6	<b>123</b>	253.4	81.7	<b>179</b>	354.2	112.8	<b>235</b>	455
-11.1	<b>12</b>	53.6	20	<b>68</b>	154.4	51.1	<b>124</b>	255.2	82.2	<b>180</b>	356	113.3	<b>236</b>	456.8
-10.6	<b>13</b>	55.4	20.6	<b>69</b>	156.2	51.7	<b>125</b>	257	82.8	<b>181</b>	357.8	113.9	<b>237</b>	458.6
-10	<b>14</b>	57.2	21.1	<b>70</b>	158	52.2	<b>126</b>	258.8	83.3	<b>182</b>	359.6	114.4	<b>238</b>	460.4
-9.4	<b>15</b>	59	21.7	<b>71</b>	159.8	52.8	<b>127</b>	260.6	83.9	<b>183</b>	361.4	115	<b>239</b>	462.2
-8.9	<b>16</b>	60.8	22.2	<b>72</b>	161.6	53.3	<b>128</b>	262.4	84.4	<b>184</b>	363.2	115.6	<b>240</b>	464
-8.3	<b>17</b>	62.6	22.8	<b>73</b>	163.4	53.9	<b>129</b>	264.2	85	<b>185</b>	365	116.1	<b>241</b>	465.8
-7.8	<b>18</b>	64.4	23.3	<b>74</b>	165.2	54.4	<b>130</b>	266	85.6	<b>186</b>	366.8	116.7	<b>242</b>	467.6
-7.2	<b>19</b>	66.2	23.9	<b>75</b>	167	55	<b>131</b>	267.8	86.1	<b>187</b>	368.6	117.2	<b>243</b>	469.4
-6.7	<b>20</b>	68	24.4	<b>76</b>	168.8	55.6	<b>132</b>	269.6	86.7	<b>188</b>	370.4	117.8	<b>244</b>	471.2
-6.1	<b>21</b>	69.8	25	<b>77</b>	170.6	56.1	<b>133</b>	271.4	87.2	<b>189</b>	372.2	118.3	<b>245</b>	473
-5.6	<b>22</b>	71.6	25.6	<b>78</b>	172.4	56.7	<b>134</b>	273.2	87.8	<b>190</b>	374	118.9	<b>246</b>	474.8
-5	<b>23</b>	73.4	26.1	<b>79</b>	174.2	57.2	<b>135</b>	275	88.3	<b>191</b>	375.8	119.4	<b>247</b>	476.6
-4.4	<b>24</b>	75.2	26.7	<b>80</b>	176	57.8	<b>136</b>	276.8	88.9	<b>192</b>	377.6	120	<b>248</b>	478.4
-3.9	<b>25</b>	77	27.2	<b>81</b>	177.8	58.3	<b>137</b>	278.6	89.4	<b>193</b>	379.4	120.6	<b>249</b>	480.2
-3.3	<b>26</b>	78.8	27.8	<b>82</b>	179.6	58.9	<b>138</b>	280.4	90	<b>194</b>	381.2	121	<b>250</b>	482
-2.8	<b>27</b>	80.6	28.3	<b>83</b>	181.4	59.4	<b>139</b>	282.2	90.6	<b>195</b>	383	122	<b>260</b>	500
-2.2	<b>28</b>	82.4	28.9	<b>84</b>	183.2	60	<b>140</b>	284	91.1	<b>196</b>	384.8	132	<b>270</b>	518
-1.7	<b>29</b>	84.2	29.4	<b>85</b>	185	60.6	<b>141</b>	285.8	91.7	<b>197</b>	386.6	138	<b>280</b>	536
-1.1	<b>30</b>	86	30	<b>86</b>	186.8	61.1	<b>142</b>	287.6	92.2	<b>198</b>	388.4	143	<b>290</b>	554
-0.6	<b>31</b>	87.8	30.6	<b>87</b>	188.6	61.7	<b>143</b>	289.4	92.8	<b>199</b>	390.2	149	<b>300</b>	572
0	<b>32</b>	89.6	31.1	<b>88</b>	190.4	62.2	<b>144</b>	291.2	93.3	<b>200</b>	392	154	<b>310</b>	590
0.6	<b>33</b>	91.4	31.7	<b>89</b>	192.2	62.8	<b>145</b>	293	93.9	<b>201</b>	393.8	160	<b>320</b>	608
1.1	<b>34</b>	93.2	32.2	<b>90</b>	194	63.3	<b>146</b>	294.8	94.4	<b>202</b>	395.6	166	<b>330</b>	626
1.7	<b>35</b>	95	32.8	<b>91</b>	195.8	63.9	<b>147</b>	296.6	95	<b>203</b>	397.4	171	<b>340</b>	644
2.2	<b>36</b>	96.8	33.3	<b>92</b>	197.6	64.4	<b>148</b>	298.4	95.6	<b>204</b>	399.2	177	<b>350</b>	662
2.8	<b>37</b>	98.6	33.9	<b>93</b>	199.4	65	<b>149</b>	300.2	96.1	<b>205</b>	401	182	<b>360</b>	680
3.3	<b>38</b>	100.4	34.4	<b>94</b>	201.2	65.6	<b>150</b>	302	96.7	<b>206</b>	402.8	188	<b>370</b>	698
3.9	<b>39</b>	102.2	35	<b>95</b>	203	66.1	<b>151</b>	303.8	97.2	<b>207</b>	404.6	193	<b>380</b>	716
4.4	<b>40</b>	104	35.6	<b>96</b>	204.8	66.7	<b>152</b>	305.6	97.8	<b>208</b>	406.4	199	<b>390</b>	734
5	<b>41</b>	105.8	36.1	<b>97</b>	206.6	67.2	<b>153</b>	307.4	98.3	<b>209</b>	408.2	204	<b>400</b>	752
5.6	<b>42</b>	107.6	36.7	<b>98</b>	208.4	67.8	<b>154</b>	309.2	98.9	<b>210</b>	410	210	<b>410</b>	770
6.1	<b>43</b>	109.4	37.2	<b>99</b>	210.2	68.3	<b>155</b>	311	99.4	<b>211</b>	411.8	216	<b>420</b>	788
6.7	<b>44</b>	111.2	37.8	<b>100</b>	212	68.9	<b>156</b>	312.8	100	<b>212</b>	413.6	221	<b>430</b>	806
7.2	<b>45</b>	113	38.3	<b>101</b>	213.8	69.4	<b>157</b>	314.6	100.6	<b>213</b>	415.4	227	<b>440</b>	824
7.8	<b>46</b>	114.8	38.9	<b>102</b>	215.6	70	<b>158</b>	316.4	101.1	<b>214</b>	417.2	232	<b>450</b>	842
8.3	<b>47</b>	116.6	39.4	<b>103</b>	217.4	70.6	<b>159</b>	318.2	101.7	<b>215</b>	419	238	<b>460</b>	860
8.9	<b>48</b>	118.4	40	<b>104</b>	219.2	71.7	<b>160</b>	320	102.2	<b>216</b>	420.8	243	<b>470</b>	878
9.4	<b>49</b>	120.2	40.6	<b>105</b>	221	71.6	<b>161</b>	321.8	102.8	<b>217</b>	422.6	249	<b>480</b>	896
10	<b>50</b>	122	41.1	<b>106</b>	222.8	72.2	<b>162</b>	323.6	103.3	<b>218</b>	424.4	254	<b>490</b>	914
10.6	<b>51</b>	123.8	41.7	<b>107</b>	224.6	72.8	<b>163</b>	325.4	103.9	<b>219</b>	426.2	260	<b>500</b>	932
11.1	<b>52</b>	125.6	42.2	<b>108</b>	226.4	73.3	<b>164</b>	327.2	104.4	<b>220</b>	428	266	<b>510</b>	950
11.7	<b>53</b>	127.4	42.8	<b>109</b>	228.2	73.9	<b>165</b>	329	105	<b>221</b>	429.8	271	<b>520</b>	968
12.2	<b>54</b>	129.2	43.3	<b>110</b>	230	74.4	<b>166</b>	330.8	105.6	<b>222</b>	431.6	277	<b>530</b>	986
12.8	<b>55</b>	131	43.9	<b>111</b>	231.8	75	<b>167</b>	332.6	106.1	<b>223</b>	433.4	282	<b>540</b>	1004

**PRESSURE CONVERSION TABLES**

Temperature equivalents of saturated steam at sea level.

Gauge Pressure		Approximate Temperature		Gauge Pressure		Approximate Temperature	
P.S.I.	Kg/cm2	°C	°F	P.S.I.	Kg/cm2	°C	°F
0	0.00	100	212	68	4.78	157	314
5	0.35	109	227	70	4.92	158	316
10	0.70	115	239	75	5.27	160	320
15	1.06	121	250	80	5.62	162	324
20	1.41	125	258	85	5.98	164	327
22	1.55	127	261	95	6.33	166	330
24	1.69	129	265	100	6.68	168	334
26	1.83	131	268	105	7.03	170	337
28	1.97	133	271	110	7.38	172	340
30	2.11	134	274	115	7.73	173	344
32	2.25	136	277	120	8.09	176	347
34	2.39	138	280	125	8.49	177	350
36	2.53	139	282	130	8.70	178	352
38	2.67	140	285	135	9.19	180	356
40	2.81	141	287	140	9.49	181	358
42	2.95	143	290	145	9.84	183	361
44	3.09	144	292	150	10.55	184	363
46	3.23	145	294	155	10.90	186	366
48	3.37	147	296	160	11.25	187	368
50	3.51	148	298	165	11.60	188	370
52	3.66	149	300	170	11.95	190	376
54	3.80	150	302	175	12.30	191	378
56	3.94	151	304	180	12.65	192	380
58	4.08	152	305	185	13.01	193	381
60	4.22	153	307	190	13.36	194	384
62	4.36	154	311	195	13.71	196	387
64	4.50	155	312	200	14.06	197	388
66	4.64	156	313				



## Identifying Threads

*It is important to identify the threads required before ordering couplings.*

Identifying threads can sometimes be the most difficult and frustrating part of coupling selection. However, without the right combination of threads, you may not provide a functional or safe connection.

The diameters, threads per inch (TPI) and thread pitch, etc. is necessary to completely identify a thread. Ring, Plug and GO/NOGO gauges are required to accurately gauge or identify threads. In the field, in the absence of these gauges, thread leaf gauges can be used to identify the Threads Per Inch (TPI) and the thread pitch. On threads you have determined to be straight threads, a caliper can be used to measure the Outside Diameter of the Male (ODM) or the Inside Diameter of the Female (IDF). A caliper can also be used to take measurements of tapered thread diameters. However, these are more difficult to define because of the taper. Fortunately, there are few tapered threads to deal with and these can usually be identified from the nominal ODM and the TPI.

However, identifying the thread may not fully identify what is needed in a mating fitting. The application is the primary limiting factor on the thread type used. Dixon offers products with a wide variety of threads used with hose, pipe and hydraulics.

When attempting to choose a fitting, it is always advisable to first identify the thread to which it must connect. This may entail checking with a fitting or equipment manufacturer.

The fire hose thread specifications for some local municipal fire equipment and hydrants may vary according to local specifications. Contacting the local fire department responsible for the hydrant can generally most easily identify these.

The most common thread used on fire equipment is National Standard Thread (NST), also known as National Hose thread (NH).

When it is not possible to identify the thread:

- 1) Determine the number of threads per inch by measuring the distance from peak of thread to peak of thread across the largest number of whole threads. Then divide the number of threads by the measurement (This will provide the TPI)

- 2) Check to see if the thread is straight or tapered.

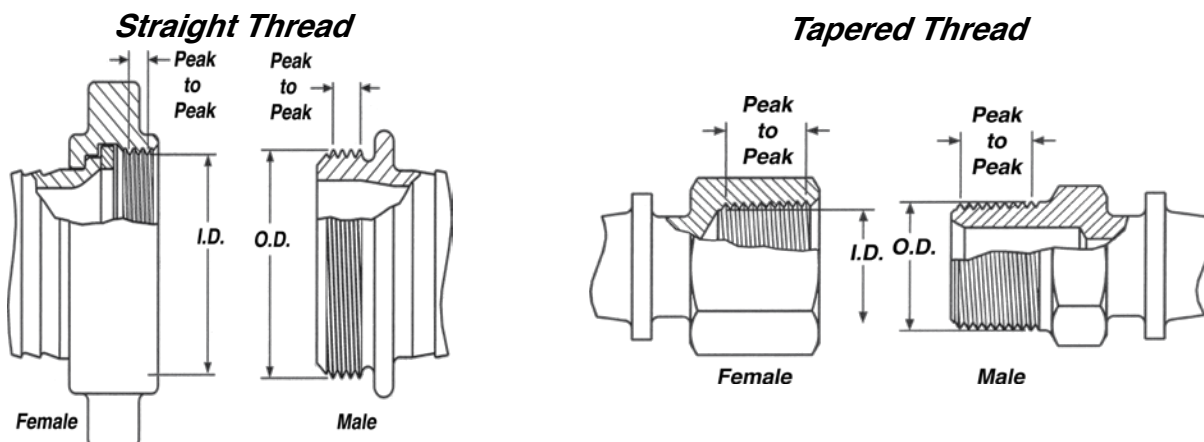
a) Straight Threads

Measure the Outside Diameter of the Male (ODM) or the Inside Diameter of the Female (IDF), from peak of thread to peak of thread.

b) Tapered Threads

Measure the Outside Diameter of the Male (ODM) at the large end and the small end, or the Inside Diameter of the Female (IDF) at the large end and the small end, from peak of thread to peak of thread. Then measure the Outside Diameter (OD) of the unthreaded pipe.

Once the application and these two pieces of information have been determined, the thread can generally be determined. When in doubt, contact the factory.



**THREAD DIMENSIONS**  
**Nominal Dimensions of Standard Threads**

ODM - Outside Diameter of the Male

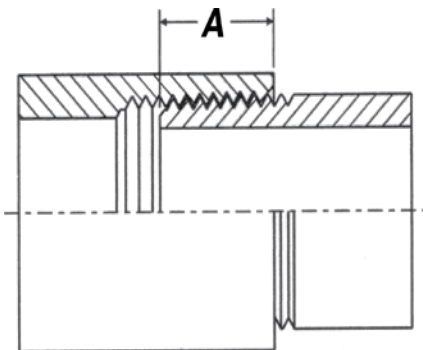
IDF - Inside Diameter of the Female

TPI - Threads Per Inch

		Tapered Threads		Straight Threads											
		NPT	BSPT	NPSH			NPSM			NST (NH)			BSPP		
Nom. Pipe Dia.	Pipe O.D.	TPI	TPI	TPI	ODM (max)	IDF (min)	TPI	ODM (max)	IDF (min)	TPI	ODM (max)	IDF (min)	TPI	ODM (max)	IDF (min)
1/8"	0.405	27	28				27	0.397	0.358					0.383	0.337
1/4"	0.504	18	19				18	0.526	0.468					0.516	0.450
3/8"	0.675	18	19				18	0.662	0.603					0.656	0.588
1/2"	0.840	14	14	14	0.825	0.740	14		0.747					0.825	0.733
3/4"	1.050	14	14	14	1.035	0.950	14	1.034	0.958	8	1.375	1.225		1.041	0.950
1"	1.315	11.5	11	11.5	1.295	1.192	11.5	1.293	1.201	8	1.375	1.225	11	1.309	1.193
1-1/4"	1.660	11.5	11	11.5	1.640	1.537	11.5	1.638	1.546					1.650	1.534
1-1/2"	1.900	11.5	11	11.5	1.295	1.778	11.5	1.887	1.785	9	1.990	1.858		1.882	1.766
2"	2.375	11.5	11	11.5	2.353	2.250	11.5	2.351	2.259				11	2.347	2.231
2-1/2"	2.875	8	11	8	2.843	2.693	8	2.841	2.708	7.5	3.066	2.910	11	2.960	2.844
3"	3.500	8	11				8	3.467	3.334	6	3.623	3.531	11	3.460	3.344
4"	4.500	8	11				8	4.466	4.333	4	5.010	4.711		4.450	4.334
4-1/2"										4	5.760	5.461	11		
5"	5.563	8	11				8	5.528	5.395	4	6.260	5.960	11	5.450	5.359
6"	6.625	8	11				8	6.585	6.452	4	7.025	6.725		6.450	6.359

**Normal Engagement Length of NPT Thread in Inches "A"**

\* Dimensions shown do not allow for variations in tapping or threading.



Thread Size	"A"
1/8"	1/4"
1/4"	3/8"
3/8"	3/8"
1/2"	1/2"
3/4"	9/16"
1"	11/16"
1-1/4"	11/16"
1-1/2"	11/16"
2"	3/4"

Thread Size	"A"
2-1/2"	15/16"
3"	1"
4"	1-1/8"
5"	1-1/4"
6"	1-5/16"
8"	1-7/16"
10"	1-5/8"
12"	1-3/4"

Accord International, Inc.  
**THREAD INFORMATION**

Abbreviation	System Name	Compatibility	Seal Method
<b>BSPP</b>	<b>British Standard Pipe Parallel</b>	Male BSPP with Female BSPP Female BSPP with Male BSPP Female BSPP with Male BSPT <sub>r</sub>	Washer Washer Washer
<b>BSPT<sub>r</sub></b>	<b>British Standard Pipe Taper</b>	Male BSPT <sub>r</sub> with Female BSPT <sub>r</sub> Male BSPT <sub>r</sub> with Female BSPP Female BSPT <sub>r</sub> with Male BSPT <sub>r</sub> <i>Female BSPT<sub>r</sub> not compatible with Male BSPP</i>	Thread Washer Thread
<b>CHT</b>	American Standard Fire Hose Thread (1" <b>National Hose Thread</b> is <b>Chemical Hose Thread</b> , also known as <b>Booster Hose Thread</b> )	1" Male NH/NST with 1" Female NH/NST 1" Female NH (NST) with 1" Male NH (NST) 1" Thread is used on both 3/4" hose and 1" hose <i>Not compatible with other systems</i>	Washer Washer
<b>GHT</b>	<b>Garden Hose Thread</b>	Male GHT with Female GHT Female GHT with Male GHT Thread is the same for all size hose <i>Not compatible with other systems</i>	Washer Washer
<b>IPS</b>	<b>Iron Pipe Straight Thread</b>	Generic Name for Straight Pipe Thread See NPSH for compatibility	Washer
<b>IPT</b>	<b>Iron Pipe Thread</b>	Generic Name for All Pipe Thread <i>More information required</i>	
<b>JIC</b>	<b>Joint Industrial Committee</b>	Used with other mating JIC threads	Mechanical
<b>NH or NST</b>	American Standard Fire Hose Coupling Thread ( <b>National Hose</b> aka <b>National Standard Thread</b> )		Washer Washer
<b>NPT</b>	American Standard Taper Pipe Thread ( <b>National Pipe Tapered</b> )	Male NPT with Female NPT Male NPT with Female NPTF Male NPT with Female NPSM Male NPT with Male NPSH Female NPT with Male NPT Female NPT with Male NPTF <i>Female NPT not compatible with Male NPSM or Male NPSH</i>	Thread Thread Washer Washer Thread Thread
<b>NPTF</b>	American Standard Taper Pipe Fuel Dryseal Thread ( <b>National Pipe Tapered</b> ) (Dryseal)	Male NPTF with Female NPTF Male NPTF with Female NPT Male NPTF with Female NPSM Male NPTF with Female NPSH Female NPTF with Male NPTF Female NPTF with Male NPT Female NPTF with Male NPSM or NPSH Note: NPTF with NPTF threads do not require sealant for initial use; after that, requires sealant	Thread Thread Washer Washer Thread Thread <i>Not compatible</i>
<b>NPSH</b>	American Standard Straight Pipe for Hose Couplings ( <b>National Pipe Straight Hose</b> )	Male NPSH with Female NPSH Female NPSH with Male NPSH Female NPSH with Male NPT Female NPSH with Male NPTF Female NPSH with Male NPSM	Washer Washer Washer Washer Washer
<b>NPSM</b>	American Standard Straight Mechanical Joints ( <b>National Pipe Straight Mechanical</b> )	Male NPSM with Female NPSM Male NPSM with Female NPSH Female NPSM with Male NPSM Female NPSM with Male NPT Female NPSM with Male NPTF	Seal can be either mechanical or washer. Mating fittings must be of same type
<b>SIPT</b>	<b>Straight Iron Pipe Thread</b>	Generic name for Straight Pipe Thread	Washer
<b>TIPT</b>	<b>Tapered Iron Pipe Thread</b>	Generic name for Tapered Pipe Thread	Thread
<b>NYC</b>	<b>NYC Fire Department</b>	Straight Thread used in New York City	Washer
<b>Chicago</b>	<b>Chicago Fire Department</b>	Straight Thread used in Chicago	Washer

## Thread Sealing Tips

Sealing N.P.T. threads can be an exasperating experience if certain techniques are not followed. The following tips will help alleviate many common problems in thread sealing:

1. Always use some type of sealant (tape or paste) and apply sealant to male thread only. If using a hydraulic sealant, allow sufficient curing time before system is pressurized.

2. When using tape sealant, wrap the threads in a clockwise motion starting at the first thread and, as layers are applied, work towards the imperfect (vanishing) thread. If the system that the connection being made to cannot tolerate foreign matter (i.e. air systems), leave the first thread exposed and apply the tape sealant as outlined above.

3. When using paste sealant, apply to threads with a brush, using the brush to work the sealant into the threads. Apply enough sealant to fill in all the threads all the way around.

4. When connecting one stainless steel part to another stainless steel part that will require future disassembly, use a thread sealant that is designed for stainless steel (see page 490). This stainless steel thread sealant is also useful when connection aluminum to aluminum that needs to be disconnected in the future. These two materials gall easily, and if the correct sealant is not used, it can be next to impossible to disassemble.

5. When connecting parts made of dissimilar metals (i.e. steel and aluminum), standard tape or paste sealant performs satisfactory.

6. For sizes 2" and below, tape or paste performs satisfactory. When using thread tape, four wraps (covering all necessary threads) are usually sufficient.

7. For sizes 2 1/2" and above, thread paste is recommended. If thread tape is used, eight wraps (covering all necessary threads) are usually sufficient. Apply more wraps if necessary.

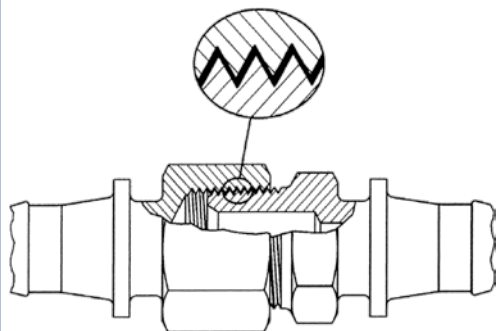
8. For stubborn to seal threads, apply a normal coating of thread paste followed by a normal layer of thread tape.

9. For extremely stubborn to seal threads, apply a normal coating of thread paste followed by a single layer of gauze bandage followed by a single layer of gauze bandage followed by a normal layer of thread tape.

### Caution!

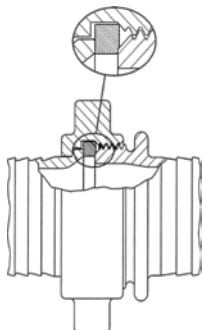
When this procedure is done, the connection becomes permanent. Extreme measures will be necessary to disconnect these components. All other measures to deal the threads should be explored prior to use of this technique.

10. Over-tightening threads can be just as detrimental as insufficient tightening. For sizes 2" and below, hand tighten the components and, with a wrench, tighten 3 full turns. For sizes 2 1/2" and above, hand tighten the components and, with a wrench, tighten 2 full turns.



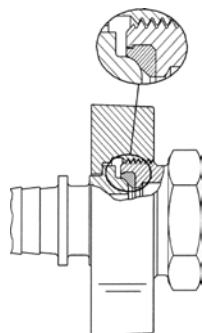
### Thread Seal Type

- A seal is obtained by applying a sealant to the male thread before engaging.
- The sealant is used to prevent spiral leakage.
- Thread tape or paste is the preferred sealant in this type of application.



### Washer Seal Type

- A seal is obtained when the male thread is tightened down onto the washer of the female assembly.
- The washer should be inspected regularly and replaced as needed to prevent leakage.



### Mechanical Seal Type

- A seal is obtained through metal to metal contact or metal to seal contact.
- The couplings should be retightened as needed to prevent leakage.