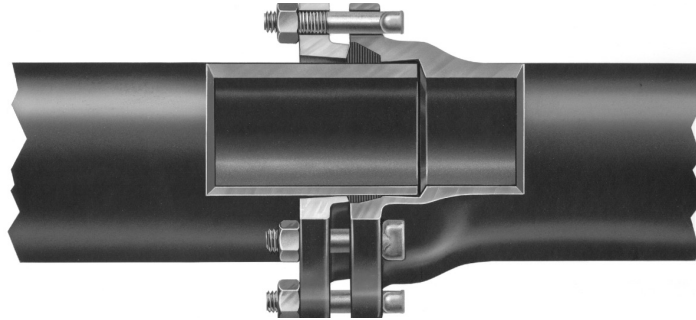




AMERICAN DUCTILE IRON PIPE

AMERICAN Mechanical Joint Pipe For Water, Sewage or Other Liquids



The AMERICAN Mechanical Joint was developed by the American Cast Iron Pipe Company and first marketed in 1929. Since that time, millions of feet of AMERICAN pipe equipped with this joint have been installed to give dependable service across the nation and in many foreign countries. The joint is designed with a stuffing box into which a rubber gasket is compressed by a ductile iron gland drawn up with low-alloy steel bolts. It affords liberal deflection and allows expansion and contraction of the line without leakage. It is rated for a water working pressure of up to 350 psi.

Originally designed to meet the rigid requirements of the gas industry for a pressure-tight joint, the AMERICAN Mechanical Joint was instrumental in starting a nationwide trend toward rubber-packed joints for water service as well as gas service. Its design was widely accepted and it soon became the standardized mechanical joint of the cast iron pipe industry. The popularity of the AMERICAN Mechanical

Joint among utility officials, contractors and engineers steadily increased until the majority of cast iron piping furnished for gas, water, sewage and other services was equipped with this joint. However, push-on joint pipes, which are less labor intensive and reliant with push-on or mechanical joint fittings, currently make up the vast majority of ductile iron pipelines being installed for underground service. Mechanical joint pipe is now used to a much lesser extent.

The AMERICAN Mechanical Joint meets the requirements of ANSI/AWWA C110/A21.10 and ANSI/AWWA C111/A21.11.

AMERICAN Ductile Iron Mechanical Joint Pipe is centrifugally cast in nominal 18' or 20' laying lengths, depending on size, under rigid production and quality control procedures in accordance with ANSI/AWWA Standards. AMERICAN Mechanical Joint Ductile Iron Pipe is available in 4" -12" sizes and in Special Thickness Classes 53 and higher.



The AMERICAN Mechanical Joint provides easy installation under the most adverse conditions. Plain rubber gaskets of SBR are normally used for water and domestic sewage service. Fabric tipped plain rubber gaskets are available, as well as other special gaskets such as oil-resistant rubber. Plain rubber gaskets or tipped gaskets are used for air or liquid temperatures up to 120°F. For applications involving temperatures in excess of 120°F, or for other spe-

cial service applications, and for installations in contaminated soils where permeation through gaskets might be a concern, consult AMERICAN for recommendations. See Table No. 2-6.

Standard joint accessories furnished with mechanical joint pipe and fittings include ductile iron glands, low-alloy steel tee head bolts with hex nuts and plain rubber gaskets. The cost of these accessories is normally included in the price of the pipe or fittings.

Mechanical Joint Gaskets

Table No. 2-6

Common Name or Trade Name*	Chemical Name	Maximum Service Temperature**		Common Uses
		Water & Sewer	Air	
Plain Rubber	Styrene Butadiene Copolymer(SBR)	150°F	125°F	Fresh Water, Salt Water, Sanitary Sewage
Neoprene	Polychloroprene(CR)	200°F	150°F	Fresh Water, Sewage
Fluoroelastomer Fluorel Viton®***	FKM	212°F	300°F	Aromatic Hydrocarbons, Gasoline, Refined Petroleum Products, most Chemicals and Solvents, High Temp., Air (Least permeable of all available Fastite gasket rubbers)
Buna-N Nitrile	Acrylonitrile Butadiene(NBR)	150°F	125°F	Non-Aromatic Hydrocarbons, Petroleum Oil, Hydraulic Fluids, Fuel Oil, Fats, Oil, Grease†
EPDM	Ethylene Propylene Diene Monomer	212°F	150°F	Water, Sewage, Ketones, Dilute Acids and Alkalies, Vegetable Oil, Alcohols, Air

*AMERICAN reserves the right to furnish any Trade or Brand rubber for the chemical formulation specified.

Temperature is in reference to conveyed fluid. **Lubricating oil in air can adversely affect SBR and EPDM performance. SBR, Nitrile and Neoprene are not recommended for hot air exposure in wastewater treatment systems.

Gaskets shown for use in "Sanitary Sewage" service are also suitable for use with sewage gas.

Refer to Section 11 for temperature and service capabilities of pipe linings.

Refer other special requirements to AMERICAN for recommendation regarding suitable gasket material.

***Viton® is a registered trademark of DuPont Dow Elastomers.

Note that temperature ratings of MJ gaskets per Table No. 2-6 are in some cases lower than the ratings for similar material Fastite gaskets (see Table No. 2-1, pg. 2-7). The designer may wish to consider the use of Fastite pipe and fittings in high-temperature applications.

All MJ gaskets made from the materials in the above table are suitable for use with water containing normal concentrations of chloramine. Where increased resistance to chloramine is desired, neoprene or fluoroelastomer materials should be considered.

†This gasket rubber is **chemically resistant** for the non-potable water uses shown, but NBR is not as resistant to permeation in potable water applications as FKM.



American Mechanical Joint
ANSI/AWWA C111/A21.11 Standard Dimensions

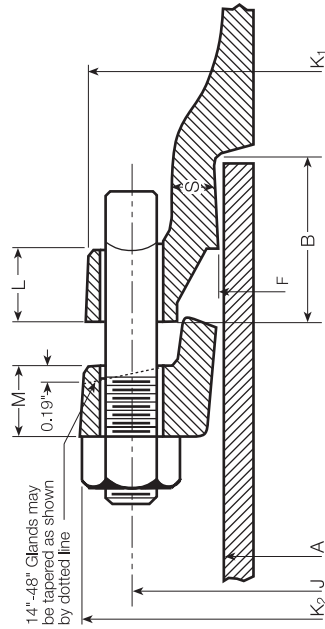


Table No. 2-7

Size in.	Dimensions in Inches											
	A Plain End	B	F	J	K ₁		K ₂	L		M	S	
					Centrifugal Pipe	Fittings		Centrifugal Pipe	Fittings		Centrifugal Pipe	Fittings
* 2	2.50	2.50	2.61	4.75	6.00	6.25	6.25	.56	.75	.62	.37	.44
* 2 1/4	2.75	2.50	2.86	5.00	6.25	6.50	6.50	.56	.75	.62	.37	.44
* 3	3.96	2.50	4.06	6.19	7.62	7.69	7.69	.87	.94	.62	.40	.52
4	4.80	2.50	4.90	7.50	9.06	9.38	9.12	.91	1.00	.75	.41	.65
6	6.90	2.50	7.00	9.50	11.06	11.31	11.12	.94	1.06	.88	.43	.70
8	9.05	2.50	9.15	11.75	13.31	13.63	13.37	.98	1.12	1.00	.45	.75
10	11.10	2.50	11.20	14.00	15.62	15.81	15.62	.98	1.19	1.00	.47	.80
12	13.20	2.50	13.30	16.25	17.88	18.06	17.88	.98	1.25	1.00	.49	.85
14	15.30	3.50	15.44	18.75	20.25	20.69	20.25	1.02	1.31	1.25	.51	.89
16	17.40	3.50	17.54	21.00	22.50	22.94	22.50	1.08	1.38	1.31	.52	.97
18	19.50	3.50	19.64	23.25	24.75	25.28	24.75	1.14	1.44	1.38	.53	1.05
20	21.60	3.50	21.74	25.50	27.00	27.08	27.00	1.20	1.50	1.44	.54	1.12
24	25.80	3.50	25.94	30.00	31.50	31.75	31.50	1.26	1.62	1.56	.56	1.22
30	32.00	4.00	32.17	36.88	**	39.12	39.12	**	1.81	2.00	**	1.50
36	38.30	4.00	38.47	43.75	**	46.00	46.00	**	2.00	2.00	**	1.80
42	44.50	4.00	44.67	50.62	**	53.12	53.12	**	2.00	2.00	**	1.95
48	50.80	4.00	50.97	57.50	**	60.00	60.00	**	2.00	2.00	**	2.20

*2", 2 1/4" and 3" sizes of pipe are no longer manufactured by AMERICAN and dimensions are given for information only. 2" and 2 1/4" sizes are not shown in AWWA C111.
 **14"-48" Mechanical Joints are not available on centrifugal pipe.
 The ductile iron pipe bell flanges are in accordance with AWWA C111 which also provides that thicker bell flanges may be furnished.
 For additional information and tolerances see AWWA C111.
 Bolt Holes are 1/8" larger than the bolt diameters. See Table No. 2-8.
 Weights and classes for ductile iron pipe are given in Section 3.



AMERICAN Mechanical Joint Accessories

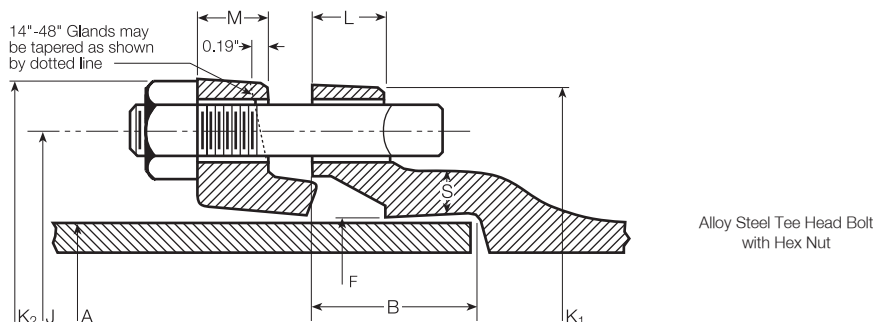


Table No. 2-8

Size in.	Bolts		Weight in Pounds			
	No. Per Joint	Size in.	Bolts Total	Gland	Gasket†	One Set Accessories
4	4	$\frac{3}{4} \times 3\frac{1}{2}$	3	6	.42	10
6	6	$\frac{3}{4} \times 3\frac{1}{2}$	5	11	.59	17
8	6	$\frac{3}{4} \times 4$	5	18	.75	24
10	8	$\frac{3}{4} \times 4$	7	20	.92	28
12	8	$\frac{3}{4} \times 4$	7	30	1.09	39
14	10	$\frac{3}{4} \times 4\frac{1}{2}$	9	35	1.23	46
16	12	$\frac{3}{4} \times 4\frac{1}{2}$	11	45	1.42	58
18	12	$\frac{3}{4} \times 4\frac{1}{2}$	11	55	1.56	68
20	14	$\frac{3}{4} \times 4\frac{1}{2}$	13	70	1.77	85
24	16	$\frac{3}{4} \times 5$	15	90	2.13	108
30*	20	1 x 6	41	180	4.16	225
36*	24	1 x 6	49	235	4.81	289
42*	28	$1\frac{1}{4} \times 6\frac{1}{2}$	99	300	5.77	405
48*	32	$1\frac{1}{4} \times 6\frac{1}{2}$	113	365	6.52	485
54**	36	$1\frac{1}{4} \times 6\frac{1}{2}$	127	360	7.30	494

AMERICAN no longer manufactures 2", 2 $\frac{1}{4}$ " and 3" sizes of pipe; bolts required per joint for 2" and 2 $\frac{1}{4}$ " sizes were 2 $\frac{5}{8}$ " x 2 $\frac{1}{2}$ ", and for 3" size were 4 $\frac{5}{8}$ " x 3".

Bolts used with mechanical joint retainer glands may be required by the manufacturers of those devices to be longer than shown above.

When required and when used with bell flanges "tapped for studs," stud bolts in lieu of Tee Head bolts are normally ordered of the same length of the Tee Head bolts they replace (See pages 2-24 and 2-25).

†Gasket weights shown here are for standard SBR rubber; other available rubber types are shown on page 2-17.

*14"-48" mechanical joints are for fittings only.

**54" Mechanical Joints are used only with special mechanical joint sleeves. This size is not in AWWA C110.



AMERICAN Mechanical Joint Pipe Allowable Joint Deflection

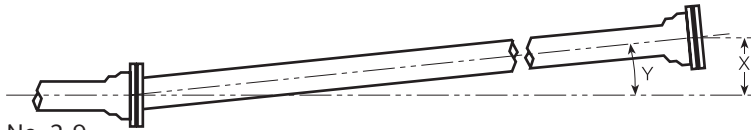


Table No. 2-9

Size in.	Nominal Laying Length ft.	Maximum Recommended Deflection		
		X Offset per Nominal Length in.	Y Deflection Angle	Radius of Curve* ft.
4	18	31	8°-18'	124
6	20	30	7°-07'	160
8	20	22	5°-21'	220
10	20	22	5°-21'	220
12	20	22	5°-21'	220
14	**	**	3°-35'	**
16	**	**	3°-35'	**
18	**	**	3°-00'	**
20	**	**	3°-00'	**
24	**	**	2°-23'	**
30	**	**	2°-23'	**
36	**	**	2°-05'	**
42	**	**	2°-00'	**
48	**	**	2°-00'	**

*Approximate radius of curve produced by a succession of nominal lengths of pipe fully deflected. A shorter radius can be obtained using shorter pipes.

The joint should be assembled with the pipe in reasonably straight alignment. Joint deflection to the maximum shown above may be made after assembly but before tightening bolts. Offset distances are based on 18-ft or 20-ft lengths.

**14"-48" Mechanical Joints are provided on fittings and valves only.

Maximum Allowable Separation

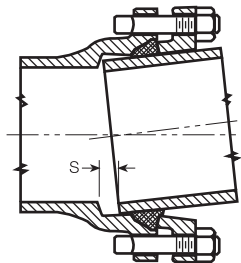
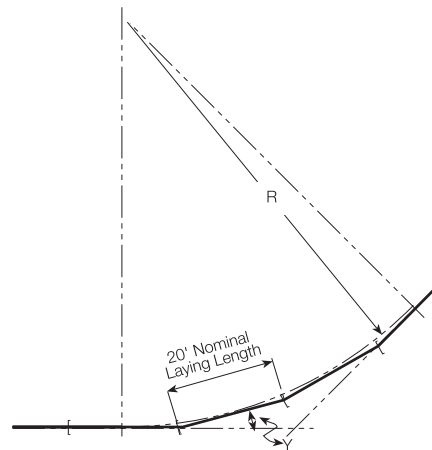


Table No. 2-10

Size in.	S Separation in.
24	1
30	1 1/4
36	1 3/8
42	1 1/2
48	1 3/4

Maximum Allowable Separation, "S", is provided for information only and should not be used to determine precise joint deflection.



R = Radius of Curve (ft.)

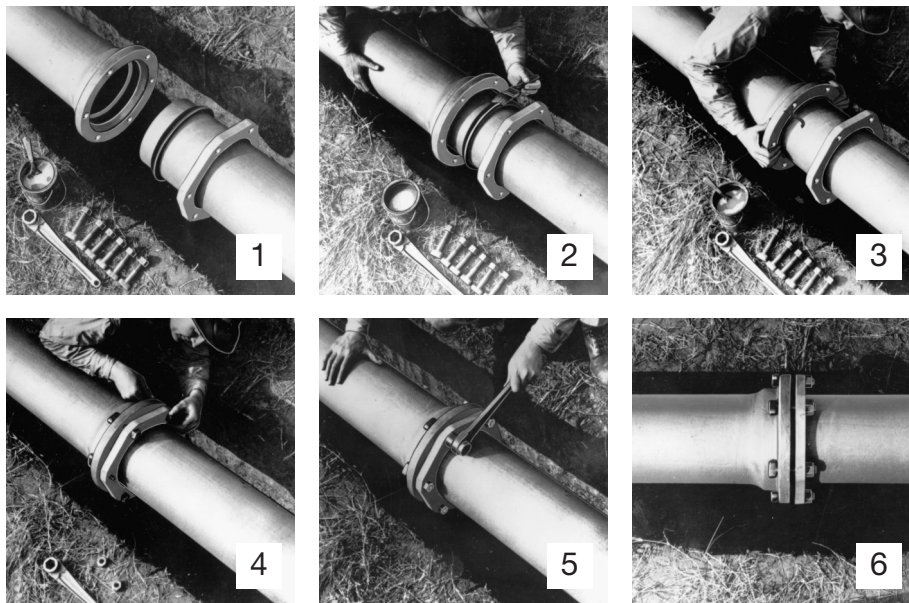
Y = Deflection Angle (degrees)

$$\text{Radius of Curve} = \frac{\text{Nominal Laying Length}}{2 \times \text{Tangent } (Y/2)}$$



AMERICAN Mechanical Joint Pipe Assembly Instructions

The AMERICAN Mechanical Joint is the Standardized Mechanical Joint per AWWA C111. Assembly of the Mechanical Joint is pictured and described below.



1. Thoroughly clean socket and plain end of all rust or foreign material; slip the gland over plain end with the lip extension toward plain end, followed by the gasket with thick section facing the gland. Gaskets to be installed during very cold weather should be warmed first.*

2. **Lubricate** socket, gasket and plain end with soapy water or an approved pipe lubricant meeting requirements of AWWA C111.

3. Insert plain end into socket and push gasket into position, making sure it is evenly seated in socket.

4. Slide gland into position, insert bolts and run nuts up finger-tight.

5. Tighten bolts to draw gland toward the pipe flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the joint. This may be achieved by partially tightening the bottom bolt first; then the top bolt; next, the bolts at either side; and, finally, the remaining bolts. This process should be repeated un-

til all bolts are within the range of torques shown. **In larger sizes (30"-48")**, as many as 5 or more repetitions may be required.

6. The completed joint.

It is recommended that the torque be applied with torque-measuring wrenches. The approximate torque can be applied by a man trained to give an average pull on a specific length regular ratchet wrench; for 5/8" bolt, length of wrench is 8"; for 3/4" bolt, 10"; for 1" bolt, 14"; and for 1 1/4" bolt, 16". **Torque so applied should be checked with torque-measuring wrenches. *Gaskets not used immediately should be stored in a cool location, out of direct sunlight.**

Table No. 2-11

Pipe Size† in.	Bolt Diameter in.	Range of Torque Ft.-Lbs
4-24	3/4	75-90
30-36	1	100-120
42-48	1 1/4	120-150

† 14"-48" Mechanical Joints are provided on fittings and valves only.