

GROOVED DUCTILE IRON PIPES

NOVEMBER 2020

Grooved Ductile Iron Pipe is manufactured in accordance with AWWA/ANSI C606. Grooved ductile iron piping is utilized for air, water, sewage, oil and other situations where owners and specifiers prefer a grooved piping system in place of a flanged piping system.

The Grooved Ductile Iron Pipe meets the standards of AWWA/ANSI A21.51/C151. The minimum Class 53 Ductile iron pipe is used subject to the manufacturing tolerances and additional wall thickness for larger diameters as may be required.

There are two different types of grooves which can be fabricated, Rigid and Flexible. Unless otherwise specified ductile iron pipe will be fabricated to rigid groove specifications.

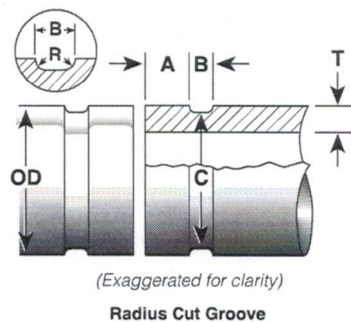
Below are the Victaulic specifications for a grooved ductile iron piping system:

Explanation of Critical Radius Cut Groove Dimensions

WARNING

AWWA pipe dimensions and groove dimensions must be within the tolerances specified in the charts on the following pages to ensure proper joint performance.

Failure to follow these specifications could result in serious personal injury, property damage, joint leakage, and/or joint failure.



"A" Dimension - The "A" dimension, or the distance from the pipe end to the groove, identifies the gasket seating area. This area must be free from indentations, projections, deep pits and swells from the pipe end to the grooved to provide leak-tight seal for the gasket.

"B" Dimension - The "B" dimension, or groove width, controls expansion and angular deflection by the distance it is located from the pipe and its width in relation to the housings' key width.

"C" Dimension - The "C" dimension is the proper diameter at the base of the groove. This dimension must be within the diameter's tolerance and concentric with the OD for proper coupling fit. The groove must be of uniform depth for the entire pipe circumference.

"R" Dimension - The "R" dimension is the radius necessary at the bottom of the groove to eliminate a point of stress concentration for cast pipe (gray and ductile).

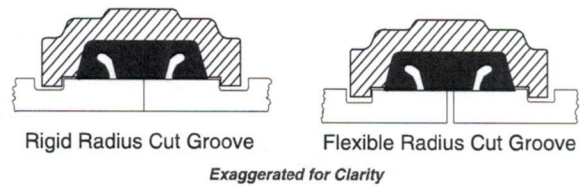
"T" Dimension - The "T" dimension is the minimum wall thickness that can be cut grooved. The tolerances must conform to Class 53 ANSI/AWWA C151/A21.51. Class 53 ductile iron pipe in sizes 18 – 36 inches (450 – 900mm) can be cut grooved. Contact Victaulic for details.

NOTICE

Coatings that are applied to the interior surfaces of Victaulic grooved and plain-end pipe couplings must not exceed 0.010 inch (0,25 mm). This includes the bolt pad mating surfaces.

In addition, the coating thickness applied to the gasket-sealing surface and within the groove on the pipe exterior must not exceed 0.010 inch (0,25 mm)

Explanation of Critical Radius Cut Groove Dimensions (continued)



Victaulic groove specification for cast pipe (gray and ductile) conform to the requirements of ANSI/AWWA Standard C-606 and CSA B242.

For cast pipe, the groove is cut with the radius ("R" dimension) at the corners of the groove base to reduce stress concentration. Grooving dimensions are the same for any pipe OD, regardless of pipe class and pressure.

Standard preparation is with a rigid radius groove. Flexible radius groove dimensions may be used to provide expansion/contraction or angular movement allowance at the joint.

GROOVE DIMENSIONS

Rigid Radius-Cut Groove Specifications – Ductile Iron Pipe

| Nom. Dia. Inches (mm) | Actual Outside Dia. Inches (mm) | Dimensions – Inches (millimeters) | | | | | | | | | | | Minimum Allowable Wall Thickness "T" | |
|-----------------------------|--|-----------------------------------|--------------------|-----------------|-----------------|------------------|-----------------|-----------------|------------------------|-------------------|----------------|-----------------|---|--|
| | | Pipe O.D. | | Gasket Seat "A" | | Groove Width "B" | | | Groove Diameter "C" | | Radius "R" | Cast Iron | Ductile Iron | |
| | | MAX | MIN | MAX | MIN | Basic | MAX | MIN | MAX | MIN | | | | |
| 3 (80) | 3.960 (100,6) | 4.005 (101,7) | 3.915 (99,4) | 0.840 (21,3) | 0.820 (20,8) | 0.375 (9,5) | 0.406 (10,3) | 0.359 (9,1) | 3.723 (94,6) | 3.703 (94,1) | 0.120 (3,1) | 0.320 (8,1) | 0.310 (7,9) | |
| 4 (100) | 4.800 (121,9) | 4.845 (123,1) | 4.755 (120,8) | 0.840 (21,3) | 0.820 (20,8) | 0.375 (9,5) | 0.406 (10,3) | 0.359 (9,1) | 4.563 (115,9) | 4.543 (115,4) | 0.120 (3,1) | 0.350 (8,9) | 0.320 (8,1) | |
| 6 (150) | 6.900 (175,3) | 6.960 (176,7) | 6.840 (173,7) | 0.840 (21,3) | 0.820 (20,8) | 0.375 (9,5) | 0.406 (10,3) | 0.359 (9,1) | 6.656 (169,1) | 6.636 (168,6) | 0.120 (3,1) | 0.380 (9,7) | 0.340 (8,6) | |
| 8 (200) | 9.050 (229,9) | 9.110 (231,4) | 8.990 (228,3) | 0.950 (21,4) | 0.930 (23,6) | 0.500 (12,7) | 0.531 (13,5) | 0.484 (12,3) | 8.781 (223,0) | 8.756 (222,4) | 0.145 (3,7) | 0.410 (10,4) | 0.360 (9,1) | |
| 10 (250) | 11.100 (281,9) | 11.160 (283,5) | 11.040 (280,4) | 1.015 (25,8) | 0.995 (25,3) | 0.500 (12,7) | 0.531 (13,5) | 0.484 (12,3) | 10,813 (274,7) | 10,788 (274,0) | 0.145 (3,7) | 0.440 (11,2) | 0.380 (9,7) | |
| 12 (300) | 13.200 (335,3) | 13.260 (336,8) | 13.140 (333,8) | 1.015 (25,8) | 0.995 (25,3) | 0.500 (12,7) | 0.531 (13,5) | 0.484 (12,3) | 12,906 (327,8) | 12,876 (327,1) | 0.145 (3,7) | 0.480 (12,2) | 0.400 (10,2) | |
| 14 (350) | 15.300 (388,6) | 15.350 (389,9) | 15.220 (386,6) | 1.015 (25,8) | 0.995 (25,3) | 0.625 (15,9) | 0.656 (16,7) | 0.609 (15,5) | 14,969 (380,2) | 14,939 (379,5) | 0.165 (4,2) | 0.550 (14,0) | 0.420 (10,7) | |
| 16 (400) | 17.400 (442,0) | 17.450 (443,2) | 17.320 (439,9) | 1.340 (34,0) | 1.320 (33,5) | 0.625 (15,9) | 0.656 (16,7) | 0.609 (15,5) | 17,063 (433,4) | 17,033 (432,6) | 0.165 (4,2) | 0.580 (14,7) | 0.430 (10,9) | |
| 18 (450) | 19.500 (495,3) | 19.550 (496,6) | 19.420 (493,3) | 1.340 (34,0) | 1.320 (33,5) | 0.625 (15,9) | 0.656 (16,7) | 0.609 (15,5) | 19,125 (485,8) | 19,095 (485,0) | 0.185 (4,7) | 0.630 (16,0) | 0.440 (11,2) | |
| 20 (500) | 21.600 (548,6) | 21.650 (549,9) | 21.520 (546,6) | 1.340 (34,0) | 1.320 (33,5) | 0.625 (15,9) | 0.656 (16,7) | 0.609 (15,5) | 21,219 (539,0) | 21,189 (538,2) | 0.185 (4,7) | 0.670 (17,0) | 0.450 (11,4) | |
| 24 (600) | 25.800 (655,3) | 25.850 (656,6) | 25.720 (653,36) | 1.340 (34,0) | 1.320 (33,5) | 0.6250 (15,9) | 0.656 (16,7) | 0.609 (15,5) | 25,406 (645,3) | 25,376 (644,6) | 0.185 (4,7) | 0.730 (18,5) | 0.470 (11,9) | |
| 30 (750) | 32.000 (762,0) | 32.080 (814,8) | 31,940 (811,3) | 1.625 (41,3) | 1.605 (40,8) | 0.750 (19,1) | 0.781 (19,8) | 0.734 (18,6) | 31,550 (801,4) | 31,550 (800,5) | 0.215 (5,5) | 0.920 (23,4) | 0.510 (13,0) | |
| 36 (900) | 38.300 (914,4) | 38.380 (974,9) | 38.240 (971,3) | 1.625 (41,3) | 1.605 (40,8) | 0.750 (19,1) | 0.781 (19,8) | 0.734 (18,6) | 37,850 (961,4) | 37,815 (960,5) | 0.215 (5,5) | 1.020 (25,9) | 0.580 (14,7) | |



Flexible Radius-Cut Groove Specifications – Ductile Iron Pipe

| Nom. Dia. Inches (mm) | Actual Outside Dia. Inches (mm) | Dimensions – Inches (millimeters) | | | | | | | | | | | Minimum Allowable Wall Thickness "T" | |
|-----------------------------|--|-----------------------------------|--------------------|-----------------|-----------------|------------------|-----------------|-----------------|------------------------|-------------------|----------------|-----------------|---|--|
| | | Pipe O.D. | | Gasket Seat "A" | | Groove Width "B" | | | Groove Diameter "C" | | Radius "R" | Cast Iron | Ductile Iron | |
| | | MIN | MAX | MIN | MAX | Basic | MIN | MAX | MIN | MAX | | | | |
| 3 (80) | 3.960 (100,6) | 4.005 (101,7) | 3.915 (99,4) | 0.750 (19,1) | 0.730 (18,5) | 0.375 (9,5) | 0.406 (10,3) | 0.359 (9,1) | 3.723 (94,6) | 3.703 (94,1) | 0.120 (3,1) | 0.320 (8,1) | 0.310 (7,9) | |
| 4 (100) | 4.800 (121,9) | 4.845 (123,1) | 4.755 (120,8) | 0.750 (19,1) | 0.730 (18,5) | 0.375 (9,5) | 0.406 (10,3) | 0.359 (9,1) | 4.563 (115,9) | 4.543 (115,4) | 0.120 (3,1) | 0.350 (8,9) | 0.320 (8,1) | |
| 6 (150) | 6.900 (175,3) | 6.960 (176,7) | 6.840 (173,7) | 0.750 (19,1) | 0.730 (18,5) | 0.375 (9,5) | 0.406 (10,3) | 0.359 (9,1) | 6.656 (169,1) | 6.636 (168,6) | 0.120 (3,1) | 0.380 (9,7) | 0.340 (8,6) | |
| 8 (200) | 9.050 (229,9) | 9.110 (231,4) | 8.990 (228,3) | 0.875 (22,2) | 0.855 (21,7) | 0.500 (12,7) | 0.531 (13,5) | 0.484 (12,3) | 8.781 (223,0) | 8.756 (222,4) | 0.145 (3,7) | 0.410 (10,4) | 0.360 (9,1) | |
| 10 (250) | 11.100 (281,9) | 11.160 (283,5) | 11.040 (280,4) | 0.938 (23,8) | 0.918 (23,3) | 0.500 (12,7) | 0.531 (13,5) | 0.484 (12,3) | 10,813 (274,7) | 10,788 (274,0) | 0.145 (3,7) | 0.440 (11,2) | 0.380 (9,7) | |
| 12 (300) | 13.200 (335,3) | 13.260 (336,8) | 13.140 (333,8) | 0.938 (23,8) | 0.918 (23,3) | 0.500 (12,7) | 0.531 (13,5) | 0.484 (12,3) | 12,906 (327,8) | 12,876 (327,1) | 0.145 (3,7) | 0.480 (12,2) | 0.400 (10,2) | |
| 14 (350) | 15.300 (388,6) | 15.350 (389,9) | 15.220 (386,6) | 0.938 (23,8) | 0.918 (23,3) | 0.625 (15,9) | 0.656 (16,7) | 0.609 (15,5) | 14,969 (380,2) | 14,939 (379,5) | 0.165 (4,2) | 0.550 (14,0) | 0.420 (10,7) | |
| 16 (400) | 17.400 (442,0) | 17.450 (443,2) | 17.320 (439,9) | 1.188 (30,2) | 1.168 (29,7) | 0.625 (15,9) | 0.656 (16,7) | 0.609 (15,5) | 17,063 (433,4) | 17,033 (432,6) | 0.165 (4,2) | 0.580 (14,7) | 0.430 (10,9) | |
| 18 (450) | 19.500 (495,3) | 19.550 (496,6) | 19.420 (493,3) | 1.188 (30,2) | 1.168 (29,7) | 0.625 (15,9) | 0.656 (16,7) | 0.609 (15,5) | 19,125 (485,8) | 19,095 (485,0) | 0.185 (4,7) | 0.630 (16,0) | 0.440 (11,2) | |
| 20 (500) | 21.600 (548,6) | 21.650 (549,9) | 21.520 (546,6) | 1.188 (30,2) | 1.168 (29,7) | 0.625 (15,9) | 0.656 (16,7) | 0.609 (15,5) | 21,219 (539,0) | 21,189 (538,2) | 0.185 (4,7) | 0.670 (17,0) | 0.450 (11,4) | |
| 24 (600) | 25.800 (655,3) | 25.850 (656,6) | 25.720 (653,36) | 1.188 (30,2) | 1.168 (29,7) | 0.6250 (15,9) | 0.656 (16,7) | 0.609 (15,5) | 25,406 (645,3) | 25,376 (644,6) | 0.185 (4,7) | 0.730 (18,5) | 0.470 (11,9) | |
| 30 (750) | 32.000 (762,0) | 32.080 (814,8) | 31,940 (811,3) | 1.375 (34,9) | 1.355 (34,4) | 0.750 (19,1) | 0.781 (19,8) | 0.734 (18,6) | 31,550 (801,4) | 31,550 (800,5) | 0.215 (5,5) | 0.920 (23,4) | 0.510 (13,0) | |
| 36 (900) | 38.300 (914,4) | 38.380 (974,9) | 38.240 (971,3) | 1.375 (34,9) | 1.355 (34,4) | 0.750 (19,1) | 0.781 (19,8) | 0.734 (18,6) | 37,850 (961,4) | 37,815 (960,5) | 0.215 (5,5) | 1.020 (25,9) | 0.580 (14,7) | |

