

Three traditional methods to connect steel pipes, namely welding, flange connection and screw connection.

LIFECO grooved piping system use the grooved couplings & branch outlet fittings as the key, supplemented by a variety of non-gasket pipefittings. This is a pipe connection revolution. At present, LIFECO manufactures all kinds of grooved branch outlet fittings and non-gasket fittings. In order to meet the needs of customers, LIFECO also developed extended products such as grooved end valves, filters, etc. LIFECO will continue to improve and optimize so that the company's product line can fulfill demands in civil construction, municipal and industrial fields.

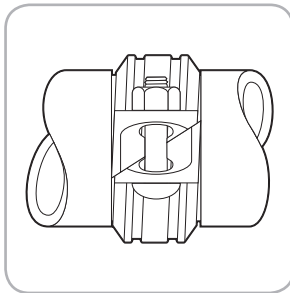
LIFECO groove piping system is an universal, economic, safe and practical piping system components, the installation process will not bring any pollution to the pipeline. It is an environmentally friendly green product.

LIFECO groove piping system builds pipe connection on the external surface of steel pipes. The inner diameter & interior surface of the pipe has no matter of the connection, which makes the range of application of this product much more extended.

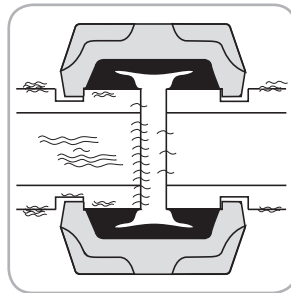


Products Strong Point

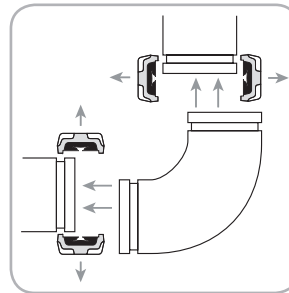
Compared with the traditional piping methods such as welded, flanges or threaded connection, the grooved and mechanical outlet fittings has very significant advantages, mainly in the following aspects:



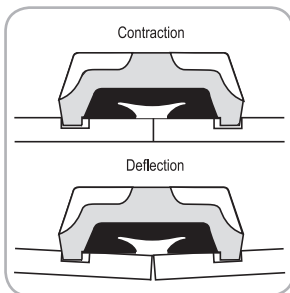
- **Rigid**
Rigid coupling provides enough rigidity to resist tube twisting and bending moment.



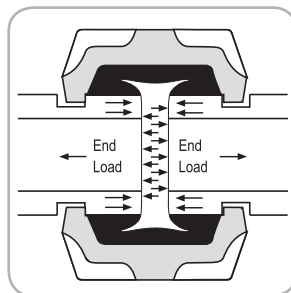
- **Noise and vibration**
The separation between pipe ends reduces the transmission of noise and vibration, provides the entire system a significant dampening effect



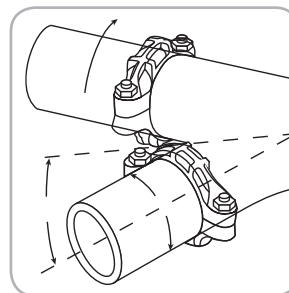
- **system maintenance**
System unit can be disassembled without moving the pipeline, thus facilitating system maintenance and modification.



- **Flexibility**
Flexible coupling provides radial and axial deflection. It absorbs expansion, contraction, deflection and vibration.



- **Earthquake stress**
The full circumferential engage between couplings keys and pipe grooves provides sufficient internal pressure and pipe end load capacity to withstand pipe movement.



- **Easy alignment**
Groove system allows free rotation of pipe and system components prior final fixing.



Warning

• Before attempting to install, disassemble, and adjust any LIFECO product, please depressurize and drain the plumbing system. Failure to do this may result in personal injury, property damage, leaks, and / or other potential function failure.

Products Type

LIFECO grooved piping system covers following categories:

● Grooved Couplings

Grooved couplings are designed as a ring self-centering connector, the inner key area of the housing engages in the pipe grooves to provide a pipe connection. When the flexible coupling is assembled in the pipeline, a gap is formed between the pipe ends to allow axial displacement and lateral deflection. Rigid coupling locks the pipes directly without deflection.

● Mechanical Outlets

The housing of branch outlet fittings has two different parts, respectively, the outlet housing and the cover. The mechanical outlets can be composed of two outlet housing (said the mechanical cross), or one outlet housing plus one cover (said as mechanical tee). The outlet housing is designed as a self-positioning structure, to builds a branch outlet on the main pipe run.

● Grooved Non-Gasket Fittings

Grooved fittings have a variety of styles, to provide flow direction turning, diameter reducing, branching and other functions.

Products Component

● Housing

Material: Ductile cast iron conforming to ASTM A-536, Grade 65-45-12.

Surface Finish: Standard: Epoxy powder coating

Optional: Galvanized (Zinc Plated, HDG), Dip painted

Surface Color: Variable colors for choice

● Rubber Gasket

Standard: EPDM.

Optional: Nitrile, Silicone, Fluoroelastomer, Neoprene

The sealing mechanism of grooved couplings and mechanical outlets is basically the same, the main structure of the gasket has "C" shape, forming a triple seal function. The first seal is formed by the elasticity of the gasket during the static state. After the coupling is installed, the gasket is confined by the housing of groove coupling or the mechanical outlet, the second seal is formed. Medium inside the pipe system press the "C" cavity after pressurizing, it increases the adhesion between gasket lip and steel pipe surface, so as to achieve the third reactive seal. The greater the pressure of the fluid within the pipe, The better the sealing of the coupling.



The material of the gasket must be chosen to follow the characteristics of the fluid medium below. The commonly used gasket are shown in the following table:

Grade	Temperature Range	Rubber Compound	Color Code	General Service Recommendations
E	-30°F to +230°F -34°C to +110°C	EPDM	Green Stripe	Recommended for hot water service within the specified temperature range plus a variety of dilute acids, oil-free air and many chemical services. UL classified in accordance with ANSI/NSF 61 for cold +86°F/+30°C and hot +180°F/+82°C potable water service. NOT RECOMMENDED FOR PETROLEUM SERVICES.
T	-20°F to +180°F -29°C to +82°C	Nitrile	Orange Stripe	Recommended for petroleum products, hydrocarbons, air with oil vapors, vegetable and mineral oils within the specified temperature range; except hot dry air over +140°F/+60°C and water over +150°F/+66°C. NOT RECOMMENDED FOR HOT WATER SERVICES.
O	-20°F to +300°F -29°C to +149°C	Fluoroelastomer	Blue Stripe	Recommended for many oxidizing acids, petroleum oils, halogenated hydrocarbons, lubricants, hydraulic fluids, organic liquids and air with hydrocarbons to +300°F/+149°C.
L	-30°F to +350°F -34°C to +177°C	Silicone	Body white	Recommended for dry heat, air without hydrocarbons to +350°F/+177°C and certain chemical services.
V	-30°F to +180°F -34°C to +82°C	Neoprene	Yellow Stripe	Recommended for hot lubricating oils and certain chemicals. Good oxidation resistance. Will not support combustion.

For specific compound and temperature compatibility, see this book Chemical Application Table

● Bolt/Nut

Heat treated and electro galvanized bolts with oval neck, and heavy duty hexagon nuts.

Track head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.



As the manufacturer and innovator of grooved coupling technology, LIFECO offers a variety of coupling sizes and styles for almost any piping application.

All grooved couplings are made up of four parts, namely housing, gasket, bolt and nut. Housing is made of ductile iron, surface finish is orange, but also for a variety of fluid piping system to provide matching color scheme; standard gasket material is EPDM, also prepared for a variety of pipeline media rubber material. The bolt's tensile rating is class 8.8 and the nut's rating 8.0.

LIFECO couplings provide pipe system with versatility not found in other pipe connection methods. LIFECO rigid and flexible couplings can be combined to allow for thermal growth within the system. Additionally, the use of three consecutive flexible couplings reduces noise and vibration and eliminates costly noise dampeners.



Style 1GS Rigid Coupling
DN25~DN300 1"~12"
33.7mm~323.9mm



Style 1X Angle-pad Rigid Coupling
DN25~DN300 1"~12"
33.7mm~323.9mm



Style 1N Flexible Coupling
DN25~DN300 1"~12"
33.7mm~323.9mm



Style 1NH H.D. Flexible Coupling
DN25~DN300 1"~12"
33.7mm~323.9mm



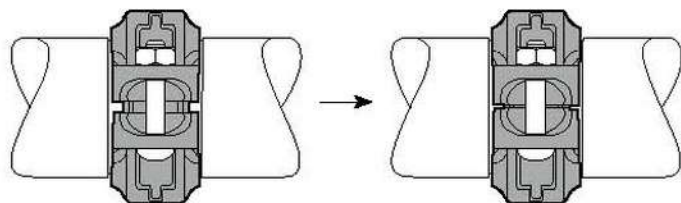
Style 1NR Reducing Flexible Coupling
DN32~DN200 1 1/4"~8"
42.4mm~219.1mm



Style 321 Split Flange Adaptor
DN50~DN200 2"~8"
60.3mm~219.1mm

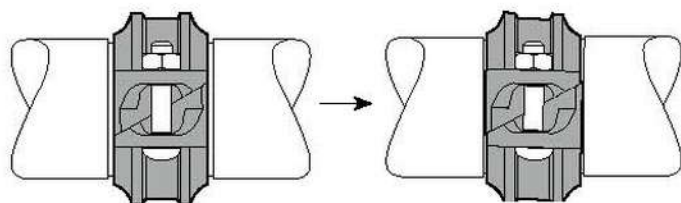


Rigid coupling connection & performance



The structure of the socket type rigid coupling is compact, with the inner and outer female and male teeth, socket type, meshing design, the use of the gap between the female and male port socket combination of pipe and joint meshing to achieve the rigid requirements.

Due to the improved interface structure, it is not easy to make the gasket to produce transverse and oblique twists and turns, the positioning of the gasket is more accurate, the abnormal pressing and destructive pressure loss of the gaskets are avoided, the sealing property is increased, and the overall joint is increased service life.



The Angle-pad rigid coupling is designed to sliding rather than vertical moving when tightening the housing. So the pipe tightly stuck to form a rigid connection. This 60° diagonal sliding also forces the coupling housing keys to make double sided contact on the inside and outside edges of the groove so that axial and radial movement of the tube cannot occur and the effect of rigid connecting pipe is truly achieved. No deflection after installation.

This rigid coupling allows for more accurate positioning of the tube end forming a fixed tube end separation that should be considered in the design and installation (see the following list of parameters).

Allow. Pipe End Sep.

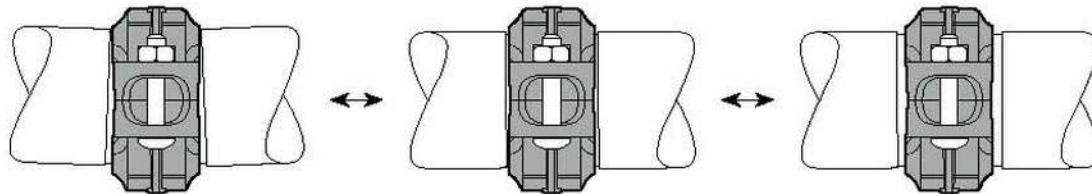
Size		Allow. Pipe End Sep.	
Nominal Dia.	Actual O.D.	Style 1GS	Style 1X
DN	mm	mm	mm
Inches	Inches	Inches	Inches
25	33.7	2.3	2.2
1	1.327	0.091	0.087
32	42.4	2.3	2.2
1¼	1.660	0.091	0.087
40	48.3	2.3	2.2
1½	1.900	0.091	0.087
50	60.3	2.3	2.2
2	2.375	0.091	0.087
65	73.0	2.3	2.7
2½	2.875	0.091	0.106
65	76.1	2.3	2.7
2½	3.000	0.091	0.106
80	88.9	2.7	2.7
3	3.500	0.106	0.106
100	108.0	2.7	3.3
4	4.250	0.106	0.130
100	114.3	2.7	3.3
4	4.500	0.106	0.130

Size		Allow. Pipe End Sep.	
Nominal Dia.	Actual O.D.	Style 1GS	Style 1X
DN	mm	mm	mm
Inches	Inches	Inches	Inches
125	133.0	2.7	3.3
5	5.250	0.106	0.130
125	139.7	2.7	3.3
5	5.500	0.106	0.130
125	141.3	2.7	3.3
5	5.563	0.106	0.130
150	159.0	2.7	3.3
6	6.250	0.106	0.130
150	165.1	2.7	3.3
6	6.500	0.106	0.130
150	168.3	2.7	3.3
6	6.625	0.106	0.130
200	219.1	4.9	4.9
8	8.625	0.193	0.193
250	273.0	4.9	4.9
10	10.750	0.193	0.193
300	323.9	4.9	4.9
12	12.750	0.193	0.193

- ★ Rigid couplings cannot be used to absorb any piping system movement.
- ★ For the absorption of pipe system movement, please use flexible couplings.

Flexible Coupling Systems & Performance

Using of flat joint design, flexible coupling keeps a separation between pipe ends to achieve flexibility of pipeline. This structure ensures the strength without fully holding the pipes, allows axial and radial displacement, suitable for deflection requirements of the pipeline. The flexible coupling is designed to absorb the deviation of the pipe outer diameter without affecting the joint performance



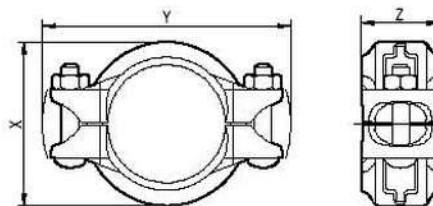
Allow. Pipe End Sep. & Flexibility

Size		Allow. Pipe End Sep.	Flexibility	
Nominal Dia.	Actual O.D.		Max. Degrees	Misalignment
DN Inches	mm Inches	mm Inches	(°)	mm/m In./Ft.
25 1	33.7 1.327	2.2 0.087	2.7	47 0.57
32 1 1/4	42.4 1.660	2.2 0.087	2.2	38 0.46
40 1 1/2	48.3 1.900	2.2 0.087	2.0	34 0.42
50 2	57.0 2.250	2.2 0.087	1.9	33 0.40
50 2	60.3 2.375	2.2 0.087	1.9	33 0.40
65 2 1/2	73.0 2.875	2.4 0.094	1.8	31 0.38
65 2 1/2	76.1 3.000	2.4 0.094	1.8	31 0.38
80 3	88.9 3.500	2.8 0.110	1.7	29 0.36
100 4	108.0 4.250	3.3 0.130	1.6	27 0.34
100 4	114.3 4.500	3.3 0.130	1.6	27 0.34

Size		Allow. Pipe End Sep.	Flexibility	
Nominal Dia.	Actual O.D.		Max. Degrees	Misalignment
DN Inches	mm Inches	mm Inches	(°)	mm/m In./Ft.
125 5	133.0 5.250	3.6 0.142	1.3	22 0.27
125 5	139.7 5.500	3.6 0.142	1.3	22 0.27
125 5	141.3 5.563	3.6 0.142	1.3	22 0.27
150 6	159.0 6.250	3.9 0.154	1.1	19 0.23
150 6	165.1 6.500	3.9 0.154	1.1	19 0.23
150 6	168.3 6.625	3.9 0.154	1.1	19 0.23
200A 8	216.3 8.516	4.9 0.193	0.85	14 0.18
200 8	219.1 8.625	4.9 0.193	0.85	14 0.18
250A 10	267.4 10.528	4.9 0.193	0.67	11 0.14
250 10	273.0 10.750	4.9 0.193	0.67	11 0.14
300A 12	318.5 12.539	4.9 0.193	0.58	10 0.12
300 12	323.9 12.750	4.9 0.193	0.58	10 0.12

- ✦ All the parameters in the above table are the maximum tolerance of each flexible coupling.
- ✦ These values are based on standard roll grooved pipe. Figures for standard cut grooved pipe may increase.
- ✦ All the parameters in the above table are the maximum performance parameters. When designing and installing, the corresponding safety factor should be considered. It is suggested that the pipe diameter of DN25 ~ DN80 should be reduced to 50% and the pipe diameter of DN100 ~ DN300 should be reduced to 75%.

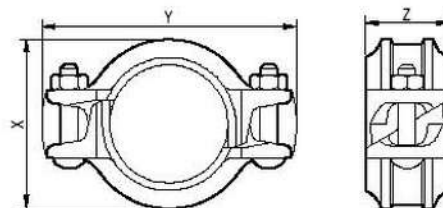
Style 1GS Rigid Coupling



- Model 1GS rigid coupling, socketed & meshing design
- Female and male port socket design is not easy to make the horizontal and horizontal seal twists and turns, the gasket is not exposed, increasing the sealing and improve the overall service life of the joint
- Enhanced body resists 4 times working pressure.

Size		Max. Work Pressure	Max. End Load	Allow. Pipe End Sep.	Dimensions			Bolt/Nut Size
Nominal Dia.	Actual O.D.				X	Y	Z	
DN Inches	mm Inches	KPa PSI	N Lbs.	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches
25	33.7	5170	4530	2.3	54	98	44	M10X55
1	1.327	750	1020	0.091	2.126	3.858	1.732	3/8X2 1/2
32	42.4	5170	7300	2.3	63	103	44	M10X55
1 1/4	1.660	750	1620	0.091	2.480	4.055	1.732	3/8X2 1/2
40	48.3	5170	9470	2.3	69	109	44	M10X55
1 1/2	1.900	750	2130	0.091	2.717	4.291	1.732	3/8X2 1/2
50	60.3	4140	11820	2.3	82	123	45	M10X55
2	2.375	600	2660	0.091	3.268	4.843	1.772	3/8X2 1/2
65	73.0	3780	15820	2.3	96	142	46	M10X60
2 1/2	2.875	550	3670	0.091	3.780	5.591	1.811	3/8X2 1/2
65	76.1	3780	17190	2.3	100	145	46	M10X60
2 1/2	3.000	550	3890	0.091	3.937	5.709	1.811	3/8X2 1/2
80	88.9	3780	23460	2.7	113	159	47	M10X60
3	3.500	550	5290	0.106	4.449	6.260	1.850	3/8X2 1/2
100	108.0	3450	31610	2.7	136	186	49	M12X70
4	4.250	500	7090	0.106	5.354	7.323	1.929	1/2X2 1/4
100	114.3	3450	35400	2.7	142	192	49	M12X70
4	4.500	500	7950	0.106	5.591	7.559	1.929	1/2X2 1/4
100	114.3	3450	3540	2.7	140	189	47	M12X70
4	4.5	500	7950	0.106	5.512	7.441	1.850	1/2X2 1/4
125	133.0	3450	47930	2.7	163	216	50	M12X75
5	5.250	500	10820	0.106	6.417	8.504	1.969	1/2X3
125	139.7	3450	52880	2.7	169	222	50	M12X75
5	5.500	500	11880	0.106	6.654	8.740	1.969	1/2X3
125	141.3	3450	54100	2.7	171	224	50	M12X75
5	5.563	500	12150	0.106	6.732	8.819	1.969	1/2X3
150	159.0	3450	68500	2.7	190	237	51	M12X75
6	6.250	500	15340	0.106	7.480	9.33	2.008	1/2X3
150	165.1	3450	73860	2.7	196	248	51	M12X75
6	6.500	500	16590	0.106	7.717	9.764	2.008	1/2X3
150	168.3	3450	76750	2.7	198	251	51	M12X75
6	6.625	500	17240	0.106	7.835	9.882	2.008	1/2X3
200	216.3	2750	101050	4.9	252	319	58	M16X90
8	8.516	400	22780	0.193	9.921	12.560	2.283	3/4X3 1/2
200	219.1	2750	103680	4.9	255	322	58	M16X90
8	8.625	400	23370	0.193	10.039	12.677	2.283	3/4X3 1/2
250A	267.4	2500	140400	4.9	307	386	62	M20X100
10	10.528	350	30470	0.193	12.087	15.197	2.441	3/4X4
250	273.0	2500	146340	4.9	313	391	62	M20X100
10	10.750	350	31770	0.193	12.323	15.394	2.441	3/4X4
300A	318.5	2500	199182	4.9	360	440	63	M20X110
12	12.539	350	43220	0.193	14.173	17.468	2.480	3/4X4 1/2
300	323.9	2500	206990	4.9	366	445	63	M20X110
12	12.750	350	44690	0.193	14.409	17.520	2.480	3/4X4 1/2
350	355.6	2500	248287	4.9	404	496	73	M22X120
14	14.000	350	53880	0.193	15.905	19.528	28.740	7/8X4 1/4
400	406.4	2500	324294	4.9	459	552	73	M22X120
16	16.000	350	70370	0.193	18.071	21.732	28.740	7/8X4 1/4

- ◆ **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- ◆ **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI(2.065MPa / 20.65bars)
- ◆ **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- ◆ **Coupling gasket material:** EPDM (Optional: Nitrile NBR, Silicone and Others)
- ◆ **Bolts and Nuts:** Heat treated and electro galvanized bolts with oval neck, and heavy duty hexagon nuts. Track head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.
- ◆ **Size Range:** DN25 through DN300 (1" through 12")

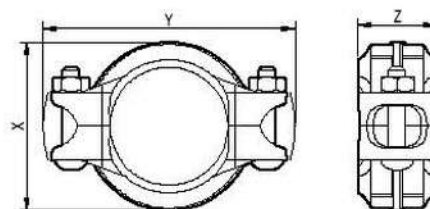
Style 1X Rigid Coupling –Angle pad


- Model 1X Angle pad rigid coupling
- This rigid coupling allows for more accurate positioning of the tube end, forming a fixed tube end separation, which should be considered in the design and installation.
- Enhanced body resists 4 times working pressure.

Size		Max. Work Pressure	Max. End Load	Allow. Pipe End Sep.	Dimensions			Bolt/Nut Size
Nominal Dia.	Actual O.D.				X	Y	Z	
DN Inches	mm Inches	KPa PSI	N Lbs.	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches
25 1	33.7 1.327	5170 750	4530 1020	2.2 0.086	54 2.126	90 3.543	45 1.772	M10X55 3/8X2 1/2
32 1 1/4	42.4 1.660	5170 750	7900 1620	2.2 0.086	63 2.480	102 4.016	45 1.772	M10X55 3/8X2 1/2
40 1 1/2	48.3 1.900	5170 750	9470 2130	2.2 0.086	69 2.717	108 4.252	45 1.772	M10X55 3/8X2 1/2
50 2	60.3 2.375	4140 600	11820 2660	2.2 0.086	82 3.228	124 4.882	47 1.850	M10X55 3/8X2 1/2
65 2 1/2	73.0 2.875	3780 550	15820 3570	2.7 0.106	96 3.780	140 5.512	48 1.900	M10X60 3/2X2 1/2
65 2 1/2	76.1 3.000	3780 550	17190 3890	2.7 0.106	99 3.900	143 5.630	48 1.900	M10X60 3/2X2 1/2
80 3	88.9 3.500	3780 550	23460 5290	2.7 0.106	113 4.567	158 6.220	48 1.900	M10X60 3/2X2 1/2
100 4	108.0 4.250	3450 500	31610 7090	3.3 0.130	138 5.433	188 7.402	51 2.008	M12X70 1/2X2 1/2
100 4	114.3 4.500	3450 500	35400 7950	3.3 0.130	141 5.551	194 7.638	50 1.970	M12X70 1/2X2 1/2
125 5	133.0 5.250	3450 500	47930 10820	3.3 0.130	165 6.496	226 8.898	51 2.008	M12X75 1/2X3
125 5	139.7 5.500	3450 500	52880 11880	3.3 0.130	168 6.614	224 8.819	51 2.008	M12X75 1/2X3
125 5	141.3 5.563	3450 500	54100 12150	3.3 0.130	169 6.654	226 8.898	51 2.008	M12X75 1/2X3
150 6	159.0 6.250	3450 500	68500 15340	3.3 0.130	192 7.559	252 9.921	52 2.047	M12X75 1/2X3
150 6	165.1 6.500	3450 500	73860 16590	3.3 0.130	195 7.677	253 9.961	52 2.047	M12X75 1/2X3
150 6	168.3 6.625	3450 500	76750 17240	3.3 0.130	198 7.795	256 10.079	52 2.047	M12X75 1/2X3
200A 8	216.3 8.516	2750 400	101050 22780	4.9 0.193	252 9.921	319 12.560	60 2.362	M16X100 3/2X4 1/2
200 8	219.1 8.625	2750 400	103680 23370	4.9 0.193	255 10.039	322 12.677	60 2.362	M16X90 3/2X3 1/2
250A 10	267.4 10.528	2500 350	140400 30470	4.9 0.193	307 12.087	386 15.197	62 2.441	M20X115 3/4X4 1/2
250 10	273.0 10.750	2500 350	146340 31770	4.9 0.193	313 12.323	397 15.630	62 2.441	M20X115 3/4X4 1/2
300A 12	318.5 12.539	2500 350	199180 43220	4.9 0.193	361 14.213	440 17.323	63 2.480	M20X115 3/4X4 1/2
300 12	323.9 12.750	2500 350	205990 44690	4.9 0.193	366 14.409	445 17.520	63 2.480	M20X115 3/4X4 1/2

- ✦ **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- ✦ **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI (2.065MPa / 20.65bars)
- ✦ **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- ✦ **Coupling gasket material:** EPDM (Optional: Nitrile NBR, Silicone and Others)
- ✦ **Bolts and Nuts:** Heat treated and electro galvanized bolts with oval neck, and heavy duty hexagon nuts. Track head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.
- ✦ **Size Range:** DN25 through DN300 (1" through 12")

Style 1N Flexible Coupling

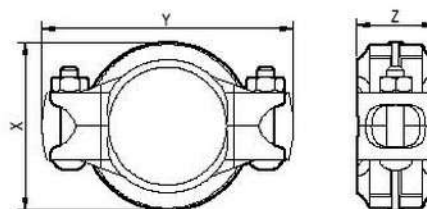


- Style 1N standard flexible coupling provides flexible connection by the gap between pipe groove and coupling key.
- Unique design allows both axial and radial movement, suitable for pipeline with flexibility under intermediate pressure.
- Enhanced body resists 4 times working pressure.

Size		Max. Work Pressure	Max. End Load	Allow. Pipe End Sep.	Dimensions			Bolt/Nut Size
Nominal Dia.	Actual O.D.				X	Y	Z	
DN Inches	mm Inches	KPa PSI	N Lbs.	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches
25	33.7	5170	4530	2.2	56	91	45	M10X55
1	1.327	750	1020	0.087	2.205	3.583	1.772	3/8 X 2 1/2
32	42.4	5170	7300	2.2	68	103	45	M10X55
1 1/4	1.660	750	1620	0.087	2.677	4.055	1.772	3/8 X 2 1/2
40	48.3	5170	9470	2.2	73	109	45	M10X55
1 1/2	1.900	750	2130	0.087	2.874	4.291	1.772	3/8 X 2 1/2
50	57.0	4140	10560	2.2	82	123	45	M10X55
2	2.250	600	2390	0.087	3.228	4.843	1.772	3/8 X 2 1/2
50	60.3	4140	11820	2.2	87	125	45	M10X55
2	2.375	600	2660	0.087	3.425	4.921	1.772	3/8 X 2 1/2
65	73.0	3780	15820	2.4	100	138	46	M10X60
2 1/2	2.875	550	3570	0.094	3.937	5.433	1.811	3/8 X 2 3/4
65	76.1	3780	17190	2.4	103	141	46	M10X60
2 1/2	3.000	550	3890	0.094	4.055	5.551	1.811	3/8 X 2 3/4
80	88.9	3780	23460	2.8	118	165	46	M12X70
3	3.500	550	5290	0.110	4.646	6.496	1.811	1/2 X 2 3/4
100	108.0	3450	31610	3.3	136	183	50	M12X70
4	4.250	500	7090	0.130	5.354	7.205	1.969	1/2 X 2 3/4
100	114.3	3450	35400	3.3	140	194	50	M12X70
4	4.500	500	7950	0.130	5.512	7.634	1.969	1/2 X 2 3/4
100	114.3	3450	35400	3.3	146	196	50	M12X70
4	4.500	500	7950	0.130	5.748	7.717	1.969	1/2 X 2 3/4
125	133.0	3450	47980	3.6	160	209	51	M12X70
5	5.250	500	10820	0.142	6.300	8.228	2.008	1/2 X 2 3/4
125	139.7	3450	52880	3.6	172	220	51	M12X85
5	5.500	500	11880	0.142	6.772	8.661	2.008	1/2 X 2 3/4
125	141.3	3450	54100	3.6	173	221	51	M12X75
5	5.563	500	12150	0.142	6.811	8.701	2.008	1/2 X 3
150	159.0	3450	66500	3.9	190	238	52	M12X75
6	6.250	500	15340	0.154	7.480	9.370	2.047	1/2 X 3

- ◆ **Housing material:** Ductile Iron conforming to ASTM A-536, grade 65-45-12.
- ◆ **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI (2.065MPa / 20.65bars)
- ◆ **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- ◆ **Coupling gasket material:** EPDM (Optional: Nitrile NBR, Silicone and Others)
- ◆ **Bolts and Nuts:** Heat treated and electro galvanized bolts with oval neck, and heavy duty hexagon nuts. Track head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.
- ◆ **Size Range:** DN25 through DN300 (1" through 12")

Style 1N Flexible Coupling

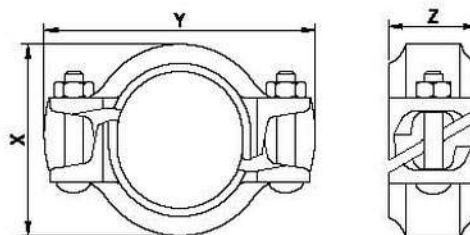


- Style 1N standard flexible coupling provides flexible connection by the gap between pipe groove and coupling key.
- Unique design allows both axial and radial movement, suitable for pipeline with flexibility under intermediate pressure.
- Enhanced body resists 4 times working pressure.

Size		Max. Work Pressure	Max. End Load	Allow. Pipe End Sep.	Dimensions			Bolt/Nut Size
Nominal Dia.	Actual O.D.				X	Y	Z	
DN	mm	KPa	N	mm	mm	mm	mm	mm
Inches	Inches	PSI	Lbs.	Inches	Inches	Inches	Inches	Inches
150	165.1	3450	7360	3.9	197	250	51	M12X75
6	6.500	500	1690	0.154	7.756	9.843	2.008	1/2 X 3
150	165.1	3450	7360	3.9	199	265	52	M16X90
6	6.500	500	1690	0.154	7.835	10.433	2.047	3/8 X 3 1/2
150	168.3	3450	76750	3.9	202	251	52	M12X75
6	6.625	500	17240	0.154	7.835	9.882	2.047	1/2 X 3
200A	216.3	2750	101050	4.9	257	332	61	M20X115
8	8.516	400	22780	0.193	10.118	13.071	2.402	3/4 X 4 1/2
200	219.1	2750	103680	4.9	260	335	61	M16X90
8	8.625	400	23370	0.193	10.236	13.189	2.402	3/8 X 3 1/2
200	219.1	2750	103680	4.9	257	325	59	M20X115
8	8.625	400	23370	0.193	10.118	12.795	2.323	3/4 X 4 1/2
250A	267.4	2500	140400	4.9	309	395	62	M20X100
10	10.528	350	30470	0.193	12.165	15.551	2.441	3/8 X 4
250	273.0	2500	146340	4.9	315	400	62	M20X100
10	10.750	350	31770	0.193	12.401	15.748	2.441	3/8 X 4
300A	318.5	2500	199180	4.9	363	451	63	M20X100
12	12.539	350	43220	0.193	14.911	17.756	2.480	3/8 X 4
300	323.9	2500	205990	4.9	368	448	63	M20X100
12	12.750	350	44690	0.193	14.488	17.638	2.480	3/8 X 4
350A	355.6	2500	248290	4.9	403	502	73	M22X120
14	14.000	350	53880	0.193	15.866	19.764	2.874	7/8 X 4 3/4
350	377.0	2500	279070	4.9	425	515	73	M22X120
14	14.842	350	60560	0.193	16.732	20.276	2.874	7/8 X 4 3/4
400A	406.4	2500	324300	4.9	459	560	73	M22X120
16	16.000	350	70880	0.193	18.071	22.047	2.874	7/8 X 4 3/4
400	426.0	2500	36330	4.9	473	573	73	M22X120
16	16.772	350	77330	0.193	18.622	22.559	2.874	7/8 X 4 3/4
500	508.0	2100	425640	4.9	576	681	76	M24X150
20	20.000	300	94250	0.193	22.677	26.811	2.992	1 X 5 1/2
600	610.0	2100	612920	4.9	666	769	78	M24X150
24	24.016	300	135720	0.193	26.220	30.276	3.071	1 X 5 1/2

- ♦ **Housing material**: Ductile iron conforming to ASTM A-536, grade 65-45-12.
- ♦ **FM Approved & UL Listed**: R.W.P. rated working pressure 300PSI (2.065MPa / 20.65bars)
- ♦ **Housing Finish**: Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- ♦ **Coupling gasket material**: EPDM (Optional: Nitrile NBR, Silicone and Others)
- ♦ **Bolts and Nuts**: Heat treated and electro galvanized bolts with oval neck, and heavy duty hexagon nuts. Track head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.
- ♦ **Size Range**: DN25 through DN300 (1" through 12")

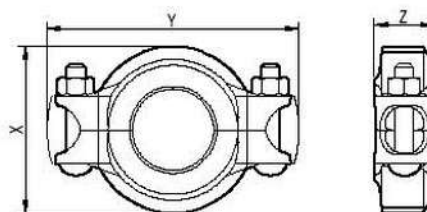
Style 1F Quick Coupling



- Model 1F Quick Coupling rigid coupling
- This rigid coupling allows for more accurate positioning of the tube end, forming a fixed tube end separation, which should be considered in the design and installation.
- Enhanced body resists 4 times working pressure.

Size		Max. Work Pressure	Pre-assembly dimension			Post-assembly dimension			Bolt/Nut Size
Nominal Dia.	Actual O.D.		X	Y	Z	X	Y	Z	
DN Inches	mm Inches	KPa PSI	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches
25	33.7	5170	65	100	50	56	100	50	M10X55
1	1.327	750	2.556	3.937	1.969	2.205	3.937	1.969	3/8X2 1/8
32	42.4	5170	73	109	50	65	109	50	M10X55
1 1/4	1.660	750	2.874	4.291	1.969	2.556	4.291	1.969	3/8X2 1/8
40	48.3	5170	78	115	50	70	115	50	M10X55
1 1/2	1.900	750	3.071	4.528	1.969	2.756	4.528	1.969	3/8X2 1/8
50	60.3	4140	89	127	50	83	127	50	M10X60
2	2.375	600	3.504	5.000	1.969	3.268	5.000	1.969	3/8X2 3/8
65	73.0	3780	103	140	50	96	140	50	M10X60
2 1/2	2.875	550	4.055	5.512	1.969	3.780	5.512	1.969	3/8X2 3/8
65	76.1	3780	106	142	50	99	142	50	M10X60
2 1/2	3.000	550	4.173	5.591	1.969	3.898	5.591	1.969	3/8X2 3/8
80	88.9	3780	118	159	50	112	159	50	M12X65
3	3.500	550	4.646	6.260	1.969	4.409	6.260	1.969	1/2X2 1/2
100	114.3	3450	142	189	53	138	189	53	M12X70
4	4.500	500	5.591	7.441	2.087	5.433	7.441	2.087	1/2X2 3/4
125	139.7	3450	175	218	53	168	218	53	M12X75
5	5.500	500	6.891	8.583	2.087	6.614	8.583	2.087	1/2X3
125	141.3	3450	175	220	53	169	220	53	M12X75
5	5.563	500	6.891	8.661	2.087	6.654	8.661	2.087	1/2X3
150	165.1	3450	198	255	53	190	255	53	M16X90
6	6.500	500	7.795	10.039	2.087	7.480	10.039	2.087	3/4X3 1/2
150	168.3	3450	198	257	53	193	257	53	M16X90
6	6.625	500	7.795	10.118	2.087	7.598	10.118	2.087	3/4X3 1/2
200	216.3	2750	251	312	60	244	312	60	M16X90
8	8.516	400	9.882	12.283	2.362	9.606	12.283	2.362	3/4X3 1/2
200	219.1	2750	251	315	60	246	315	60	M16X90
8	8.625	400	9.882	12.402	2.362	9.685	12.402	2.362	3/4X3 1/2

Style 1NR Reducing Flexible Coupling

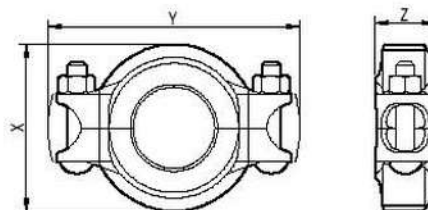


- Model 1NR is a reducing flexible coupling. Two ends can connect to different diameter of steel pipe. The middle of the coupling with a steel plate to avoid telescope by vertical installation.
- The structure ensures lower cost and faster installation under the premise of ensuring the strength.
- Enhanced body resists 4 times working pressure.

Size			Max. Work Pressure	Max. End Load	Allow. Pipe End Sep.	Dimensions			Bolt/Nut Size
Run Pipe	X	Branch Pipe				X	Y	Z	
mm	X	mm	KPa	N	mm	mm	mm	mm	mm
Inches	X	Inches	PSI	Lbs.	Inches	Inches	Inches	Inches	Inches
42.4	X	33.7	3800	3390	2.4	63	103	45	M10X55
1 1/4	X	1	550	730	0.094	2.480	4.055	1.772	3/8 X 2 1/2
48.3	X	42.4	3800	5365	2.4	72	109	45	M10X55
1 1/2		1 1/4	550	1190	0.094	2.835	4.291	1.772	3/8 X 2 1/2
60.3	X	42.4	3800	5365	2.6	84	125	46	M10X55
2		1 1/4	550	1190	0.102	3.307	4.921	1.811	3/8 X 2 1/2
		48.3	3800	6963	2.6	82	125	46	M10X55
		1 1/2	550	1559	0.102	3.228	4.921	1.811	3/8 X 2 1/2
73.0	X	42.4	3800	5365	2.6	100	145	46	M12X75
2 1/2		1 1/4	550	1190	0.102	3.937	5.709	1.811	1/2 X 3
		48.3	3800	6963	2.6	100	145	46	M12X75
		1 1/2	550	1559	0.102	3.937	5.709	1.811	1/2 X 3
		60.3	3800	10852	2.9	100	145	46	M12X75
		2	550	2437	0.114	3.937	5.709	1.811	1/2 X 3
76.1	X	42.4	3800	5365	2.6	103	148	46	M12X75
2 1/2		1 1/4	550	1190	0.102	4.055	5.827	1.811	1/2 X 3
		48.3	3800	6963	2.6	103	148	46	M12X75
		1 1/2	550	1559	0.102	4.055	5.827	1.811	1/2 X 3
		60.3	3800	10852	2.9	103	148	46	M12X75
		2	550	2437	0.114	4.055	5.827	1.811	1/2 X 3
		73.0	3800	15905	3.1	103	148	46	M12X75
		2 1/2	550	3571	0.122	4.055	5.827	1.811	1/2 X 3
88.9	X	42.4	3800	5365	3.1	114	160	49	M12X75
3		1 1/4	550	1190	0.122	4.488	6.299	1.929	1/2 X 3
		48.3	3800	6963	3.1	114	160	49	M12X75
		1 1/2	550	1559	0.122	4.488	6.299	1.929	1/2 X 3
		60.3	3450	9852	3.1	114	160	49	M12X75
		2	500	2215	0.122	4.488	6.299	1.929	1/2 X 3
		73.0	3800	15905	3.1	114	160	49	M12X75
		2 1/2	550	3571	0.122	4.488	6.299	1.929	1/2 X 3
		76.1	3800	17284	3.1	114	160	49	M12X75
		2 1/2	550	3888	0.122	4.488	6.299	1.929	1/2 X 3

- ◆ **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- ◆ **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI(2.065MPa / 20.65bars)
- ◆ **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- ◆ **Coupling gasket material:** EPDM (Optional: Nitrile NBR, Silicone and Others)
- ◆ **Bolts and Nuts:** Heat treated and electro galvanized bolts with oval neck, and heavy duty hexagon nuts. Track head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.
- ◆ **Size Range:** DN40 X DN32 through DN200 X DN150 (1 1/2" X 1 1/4" through 8" X 6")

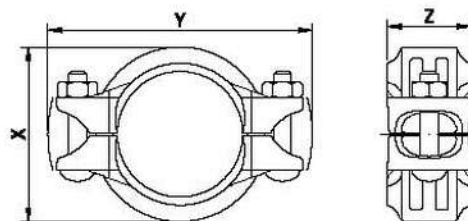
Style 1NR Reducing Flexible Coupling



- Model 1NR is a reducing flexible coupling. Two ends can connect to different diameter of steel pipe. The middle of the coupling with a steel plate to avoid telescope by vertical installation.
- The structure ensures lower cost and faster installation under the premise of ensuring the strength.
- Enhanced body resists 4 times working pressure.

Size			Max. Work Pressure	Max. End Load	Allow. Pipe End Sep.	Dimensions			Bolt/Nut Size
Run Pipe	X	Branch Pipe				X	Y	Z	
mm	X	mm	KPa	N	mm	mm	mm	mm	mm
Inches	X	Inches	PSI	Lbs.	Inches	Inches	Inches	Inches	Inches
114.3 4	X	48.3	3450	6321	35	142	200	51	M16X90
		1½	500	1421	0.138	5.591	7.874	2.008	¾X3½
		60.3	3450	9852	35	142	200	51	M16X90
		2	500	2215	0.138	5.591	7.874	2.008	¾X3½
		73.0	3450	14440	35	142	200	51	M16X90
		2½	500	3246	0.138	5.591	7.874	2.008	¾X3½
165.1 6	X	76.1	3450	15692	35	142	200	51	M16X90
		2½	500	3634	0.138	5.591	7.874	2.008	¾X3½
		88.9	3800	23687	35	142	200	51	M16X90
		3	550	5292	0.138	5.591	7.874	2.008	¾X3½
		114.3	3100	31809	4.0	197	269	51	M20X115
		4	450	7157	0.157	7.756	10.591	2.008	¾X4½
168.3 6	X	76.1	2750	12508	4.0	200	272	51	M20X115
		2½	400	2812	0.157	7.874	10.709	2.008	¾X4½
		88.9	2750	17070	4.0	200	272	51	M20X115
		3	400	3848	0.157	7.874	10.709	2.008	¾X4½
		114.3	3100	31809	4.0	200	272	51	M20X115
		4	450	7157	0.157	7.874	10.709	2.008	¾X4½
216.3 8	X	165.1	2750	58873	4.7	258	342	61	M22X135
		6	350	13273	0.185	10.157	13.465	2.402	¾X5½
219.1 8	X	88.9	2070	12849	4.9	261	345	61	M22X135
		3	300	2886	0.193	10.276	13.583	2.402	¾X5½
		114.3	2070	21240	4.9	261	345	61	M22X135
		4	300	7157	0.193	10.276	13.583	2.402	¾X5½
		165.1	2750	58873	4.9	261	345	61	M22X135
		6	350	11674	0.193	10.276	13.583	2.402	¾X5½
219.1 8	X	168.3	2750	61178	4.9	261	345	61	M22X135
		6	350	12058	0.193	10.276	13.583	2.402	¾X5½

- **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- **FM Approved & UL Listed:** R.W.P. rated working pressure 300 PSI (2.065 MPa / 20.65 bars)
- **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- **Coupling gasket material:** EPDM (Optional: Nitrile NBR, Silicone and Others)
- **Bolts and Nuts:** Heat treated and electro galvanized bolts with oval neck, and heavy duty hexagon nuts. Track head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.
- **Size Range:** DN40 X DN32 through DN200 X DN150 (1½" X 1¼" through 8" X 6")

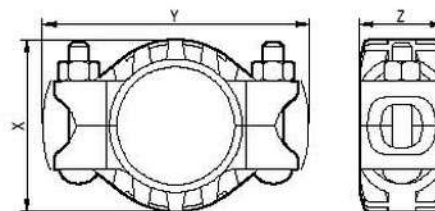
Style 1GH Heavy Duty Coupling


- Model 1GH rigid coupling, socketed & meshing design
- Female and male port socket design is not easy to make the horizontal and horizontal seal twists and turns, the gasket is not exposed, increasing the sealing and improve the overall service life of the joint
- Enhanced body resists 4 times working pressure.

Size		Max. Work Pressure	Max. End Load	Allow. Pipe End Sep.	Dimensions			Bolt/Nut Size
Nominal Dia.	Actual O.D.				X	Y	Z	
DN Inches	mm Inches	KPa PSI	N Lbs.	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches
25	33.7	10350	9068	2.2	56	97	45	M12X60
1	1.327	1500	2037	0.086	2.205	3.820	1.772	1/2 X 2 3/8
32	42.4	860	1214	2.2	66	112	45	M12X60
1 1/4	1.660	1250	2705	0.086	2.520	4.409	1.772	1/2 X 2 3/8
40	48.3	860	1576	2.2	70	125	45	M12X60
1 1/2	1.900	1250	3544	0.086	2.760	4.921	1.772	1/2 X 2 3/8
50	60.3	860	2195	2.2	84	134	46	M12X60
2	2.375	1250	4970	0.086	3.308	5.276	1.811	1/2 X 2 3/8
65	73.0	860	2456	2.7	98	153	48	M12X60
2 1/2	2.875	1250	5538	0.106	3.858	6.074	1.900	1/2 X 2 3/8
65	76.1	6900	28879	2.7	101	156	48	M12X60
2 1/2	3.000	1000	6492	0.106	3.976	6.142	1.900	1/2 X 2 3/8
80	88.9	6900	31384	2.7	115	164	48	M12X60
3	3.500	1000	7069	0.106	4.528	6.457	1.900	1/2 X 2 3/8
100	108.0	6900	42830	3.3	138	188	49	M12X75
4	4.250	1000	9621	0.130	5.433	7.402	1.929	1/2 X 3
100	114.3	6900	63210	3.3	144	203	49	M12X75
4	4.500	1000	14186	0.130	5.669	7.992	1.929	1/2 X 3
125	133.0	6900	70800	3.3	165	226	51	M16X90
5	5.250	1000	15904	0.130	6.496	8.898	2.008	3/4 X 3 1/2
125	139.7	6900	95861	3.3	171	233	51	M16X90
5	5.500	1000	21648	0.130	6.732	9.173	2.008	3/4 X 3 1/2
125	141.3	6900	105763	3.3	173	235	51	M16X90
5	5.563	1000	23758	0.130	6.811	9.252	2.008	3/4 X 3 1/2
150	159.0	6900	108199	3.3	192	252	52	M16X100
6	6.250	1000	24306	0.130	7.559	9.921	2.047	3/4 X 4
150	165.1	6900	137004	3.3	198	266	52	M16X100
6	6.500	1000	30680	0.130	7.795	10.472	2.047	3/4 X 4
150	168.3	6900	147718	3.3	201	269	52	M16X100
6	6.625	1000	33183	0.130	7.913	10.591	2.047	3/4 X 4
200A	216.3	6900	153500	4.9	250	334	61	M20X100
8	8.516	1000	34472	0.193	9.843	13.150	2.402	3/4 X 4
200	219.1	5500	207366	4.9	258	337	60	M20X100
8	8.625	800	46741	0.193	10.157	13.268	2.362	3/4 X 4
250A	267.4	5500	308870	4.9	314	396	64	M20X100
10	10.528	800	69642	0.193	12.362	15.591	2.520	3/4 X 4
250	273.0	5500	321943	4.9	319	401	64	M20X100
10	10.750	800	72610	0.193	12.560	15.787	2.520	3/4 X 4
300A	318.5	5500	438200	4.9	364	448	65	M20X115
12	12.539	800	98789	0.193	14.331	17.638	2.560	3/4 X 4 1/2
300	323.9	5500	453185	4.9	369	453	65	M20X115
12	12.750	800	102141	0.193	14.528	17.835	2.560	3/4 X 4 1/2

- **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- **FM Approved & UL Listed:** R.W.P. rated working pressure 500PSI(3.447MPa / 34.47bars)
- **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- **Coupling gasket material:** EPDM (Optional: Nitrile NBR, Silicone and Others)
- **Bolts and Nuts:** Heat treated and electro galvanized bolts with oval neck, and heavy duty hexagon nuts. Track head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.
- **Size Range:** DN25 through DN300 (1" through 12")

Style 1NH Heavy Duty Flexible Coupling

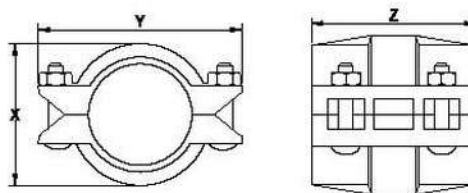


- Style 1NH heavy duty flexible coupling provides flexible connection by the gap between pipe groove and coupling key.
- Unique design allows both axial and radial movement, suitable for pipeline with flexibility under intermediate pressure.
- Enhanced body resists 4 times working pressure.

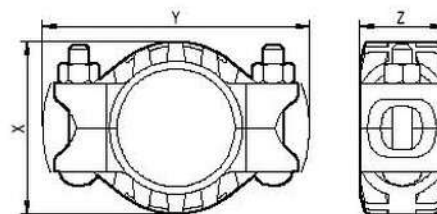
Size		Max. Work Pressure	Max. End Load	Allow Pipe End Sep.	Dimensions			Bolt/Nut Size
Nominal Dia.	Actual O.D.				X	Y	Z	
DN Inches	mm Inches	KPa PSI	N Lbs.	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches
25	33.7	10350	9068	2.2	57	91	45	M10X55
1	1.327	1500	2037	0.087	2.244	3.583	1.772	3/8X2 1/2
32	42.4	860	1214	2.2	66	109	45	M12X60
1 1/4	1.660	1250	2705	0.087	2.598	4.291	1.772	1/2X2 1/2
40	48.3	860	1576	2.2	72	115	45	M12X60
1 1/2	1.900	1250	3544	0.087	2.835	4.528	1.772	1/2X2 1/2
50	60.3	860	2456	2.2	87	131	49	M12X60
2	2.375	1250	5538	0.087	3.425	5.787	1.929	1/2X2 1/2
65	73.0	6900	28879	2.4	101	147	49	M12X70
2 1/2	2.875	1000	6492	0.094	3.976	5.984	1.929	1/2X2 1/2
65	76.1	6900	31384	2.4	104	150	49	M12X70
2 1/2	3.000	1000	7069	0.094	4.094	5.906	1.929	1/2X2 1/2
80	88.9	6900	42830	2.8	118	166	49	M12X70
3	3.500	1000	9621	0.110	4.646	6.53	1.929	1/2X2 1/2
100	108.0	6900	63210	3.3	142	206	51	M16X90
4	4.250	1000	14186	0.130	5.591	8.110	2.008	3/4X3 1/2
100	114.3	6900	70800	3.3	148	204	51	M16X90
4	4.500	1000	15904	0.130	5.827	8.031	2.008	3/4X3 1/2
125	133.0	6900	95861	3.6	169	235	51	M20X110
5	5.250	1000	21648	0.142	6.654	9.324	2.008	3/4X4 1/2
125	139.7	6900	105763	3.6	176	241	51	M20X110
5	5.500	1000	23758	0.142	6.929	9.488	2.008	3/4X4 1/2
125	141.3	6900	108199	3.6	177	243	51	M20X110
5	5.563	1000	24306	0.142	6.969	9.567	2.008	3/4X4 1/2
150	159.0	6900	137004	3.9	197	263	52	M20X115
6	6.250	1000	30680	0.154	7.756	10.354	2.047	3/4X4 1/2
150	165.1	6900	147718	3.9	203	269	52	M20X115
6	6.500	1000	33183	0.154	7.992	10.591	2.047	3/4X4 1/2
150	168.3	6900	153500	3.9	206	272	52	M20X115
6	6.625	1000	34472	0.154	8.110	10.709	2.047	3/4X4 1/2
200A	216.3	5500	202100	4.9	264	342	61	M22X135
8	8.516	800	45567	0.193	10.394	13.465	2.402	7/8X5 1/2
200	219.1	5500	207366	4.9	267	345	61	M22X135
8	8.625	800	46741	0.193	10.512	13.583	2.402	7/8X5 1/2
250A	267.4	5500	308870	4.9	317	419	65	M24X150
10	10.528	800	68642	0.193	12.480	16.496	2.559	1X5 1/2
250	273.0	5500	321943	4.9	322	424	65	M24X150
10	10.750	800	72610	0.193	12.677	16.693	2.559	1X5 1/2
300A	318.5	5500	438200	4.9	371	473	65	M24X150
12	12.539	800	98789	0.193	14.606	18.622	2.559	1X5 1/2
300	323.9	5500	453185	4.9	376	478	65	M24X150
12	12.750	800	102141	0.193	14.803	18.819	2.559	1X5 1/2

- **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- **FM Approved & UL Listed:** R.W.P. rated working pressure 500 PSI (3.447 MPa / 34.47 bars)
- **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- **Coupling gasket material:** EPDM (Optional: Nitrile NBR, Silicone and Others)
- **Bolts and Nuts:** Heat treated and electro galvanized bolts with oval neck, and heavy duty hexagon nuts. Track head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.
- **Size Range:** DN25 through DN300 (1" through 12")

HDPE Coupling

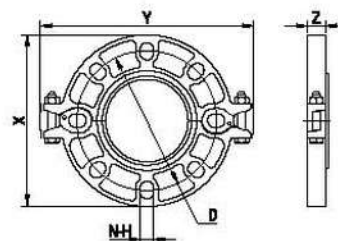


PIPE O.D.		Dimensions			Bolt/Nut Size
Min	Max	A	B	C	
mm Inches	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches
50 1.969	50.5 1.988	71 2.795	111 4.370	105 4.134	M10X50 3/8"X2
63 2.480	63.6 2.504	86.7 3.413	128 5.039	105 4.134	M10X50 3/8"X2
75 2.953	75.7 2.980	97.5 3.839	140 5.512	105 4.134	M10X50 3/8"X2
90 3.543	90.9 3.579	113 4.449	156 6.142	105 4.134	M12X75 1/2"X3
110 4.331	111 4.370	136 5.354	180 7.087	112 4.409	M12X75 1/2"X3
140 5.512	141.3 5.563	168 6.614	210 8.268	118 4.646	M12X75 1/2"X3
160 6.299	161.5 6.358	187 7.362	230 9.055	118 4.646	M12X80 3/8"X3 1/2
180 7.087	181.7 7.154	211 8.307	253 9.961	118 4.646	M12X70 3/8"X2 1/4
200 7.874	201.8 7.945	228.4 8.992	290 11.417	127 5.000	M16X100 3/4"X4
225 8.858	226.4 8.913	261 10.276	330 12.992	127 5.000	M16X100 3/4"X4
250 9.843	252.3 9.933	279 10.984	345.5 13.602	134 5.276	M16X100 3/4"X4
280 11.024	281.7 11.091	311 12.244	393 15.472	134 5.276	M20X115 3/4"X4 1/2
315 12.402	317.9 12.516	347 13.661	429 16.890	134 5.276	M20X115 3/4"X4 1/2

Style 777Z Flexible Coupling


Size		Max. Work Pressure	Max. End Load	Allow. Pipe End Sep.	Dimensions			Bolt/Nut Size
Nominal Dia.	Actual O.D.				X	Y	Z	
DN Inches	mm Inches	KPa PSI	N Lbs.	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches
25	33.7	10350	9068	2.2	57	101	44	M10X50
1	1.327	1500	2037	0.087	2.244	3.976	1.732	3/8 X 2 1/4
32	42.4	860	1214	2.2	66	113	45	M12X60
1 1/4	1.660	1250	2705	0.087	2.598	4.449	1.772	1/2 X 2 1/2
40	48.3	860	1576	2.2	72	121	45	M12X60
1 1/2	1.900	1250	3544	0.087	2.835	4.764	1.772	1/2 X 2 1/2
50	57.0	860	2195	2.2	84	135	47	M12X60
2	2.250	1250	4970	0.087	3.307	5.315	1.850	1/2 X 2 1/2
50	60.3	860	2456	2.2	87	138	47	M12X60
2	2.375	1250	5538	0.087	3.425	5.433	1.850	1/2 X 2 1/2
65	73.0	6900	28879	2.4	101	152	49	M12X75
2 1/2	2.875	1000	6492	0.094	3.976	5.984	1.929	1/2 X 3
65	76.1	6900	31384	2.4	104	155	49	M12X75
2 1/2	3.000	1000	7069	0.094	4.094	6.102	1.929	1/2 X 3
80	88.9	6900	42830	2.8	118	170	49	M12X75
3	3.500	1000	9621	0.110	4.646	6.693	1.929	1/2 X 3
100	108.0	6900	63210	3.3	142	206	51	M16X90
4	4.250	1000	14186	0.130	5.591	8.110	2.008	3/4 X 3 1/2
100	114.3	6900	70800	3.3	148	212	51	M16X90
4	4.500	1000	15904	0.130	5.827	8.346	2.008	3/4 X 3 1/2
125	133.0	6900	95861	3.6	169	243	51	M20X115
5	5.250	1000	21648	0.142	6.654	9.567	2.008	3/4 X 4 1/2
125	139.7	6900	105763	3.6	176	249	51	M20X115
5	5.500	1000	23758	0.142	6.929	9.803	2.008	3/4 X 4 1/2
125	141.3	6900	108199	3.6	177	251	51	M20X115
5	5.563	1000	24306	0.142	6.969	9.882	2.008	3/4 X 4 1/2
150	159.0	6900	137004	3.9	197	271	51	M20X115
6	6.250	1000	30680	0.154	7.756	10.669	2.008	3/4 X 4 1/2
150	165.1	6900	147718	3.9	203	277	51	M20X115
6	6.500	1000	33183	0.154	7.992	10.906	2.008	3/4 X 4 1/2
150	168.3	6900	153500	3.9	206	279	51	M20X115
6	6.625	1000	34472	0.154	8.110	10.984	2.008	3/4 X 4 1/2
200	219.1	5500	207366	4.9	267	357	63	M22X135
8	8.625	800	46741	0.193	10.512	14.055	2.480	7/8 X 5 1/2
250	273.0	5500	321943	4.9	320	410	65	M24X150
10	10.750	800	72610	0.193	12.598	16.142	2.559	1 X 5 1/2
300	323.9	5500	453185	4.9	370	460	65	M24X150
12	12.750	800	102141	0.193	14.567	18.110	2.559	1 X 5 1/2

Style 321 Split Flange



- Style 321 split flange mainly use for the flange connection with the valve, equipment or pipe conversion connection to solve the groove connection and flange connection conversion, installation is simple and fast.

- Model 321 split flange's bolt holes designed into oval hole. ANSI Class 125 & 150 and PN16 grade flanges are universally available, with DN50 to DN80 (2" to 3") for both PN10 and PN25 nominal flanges; DN100 to DN150 (4" to 6") for both flanges PN10 nominal grade flange.

- In addition to the standard flanges described above, it is also available to provide flanges under other standards such as JIS 10K and ANSI Class 300.

Size		Max. Work Pressure	Max. End Load	Dimensions			Diameter	No. & Hole	Bolt/Nut Size
Nominal Dia.	Actual O.D.			X	Y	Z			
DN	mm	KPa	N	mm	mm	mm	mm	N—H	mm
Inches	Inches	PSI	Lbs.	Inches	Inches	Inches	Inches	Inches	Inches
50	60.3	3450	9852	165	207	22	125	4-M18	M10X70
2	2.375	500	2215	6.496	8.145	0.866	4.921	4-0.709	3/8X2 1/8
65	73.0	3450	14440	178	223	22	140	4-M18	M10X70
2 1/2	2.875	500	3246	7.008	8.780	0.866	5.512	4-0.709	3/8X2 1/8
65	76.1	3450	15692	185	230	22	145	4-M18	M10X70
2 1/2	3.000	500	3534	7.283	9.055	0.866	5.709	4-0.709	3/8X2 1/8
80	88.9	3450	21415	200	246	22	160	8-M18	M10X70
3	3.500	500	4811	7.874	9.685	0.866	6.299	0.709	3/8X2 1/8
100	108.0	3450	31610	220	267	24	180	8-M18	M10X70
4	4.252	500	7090	8.661	10.512	0.945	7.087	0.709	3/8X2 1/8
100	114.3	3450	35400	229	276	24	191	8-M18	M10X70
4	4.500	500	7952	9.016	10.866	0.945	7.520	0.709	3/8X2 1/8
125	133.0	3450	47930	250	298	24	210	8-M18	M10X70
5	5.236	500	10820	9.843	11.732	0.945	8.268	0.709	3/8X2 1/8
125	138.7	3450	52881	254	300	24	210	8-M18	M10X70
5	5.500	500	11879	10.000	11.811	0.945	8.268	0.709	3/8X2 1/8
125	141.3	3450	54100	255	304	24	216	8-M22	M10X70
5	5.563	500	12153	10.039	11.968	0.945	8.504	0.866	3/8X2 1/8
150	159.0	3450	68500	285	341	25	240	8-M22	M12X75
6	6.260	500	15340	11.220	13.425	0.984	9.449	0.866	1/2X3
150	165.1	3450	73859	285	341	25	240	8-M22	M12X75
6	6.500	500	16592	11.220	13.425	0.984	9.449	0.866	1/2X3
150	168.3	3450	76750	285	341	26	240	8-M22	M12X75
6	6.625	500	17236	11.220	13.425	1.024	9.449	0.866	1/2X3
200A	216.3	2750	101050	330	391	28	290	12-M22	M12X75
8	8.516	400	22780	12.992	15.394	1.102	11.417	12-0.866	1/2X3
200	219.1	2750	103683	343	400	28	298	12-M22	M12X75
8	8.625	400	23371	13.50	15.748	1.102	11.732	12-0.866	1/2X3
250A	267.4	2500	140396	400	461	24	355	12-M25	M12X85
10	10.528	350	30468	15.748	18.150	0.945	13.976	12-0.984	1/2X3 1/8
250	273.0	2500	146340	410	471	30	362	12-M25	M12X85
10	10.750	350	31770	16.142	18.543	1.181	14.252	12-0.984	1/2X3 1/8
300A	318.5	2500	199182	445	506	24	400	16-M25	M12X85
12	12.539	350	43220	17.520	19.921	0.945	15.748	16-0.984	1/2X3 1/8
300	323.9	2500	205990	480	541	30	432	12-M26	M12X85
12	12.750	350	44690	18.898	21.299	1.181	17.008	12-1.024	1/2X3 1/8

• **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.

• **FM Approved & UL Listed:** R.W.P. rated working pressure 300 PSI (2.065MPa / 20.65bars)

• **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)

• **Coupling gasket material:** EPDM (Optional: Nitrile NBR, Silicone and Others)

• **Bolts and Nuts:** Heat treated and electro galvanized bolts with oval neck, and heavy duty hexagon nuts. Track head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.

• **Size Range:** DN50 through DN200 (2" through 8")

General



Grooved pipe fittings mainly include groove elbows, tee, cross, head, end cap and flange adaptor, etc., is an indispensable accessory in the grooved piping system, widely used in the whole system. Due to the grooved pipe fittings, making the site on-site installation and piping becomes quick and easy, is a very ideal way of piping.

The commonly used grooved fittings are made by the casting process. Most of the groove parts are made by casting. The advanced equipment and exquisite casting technology ensure the dimension accuracy of the groove. Machined grooves used, high precision machining, to ensure the reliability of the pipe system connection.

The material of the grooved pipe fitting is ductile iron, which has the same performance as the connector shell. It has very high strength and toughness, and is a high-quality and long-life product.

The power of the pipeline system is provided by the pump. After passing through the entire piping system, it is ensured that sufficient pressure will be obtained on reaching the water equipment or appliances, and the pressure loss of the piping system will be minimized and the energy saving effect of the system will also be achieved.

The pressure loss of the pipe system is mainly caused by the pressure loss of pipes, pipe fittings, valves and some other fittings or accessories. The most serious pressure loss is the fittings of the pipe fittings. Therefore, it is very necessary to effectively control and improve the pressure loss of pipe fittings.

LIFECO groove fittings have carried out the calculation of the flow coefficient, to ensure product safety and life expectancy, but also to ensure adequate flow path diameter, turning radius and the smoothness of the inner surface, so as to ensure The pressure loss of the entire pipeline system is reduced, and the energy saving effect is achieved.

The pressure loss of LIFECO grooved pipe fittings can be estimated by referring to the flow coefficient table on the next page..

LIFECO groove fittings in addition to the standard ductile iron parts, there are other types of pipe fittings.

- lined plastic grooved pipe fittings
- The lining plastic is lined with a layer of PTFE material on the inner surface of the pipe fitting, which is tasteless and non-toxic, and is an environmentally friendly food-grade material. Plastic pipe fittings are mainly used in domestic water piping systems or food-grade requirements of the pipeline system, such as pharmaceutical, food and other industries process pipeline.
- hot galvanized groove pipe fittings
- Steel grooved pipe fittings

Flow Date

The chart expresses the frictional resistance of various LIFECO fittings as equivalent feet of straight pipe. Fittings not listed can be estimated from the data given, for example, a 22.5° elbow is approximately one-half the resistance of a 45° elbow. Values of mid-sizes can be interpolated.

Size		90° Elbow		45° Elbow		Tee	
Nominal Dia.	Actual O.D.	Style 90	Style 9015D	Style 120	Style 9015D	Branch	RUN
DN	mm	m	m	m	m	m	m
Inches	Inches	Feet	Feet	Feet	Feet	Feet	Feet
25	33.7	0.5	—	0.2	—	1.3	0.5
1	1.327	1.6	—	0.7	—	4.3	1.6
32	42.4	0.8	—	0.4	—	1.8	0.8
1 1/4	1.660	2.6	—	1.3	—	5.9	2.6
40	48.3	0.9	—	0.4	—	2.0	0.9
1 1/2	1.900	3.0	—	1.3	—	6.6	3.0
50	60.3	1.1	0.8	0.5	0.3	2.6	1.1
2	2.375	3.6	2.6	1.6	1.0	8.5	3.6
65	73.0	1.2	0.9	0.6	0.4	3.2	1.2
2 1/2	2.875	3.9	3.0	2.0	1.3	10.5	3.9
65	76.1	1.3	1.0	0.7	0.4	3.3	1.3
2 1/2	3.000	4.3	3.3	2.3	1.3	10.8	4.3
80	88.9	1.5	1.2	0.8	0.5	4.0	1.5
3	3.500	4.9	3.9	2.6	1.6	13.1	4.9
100	108.0	2.0	1.4	0.9	0.6	4.7	2.0
4	4.250	6.6	4.6	3.0	2.0	15.4	6.6
100	114.3	2.1	1.5	1.0	0.6	4.9	2.1
4	4.500	6.9	4.9	3.3	2.0	16.1	6.9
125	133.0	2.5	1.9	1.2	0.8	6.2	2.5
5	5.250	8.2	6.2	3.9	2.6	20.3	8.2
125	139.7	2.6	2.0	1.3	0.8	6.4	2.6
5	5.500	8.5	6.6	4.3	2.6	21.0	8.5

Size		90° Elbow		45° Elbow		Tee	
Nominal Dia.	Actual O.D.	Style 90	Style 9015D	Style 120	Style 9015D	Branch	RUN
DN	mm	m	m	m	m	m	m
Inches	Inches	Feet	Feet	Feet	Feet	Feet	Feet
125	141.3	2.6	2.0	1.3	0.8	6.4	2.6
5	5.563	8.5	6.6	4.3	2.6	21.0	8.5
150	159.0	2.9	2.2	1.5	0.9	7.6	2.9
6	6.250	9.5	7.2	4.9	3.0	24.9	9.5
150	165.1	2.9	2.3	1.5	0.9	7.6	3.0
6	6.500	9.5	7.2	4.9	3.0	24.9	9.5
150	168.3	3.0	2.3	1.5	0.9	7.6	3.0
6	6.625	9.8	7.5	4.9	3.0	24.9	9.8
200A	216.3	3.9	2.9	1.9	1.1	10.0	3.9
8	8.516	13.0	9.6	6.5	3.8	33.0	13.0
200	219.1	4.0	3.0	2.0	1.2	10.1	4.0
8	8.625	13.1	9.8	6.6	3.9	33.1	13.1
250A	267.4	4.9	3.4	2.4	1.4	12.3	4.9
10	10.528	16.0	11.1	8.1	4.8	40.3	16.0
250	273.0	5.2	3.7	2.5	1.5	12.5	5.2
10	10.750	17.1	12.1	8.2	4.9	41.0	17.1
300A	318.5	5.8	4.1	2.9	1.7	15.0	5.8
12	12.539	19.1	13.4	9.7	5.8	49.2	19.1
300	323.9	6.1	4.4	3.0	1.8	15.2	6.1
12	12.750	20.0	14.4	9.8	5.9	49.9	20.0

Note: The flow data listed is based upon the pressure drop of Schedule 40 pipe.

Material Specifications

Housing :

A: Ductile cast iron, QT450-12 conforming to ASTM A—536, Grade 65—45—12.

Ductile cast iron material is not easy to rust, high strength & toughness, good extensibility, but also has strong shock absorption properties.

B: Steel, steel groove pipe fittings made of high-quality cold-rolled steel pipe, the groove is made of rolled (also according to customer requirements for cutting groove) ,

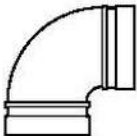
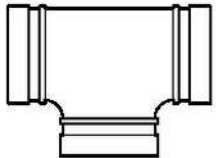
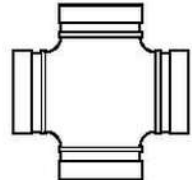
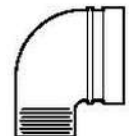
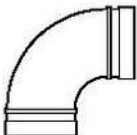
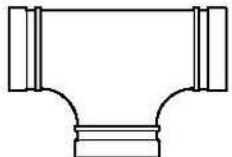
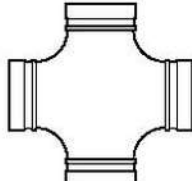
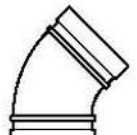
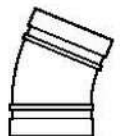
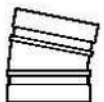
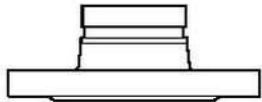
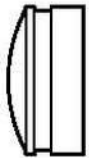
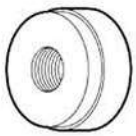
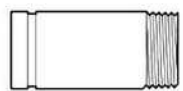
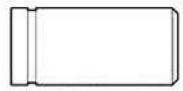
Housing color:

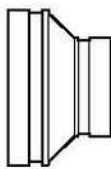
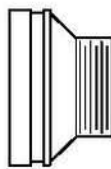
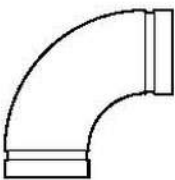
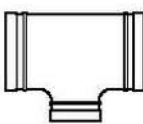
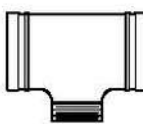
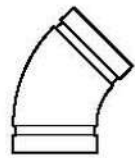
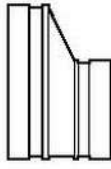
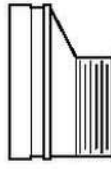
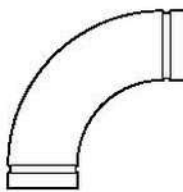
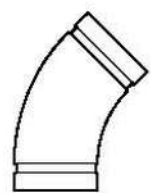
Standard color: orange red paint

Electrostatic powder epoxy resin powder, salt spray time more than 600 hours, superior corrosion resistance.

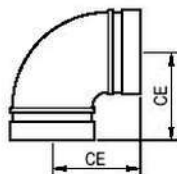
Other Optional: blue paint, gray paint, galvanized, etc. (order must be specified)

- The rated pressure of all standard pipe fittings is equal to the rated pressure of the coupling is used
- All pipe fittings are cut groove ends, as well as thread, flange and other conversion ends.
- Housing Finish: Fusion Bonded Epoxy Coated(Optional:Hot Deep Galvanized and Others)

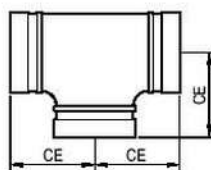
 Style 90S 90° Short Elbow DN50~DN200 2"~8" 60.3mm~219.1mm FM APPROVED UL	 Style 130S Short Equal Tee DN50~DN200 2"~8" 60.3mm~219.1mm FM APPROVED UL	 Style 180S Short Equal Cross DN50~DN200 2"~8" 60.3mm~219.1mm FM APPROVED UL	 Style 90RT 90° Reducing Elbow GxT DN25~DN65 1 1/4"~2 1/2" 42.4mm~76.1mm FM CULUS
 Style 90 90° Std. Elbow DN25~DN300 1"~12" 33.7mm~323.9mm FM APPROVED UL	 Style 130 Std. Equal Tee DN25~DN300 1"~12" 33.7mm~323.9mm FM APPROVED UL	 Style 180 Std. Equal Cross DN25~DN300 1"~12" 33.7mm~323.9mm FM APPROVED UL	 Style 90DE 90° Drain Elbow DN50~DN200 2"~8" 60.3mm~219.1mm FM CULUS
 Style 120 45° Elbow DN25~DN300 1"~12" 33.7mm~323.9mm FM APPROVED UL	 Style 110 22.5° Elbow DN25~DN300 1"~12" 33.7mm~323.9mm FM APPROVED UL	 Style 105 11.25° Elbow DN25~DN300 1"~12" 33.7mm~323.9mm FM APPROVED UL	 Style 321G Flange Adaptor Nipple DN50~DN300 2"~12" 60.3mm~323.9mm FM CULUS
 Style 300 End Cap DN25~DN300 1"~12" 33.7mm~323.9mm FM CULUS LISTED	 Style 300CH End Cap With Center Hole DN50~DN300 2"~12" 60.3mm~323.9mm FM CULUS LISTED	 Style 300EH End Cap With Eccentric Hole DN50~DN300 2"~12" 60.3mm~323.9mm FM CULUS LISTED	 Style 018GG Grooved X Grooved Nipple DN25~DN300 1"~12" 33.7mm~323.9mm
			 Style 018GT Grooved X Threaded Nipple DN25~DN300 1"~12" 33.7mm~323.9mm
			 Style 018GB Grooved X Bevel Nipple DN25~DN300 1"~12" 33.7mm~323.9mm

 Style 240 Grooved Concentric Reducer DN32X25~DN300X250 1¹/₄X1¹/₂~12X10" 42.4X33.7mm~323.9X273.0mm  	 Style 240N Threaded Concentric Reducer DN32X15~DN300X80 1¹/₄X1¹/₂~12X3" 42.4X21.3mm~323.9X88.9mm  	 Style 9015D Long Radius 90° Elbows 1.5 D DN50~DN300 2¹/₂~12" 60.3mm~323.9mm
 Style 131 Grooved Reducing Tee DN32X25~DN300X250 1¹/₄X1¹/₂~12X10" 42.4X33.7mm~323.9X273.0mm  	 Style 131N Threaded Reducing Tee DN32X15~DN300X80 1¹/₄X1¹/₂~12X3" 42.4X21.3mm~323.9X88.9mm  	 Style 4515D Long Radius 45° Elbows 1.5 D DN50~DN300 2¹/₂~12" 60.3mm~323.9mm
 Style 230 Grooved Eccentric Reducer DN32X25~DN300X250 1¹/₄X1¹/₂~12X10" 42.4X33.7mm~323.9X273.0mm  	 Style 230N Threaded Eccentric Reducer DN32X15~DN300X80 1¹/₄X1¹/₂~12X3" 42.4X21.3mm~323.9X88.9mm  	 Style 9030D Long Radius 90° Elbows 3D DN50~DN300 2¹/₂~12" 60.3mm~323.9mm
		 Style 4530D Long Radius 45° Elbows 3D DN50~DN300 2¹/₂~12" 60.3mm~323.9mm

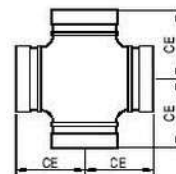
90° Short Elbow, Short Equal Tee & Short Equal Cross



Style 90S



Style 130S



Style 180S

Style 90S 90° Short Elbow



Style 130S Short Equal Tee



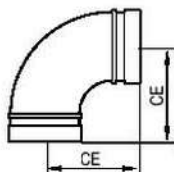
Style 180S Short Equal Cross



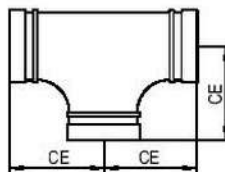
Size		Style 90S 90° Short Elbow	Style 130S Short Equal Tee	Style 180S Short Equal Cross
Nominal Dia.	Actual O.D.	CE	CE	CE
DN	mm	mm	mm	mm
Inches	Inches	Inches	Inches	Inches
25	33.7	—	—	—
1	1.327	—	—	—
32	42.1	—	—	—
1 1/4	1.660	—	—	—
40	48.3	—	—	—
1 1/2	1.900	—	—	—
50	60.3	70	70	70
2	2.375	2.75	2.75	2.75
65	73.0	76	76	76
2 1/2	2.875	3.00	3.00	3.00
65	76.1	76	76	76
2 1/2	3.000	3.00	3.00	3.00
80	88.9	86	86	86
3	3.500	3.40	3.40	3.40
100	108.0	102	102	102
4	4.250	4.00	4.00	4.00
100	114.3	102	102	102
4	4.500	4.00	4.00	4.00
125	133.0	124	124	124
5	5.250	4.88	4.88	4.88
125	139.7	124	124	124
5	5.500	4.88	4.88	4.88
125	141.3	124	124	124
5	5.563	4.88	4.88	4.88
150	159.0	140	140	140
6	6.250	5.50	5.50	5.50
150	165.1	140	140	140
6	6.500	5.50	5.50	5.50
150	168.3	140	140	140
6	6.625	5.50	5.50	5.50
200	216.3	173	173	173
8	8.516	6.80	6.80	6.80
200	219.1	173	173	173
8	8.625	6.80	6.80	6.80
250A	267.4	204	204	—
10	10.528	8.03	8.03	—
250	273.0	185	185	—
10	10.750	7.28	7.28	—
300A	318.5	220	220	—
12	12.539	8.66	8.66	—
300	323.9	215	215	—
12	12.750	8.46	8.46	—

- ♦ **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- ♦ **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI (2.065MPa / 20.65bars)
- ♦ **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- ♦ **Size Range:** DN50 through DN200 (2" through 8")

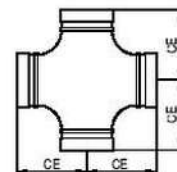
90° Standard Elbow, Standard Equal Tee & Standard Equal Cross



Style 90



Style 130



Style 180

Style 90 90° Standard Elbow



Style 130 Standard Equal Tee



Style 180 Standard Equal Cross



Size		Style 90 90° Std. Elbow	Style 130 Std. Equal Tee	Style 180 Std. Equal Cross
Nominal Dia.	Actual O.D.	CE	CE	CE
DN	mm	mm	mm	mm
Inches	Inches	Inches	Inches	Inches
25	33.7	57	57	57
1	1.327	2.25	2.25	2.25
32	42.4	70	70	70
1 1/4	1.660	2.75	2.75	2.75
40	48.3	70	70	70
1 1/2	1.900	2.75	2.75	2.75
50	60.3	83	83	83
2	2.375	3.25	3.25	3.25
65	73.0	95	95	95
2 1/2	2.875	3.75	3.75	3.75
65	76.1	95	95	95
2 1/2	3.000	3.75	3.75	3.75
80	88.9	108	108	108
3	3.500	4.25	4.25	4.25
100	108.0	127	127	127
4	4.250	5.00	5.00	5.00
100	114.3	127	127	127
4	4.500	5.00	5.00	5.00
125	133.0	140	140	140
5	5.250	5.50	5.50	5.50
125	139.7	140	140	140
5	5.500	5.50	5.50	5.50
125	141.3	140	140	140
5	5.563	5.50	5.50	5.50
150	159.0	165	165	165
6	6.250	6.50	6.50	6.50
150	165.1	165	165	165
6	6.500	6.50	6.50	6.50
150	168.3	165	165	165
6	6.625	6.50	6.50	6.50
200A	216.3	197	197	197
8	8.516	7.75	7.75	7.75
200	219.1	197	197	197
8	8.625	7.75	7.75	7.75
250A	267.4	229	229	229
10	10.528	9.00	9.00	9.00
250	273.0	229	229	229
10	10.750	9.00	9.00	9.00
300A	318.5	254	254	254
12	12.539	10.00	10.00	10.00
300	323.9	254	254	254
12	12.750	10.00	10.00	10.00

- **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- **FM Approved & UL listed:** R.W.P. rated working pressure 300PSI (2.065MPa / 20.65bars)
- **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- **Size Range:** DN25 through DN300 (1" through 12")

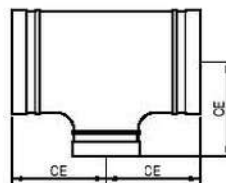
Reducing Tee



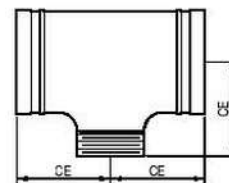
Style 131 Grooved Reducing Tee



Style 131N Threaded Reducing Tee



Style 131



Style 131N



Size			Style 131 Reducing Tee	Style 131N Reducing Tee
Run Pipe	X	Branch Pipe	EE	EE
mm	X	mm	mm	mm
Inches	X	Inches	Inches	Inches
42.4	X	33.7	57	57
1 1/4		1	2.25	2.25
48.3	X	33.4	70	70
1 1/2		1	2.75	2.75
		42.4	70	70
		1 1/4	2.75	2.75
60.3	X	33.7	70	70
2		1	2.75	2.75
		42.4	70	70
		1 1/4	2.75	2.75
		48.3	70	70
		1 1/2	2.75	2.75
73.0	X	33.7	76	76
2 1/2		1	3.00	3.00
		42.4	76	76
		1 1/4	3.00	3.00
		48.3	76	76
		1 1/2	3.00	3.00
		60.3	76	76
		2	3.00	3.00
76.1	X	33.7	76	76
2 1/2		1	3.00	3.00
		42.4	76	76
		1 1/4	3.00	3.00
		48.3	76	76
		1 1/2	3.00	3.00
		60.3	76	76
		2	3.00	3.00
88.9	X	33.7	86	86
3		1	3.40	3.40
		42.4	86	86
		1 1/4	3.40	3.40
		48.3	86	86
		1 1/2	3.40	3.40
		60.3	86	86
		2	3.40	3.40
		73.0	86	86
		2 1/2	3.40	3.40
		76.1	86	86
		2 1/2	3.40	3.40

Size			Style 131 Reducing Tee	Style 131N Reducing Tee
Run Pipe	X	Branch Pipe	EE	EE
mm	X	mm	mm	mm
Inches	X	Inches	Inches	Inches
114.3	X	33.7	102	102
4		1	4.00	4.00
		42.4	102	102
		1 1/4	4.00	4.00
		48.3	102	102
		1 1/2	4.00	4.00
		60.3	102	102
		2	4.00	4.00
		73.0	102	102
		2 1/2	4.00	4.00
		76.1	102	102
		2 1/2	4.00	4.00
		88.9	102	102
		3	4.00	4.00
139.7	X	33.7	124	124
5		1	4.88	4.88
		42.4	124	124
		1 1/4	4.88	4.88
		48.3	124	124
		1 1/2	4.88	4.88
		60.3	124	124
		2	4.88	4.88
		76.1	124	124
		2 1/2	4.88	4.88
		88.9	124	124
		3	4.88	4.88
		114.3	124	--
		4	4.88	--
141.3	X	33.7	124	124
5		1	4.88	4.88
		42.4	124	124
		1 1/4	4.88	4.88
		48.3	124	124
		1 1/2	4.88	4.88
		60.3	124	124
		2	4.88	4.88
		73.0	124	124
		2 1/2	4.88	4.88
		88.9	124	124
		3	4.88	4.88
		114.3	124	--
		4	4.88	--

- **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI (2.065MPa / 20.65kgf/cm²)
- **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- **Size Range:** DN32 X DN25 through DN300 X DN250 (1 1/4" X 1" through 12" X 10")

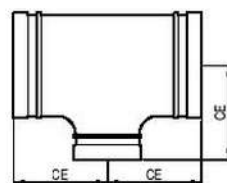
Reducing Tee



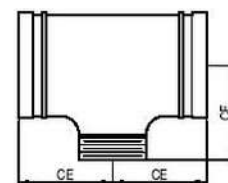
Style 131 Grooved Reducing Tee



Style 131N Threaded Reducing Tee



Style 131



Style 131N



Size			Style 131 Reducing Tee	Style 131N Reducing Tee
Run Pipe	X	Branch Pipe	EE	EE
mm Inches	X X	mm Inches	mm Inches	mm Inches
165.1 6	X	33.7 1	140 5.50	140 5.50
		42.4 1 1/4	140 5.50	140 5.50
		48.3 1 1/2	140 5.50	140 5.50
		60.3 2	140 5.50	140 5.50
		76.1 2 1/2	140 5.50	140 5.50
		88.9 3	140 5.50	140 5.50
		114.3 4	140 5.50	--
		139.7 5	140 5.50	--
168.3 6	X	33.7 1	140 5.50	140 5.50
		42.4 1 1/4	140 5.50	140 5.50
		48.3 1 1/2	140 5.50	140 5.50
		60.3 2	140 5.50	140 5.50
		73.0 2 1/2	140 5.50	140 5.50
		88.9 3	140 5.50	140 5.50
		114.3 4	140 5.50	--
		114.3 5	140 5.50	--
216.3 8	X	33.7 1	173 6.80	173 6.80
		42.4 1 1/4	173 6.80	173 6.80
		48.3 1 1/2	173 6.80	173 6.80
		60.3 2	173 6.80	173 6.80
		73.0 2 1/2	173 6.80	173 6.80
		76.1 2 1/2	173 6.80	173 6.80
		88.9 3	173 6.80	173 6.80
		114.3 4	173 6.80	--
		139.7 5	173 6.80	--

Size			Style 131 Reducing Tee	Style 131N Reducing Tee
Run Pipe	X	Branch Pipe	EE	EE
mm Inches	X X	mm Inches	mm Inches	mm Inches
216.3 8	X	165.1 6	173 6.80	--
		168.3 6	173 6.80	--
219.1 8	X	33.7 1	173 6.80	173 6.80
		42.4 1 1/4	173 6.80	173 6.80
		48.3 1 1/2	173 6.80	173 6.80
		60.3 2	173 6.80	173 6.80
		73.0 2 1/2	173 6.80	173 6.80
		76.1 2 1/2	173 6.80	173 6.80
		88.9 3	173 6.80	173 6.80
		114.3 4	173 6.80	--
		139.7 5	173 6.80	--
		141.3 5	173 6.80	--
		165.1 6	173 6.80	--
		168.3 6	173 6.80	--
273.0 10	X	114.3 4	229 9.00	--
		139.7 5	229 9.00	--
		141.3 5	229 9.00	--
		165.1 6	229 9.00	--
		168.3 6	229 9.00	--
		219.1 8	229 9.00	--
323.9 12	X	114.3 4	254 10.00	--
		139.7 5	254 10.00	--
		141.3 5	254 10.00	--
		165.1 6	254 10.00	--
		168.3 6	254 10.00	--
		219.1 8	254 10.00	--
		273.0 10	254 10.00	--

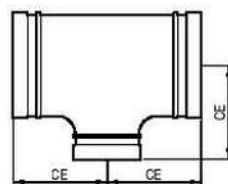
Reducing Tee



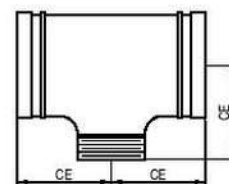
Style 131 Grooved Reducing Tee



Style 131N Threaded Reducing Tee



Style 131

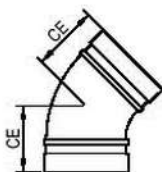


Style 131N

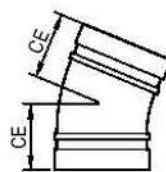


Size			Style 131 Reducing Tee	Style 131N Reducing Tee
Run Pipe	X	Branch Pipe	EE	EE
mm	X	mm	mm	mm
Inches	X	Inches	Inches	Inches
267.4 10	X	114.3 4	204 8.03	--
		139.7 5	204 8.03	--
		165.1 6	204 8.03	--
		216.3 8	204 8.03	--
273.0 10	X	114.3 4	190 7.48	--
		139.7 5	190 7.48	--
		141.3 5	190 7.48	--
		165.1 6	190 7.48	--
		168.3 6	190 7.48	--
		219.1 8	190 7.48	--
318.5 12	X	139.7 5	220 8.66	--
		165.1 6	220 8.66	--
		216.3 8	220 8.66	--
		267.4 10	220 8.66	--
323.9 12	X	114.3 4	220 8.66	--
		139.7 5	220 8.66	--
		141.3 5	220 8.66	--
		165.1 6	220 8.66	--
		168.3 6	220 8.66	--
		219.1 8	220 8.66	--
		273.0 10	220 8.66	--

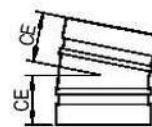
45° Elbow, 22.5° Elbow & 11.25° Elbow



Style 120



Style 110



Style 105

Style 120 45° Elbow



Style 110 22.5° Elbow



Style 105 11.25° Elbow



Size		Style 120 45° Elbow	Style 110 22.5° Elbow	Style 105 11.25° Elbow
Nominal Dia.	Actual O.D.	CE	CE	CE
DN	mm	mm	mm	mm
Inches	Inches	Inches	Inches	Inches
25	33.7	44	44	35
1	1.327	1.75	1.75	1.38
32	424	44	44	35
1 1/4	1.660	1.75	1.75	1.38
40	48.3	44	44	35
1 1/2	1.900	1.75	1.75	1.38
50	60.3	51	48	35
2	2.375	2.00	1.89	1.38
65	73.0	57	51	38
2 1/2	2.875	2.25	2.00	1.50
65	76.1	57	51	38
2 1/2	3.000	2.25	2.00	1.50
80	88.9	64	57	38
3	3.500	2.50	2.25	1.50
100	108.0	76	73	44
4	4.250	3.00	2.87	1.75
100	114.3	76	73	44
4	4.500	3.00	2.87	1.75
125	133.0	83	73	51
5	5.250	3.25	2.87	2.00
125	139.7	83	73	51
5	5.500	3.25	2.87	2.00
125	141.3	83	73	51
5	5.563	3.25	2.87	2.00
150	159.0	89	79	51
6	6.250	3.50	3.11	2.00
150	165.1	89	79	51
6	6.500	3.50	3.11	2.00
150	168.3	89	79	51
6	6.625	3.50	3.11	2.00
200A	216.3	108	83	51
8	8.516	4.25	3.25	2.00
200	219.1	108	83	51
8	8.625	4.25	3.25	2.00
250A	267.4	121	89	54
10	10.528	4.75	3.50	2.15
250	273.0	121	89	54
10	10.750	4.75	3.50	2.15
300A	318.5	133	102	57
12	12.539	5.25	4.00	2.25
300	323.9	133	102	57
12	12.750	5.25	4.00	2.25

✦ **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.

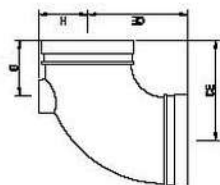
✦ **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI (2.065MPa / 20.65bars)

✦ **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)

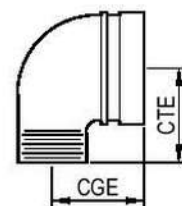
✦ **Coupling gasket material:** EPDM (Optional: Nitrile NBR, Silicone and Others)

✦ In addition to the points listed in this table, but also according to customer requirements to provide a variety of special point of the elbow

✦ **Size Range:** DN25 through DN300 (1" through 12")

Style 90DE 90° Drain Elbow with 1" Threaded


Style 90DE


Style 90RT 90° Reducing Elbow with Threaded Small End (Add-a-cap)


Style 90RT



Size			Style 90RT 90° Drain Elbow		
Run Pipe	X	Branch Pipe	C to CE	C to G	C to H
mm	X	mm	mm	mm	mm
Inches	X	Inches	Inches	Inches	Inches
60.3	X	33.7	83	57	40
2	X	1	3.27	2.24	1.57
73.0	X	33.7	95	70	40
2 1/2	X	1	3.74	2.76	1.57
76.1	X	33.7	95	70	40
2 1/2	X	1	3.74	2.76	1.57
88.9	X	33.7	108	70	49
3	X	1	4.25	2.76	1.93
114.3	X	33.7	127	70	63
4	X	1	5.00	2.76	2.48
139.7	X	33.7	140	70	76
5	X	1	5.51	2.76	2.99
141.3	X	33.7	140	70	76
5	X	1	5.51	2.76	2.99
165.1	X	33.7	165	70	90
6	X	1	6.50	2.76	3.54
168.3	X	33.7	165	70	90
6	X	1	6.50	2.76	3.54
216.3	X	33.7	197	84	114
8	X	1	7.76	3.31	4.49
219.1	X	33.7	197	84	114
8	X	1	7.76	3.31	4.49

Size			Style 90RT 90° Reducing Elbow	
Run Pipe	X	Branch Pipe	C to GE	C to GE
mm	X	mm	mm	mm
Inches	X	Inches	Inches	Inches
42.4	X	21.3	48	32
1 1/4	X	1/2	1.90	1.26
		26.9	51	34
		3/4	2.00	1.34
		33.7	55	37
		1	2.17	1.46
48.3	X	21.3	48	35
1 1/2	X	1/2	1.90	1.38
		26.9	51	37
		3/4	2.00	1.46
		33.7	55	40
		1	2.17	1.57
60.3	X	21.3	48	41
2	X	1/2	1.90	1.60
		26.9	51	43
		3/4	2.00	1.70
		33.7	55	46
		1	2.17	1.80
73.0	X	21.3	48	48
2 1/2	X	1/2	1.90	1.90
		26.9	51	50
		3/4	2.00	1.97
		33.7	55	53
		1	2.17	2.10
76.1	X	21.3	48	51
2 1/2	X	1/2	1.90	2.00
		26.9	51	53
		3/4	2.00	2.10
		33.7	55	56
		1	2.17	2.20

- **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI (2.065MPa / 20.65bars)
- **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- Hydrophobic port thread standard size is 1", for other specifications, please indicate on the order.
- **Size Range:** DN50 through DN200 (2"through 8")

- **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI (2.065MPa / 20.65bars)
- **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- **Size Range:** DN32 X DN15 through DN65 X DN25 (1 1/4" X 1/2" through 2 1/2" X 1")

End Cap & End Cap with Hole



Style 300

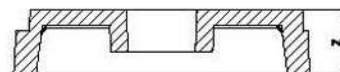
Style 300 End Cap



Size		Style 300 End Cap
Nominal Dia.	Actual O.D.	CE
DN Inches	mm Inches	mm Inches
25 1	33.7 1.327	27 1.06
32 1 1/4	42.4 1.660	27 1.06
40 1 1/2	48.3 1.900	27 1.06
50 2	60.3 2.375	29 1.142
65 2 1/2	73.0 2.875	29 1.142
65 2 1/2	76.1 3.000	29 1.142
80 3	88.9 3.500	31 1.221
100 4	108.0 4.250	33 1.299
100 4	114.3 4.500	33 1.299
125 5	133.0 5.250	35 1.378
125 5	139.7 5.500	35 1.378
125 5	141.3 5.563	35 1.378
150 6	159.0 6.250	35 1.378
150 6	165.1 6.500	35 1.378
150 6	168.3 6.625	35 1.378
200 8	216.3 8.516	43 1.693
200 8	219.1 8.625	43 1.693
250A 10	267.4 10.528	50 1.969
250 10	273.0 10.750	50 1.969
300A 12	318.5 12.539	50 1.969
300 12	323.9 12.750	50 1.969

- ✦ **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- ✦ **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI (2.065MPa / 20.65bars)
- ✦ **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- ✦ End cap standard thread is 1", for other specifications, please indicate on the order
- ✦ **Size Range:** DN25 through DN300 (1" through 12")

End Cap & End Cap with Hole



Style 300H1

Style 300H1 End Cap With Center Hole

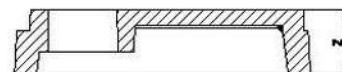


Size			Max Work Pressure	Dimensions	
Run Pipe	X	Branch Pipe		Z	
mm	X	mm	KPa	mm	
Inches	X	Inches	PSI	Inches	
60.3 2	X	33.7	2500	25	
		1	350	0.984	
		42.4	2500	25	
		1 1/4	350	0.984	
		48.3	2500	25	
73.0 2 1/2	X	33.7	2500	25	
		1	350	0.984	
		42.4	2500	25	
		1 1/4	350	0.984	
		48.3	2500	25	
76.1 2 1/2	X	33.7	2500	25	
		1	350	0.984	
		42.4	2500	25	
		1 1/4	350	0.984	
		48.3	2500	25	
88.9 3	X	33.7	2500	25	
		1	350	0.984	
		42.4	2500	25	
		1 1/4	350	0.984	
		48.3	2500	25	
108.0 4	X	33.7	2500	25	
		1	350	0.984	
		42.4	2500	25	
		1 1/4	350	0.984	
		48.3	2500	25	
114.3 4	X	33.7	2500	25	
		1	350	0.984	
		42.4	2500	25	
		1 1/4	350	0.984	
		48.3	2500	25	
133.0 4	X	33.7	2500	25	
		1	350	0.984	
		42.4	2500	25	
		1 1/4	350	0.984	
		48.3	2500	25	

Size			Max Work Pressure	Dimensions	
Run Pipe	X	Branch Pipe		Z	
mm	X	mm	KPa	mm	
Inches	X	Inches	PSI	Inches	
139.7 5	X	33.7	2500	25	
		1	350	0.984	
		42.4	2500	25	
		1 1/4	350	0.984	
		48.3	2500	25	
141.3 5	X	33.7	2500	25	
		1	350	0.984	
		42.4	2500	25	
		1 1/4	350	0.984	
		48.3	2500	25	
159.0 6	X	33.7	2500	25	
		1	350	0.984	
		42.4	2500	25	
		1 1/4	350	0.984	
		48.3	2500	25	
165.1 6	X	33.7	2500	25	
		1	350	0.984	
		42.4	2500	25	
		1 1/4	350	0.984	
		48.3	2500	25	
168.3 6	X	33.7	2500	25	
		1	350	0.984	
		42.4	2500	25	
		1 1/4	350	0.984	
		48.3	2500	25	
216.3 8	X	33.7	2500	30	
		1	350	1.181	
		42.4	2500	30	
		1 1/4	350	1.181	
		48.3	2500	30	
219.1 8	X	33.7	2500	30	
		1	350	1.181	
		42.4	2500	30	
		1 1/4	350	1.181	
		48.3	2500	30	

- ♦ **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- ♦ **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI (2.065MPa / 20.65bars)
- ♦ **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- ♦ End cap standard thread is 1", for other specifications, please indicate on the order
- ♦ **Size Range:** DN25 through DN300 (1" through 12")

End Cap & End Cap with Hole



Style 300H2

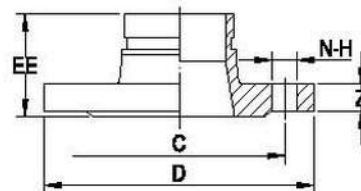
Style 300H2 End Cap With Eccentric Hole


Size			Max Work Pressure	Dimensions	
Run Pipe	X	Branch Pipe		Z	
mm	X	mm	KPa	mm	
Inches	X	Inches	PSI	Inches	
60.3 2	X	33.7 1	2500 350	25 0.984	
		42.4 1 1/4	2500 350	25 0.984	
		48.3 1 1/2	2500 350	25 0.984	
		73.0 2 1/2	2500 350	25 0.984	
		108.0 4	2500 350	25 0.984	
76.1 2 1/2	X	33.7 1	2500 350	25 0.984	
		42.4 1 1/4	2500 350	25 0.984	
		48.3 1 1/2	2500 350	25 0.984	
		60.3 2	2500 350	25 0.984	
		108.0 4	2500 350	25 0.984	
88.9 3	X	33.7 1	2500 350	25 0.984	
		42.4 1 1/4	2500 350	25 0.984	
		48.3 1 1/2	2500 350	25 0.984	
		60.3 2	2500 350	25 0.984	
		108.0 4	2500 350	25 0.984	
108.0 4	X	33.7 1	2500 350	25 0.984	
		42.4 1 1/4	2500 350	25 0.984	
		48.3 1 1/2	2500 350	25 0.984	
		60.3 2	2500 350	25 0.984	
		114.3 4 1/2	2500 350	25 0.984	
114.3 4 1/2	X	33.7 1	2500 350	25 0.984	
		42.4 1 1/4	2500 350	25 0.984	
		48.3 1 1/2	2500 350	25 0.984	
		60.3 2	2500 350	25 0.984	
		133.0 5 1/4	2500 350	25 0.984	
133.0 5 1/4	X	33.7 1	2500 350	25 0.984	
		42.4 1 1/4	2500 350	25 0.984	
		48.3 1 1/2	2500 350	25 0.984	
		60.3 2	2500 350	25 0.984	
		133.0 5 1/4	2500 350	25 0.984	

Size			Max Work Pressure	Dimensions	
Run Pipe	X	Branch Pipe		Z	
mm	X	mm	KPa	mm	
Inches	X	Inches	PSI	Inches	
139.7 5 1/2	X	33.7 1	2500 350	25 0.984	
		42.4 1 1/4	2500 350	25 0.984	
		48.3 1 1/2	2500 350	25 0.984	
		60.3 2	2500 350	25 0.984	
		141.3 5 1/2	2500 350	25 0.984	
141.3 5 1/2	X	33.7 1	2500 350	25 0.984	
		42.4 1 1/4	2500 350	25 0.984	
		48.3 1 1/2	2500 350	25 0.984	
		60.3 2	2500 350	25 0.984	
		159.0 6 1/4	2500 350	25 0.984	
159.0 6 1/4	X	33.7 1	2500 350	25 0.984	
		42.4 1 1/4	2500 350	25 0.984	
		48.3 1 1/2	2500 350	25 0.984	
		60.3 2	2500 350	25 0.984	
		165.1 6 1/2	2500 350	25 0.984	
165.1 6 1/2	X	33.7 1	2500 350	25 0.984	
		42.4 1 1/4	2500 350	25 0.984	
		48.3 1 1/2	2500 350	25 0.984	
		60.3 2	2500 350	25 0.984	
		168.3 6 3/4	2500 350	25 0.984	
168.3 6 3/4	X	33.7 1	2500 350	25 0.984	
		42.4 1 1/4	2500 350	25 0.984	
		48.3 1 1/2	2500 350	25 0.984	
		60.3 2	2500 350	25 0.984	
		216.3 8 1/2	2500 350	30 1.181	
216.3 8 1/2	X	33.7 1	2500 350	30 1.181	
		42.4 1 1/4	2500 350	30 1.181	
		48.3 1 1/2	2500 350	30 1.181	
		60.3 2	2500 350	30 1.181	
		219.1 8 3/4	2500 350	30 1.181	
219.1 8 3/4	X	33.7 1	2500 350	30 1.181	
		42.4 1 1/4	2500 350	30 1.181	
		48.3 1 1/2	2500 350	30 1.181	
		60.3 2	2500 350	30 1.181	
		219.1 8 3/4	2500 350	30 1.181	

- ✦ **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- ✦ **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI (2.065MPa / 20.65bars)
- ✦ **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- ✦ End cap standard thread is 1", for other specifications, please indicate on the order
- ✦ **Size Range:** DN25 through DN300 (1" through 12")

Style 321G Flange Adaptor Nipple



Style 321G

Style 321G Flange Adaptor Nipple



- Model 321G flanged adaptor is mainly used for the conversion connection of valves, equipment or pipes which interface with some flanges, which solves the conversion of the grooved connection and the flanged connection, and the installation is quick and easy.
- Model 321G flanged adaptor has bolt hole designed into an oval shape. ANSI Class 125 & 150 and PN16 grade flanges are universally available, with DN50 to DN80(2" to 3") for both PN10 and PN25 nominal flanges; DN100 to DN150 (4" to 6") for both flanges PN10 nominal grade flange.
- In addition to the above standard flanged short pipe products, other flange standards such as JIS 10K and ANSI Class 300 can also be supplied.

Size		Dimensions				
Nominal Dia.	Actual O.D.	EE	D	C	Z	No. & Hole
DN	mm	mm	mm	mm	mm	mm
Inches	Inches	Inches	Inches	Inches	Inches	Inches
32	424	60	134	100	14	4-M18
1 1/4	1.660	2.36	5.28	3.94	0.55	4-0.71
40	483	60	150	110	14	4-M18
1 1/2	1.900	2.36	5.91	4.33	0.55	4-0.71
50	603	60	165	121	15	4-M18
2	2.375	2.36	6.50	4.76	0.59	4-0.71
65	730	60	182	140	15	4-M18
2 1/2	2.875	2.36	7.17	5.51	0.59	4-0.71
65	761	60	182	140	15	4-M18
2 1/2	3.000	2.36	7.17	5.51	0.59	4-0.71
80	88.9	60	199	153	15	8-M18
3	3.500	2.36	7.83	6.02	0.59	8-0.71
100	108.0	70	227	180	18	8-M18
4	4.250	2.76	8.94	7.09	0.71	8-0.71
100	114.3	70	227	191	18	8-M18
4	4.500	2.76	8.94	7.52	0.71	8-0.71
125	133.0	70	250	210	19	8-M18
5	5.250	2.76	9.84	8.27	0.75	8-0.71
125	139.7	70	250	210	19	8-M23
5	5.500	2.76	9.84	8.27	0.75	8-0.91
125	139.7	80	253	210	19	8-M18
5	5.500	3.15	9.96	8.27	0.75	8-0.71
125	141.3	70	254	216	19	8-M22
5	5.563	2.76	10.00	8.50	0.75	8-0.87
150	159.0	70	285	240	19	8-M22
6	6.250	2.76	11.22	9.45	0.75	8-0.87
150	165.1	70	285	240	19	8-M22
6	6.500	2.76	11.22	9.45	0.75	8-0.87
150	168.3	70	285	240	19	8-M22
6	6.625	2.76	11.22	9.45	0.75	8-0.87
200	216.3	75	330	290	19	12-M22
8	8.516	2.95	11.29	11.42	0.75	12-0.87
200	219.1	75	345	295	19	12-M22
8	8.625	2.95	13.58	11.61	0.75	12-0.87
250A	267.4	90	400	355	24	12-M25
10	10.528	3.54	15.748	13.98	0.945	12-0.98
250	273.0	90	405	362	22	12-M25
10	10.750	3.54	15.94	14.25	0.87	12-0.98
300A	318.5	95	445	400	24	16-M26
12	12.539	3.74	17.520	15.75	0.945	16-1.02
300	323.9	95	485	432	30	12-M26
12	12.750	3.74	19.09	17.01	1.18	12-1.02

- **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI (2.065MPa / 20.65bars)
- **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- **Size Range:** DN50 through DN300 (2" through 12")

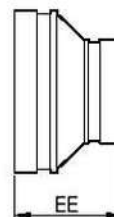
Concentric Reducer



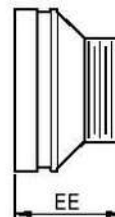
Style 240 Grooved Concentric Reducer



Style 240N Threaded Concentric Reducer



Style 240



Style 240N



Size			Style 240 Concentric Reducer	Style 240N Concentric Reducer
Run Pipe	X	Branch Pipe	EE	EE
mm	X	mm	mm	mm
Inches	X	Inches	Inches	Inches
42.4	X	33.7	64	64
1 1/4		1	2.50	2.50
48.3	X	33.7	64	64
1 1/2		1	2.50	2.50
		42.4	64	64
		1 1/4	2.50	2.50
60.3	X	33.7	64	64
2		1	2.50	2.50
		42.4	64	64
		1 1/4	2.50	2.50
		48.3	64	64
		1 1/2	2.50	2.50
73.0	X	33.7	64	64
2 1/2		1	2.50	2.50
		42.4	64	64
		1 1/4	2.50	2.50
		48.3	64	64
		1 1/2	2.50	2.50
		60.3	64	64
		2	2.50	2.50
76.1	X	33.7	64	64
2 1/2		1 1/2	2.50	2.50
		42.4	64	64
		1 1/4	2.50	2.50
		48.3	64	64
		1 1/2	2.50	2.50
		60.3	64	64
		2	2.50	2.50
88.9	X	33.7	64	64
3		1	2.50	2.50
		42.4	64	64
		1 1/4	2.50	2.50
		48.3	64	64
		1 1/2	2.50	2.50

Size			Style 240 Concentric Reducer	Style 240N Concentric Reducer
Run Pipe	X	Branch Pipe	EE	EE
mm	X	mm	mm	mm
Inches	X	Inches	Inches	Inches
88.9	X	60.3	64	64
3		2	2.50	2.50
		73.0	64	64
		2 1/2	2.50	2.50
		76.1	64	64
		2 1/2	2.50	2.50
114.3	X	33.7	76	76
4		1	3.00	3.00
		42.4	76	76
		1 1/4	3.00	3.00
		48.3	76	76
		1 1/2	3.00	3.00
		60.3	76	76
		2	3.00	3.00
		73.0	76	76
		2 1/2	3.00	3.00
		76.1	76	76
		2 1/2	3.00	3.00
		88.9	76	76
		3	3.00	3.00
139.7	X	33.7	89	89
5		1	3.50	3.50
		42.4	89	89
		1 1/4	3.50	3.50
		48.3	89	89
		1 1/2	3.50	3.50
		60.3	89	89
		2	3.50	3.50
		76.1	89	89
		2 1/2	3.50	3.50
		88.9	89	89
		3	3.50	3.50
		114.3	89	--
		4	3.50	--
141.3	X	33.7	89	89
5		1	3.50	3.50
		42.4	89	89
		1 1/4	3.50	3.50
		48.3	89	89
		1 1/2	3.50	3.50
		60.3	89	89
		2	3.50	3.50
		73.0	89	89
		2 1/2	3.50	3.50
		88.9	89	89
		3	3.50	3.50
		114.3	89	--
		4	3.50	--

- **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI(2.065MPa/ 20.65bars)
- **Housing Finish:** Fusion Bonded Epoxy Coated(Optional: Hot Deep Galvanized and Others)
- **Size Range:** DN32 X DN25 through DN300 X DN250 (1 1/4" X 1" through 12" X 10")

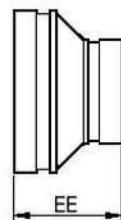
Concentric Reducer



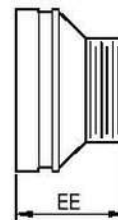
Style 240 Grooved Concentric Reducer



Style 240N Threaded Concentric Reducer



Style 240



Style 240N



Size			Style 240 Concentric Reducer	Style 240N Concentric Reducer
Run Pipe	X	Branch Pipe	EE	EE
mm	X	mm	mm	mm
Inches	X	Inches	Inches	Inches
165.1 6	X	33.7	102	102
		1	4.00	4.00
		42.4	102	102
		1 1/4	4.00	4.00
		48.3	102	102
		1 1/2	4.00	4.00
		60.3	102	102
		2	4.00	4.00
		76.1	102	102
		2 1/2	4.00	4.00
		88.9	102	102
		3	4.00	4.00
		114.3	102	--
		4	4.00	--
168.3 6	X	33.7	102	102
		1	4.00	4.00
		42.4	102	102
		1 1/4	4.00	4.00
		48.3	102	102
		1 1/2	4.00	4.00
		60.3	102	102
		2	4.00	4.00
		73.0	102	102
		2 1/2	4.00	4.00
		88.9	102	102
		3	4.00	4.00
		114.3	102	--
		4	4.00	--
216.3 8	X	33.7	127	127
		1	5.00	5.00
		141.3	127	127
		1 1/4	5.00	5.00
		48.3	127	127
		1 1/2	5.00	5.00
		60.3	127	127
		2	5.00	5.00
		73.0	127	127
		2 1/2	5.00	5.00
		88.9	127	127
		3	5.00	5.00
		114.3	127	--
		4	5.00	--

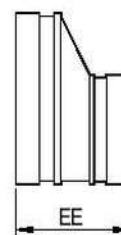
Size			Style 240 Concentric Reducer	Style 240N Concentric Reducer
Run Pipe	X	Branch Pipe	EE	EE
mm	X	mm	mm	mm
Inches	X	Inches	Inches	Inches
216.3 8	X	165.1	127	--
		6	5.00	--
		168.3	127	--
		6	5.00	--
		219.1	127	127
		1	5.00	5.00
		141.3	127	127
		1 1/4	5.00	5.00
		48.3	127	127
		1 1/2	5.00	5.00
		60.3	127	127
		2	5.00	5.00
		73.0	127	127
		2 1/2	5.00	5.00
273.0 10	X	114.3	152	--
		4	6.00	--
		139.7	152	--
		5	6.00	--
		141.3	152	--
		5	6.00	--
		165.1	152	--
		6	6.00	--
		168.3	152	--
		6	6.00	--
		219.1	152	--
		8	6.00	--
		323.9	178	--
		12	7.00	--
323.9 12	X	114.3	178	--
		4	7.00	--
		139.7	178	--
		5	7.00	--
		141.3	178	--
		5	7.00	--
		165.1	178	--
		6	7.00	--
		168.3	178	--
		6	7.00	--
		219.1	178	--
		8	7.00	--
		273.0	178	--
		10	7.00	--

Eccentric Reducer

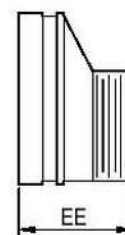


Style 230 Grooved Eccentric Reducer

Style 230N Threaded Eccentric Reducer



Style 230



Style 230N



Size			Style 230 Eccentric Reducer	Style 230N Eccentric Reducer
Run Pipe	X	Branch Pipe	EE	EE
mm Inches	X	mm Inches	mm Inches	mm Inches
42.4	X	33.7	64	64
1 1/4		1	2.50	2.50
48.3	X	33.4	64	64
1 1/2		1	2.50	2.50
		42.4	64	64
		1 1/4	2.50	2.50
60.3	X	33.7	64	64
2		1	2.50	2.50
		42.4	64	64
		1 1/4	2.50	2.50
		48.3	64	64
		1 1/2	2.50	2.50
73.0	X	33.7	64	64
2 1/2		1	2.50	2.50
		42.4	64	64
		1 1/4	2.50	2.50
		48.3	64	64
		1 1/2	2.50	2.50
		60.3	64	64
		2	2.50	2.50
76.1	X	33.7	64	64
2 1/2		1 1/2	2.50	2.50
		42.4	64	64
		1 1/4	2.50	2.50
		48.3	64	64
		1 1/2	2.50	2.50
		60.3	64	64
		2	2.50	2.50
88.9	X	33.7	64	64
3		1	2.50	2.50
		42.4	64	64
		1 1/4	2.50	2.50
		48.3	64	64
		1 1/2	2.50	2.50
		60.3	64	64
		2	2.50	2.50
		73.0	64	64
		2 1/2	2.50	2.50
		76.1	64	64
		2 1/2	2.50	2.50
108.0	X	33.7	76	76
4		1	3.00	3.00
		42.4	76	76
		1 1/4	3.00	3.00
		48.3	76	76
		1 1/2	3.00	3.00

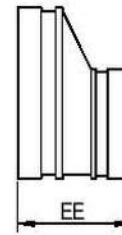
Size			Style 230 Eccentric Reducer	Style 230N Eccentric Reducer
Run Pipe	X	Branch Pipe	EE	EE
mm Inches	X	mm Inches	mm Inches	mm Inches
108.0	X	60.3	76	76
4		2	3.00	3.00
		76.1	76	76
		2 1/2	3.00	3.00
		88.9	76	76
		3	3.00	3.00
114.3	X	33.7	76	76
4		1	3.00	3.00
		42.4	76	76
		1 1/4	3.00	3.00
		48.3	76	76
		1 1/2	3.00	3.00
		60.3	76	76
		2	3.00	3.00
		73.0	76	76
		2 1/2	3.00	3.00
		76.1	76	76
		2 1/2	3.00	3.00
		88.9	76	76
		3	3.00	3.00
133.0	X	60.3	89	89
5		2	3.50	3.50
		76.1	89	89
		2 1/2	3.50	3.50
		88.9	89	89
		3	3.50	3.50
		108.0	89	--
		4	3.50	--
		114.3	89	--
		4	3.50	--
139.7	X	60.3	89	89
5		2	3.50	3.50
		76.1	89	89
		2 1/2	3.50	3.50
		88.9	89	89
		3	3.50	3.50
		108.0	89	--
		4	3.50	--
		114.3	89	--
		4	3.50	--
141.3	X	60.3	89	89
5		2	3.50	3.50
		73.0	89	89
		2 1/2	3.50	3.50
		88.9	89	89
		3	3.50	3.50
		114.3	89	--
		4	3.50	--

Eccentric Reducer

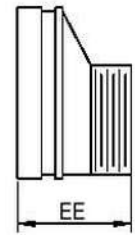


Style 230 Grooved Eccentric Reducer

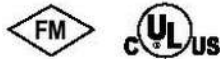
Style 230N Threaded Eccentric Reducer



Style 230



Style 230N



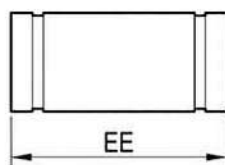
Size			Style 230 Eccentric Reducer	Style 230N Eccentric Reducer
Run Pipe	X	Branch Pipe	EE	EE
mm Inches	X	mm Inches	mm Inches	mm Inches
159.0 6	X	60.3	102	102
		2	4.00	4.00
		76.1	102	102
		2 1/2	4.00	4.00
		88.9	102	102
		3	4.00	4.00
		108.0	102	--
		4	4.00	--
		114.3	102	--
		4	4.00	--
165.1 6	X	60.3	102	102
		2	4.00	4.00
		76.1	102	102
		2 1/2	4.00	4.00
		88.9	102	102
		3	4.00	4.00
		108.0	102	--
		4	4.00	--
		114.3	102	--
		4	4.00	--
168.3 6	X	60.3	102	102
		2	4.00	4.00
		73.0	102	102
		2 1/2	4.00	4.00
		88.9	102	102
		3	4.00	4.00
		114.3	102	--
		4	4.00	--
		141.3	102	--
		5	4.00	--

Size			Style 230 Eccentric Reducer	Style 230N Eccentric Reducer
Run Pipe	X	Branch Pipe	EE	EE
mm Inches	X	mm Inches	mm Inches	mm Inches
216.3 8	X	60.3	127	127
		2	5.00	5.00
		73.0	127	127
		2 1/2	5.00	5.00
		76.1	127	127
		2 1/2	5.00	5.00
		88.9	127	127
		3	5.00	5.00
		108.0	127	--
		4	5.00	--
219.1 8	X	60.3	127	127
		2	5.00	5.00
		73.0	127	127
		2 1/2	5.00	5.00
		76.1	127	127
		2 1/2	5.00	5.00
		88.9	127	127
		3	5.00	5.00
		108.0	127	--
		4	5.00	--

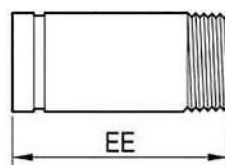
Size			Style 230 Eccentric Reducer	Style 230N Eccentric Reducer
Run Pipe	X	Branch Pipe	EE	EE
mm Inches	X	mm Inches	mm Inches	mm Inches
219.1 8	X	114.3	127	--
		4	5.00	--
		133.0	127	--
		5	5.00	--
		139.7	127	--
		5	5.00	--
		141.3	127	--
		5	5.00	--
		159.0	127	--
		6	5.00	--
273.0 10	X	108.0	152	--
		4	6.00	--
		114.3	152	--
		4	6.00	--
		133.0	152	--
		5	6.00	--
		139.7	152	--
		5	6.00	--
		141.3	152	--
		5	6.00	--
323.9 12	X	108.0	178	--
		4	7.00	--
		114.3	178	--
		4	7.00	--
		133.0	178	--
		5	7.00	--
		139.7	178	--
		5	7.00	--
		141.3	178	--
		5	7.00	--

- **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI (2.065MPa / 20.65kgf/cm²)
- **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)
- **Size Range:** DN32 X DN25 through DN300 X DN250 (1 1/4" X 1" through 12" X 10")

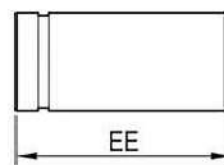
Nipple



Style 018GG



Style 018GT



Style 018GB

- The table EE value is the standard value, but can also be customized according to user requirements length
- Nipple's wall thickness is the standard US' SCH40 thickness, weight is based on the wall thickness, but also according to user requirements choose a different wall thickness
- Standard cutting groove, but also can do the rolling groove

Size		Style018GG Grooved X Grooved Nipple	Style018GT Grooved X Threaded Nipple	Style 018GB Grooved X Bevel Nipple
Nominal Dia.	Actual O.D.	EE	EE	EE
DN	mm	mm	mm	mm
Inches	Inches	Inches	Inches	Inches
25	33.7	76	76	76
1	1.327	3.00	3.00	3.00
32	42.4	102	102	102
1 1/4	1.660	4.00	4.00	4.00
40	48.3	102	102	102
1 1/2	1.900	4.00	4.00	4.00
50	60.3	102	102	102
2	2.375	4.00	4.00	4.00
65	73.0	102	102	102
2 1/2	2.875	4.00	4.00	4.00
65	76.1	102	102	102
2 1/2	3.000	4.00	4.00	4.00
80	88.9	102	102	102
3	3.500	4.00	4.00	4.00
100	108.0	152	---	152
4	4.250	6.00	---	6.00
100	114.3	152	---	152
4	4.500	6.00	---	6.00
125	133.0	152	---	152
5	5.250	6.00	---	6.00
125	139.7	152	---	152
5	5.500	6.00	---	6.00
125	141.3	152	---	152
5	5.563	6.00	---	6.00
150	159.0	152	---	152
6	6.250	6.00	---	6.00
150	165.1	152	---	152
6	6.500	6.00	---	6.00
150	168.3	152	---	152
6	6.625	6.00	---	6.00
200A	216.3	152	---	152
8	8.516	6.00	---	6.00
200	219.1	152	---	152
8	8.625	6.00	---	6.00
250A	267.4	203	---	203
10	10.528	8.00	---	8.00
250	273.0	203	---	203
10	10.750	8.00	---	8.00
300A	318.5	203	---	203
12	12.539	8.00	---	8.00
300	323.9	203	---	203
12	12.750	8.00	---	8.00

♦ Housing material: Steel

♦ Housing Finish: Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)

♦ Size Range: DN25 through DN300 (1" through 12")



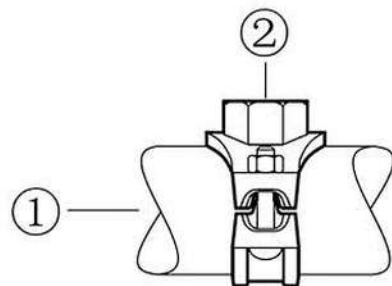
- ◆ Branch outlet fitting is a supplement to the grooved piping system. It is a very important piping unit in the mechanical piping system. The appearance of the branch outlet fitting makes the installation of the piping system more convenient and quick. Branch outlet fittings replaced welding and reducing Tee, to solve the problem of the connection branch.
- ◆ Branch outlet fitting is another way of piping innovation, is the use of bolted connections branch pipe fittings. No need to weld directly from the supervisor on the branch pipe. The method used is in the need to take over the main branch pipe processing a round hole, fitted with branch outlet housing. The opening must be secured on the centerline of the pipe and be mechanically perforated by a dedicated opening.
- ◆ LIFECO branch outlet fitting, including mechanical tee, mechanical cross, U-bolt.

Flow Data

The flow coefficient and flow resistance of the product at 16 °C (60 F) are shown in the table on the right.

Since the pressure of the medium varies across the manifolds, the connection of the product functions best when the medium flows between ① and ②. As shown below.

The physical relationship between the various parameters under different pressures can be calculated from the formula on the right and from the data on the right.



Formulas for CV Values:

$$\Delta P = \frac{Q^2}{C_v^2}$$

$$Q = C_v \times \sqrt{\Delta P}$$

注:

ΔP : Pressure Drop, MPa

Q : Flow, L/min

C_v : Flow Coefficient

Size		C _v Values	Equiv. of Pipe		Size		C _v Values	Equiv. of Pipe	
Nominal Dia.	Actual O.D.		Grooved	Threaded	Nominal Dia.	Actual O.D.		Grooved	Threaded
DN Inches	mm Inches		m Feet	m Feet	DN Inches	mm Inches		m Feet	m Feet
15	21.3	775	---	0.6	65	73.0	6154	3.4	3.8
1/2	0.840		---	2.0	2 1/2	2.875		11.0	12.5
20	26.9	957	---	1.2	65	76.1	6154	3.4	3.8
3/4	1.050		---	4.0	2 1/2	3.000		11.0	12.5
25	33.7	1140	---	1.5	80	88.9	9117	4.1	4.7
1	1.327		---	5.0	3	3.500		13.5	15.5
32	42.4	2051	1.7	1.8	100	108.0	18234	6.1	6.7
1 1/4	1.660		5.5	6.0	4	4.250		20.0	22.0
40	48.3	2735	2.1	2.4	100	114.3	18234	6.1	6.7
1 1/2	1.900		7.0	8.0	4	4.500		20.0	22.0
50	60.3	4558	2.7	3.2					
2	2.375		9.0	10.5					

Mechanical Cross



Mechanical cross description:

- ◆ Model 3GG grooved mechanical cross is built by 2 pieces of model 3G's outlet housing.
- ◆ Model 3JJ threaded mechanical cross is built by 2 pieces of model 3J's outlet housing

All sizes of 3G / 3J mechanical tee can be combined into a mechanical cross, but must be combined according to certain principles, otherwise it will affect the strength of the pipeline, see the table on the right.

In the sprinkler system, the use of mechanical cross should be in accordance with the following principles, otherwise it will affect the strength of the pipeline:

Run Pipe Size		Max. Branch Pipe Size			
Nominal Dia.	Actual O.D.	Mechanical Tee		Mechanical Cross	
		Nominal Dia.	Actual O.D.	Nominal Dia.	Actual O.D.
DN Inches	mm Inches	DN Inches	mm Inches	DN Inches	mm Inches
50	60.3	25	33.7	25	33.7
2	2.375	1	1.327	1	1.327
65	73.0	40	48.3	32	42.4
2½	2.875	1½	1.900	1¼	1.660
65	76.1	40	48.3	32	42.4
2½	3.000	1½	1.900	1¼	1.660
80	88.9	50	60.3	40	48.3
3	3.500	2	2.375	1½	1.900
100	108.0	65	76.1	50	60.3
4	4.250	2½	3.000	2	2.375
100	114.3	80	88.9	50	60.3
4	4.500	3	3.500	2	2.375
125	133.0	80	88.9	76.1	40
5	5.250	3	3.500	3.000	1½
125	139.7	80	88.9	76.1	40
5	5.500	3	3.500	3.000	1½
125	141.3	80	88.9	73.0	40
5	5.563	3	3.500	2.875	1½
150	159.0	100	114.3	88.9	50
6	6.250	4	4.500	3.500	2
150	165.1	100	114.3	88.9	50
6	6.500	4	4.500	3.500	2
150	168.3	100	114.3	88.9	50
6	6.625	4	4.500	3.500	2
200	219.1	100	114.3	100	114.3
8	8.625	4	4.500	4	4.500

- ◆ With mechanical outlet fittings, the branch pipe can be built directly from the main pipe without welding.
- ◆ Gasket designed with the pipe arc to pipe surface, so as to achieve a more ideal sealing effect.
- ◆ Hole cut must be ensured on the center line of the pipe and be perforated by hole saw.



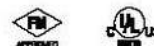
Style 3G Grooved Outlet Mechanical Tee
DN65X25~DN200X100
2X1 1/8X4"
60.3X33.7mm~219.1X114.3mm



Style 3J Threaded Outlet Mechanical Tee
DN65X15~DN200X80
2 1/2X1 1/2~8X3"
60.3X21.3mm~219.1X88.9mm



Style 3L U-bolt Mechanical Tee
DN32X15~DN65X25
1 1/8X1 1/2~2 1/2X1"
42.4X21.3mm~76.1X33.7mm



Style 3CC Grooved Mechanical Cross

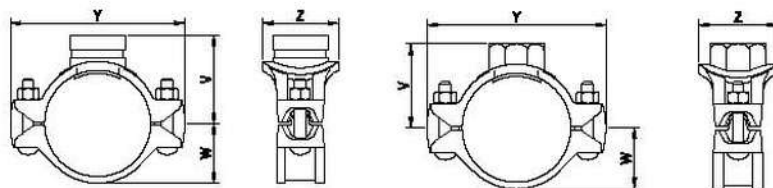


Style 3RR Threaded Mechanical Cross



Style 3CR Grooved/Threaded Mechanical Cross

Mechanical Tee



Style 3G

Style 3I

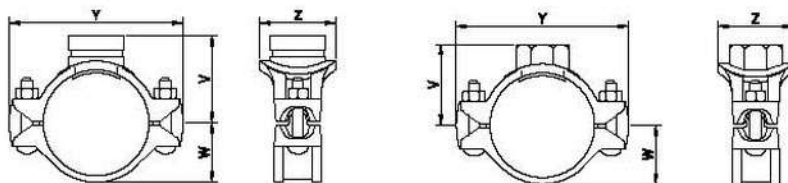
 Style 3G Grooved Outlet
Mechanical Tee

 Style 3I Threaded Outlet
Mechanical Tee


- By using the bolting method, the branch pipe is directly connected with the main pipe without welding
- All products have 21.3mm (1/2") outlets and 26.9mm (3/4") outlets are the same as 33.4mm (1") outlets.
- Enhanced body resists 4 times working pressure.

Size			Max. Work Pressure	Hole Size	Dimensions					Bolt/Nut Size
Run Pipe	X	Branch Pipe			W	Y	Z	3G V	3I V	
mm	X	mm	KPa	mm	mm	mm	mm	mm	mm	mm
Inches	X	Inches	PSI	Inches	Inches	Inches	Inches	Inches	Inches	Inches
60.3 2	X	33.7	3450	38	35	128	70	63	62	M12X60
		1	500	1.50	1.38	5.04	2.76	2.48	2.44	1/2 X 2 1/2
		42.4	3450	44.5	35	128	77	63	60	M12X60
		1 1/4	500	1.75	1.38	5.04	3.03	2.48	2.36	1/2 X 2 1/2
		48.3	3450	44.5	35	128	77	63	60	M12X60
73.0 2 1/2	X	33.7	3450	38	42	139	69	70	69	M12X75
		1	500	1.50	1.65	5.47	2.72	2.76	2.72	1/2 X 3
		42.4	3450	44.5	42	139	77	70	71	M12X75
		1 1/4	500	1.75	1.65	5.47	3.03	2.76	2.80	1/2 X 3
		48.3	3450	51	42	139	83	70	71	M12X75
76.1 2 1/2	X	33.7	3450	38	43	142	69	72	68	M12X75
		1	500	1.50	1.69	5.59	2.72	2.83	2.68	1/2 X 3
		42.4	3450	44.5	43	142	77	72	69	M12X75
		1 1/4	500	1.75	1.69	5.59	3.03	2.83	2.72	1/2 X 3
		48.3	3450	51	43	142	83	72	69	M12X75
88.9 3	X	33.7	3450	38	50	152	69	77	76	M12X75
		1	500	1.50	1.97	5.98	2.72	3.03	2.99	1/2 X 3
		42.4	3450	44.5	50	152	75	78	79	M12X75
		1 1/4	500	1.75	1.97	5.98	2.95	3.07	3.11	1/2 X 3
		48.3	3450	51	50	152	83	78	79	M12X75
108.0 4	X	33.7	3450	38	60	173	69	--	84	M12X75
		1	500	1.50	2.36	6.81	2.72	--	3.31	1/2 X 3
		42.4	3450	44.5	60	173	75	--	85	M12X75
		1 1/4	500	1.75	2.36	6.81	2.95	--	3.35	1/2 X 3
		48.3	3450	51	60	173	83	--	85	M12X75
114.3 4	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
127.0 5	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
154.0 6	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
190.5 7 1/2	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
219.1 8 1/2	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
273.1 10 3/4	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
304.8 12	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
330.3 13	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
356.8 14	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
384.1 15	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
412.7 16	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
442.7 17	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
474.1 18	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
507.3 20	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
541.9 21	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
579.9 22	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
610.3 24	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
640.3 26	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
670.3 28	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
700.3 30	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
730.3 32	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
760.3 34	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
790.3 36	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500	1.75	2.48	7.05	2.95	3.58	3.46	1/2 X 3
		48.3	3450	51	63	179	83	91	88	M12X75
820.3 38	X	33.7	3450	38	63	179	69	91	87	M12X75
		1	500	1.50	2.48	7.05	2.72	3.58	3.42	1/2 X 3
		42.4	3450	44.5	63	179	75	91	88	M12X75
		1 1/4	500							

Mechanical Tee



Style 3G

Style 3J

Style 3G Grooved Outlet
Mechanical Tee



Style 3J Threaded Outlet
Mechanical Tee

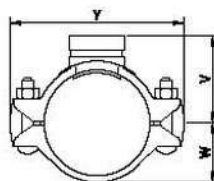


- By using the bolting method, the branch pipe is directly connected with the main pipe without welding
- All products have 21.3mm (1/2") outlets and 26.9mm (3/4") outlets are the same as 33.4mm (1") outlets.
- Enhanced body resists 4 times working pressure.

Size			Max. Work Pressure	Hole Size	Dimensions					Bolt/Nut Size
Run Pipe	X	Branch Pipe			W	Y	Z	3G V	3J V	
mm	X	mm	KPa	mm	mm	mm	mm	mm	mm	mm
Inches	X	Inches	PSI	Inches	Inches	Inches	Inches	Inches	Inches	Inches
133.0 5	X	33.7	3450	38	73	216	69	--	97	M16X90
		1	500	1.50	2.87	8.50	2.72	--	3.82	3/4"X3/4"
		42.4	3450	44.5	73	216	75	--	97	M16X90
		1 1/4	500	1.75	2.87	8.50	2.95	--	3.82	3/4"X3/4"
		48.3	3450	51	73	216	83	--	97	M16X90
		1 1/2	500	2.00	2.87	8.50	3.27	--	3.82	3/4"X3/4"
		60.3	3450	64	73	216	95	104	102	M16X90
		2	500	2.50	2.87	8.50	3.74	4.09	4.02	3/4"X3/4"
		76.1	3450	70	73	216	106	104	109	M16X90
		2 1/2	500	2.75	2.87	8.50	4.17	4.09	4.29	3/4"X3/4"
139.7 5	X	33.7	3450	38	76	222	69	105	99	M16X90
		1	500	1.50	2.99	8.74	2.72	4.13	3.90	3/4"X3/4"
		42.4	3450	44.5	76	222	75	105	101	M16X90
		1 1/4	500	1.75	2.99	8.74	2.95	4.13	3.98	3/4"X3/4"
		48.3	3450	51	76	222	83	107	101	M16X90
		1 1/2	500	2.00	2.99	8.74	3.27	4.21	3.98	3/4"X3/4"
		60.3	3450	64	76	222	95	107	105	M16X90
		2	500	2.50	2.99	8.74	3.74	4.21	4.13	3/4"X3/4"
		76.1	3450	70	76	222	106	108	112	M16X90
		2 1/2	500	2.75	2.99	8.74	4.17	4.25	4.41	3/4"X3/4"
141.3 5	X	33.7	3450	38	77	224	69	106	100	M16X90
		1	500	1.50	3.03	8.97	2.72	4.17	3.94	3/4"X3/4"
		42.4	3450	44.5	77	224	75	106	102	M16X90
		1 1/4	500	1.75	3.03	8.97	2.95	4.17	4.02	3/4"X3/4"
		48.3	3450	51	77	224	83	106	102	M16X90
		1 1/2	500	2.00	3.03	8.97	3.27	4.17	4.02	3/4"X3/4"
		60.3	3450	64	77	224	95	108	106	M16X90
		2	500	2.50	3.03	8.97	3.74	4.25	4.17	3/4"X3/4"
		73.0	3450	70	77	224	106	108	112	M16X90
		2 1/2	500	2.75	3.03	8.97	4.17	4.25	4.41	3/4"X3/4"
159.0 5	X	33.7	3450	38	86	244	69	--	110	M16X90
		1	500	1.50	3.76	9.61	2.72	--	4.33	3/4"X3/4"
		42.4	3450	44.5	86	244	75	--	111	M16X90
		1 1/4	500	1.75	3.76	9.61	2.95	--	4.37	3/4"X3/4"
		48.3	3450	51	86	244	83	--	111	M16X90
		1 1/2	500	2.00	3.76	9.61	3.27	--	4.37	3/4"X3/4"
		60.3	3450	64	86	244	95	118	115	M16X90
		2	500	2.50	3.76	9.61	3.74	4.65	4.53	3/4"X3/4"
		76.1	3450	70	86	244	106	118	121	M16X90
		2 1/2	500	2.75	3.76	9.61	4.17	4.65	4.76	3/4"X3/4"
108.0 4	X	33.7	3450	38	86	244	69	--	--	--
		1	500	1.50	3.76	9.61	2.72	--	--	--
		42.4	3450	44.5	86	244	75	--	--	--
		1 1/4	500	1.75	3.76	9.61	2.95	--	--	--
114.3 4	X	33.7	3450	38	86	244	69	--	--	--
		1	500	1.50	3.76	9.61	2.72	--	--	--
		42.4	3450	44.5	86	244	75	--	--	--
		1 1/4	500	1.75	3.76	9.61	2.95	--	--	--

- **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.
- **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI(2.065MPa / 20.65bars)
- **Housing Finish:** Fusion Bonded Epoxy Coated(Optional: Hot Deep Galvanized and Others)
- **Coupling gasket material:** EPDM(Optional: Nitrile NBR, Silicone and Others)
- **Bolts and Nuts:** Heat treated and electro galvanized bolts with oval neck, and heavy duty hexagon nuts. Track head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.
- **Size Range:** DN50 X DN25 through DN200 X DN100 (2" X 1" through 8" X 4")

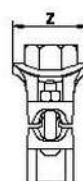
Mechanical Tee



Style 3G



Style 3J


 Style 3G Grooved Outlet
Mechanical Tee

 Style 3J Threaded Outlet
Mechanical Tee


- By using the bolting method, the branch pipe is directly connected with the main pipe without welding
- All products have 21.3mm (1/2") outlets and 26.9mm (3/4") outlets are the same as 33.4mm (1") outlets.
- Enhanced body resists 4 times working pressure.

Size			Max. Work Pressure	Hole Size	Dimensions					Bolt/Nut Size
Run Pipe	X	Branch Pipe			W	Y	Z	3G V	3J V	
mm	X	mm	KPa	mm	mm	mm	mm	mm	mm	mm
Inches	X	Inches	PSI	Inches	Inches	Inches	Inches	Inches	Inches	Inches
165.1 6	X	33.7	3450	38	89	250	69	118	103	M16x90
		1	500	1.50	3.50	9.84	2.72	4.65	4.06	3/4x3/4
		42.4	3450	44.5	89	250	75	119	115	M16x90
		1 1/2	500	1.75	3.50	9.84	2.95	4.69	4.53	3/4x3/4
		48.3	3450	51	89	250	83	121	115	M16x90
		1 1/2	500	2.00	3.50	9.84	3.27	4.76	4.53	3/4x3/4
		60.3	3450	64	89	250	95	121	119	M16x90
		2	500	2.50	3.50	9.84	3.74	4.76	4.69	3/4x3/4
		76.1	3450	70	89	250	106	121	124	M16x90
		2 1/2	500	2.75	3.50	9.84	4.17	4.76	4.88	3/4x3/4
		88.9	3450	89	89	250	126	121	126	M16x90
		3	500	3.50	3.50	9.84	4.96	4.76	4.96	3/4x3/4
		108.0	3450	114	89	250	154	124	126	M16x90
		4	500	4.50	3.50	9.84	6.06	4.88	4.96	3/4x3/4
		114.3	3450	114	89	250	154	124	126	M16x90
		4	500	4.50	3.50	9.84	6.06	4.88	4.96	3/4x3/4
		168.3	3450	168	91	253	69	120	115	M16x90
		6	500	1.50	3.58	9.96	2.72	4.72	4.53	3/4x3/4
		42.4	3450	44.5	91	253	75	120	116	M16x90
		1 1/2	500	1.75	3.58	9.96	2.95	4.72	4.57	3/4x3/4
		48.3	3450	51	91	253	83	123	116	M16x90
		1 1/2	500	2.00	3.58	9.96	3.27	4.84	4.57	3/4x3/4
216.3 8	X	33.7	3450	38	118	317	69	145	138	M20x115
		1	500	1.50	4.65	12.48	2.72	5.71	5.43	3/4x4
		42.4	3450	44.5	118	317	75	145	140	M20x115
		1 1/2	500	1.75	4.65	12.48	2.95	5.71	5.51	3/4x4
		48.3	3450	51	118	317	83	147	140	M20x115
		1 1/2	500	2.00	4.65	12.48	3.27	5.79	5.51	3/4x4
		60.3	3450	64	118	317	95	147	144	M20x115
		2	500	2.50	4.65	12.48	3.74	5.79	5.67	3/4x4
		73.0	3450	70	118	317	106	147	149	M20x115
		2 1/2	500	2.75	4.65	12.48	4.17	5.79	5.87	3/4x4
		76.1	3450	70	118	317	106	147	151	M20x115
		2 1/2	500	2.75	4.65	12.48	4.17	5.79	5.94	3/4x4
		88.9	3450	89	118	317	126	147	-	M20x115
		3	500	3.50	4.65	12.48	4.96	5.79	-	3/4x4
		108.0	3450	114	118	317	154	147	-	M20x115
		4	500	4.50	4.65	12.48	6.06	5.79	-	3/4x4
		114.3	3450	114	118	317	154	147	-	M20x115
		4	500	4.50	4.65	12.48	6.06	5.79	-	3/4x4
		219.1	3450	219	118	320	69	145	138	M20x115
		8	500	1.50	4.65	12.6	2.72	5.71	5.43	3/4x4
		42.4	3450	44.5	118	320	75	145	140	M20x115
		1 1/2	500	1.75	4.65	12.6	2.95	5.71	5.51	3/4x4
		48.3	3450	51	118	320	83	147	140	M20x115
		1 1/2	500	2.00	4.65	12.6	3.27	5.79	5.51	3/4x4
		60.3	3450	64	118	320	95	147	144	M20x115
		2	500	2.50	4.65	12.6	3.74	5.79	5.67	3/4x4
		73.0	3450	70	118	320	106	147	149	M20x115
		2 1/2	500	2.75	4.65	12.6	4.17	5.79	5.87	3/4x4
		76.1	3450	70	118	320	106	147	151	M20x115
		2 1/2	500	2.75	4.65	12.6	4.17	5.79	5.94	3/4x4
		88.9	3450	89	118	320	126	147	151	M20x115
		3	500	3.50	4.65	12.6	4.96	5.79	5.94	3/4x4
		108.0	3450	114	118	320	154	147	151	M20x115
		4	500	4.50	4.65	12.6	6.06	5.79	5.94	3/4x4
		114.3	3450	114	118	320	154	147	151	M20x115
		4	500	4.50	4.65	12.6	6.06	5.79	5.94	3/4x4

 • **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.

 • **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI (2.065MPa / 20.65bars)

 • **Housing Finish:** Fusion Bonded Epoxy Coated (Optional: Hot Deep Galvanized and Others)

 • **Coupling gasket material:** EPDM (Optional: Nitrile NBR, Silicone and Others)

 • **Bolts and Nuts:** Heat treated and electro galvanized bolts with oval neck, and heavy duty hexagon nuts. Track head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.

 • **Size Range:** DN50 X DN25 through DN200 X DN100 (2" X 1" through 8" X 4")

Mechanical Cross

Mechanical Tee, all the sizes can be combined into a mechanical cross. But it should be in accordance with certain principles of combination, otherwise it will affect pipe strength.

This table shows the principle of combination.

★ Can be combined into mechanical cross.

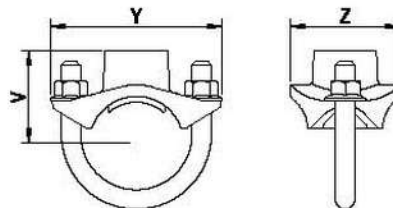
※ Not recommended to assemble a mechanical cross.



Size			Branch Pipe							
Run Pipe	X	Branch Pipe	33.7 1	42.4 1 1/4	48.3 1 1/4	60.3 2	73.0 2 1/2	76.1 2 1/2	88.9 3	
73.0 2 1/2	X	33.4 1	★	★	★					
		42.4 1 1/4	★	★	★					
		48.3 1 1/2	★	★	※					
76.1 2 1/2	X	33.7 1	★	★	★					
		42.4 1 1/4	★	★	★					
		48.3 1 1/2	★	★	※					
88.9 3	X	33.7 1	★	★	★	★				
		42.4 1 1/4	★	★	★	★				
		48.3 1 1/2	★	★	★	★				
		60.3 2	★	★	★	※				
		76.1 2 1/2	★	★	★	※				
108.0 4	X	33.7 1	★	★	★	★		★		
		42.4 1 1/4	★	★	★	★		★		
		48.3 1 1/2	★	★	★	★		★		
		60.3 2	★	★	★	★		※		
		76.1 2 1/2	★	★	★	※		※		
114.3 4	X	33.7 1	★	★	★	★	★	★	★	
		42.4 1 1/4	★	★	★	★	★	★	★	
		48.3 1 1/2	★	★	★	★	★	★	★	
		60.3 2	★	★	★	★	※	※	※	
		73.0 2 1/2	★	★	★	※	※	※	※	
		76.1 2 1/2	★	★	★	※	※	※	※	
		88.9 3	★	★	★	※	※	※	※	
		108.0 4	★	★	★	★	★	★	★	★
133.0 5	X	33.7 1	★	★	★	★		★	★	
		42.4 1 1/4	★	★	★	★		★	★	
		48.3 1 1/2	★	★	★	★		★	★	
		60.3 2	★	★	★	★		★	★	
		76.1 2 1/2	★	★	★	★		★	※	
		88.9 3	★	★	★	★		※	※	
		108.0 4	★	★	★	★		★	★	★
		114.3 4	★	★	★	★		★	★	★
139.7 5	X	33.7 1	★	★	★	★		★	★	
		42.4 1 1/4	★	★	★	★		★	★	
		48.3 1 1/2	★	★	★	★		★	★	
		60.3 2	★	★	★	★		★	★	
		76.1 2 1/2	★	★	★	★		★	※	
		88.9 3	★	★	★	★		※	※	
		108.0 4	★	★	★	★		★	★	★
		114.3 4	★	★	★	★		★	★	★

Size			Branch Pipe									
Run Pipe	X	Branch Pipe	33.7 1	42.4 1 1/4	48.3 1 1/4	60.3 2	73.0 2 1/2	76.1 2 1/2	88.9 3	108.0 4	114.3 4	
141.3 5	X	33.7 1	★	★	★	★	★		★			
		42.4 1 1/4	★	★	★	★	★		★			
		48.3 1 1/2	★	★	★	★	★		★			
		60.3 2	★	★	★	★	★		★			
		73.0 2 1/2	★	★	★	★	★		※			
		88.9 3	★	★	★	★	※		※			
		108.0 4	★	★	★	★	★		★	★	★	★
159.0 6	X	33.7 1	★	★	★	★		★	★	★	★	
		42.4 1 1/4	★	★	★	★		★	★	★	★	
		48.3 1 1/2	★	★	★	★		★	★	★	★	
		60.3 2	★	★	★	★		★	★	★	★	
		76.1 2 1/2	★	★	★	★		★	★	★	★	
		88.9 3	★	★	★	★		★	★	※	※	
		108.0 4	★	★	★	★		★	※	※	※	
		114.3 4	★	★	★	★		★	※	※	※	
165.1 6	X	33.7 1	★	★	★	★		★	★	★	★	
		42.4 1 1/4	★	★	★	★		★	★	★	★	
		48.3 1 1/2	★	★	★	★		★	★	★	★	
		60.3 2	★	★	★	★		★	★	★	★	
		76.1 2 1/2	★	★	★	★		★	★	★	★	
		88.9 3	★	★	★	★		★	★	※	※	
		108.0 4	★	★	★	★		★	※	※	※	
		114.3 4	★	★	★	★		★	※	※	※	
168.3 6	X	33.7 1	★	★	★	★		★		★		
		42.4 1 1/4	★	★	★	★		★		★		
		48.3 1 1/2	★	★	★	★		★		★		
		60.3 2	★	★	★	★		★		★		
		76.1 2 1/2	★	★	★	★		★		★		
		88.9 3	★	★	★	★		★		★		
		108.0 4	★	★	★	★		★		★	★	★
		114.3 4	★	★	★	★		★		★	★	★
219.1 8	X	33.7 1	★	★	★	★	★	★	★	★	★	
		42.4 1 1/4	★	★	★	★	★	★	★	★	★	
		48.3 1 1/2	★	★	★	★	★	★	★	★	★	
		60.3 2	★	★	★	★	★	★	★	★	★	
		73.0 2 1/2	★	★	★	★	★	★	★	★	★	
		76.1 2 1/2	★	★	★	★	★	★	★	★	★	
		88.9 3	★	★	★	★	★	★	★	★	★	
		108.0 4	★	★	★	★	★	★	★	★	★	★
219.1 8	X	33.7 1	★	★	★	★	★	★	★	★	★	
		42.4 1 1/4	★	★	★	★	★	★	★	★	★	
		48.3 1 1/2	★	★	★	★	★	★	★	★	★	
		60.3 2	★	★	★	★	★	★	★	★	★	
		73.0 2 1/2	★	★	★	★	★	★	★	★	★	
		76.1 2 1/2	★	★	★	★	★	★	★	★	★	
		88.9 3	★	★	★	★	★	★	★	★	★	
		108.0 4	★	★	★	★	★	★	★	★	★	★
219.1 8	X	33.7 1	★	★	★	★	★	★	★	★	★	
		42.4 1 1/4	★	★	★	★	★	★	★	★	★	
		48.3 1 1/2	★	★	★	★	★	★	★	★	★	
		60.3 2	★	★	★	★	★	★	★	★	★	
		73.0 2 1/2	★	★	★	★	★	★	★	★	★	
		76.1 2 1/2	★	★	★	★	★	★	★	★	★	
		88.9 3	★	★	★	★	★	★	★	★	★	
		108.0 4	★	★	★	★	★	★	★	★	★	★
219.1 8	X	33.7 1	★	★	★	★	★	★	★	★	★	
		42.4 1 1/4	★	★	★	★	★	★	★	★	★	
		48.3 1 1/2	★	★	★	★	★	★	★	★	★	
		60.3 2	★	★	★	★	★	★	★	★	★	
		73.0 2 1/2	★	★	★	★	★	★	★	★	★	
		76.1 2 1/2	★	★	★	★	★	★	★	★	★	
		88.9 3	★	★	★	★	★	★	★	★	★	
		108.0 4	★	★	★	★	★	★	★	★	★	★

Mechanical Tee



Style 3L U-bolt Mechanical Tee



- U-bolt replaces cover part, without welding, directly from the main pipe branch
- Enhanced body resists 4 times working pressure.

Size			Max. Work Pressure	Hole Size	Dimensions			Bolt/Nut Size
Run Pipe	X	Branch Pipe			Y	Z	V	
mm	X	mm	KPa	mm	mm	mm	mm	mm
Inches	X	Inches	PSI	Inches	Inches	Inches	Inches	Inches
33.7 1	X	21.3	2500	25	78	45	37	M10 X 60 X 28
		1/2	350	0.98	3.07	1.77	1.46	3/8 X 2 1/2 X 1 1/2
		26.9	2500	25	78	45	37	M10 X 60 X 28
		3/4	350	0.98	3.07	1.77	1.46	3/8 X 2 1/2 X 1 1/2
42.4 1 1/4	X	21.3	2500	30.5	87	57	42	M10 X 68 X 38
		1/2	350	1.20	3.43	2.25	1.65	3/8 X 2 1/2 X 1 1/2
		26.9	2500	30.5	87	57	45	M10 X 68 X 38
		3/4	350	1.20	3.43	2.25	1.77	3/8 X 2 1/2 X 1 1/2
48.3 1 1/2	X	21.3	2500	30.5	87	57	52	M10 X 68 X 38
		1/2	350	1.20	3.43	2.25	2.05	3/8 X 2 1/2 X 1 1/2
		26.9	2500	30.5	87	57	48	M10 X 68 X 38
		3/4	350	1.20	3.43	2.25	1.89	3/8 X 2 1/2 X 1 1/2
60.3 2	X	21.3	2500	30.5	93	57	51	M10 X 74 X 47
		1/2	350	1.20	3.66	2.25	2.00	3/8 X 2 1/2 X 1 1/2
		26.9	2500	30.5	93	57	54	M10 X 74 X 47
		3/4	350	1.20	3.66	2.25	2.13	3/8 X 2 1/2 X 1 1/2
73.0 2 1/2	X	21.3	2500	30.5	108	57	58	M10 X 89 X 57
		1/2	350	1.20	4.25	2.25	2.28	3/8 X 3 1/2 X 2 1/4
		26.9	2500	30.5	108	57	62	M10 X 89 X 57
		3/4	350	1.20	4.25	2.25	2.44	3/8 X 3 1/2 X 2 1/4
76.1 2 1/2	X	21.3	2500	30.5	108	57	58	M10 X 89 X 57
		1/2	350	1.20	4.25	2.25	2.28	3/8 X 3 1/2 X 2 1/4
		26.9	2500	30.5	108	57	62	M10 X 89 X 57
		3/4	350	1.20	4.25	2.25	2.44	3/8 X 3 1/2 X 2 1/4
33.7 1	X	21.3	2500	30.5	108	57	68	M10 X 89 X 57
		1/2	350	1.20	4.25	2.25	2.68	3/8 X 3 1/2 X 2 1/4

✦ **Housing material:** Ductile iron conforming to ASTM A-536, grade 65-45-12.

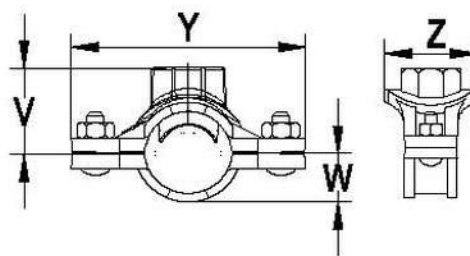
✦ **FM Approved & UL Listed:** R.W.P. rated working pressure 300PSI(2.065MPa / 20.65bars)

✦ **Housing Finish:** Fusion Bonded Epoxy Coated(Optional: Hot Deep Galvanized and Others)

✦ **Coupling gasket material:** EPDM(Optional: Nitrile NBR, Silicone and Others)

✦ **Bolts and Nuts:** Heat treated and electro galvanized bolts with oval neck, and heavy duty hexagon nuts. Track head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.

✦ **Size Range:** DN32 X DN15 through DN65 X DN25 (1 1/4" X 1/2" through 2 1/2" X 1")

Mechanical Tee

Style 3JS Mechanical Tee


- By using the bolting method, the branch pipe is directly connected with the main pipe without welding
- All products have 21.3mm (1/2") outlets and 26.9mm (3/4") outlets are the same as 33.4mm (1") outlets.
- Enhanced body resists 4 times working pressure.

Size			Max. Work Pressure	Hole Size	Dimensions				Bolt/Nut Size
Run Pipe	X	Branch Pipe			Y	V	W	Z	
mm	X	mm	KPa	mm	mm	mm	mm	mm	mm
Inches	X	Inches	PSI	Inches	Inches	Inches	Inches	Inches	Inches
33.7	X	21.3	2500	25	93	34	27	48	M10 X 40
1		1/2	360	0.98	3.661	1.339	1.063	1.890	3/2 X 1 1/2
42.4	X	21.3	2500	30.5	98	45	28	66	M10 X 40
1 1/4		1/2	360	1.20	3.858	1.772	1.102	2.598	3/2 X 1 1/2
		26.9	2500	30.5	98	45	28	66	M10 X 40
		3/4	360	1.20	3.858	1.772	1.102	2.598	3/2 X 1 1/2
		33.7	2500	30.5	98	54	28	66	M10 X 40
		1	360	1.20	3.858	2.126	1.102	2.598	3/2 X 1 1/2
48.3	X	21.3	2500	30.5	104	48	31	66	M10 X 40
1 1/2		1/2	360	1.20	4.094	1.890	1.220	2.598	3/2 X 1 1/2
		26.9	2500	30.5	104	48	31	66	M10 X 40
		3/4	360	1.20	4.094	1.890	1.220	2.598	3/2 X 1 1/2
		33.7	2500	30.5	104	57	31	66	M10 X 40
		1	360	1.20	4.094	2.244	1.220	2.598	3/2 X 1 1/2
60.3	X	21.3	2500	30.5	125	54	38	66	M10 X 40
2		1/2	360	1.20	4.921	2.126	1.496	2.598	3/2 X 1 1/2
		26.9	2500	30.5	125	54	38	66	M10 X 40
		3/4	360	1.20	4.921	2.126	1.496	2.598	3/2 X 1 1/2
		33.7	2500	30.5	125	62	38	66	M10 X 40
		1	360	1.20	4.921	2.441	1.496	2.598	3/2 X 1 1/2
73.0	X	21.3	2500	30.5	136	61	45	66	M10 X 40
2 1/2		1/2	360	1.20	5.354	2.402	1.772	2.598	3/2 X 1 1/2
		26.9	2500	30.5	136	61	45	66	M10 X 40
		3/4	360	1.20	5.354	2.402	1.772	2.598	3/2 X 1 1/2
		33.7	2500	30.5	136	71	45	66	M10 X 40
		1	360	1.20	5.354	2.795	1.772	2.598	3/2 X 1 1/2
76.1	X	21.3	2500	30.5	136	61	47	66	M10 X 40
2 1/2		1/2	360	1.20	5.354	2.402	1.850	2.598	3/2 X 1 1/2
		26.9	2500	30.5	136	61	47	66	M10 X 40
		3/4	360	1.20	5.354	2.402	1.850	2.598	3/2 X 1 1/2
		33.7	2500	30.5	136	71	47	66	M10 X 40
		1	360	1.20	5.354	2.795	1.850	2.598	3/2 X 1 1/2
88.9	X	33.7	2500	30.5	158	75	54	66	M10 X 40
3		1	360	1.20	6.220	2.953	2.126	2.598	3/2 X 1 1/2
		42.4	2500	44.5	158	79	54	66	M10 X 40
		1 1/4	360	1.75	6.220	3.110	2.126	2.598	3/2 X 1 1/2

Rubber Gasket



LIFECO gaskets are designed to provide life-of-the-system service in a wide variety of applications.

Gasket materials are available to meet most piping applications. For a list of service recommendations by gasket type see pg 45-47

Rubber Gasket Styles



Standard C type:

Usually with grooved fittings. 1GS, 1X, 1N, 1NH, such as no special requirements are supporting this type of rubber seals



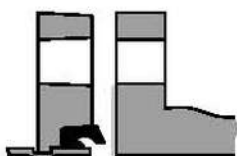
E type: :

Special Rubber Ring for 1F, 2F Quick Coupling Series.



Reducing type:

Usually with grooved reducing fitting. 1NR supporting this type of rubber ring.



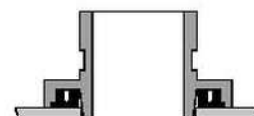
Flange type:

321-type slip flange are matched with this type of rubber ring



Opening reaction type:

3G, 3J are optional matching this type of rubber ring



Hole labyrinth type:

3G, 3J are optional matching this type of rubber ring

Rubber Gasket Materials

As elastomer technology advanced, superior gasket materials became available and were added to the LIFECO line. This allows LIFECO to presently offer a variety of synthetic rubber gaskets to provide the option of selecting LIFECO products for the widest variety of applications.

For most water system piping applications, LIFECO grade EPDM rubber is recommended. LIFECO E-grade rubber gasket material with excellent performance in anti-aging and heat resistance, the material at 125°C (257°F) temperature, the material for hot air aging test, the physical properties of the basic unchanged. When the rubber in a non-air environment, such as water piping system, its anti-aging properties will be further strengthened.

Since water has no deteriorating effect on the elastomer, temperature is the only limiting factor to be considered in determining the life expectancy of the elastomer in water service. The superior performance of the Grade "E" elastomer permits its use for hot water service up to +230°F/+110°C. The Grade "E" gasket is superior to previous gasket materials by all performance barometers, including high and low temperature limits, tensile strength, chemical resistance and shelf life.

Rubber Gasket Date

To assure the maximum life for the service intended, proper gasket selection and specification in ordering is essential. Many factors must be considered in determining the optimum gasket for a specific service. The foremost consideration is temperature, along with concentration of product, duration of service and continuity of service. Temperatures beyond the recommended limits have a degrading effect on the polymer. Therefore, there is a direct relationship between temperature, continuity of service and gasket life.

Services listed are General Service Recommendations only. It should be noted that there are services for which these gaskets are not recommended. For a list of application-specific and non-recommended application recommendations, reference should be made to the latest selection guide for seals.

The use of gasket only for the selection of rubber materials in the product, does not involve the selection of metal shell, fittings and bolts and nuts. For the housing, accessories and bolts and nuts selection, should be selected according to the actual application environment.

Rubber Gasket Lubricant

When installing the product, the outer surface of the gasket should be lubricated, this will help prevent the gasket from being crushed during installation. It is recommended to lubricate the outer surface of the gasket, including the lip and / or tube end, and the housing cavity, and the lubricated aprons surface will help to properly install the product.

Under normal circumstances recommended the use of special lubricants, if necessary, consult the relevant LIFECO institutions. Also available household human body can be directly exposed to the washing products, add water after modulation, such as detergents, soap, detergent, etc., avoid using mechanical lubricants, such as butter and so on.



To ensure that the rubber seal in the application of the longest life expectancy, the correct choice when ordering rubber seal material and specifications are the most basic requirements.
 Failure to select the right rubber seal material can result in personal injury or property damage, joint leakage, or connection failure.

Rubber Gasket Materials

The material of the gasket must be determined according to the characteristics of the fluid medium. The commonly used sealing rings are shown in the following table:

Grade	Temperature Range	Rubber Compound	Color Code	General Service Recommendations
E	-30°F to +230°F -34°C to +110°C	EPDM	Green Stripe	Recommended for hot water service within the specified temperature range plus a variety of dilute acids, oil-free air and many chemical services. UL classified in accordance with ANSI/NSF 61 for cold +86°F/+30°C and hot +180°F/+82°C potable water service. NOT RECOMMENDED FOR PETROLEUM SERVICES.
T	-20°F to +180°F -29°C to +82°C	Nitrile	Orange Stripe	Recommended for petroleum products, hydrocarbons, air with oil vapors, vegetable and mineral oils within the specified temperature range; except hot dry air over +140°F/+60°C and water over +150°F/+66°C. NOT RECOMMENDED FOR HOT WATER SERVICES.
O	-20°F to +300°F -29°C to +149°C	Fluoroelastomer	Blue Stripe	Recommended for many oxidizing acids, petroleum oils, halogenated hydrocarbons, lubricants, hydraulic fluids, organic liquids and air with hydrocarbons to +300°F/+149°C.
L	-30°F to +350°F -34°C to +177°C	Silicone	white	Recommended for dry heat, air without hydrocarbons to +350°F/+177°C and certain chemical services.
V	-30°F to +180°F -34°C to +82°C	Neoprene	Yellow Stripe	Recommended for hot lubricating oils and certain chemicals. Good oxidation resistance. Will not support combustion.

For specific compound and temperature compatibility, see this book Chemical Application Table

Rubber Gasket Selection

The temperatures listed in the table below are the recommended maximum temperatures. If not listed, it is ambient temperature. Not listed chemicals and chemical formulations, please contact the relevant Lifeco institutions for the selection of recommendations. Do not determine the selected gasket materials based on experience and similar applications.

The listed parameters and recommendations for use are based on many years of field experience from Lifeco and the best performance from laboratory tests at Lifeco. In addition, Lifeco incorporates the usage suggestions of the major rubber material manufacturers and the opinions and suggestions of the rubber suppliers.

The information provided in this Atlas is, for its part, general information and should be used where available and with full understanding of the operating conditions. In unusual, critical or harsh application conditions, the relevant Lifeco institutions should be provided with complete and complete working condition information.

Whenever possible, rubber materials should be tested for simulated service conditions to determine their suitability for the intended operating conditions. In addition, the rubber seals are unaffected when several substances are used alone, and it cannot be concluded that their mixture will not react to the rubber seal. For flammable or toxic fluids should be double the caution. All gasket recommendations are based on the pressure and temperature published by Lifeco on the basis of use. Suspected application conditions should be related to Lifeco institutions to contact and confirm.

When two or all of the material codes appear in the material code column, these two or three rubber seal materials are suitable under normal operating conditions listed.

Chemical Services

Rating Code Key		
G	Good	
C	Conditional (Submit analysis of materials to Lifeco or positive recommendations)	
NR	Not Recommended	

Chemical Composition	Rating Code	Gasket Grade	Chemical Composition	Rating Code	Gasket Grade	Chemical Composition	Rating Code	Gasket Grade	Chemical Composition	Rating Code	Gasket Grade
ASTM #3 Oil	G	T	Ammonium Alum	G	V	Antimony Chloride	G	E	Butadiene	C	V
Acetaldehyde	G	E	Ammonium Bifluoride	G	T	Antimony Trichloride	G	E	Butane Gas	C	T
Acetamide	G	T	Ammonium Carbonate	G	E	Argon Gas	G	E/O	Butanol (see Butyl Alcohol)	G	E/T
Acetic Acid up to 10% 100°F/38°C	G	E	Ammonium Chloride	G	T	Aroclor(s)	G	O	Butter	G	L
Acetic Acid up to 10-50% 100°F/38°C	G	L	Ammonium Fluoride	G	E	Arsenic Acid, to 75%	G	T	Butyl Acetate	C	E
Acetic Acid, Glacial 100°F/38°C	G	L	Ammonium Hydroxide	G	E	Arylsulfonic Acid	NR	—	Butyl Acetyl Ricinoleate	G	E
Acetic Anhydride	G	E	Ammonium Metaphosphate	G	E	Barium Carbonate	G	E	Butyl Alcohol	G	E/T
Acetone	G	E	Ammonium Nitrate	G	T	Barium Chloride	G	E/T	Butyl "Cellulosolve Adipate"	G	E/T
Acetonitrile	G	T	Ammonium Nitrite	G	E	Barium Hydroxide	G	E/T	Butyl Phenol	C	E
Acetophenone	G	E	Ammonium Persulfate, to 10%	G	E	Barium Nitrate	G	V	Butyl Stearate	G	T
Acetylene	C	E/T	Ammonium Phosphate	G	T	Barium Sulfide	G	T	Butylene	G	T
Acrylic Resin	G	V	Ammonium Sulfamate	G	T	Beer	G	A	Butylene Glycol	G	E
Acrylonitrile	NR	—	Ammonium Sulfate	G	E/T	Beet Sugar Liquors	G	A	Butyne Dial	NR	—
Adipic Acid	G	T	Ammonium Sulfide	G	E	Benzaldehyde	C	E	Butyraldehyde	C	V
Alkalis	G	E	Ammonium Thiocyanate	G	E	Benzene	G	O	Cadmium Cyanide	C	V
Allyl Alcohol to 99%	G	E	Amyl Acetate	G	E	Benzene Sulfonic (Aromatic Acid)	C	V	Calcium Acetate	C	T
Allyl Chloride	NR	—	Amyl Acetate	G	E	Benzene (see Petroleum Ether)	G	O	Calcium Bisulfide	G	T
Alum Sulfuric Acid	C	O	Amyl Alcohol	G	E	Benzoic Acid	G	E	Calcium Disulfide	G	T
Alums	G	E/T	Amyl Borate	G	V	Benzal	G	O	Calcium Disulfide	G	T
Aluminum Chloride	G	E/T	Amyl Chloride	NR	—	Benzyl Alcohol	G	E	Calcium Chloride	G	E/T
Aluminum Fluoride	G	E/T	Amyl Chloronaphthalene	C	T	Benzyl Benzoate	G	E	Calcium Fluorophosphate	C	V
Aluminum Hydroxide	G	E	Anderal	G	O	Black Sulfate Liquor	G	T	Calcium Hydroxide (Lime)	G	E/T
Aluminum Nitrate	G	V/E/T	Antraquinone	NR	—	Black Sulfate Gas	C	T	Calcium Hypochlorite	G	E
Aluminum Oxide	C	T	Antraquinone Sulfonic Acid	NR	—	Bleach, 12% Active Cl ₂	C	E	Calcium Hypochloride	G	E
Aluminum Phosphate	G	E	Aniline	G	E	Borax	G	E	Calcium Nitrate	G	V/E/T
Aluminum Salts	G	E	Aniline Dyes	C	E	Bordeaux Mixture	G	E	Calcium Sulfate	G	E/T
Aluminum Sulfate	G	E/T	Aniline Hydrochloride	C	E	Boric Acid	G	E/T	Calcium Sulfide	G	E
Ammonia, Anhydrous (Pure Ammonia)	NR	—	Aniline Oil	G	E	Bromine	G	O	Caliche Liquors	G	T
Ammonia, Aqueous (10% Max)	G	E	Animal Fats	G	L	Bromine Water	G	V	Cane Sugar Liquors	G	L



Chemical Composition	Rating Code	Gasket Grade	Chemical Composition	Rating Code	Gasket Grade	Chemical Composition	Rating Code	Gasket Grade	Chemical Composition	Rating Code	Gasket Grade
Carbitol	G	E/T	Fuel Oil	G	T	Lime and H ₂ O	G	E/T	Oil, Crude Sour	G	T
Carbonic Acid, Phenol	G	O	Fumaric Acid	G	E	Linoleic Acid	G	O	Oil, Motor	G	T
Carbon Disulphide	C	O	Furan	NR	—	Linseed Oil	G	A	Oleic Acid	G	T
Carbon Dioxide, Dry	G	E/T	Furfuryl Alcohol	G	E	Lithium Bromide	G	T	Olive Oil	G	A
Carbon Dioxide, Wet	G	E/T	Galic Acid	NR	—	Lithium Chloride	G	T	Oxamate 8200 Silicate Ester Fluid	G	O
Carbon Disulphide	G	O	Gasoline, Refined	G	T	Lubricating Oil, Refined	G	T	Orthodichlorobenzene	G	O
Carbon Monoxide	G	E	Gasoline, Refined, Unleaded	C	O	Lubricating Oil, Sour	G	T	OS-45 Silicate Ester Fluid	G	O
Carbon Tetrachloride	G	O	Gelatin	G	A	Lubricating Oil, to 150°F/66°C	G	T	OS-45-2	G	O
Castor Oil	G	A	Glucose	G	A	Mineral Oil, 150°F/66°C to 180°F/82°C	G	V	Oxalic Acid	G	E
Caustic Potash	G	E	Glue	G	T/E	Magnesium Ammonium Sulphate	C	V	Oxygen, Cold +	C	E
Cellosolve Acetate	G	E	Glycerin	G	E/T	Magnesium Chloride	G	E/T	Ozone (100 ppm)	G	E
Cellosolve (Alcohol Ether)	G	E	Glycrol	G	E/T	Magnesium Hydroxide	G	E/T	Palmitic Acid	G	T
Cellulose Acetate	G	E	Glycol	G	E/T	Magnesium Nitrate	G	V	Peanut Oil	G	A
Cellulose 220 Tri-Aryl Phosphate	G	E	Glycolic Acid	C	E	Magnesium Oxide	C	V	Pentane	G	T
Cellulose Hydraulic Fluids	G	E	Grease	G	T	Magnesium Sulfate	G	E/T	Perchloroethylene	G	O
China Wood Oil, Tung Oil	G	T	Green Sulfate Liquor	G	T	Maleic Acid	G	T	Perchloric Acid	NR	—
Chloralhydrate	NR	—	Halon 1301	G	E	Malic Acid	G	T	Petroleum Ether (see Benzene)	G	O
Chloric Acid to 20%	C	E	Heptane	G	T	Mercuric Chloride	G	E/T	Petroleum Oil	G	T
Chlorine, Dry	C	O	Hexaldehyde	G	E	Mercuric Cyanide	G	T	Phenol (Carbolic Acid)	G	O
Chlorine, Water 4000 PPM (max)	C	E	Hexane	G	T	Mercurous Nitrate	G	E/T	Phenylhydrazine	C	E
Chlorinated Paraffin (Chloro-Cosane)	G	T	Hexanol Tertiary	G	T	Mercury	G	T	Phenylhydrazine Hydrate Chloride	C	E
Chloroacetic Acid	G	E	Hexyl Alcohol	G	W/T	Methane	C	T	Phosphate Ester	G	E
Chloroacetone	G	E	Hexylene	G	T	Methyl Acetate	C	V	Phosphoric Acid, to 50% and 70%	G	E
Chlorobenzene	C	O	Hydrobromic Acid, to 40%	G	E	Methyl Alcohol, Methanol	G	E/T	Phosphoric Acid, to 85% and 100%	G	O
Chlorobromomethane	NR	—	Hydr. Chloric Acid, to 36%, 75°F/24°C	G	E	Methyl Cellulosolve (Ether)	G	V	Photographic Solutions	G	T
Chloroform	G	O	Hydr. Chloric Acid, to 36%, 158°F/70°C	C	O	Methyl Chloride	C	O	Phthalic Anhydride	G	E
Chlorosulphonic Acid	NR	—	Hydr. Chloric Acid	G	E	Methyl Cyclopentane	C	V	Picric Acid, Molten	G	V
Chrome Alum	G	T	Hydr. Chloric Acid, to 75%, 75°F/24°C	G	O	Methyl Ethyl Ketone	C	E	Plating Solutions (gold, brass, cadmium, copper, lead, silver, nickel, tin, zinc)	G	V
Chrome Plating Solutions	G	O	Hydr. Fluosilicic Acid	G	T	Methyl Isobutyl Carbinol	G	E			
Chromic Acid, to 25%	G	O	Hydrogen	C	E/T	Methyl Isobutyl Ketone	NR	—	Polybutene	G	V
Citric Acid	G	E	Hydrogen Gas, Hot	C	E	Methylene Chloride	C	O	Polyvinyl Acetate, Solid (in Liquid State is 50% solution in Methanol or 60% solution in H ₂ O)	G	E
Citronaut Oil	G	A	Hydrogen Peroxide, to 50%	C	L	Methylene Dichloride 100°F/38°C	G	O	Potassium Alum	G	E/T
Cod Liver Oil	G	A	Hydrogen Peroxide, to 90%	C	O	MIL-17808	G	O	Potassium Bicarbonate	G	E/T
Coleman Gas	G	T/O	Hydrogen Phosphide	NR	—	MIL-OS 806	G	O	Potassium Bichromate	G	T/E
Copper Chloride	G	T	Hydrogen Sulfide	G	E	MIL-OS 515	G	O	Potassium Borate	G	E
Copper Cyanide	G	T	Hydroquinone	G	T	Milk	G	A	Potassium Bromate	G	E
Copper Fluoride	G	E	Hydroxylamine Sulfate	C	E	Mineral Oils	G	T	Potassium Bromide	G	E/T
Copper Nitrate	G	E/T	Hypr. Chlorous Acid, Dilute	G	E	Naptha, 1 60°F/7.1°C	G	O	Potassium Carbonate	G	E/T
Copper Sulfate	G	E/T	100°C to 100°F/38°C	G	T	Napthalene	NR	—	Potassium Chromate	G	T
Corn Oil	G	A	Iododecane	G	V	Napthalene Acid	C	T	Potassium Chromate	G	E
Ternary Ammonium Sulfate to 30%	G	V	Isobutyl Alcohol	G	E	Natural Gas	C	T	Potassium Cyanide	G	E/T
Fish Oils	G	A	Isopropyl Acetate	G	E	Nevol	G	E	Potassium Dichromate	G	E
Fluoric Acid	G	E	Isopropyl Alcohol	G	E	Nickel Acetate to 10%, 100°F/38°C	G	V	Potassium Ferricyanide	G	E
Fluorine Gas, Wet	NR	—	Isopropyl Ether	G	T	Nickel Ammonium Sulfate	G	V	Potassium Fluoride	G	E
Fluorosilicic Acid	G	V	JP-3	G	T	Nickel Chloride	G	E/T	Potassium Hydroxide	G	T
Fly Ash	G	E	JP-4	G	T	Nickel Chloride	G	E/T	Potassium Iodide	G	V
Foam	G	E	JP-5, 6, 7, 8	G	T	Nickel Nitrate	G	V	Potassium Nitrate	G	T
Fog Oil	G	T	Kerosene	G	T	Nickel Plating Solution 125°F/52°C	G	E	Potassium Perborate	G	E
Formaldehyde	G	E/T	Ketones	G	E	Nickel Sulfate	G	E/T			
Formamide	G	T	Lactic Acid	G	A	Nitroline	C	V			
Formic Acid	G	E	Lard	G	A	Nitroline Acid	C	V			
Freon 11, 130°F/54°C	G	T	Lard Oil	G	V	Nitric Acid to 10%, 75°F/24°C	G	E			
Freon 12, 130°F/54°C	G	T	Latex (1% Styrene & Butadiene)	G	O	Nitric Acid, 30-50%, 75°F/24°C	G	O			
Freon 21	NR	—	Lauric Acid	G	T	Nitric Acid, 50-80%, 75°F/24°C	C	O			
Freon 22, 130°F/54°C	G	V	Lauryl Chloride	NR	—	Nitric Acid, Red Fuming	C	O			
Freon 113 130°F/54°C	G	T	Laurel Oil	G	T	Nitric Cellulose	G	V			
Freon 114 130°F/54°C	G	T	Lead Acetate	G	T	Nitromethane	C	E			
Freon 123	NR	—	Lead Chloride	C	E	Nitromethane	G	E			
Freon 134a 17 6°/80°C	G	E/T	Lead Sulfamate	G	V	Nitrous Oxide	G	E			
Fructose	G	T	Lead Sulfate	G	T	°C. tyl Alcohol	G	V			
						Oxogluconic Acid, to 75%, 150°F/66°C	G	O			

Rating Code	Rating Code Key
G	Good
C	Conditional
NR	Not Recommended

Chemical Composition	Rating Code	Gasket Grade	Chemical Composition	Rating Code	Gasket Grade	Chemical Composition	Rating Code	Gasket Grade	Chemical Composition	Rating Code	Gasket Grade
Potassium Perchlorate	G	T	Sodium Perborate	G	E	Tricresyl Phosphate	G	E	Water, Acid Mine	G	E/T
Potassium Permanganate, Saturated to 10%	G	E	Sodium Peroxide	G	E	Triethanolamine	G	E/T	Water, Bromine	G	V
Potassium Permanganate, Saturate 10-25%	G	E	Sodium Phosphate, Dibasic	G	T	Trisodium Phosphate	G	E	Water, Chlorine	C	E
Potassium Persulfate	G	T	Sodium Phosphate, Monobasic	G	T	Tung Oil	G	T	Water, Deionized	G	E
Potassium Phosphate	G	V	Sodium Phosphate, Tribasic	G	T	Turbo Oil #15 Diester Lubricant	G	O	Water, Seawater	G	E
Potassium Silicate	G	V/E/T	Sodium Silicate	G	T	Turpentine	C	T	Water, Waste	G	E/T
Potassium Sulfate	G	T	Sodium Sulfate	G	E/T	Urea	G	T	Whiskey	G	A
Potassium Thiosulfate	G	V	Sodium Sulfide	G	T	Vegetable Oils	G	A	White Liquor	G	E
Prestone	G	T	Sodium Sulfite Solution, to 20%	G	T	Vinegar	G	A	Wood Oil	G	T
Propane Gas	C	T	Sodium Thiosulfate, "Hypo"	G	T	Vinyl Acetate	G	E	Xylene	C	O
Propanol	G	E	Solvasol 47	G	T	Vi-Pex	G	T	Zinc Chloride, to 50%	G	E
Propargyl Alcohol	G	E	Solvasol 78	G	T	Water, to 150°F/66°C	G	E/T/	Zinc Nitrate	G	E
Propyl Acetate	C	V	Solvasol #1	G	T	Water, to 200°F/93°C	G	E	Zinc Sulfate	G	E/T
Propyl Alcohol	G	T	Solvasol #2	G	T	Water, to 230°F/110°C	G	E			
Propylene Dichloride	C	L	Solvasol #3	G	T						
Propylene Glycol	G	E	Solvasol #73	C	T						
Pydraul F - 9 and 150	NR	—	Solvasol #74	NR	—						
Pyranol 1467	G	T	Soybean Oil	G	A						
Pyranol 1476	G	T	Spindle Oil	G	T						
Pyroguard "C"	G	T	Stannic Chloride	G	T						
Pyroguard "D"	G	T	Stannous Chloride, to 15%	G	T						
Pyroguard 55	G	E	Starch	G	T						
Pyrrale	G	E	Steam	NR	—						
Rapeseed Oil	G	A	Stearic Acid	G	T						
Ref. Fuel (70 ISO Octane, 30 Toluene)	G	T	Stoddard Solvent	G	T						
Resin Oil	G	V/T	Styrene	G	O						
Salicylic Acid	G	E	Sucrose Solutions	G	A						
Secondary Butyl Alcohol	G	T	Sulfamic Acid	G	E						
Sewage	G	E/T	Sulphuric Acid Liquor	G	E						
Silver Cyanide	C	V	Sulfur	G	V/E						
Silver Nitrate	G	E	Sulfur Chloride	G	O						
Silver Plating Solution	C	V	Sulfur Dioxide, Dry	C	E/T						
Silver Sulfate	G	E	Sulfur Dioxide, Liquid	G	E						
Skydral, 200°F/93°C	G	L	Sulfur Trioxide, Dry	G	O						
Skydral 500 Phosphate Ester	C	E	Sulfuric Acid, to 29%, 150°F/66°C	G	E						
Soap Solutions	G	E/T	Sulfuric Acid, 25-50%, 200°F/93°C	G	O						
Soda Ash, Sodium Carbonate	G	E/T	Sulfuric Acid, 50-99%, 150°F/66°C	G	O						
Sodium Acetate	G	E	Sulfuric Acid, Fuming	C	O						
Sodium Alum	G	T	Sulfuric Acid, Oleum	C	O						
Sodium Benzoate	G	E/T	Sulfurous Acid	G	O						
Sodium Bicarbonate	G	E/T	Tall Oil	C	T						
Sodium Bisulfate	G	E/T	Tannic Acid, All Conc.	G	V						
Sodium Bisulfite (Black Liquor)	G	E/T	Tanning Liquors (50 g. alum. solution, 50 g. dichromate solution)	G	T						
Sodium Bromide	G	E/T	Tartaric Acid	G	E						
Sodium Carbonate	G	E/T	Terpineol	G	V						
Sodium Chlorate	G	E	Tertiary Butyl Alcohol	G	V/E/T						
Sodium Chloride	G	E/T	Tetrabutyl Titanate	G	E						
Sodium Cyanide	G	E/T	Tetrachloroethylene	G	O						
Sodium Dichromate, to 20%	G	E/T	Tetrahydrofuran	NR	—						
Sodium Ferricyanide	G	E/T	Tetralin	NR	—						
Sodium Ferrocyanide	G	E/T	Thionyl Chloride	C	T						
Sodium Fluoride	G	E/T	Terpineol	C	T						
Sodium Hydro Sulfide	G	T	Thiophene	NR	—						
Sodium Hydroxide to 50%	G	E	Titanium Tetrachloride	G	O						
Sodium Hypochlorite, to 20%	G	E	Toluene, 30%	G	T						
Sodium Metaphosphate	G	T	Transmission Fluid, Type A	G	O						
Sodium Nitrate	G	E	Triacetin	G	T						
Sodium Nitrite	G	E/T	Trichloroethane	G	O						
			Trichloroethylene, to 200°F/93°C	G	O						

Chemical Composition	Rating Code	Gasket Grade
Tricresyl Phosphate	G	E
Triethanolamine	G	E/T
Trisodium Phosphate	G	E
Tung Oil	G	T
Turbo Oil #15 Diester Lubricant	G	O
Turpentine	C	T
Urea	G	T
Vegetable Oils	G	A
Vinegar	G	A
Vinyl Acetate	G	E
Vi-Pex	G	T
Water, to 150°F/66°C	G	E/T/
Water, to 200°F/93°C	G	E
Water, to 230°F/110°C	G	E

Chemical Composition	Rating Code	Gasket Grade
Water, Acid Mine	G	E/T
Water, Bromine	G	V
Water, Chlorine	C	E
Water, Deionized	G	E
Water, Seawater	G	E
Water, Waste	G	E/T
Whiskey	G	A
White Liquor	G	E
Wood Oil	G	T
Xylene	C	O
Zinc Chloride, to 50%	G	E
Zinc Nitrate	G	E
Zinc Sulfate	G	E/T

Services Not Recommended		
The services listed below have been tested and are NOT RECOMMENDED with any of the presently available gasket materials. Services not shown as recommended or not recommended should be submitted to LIFECO's specific recommendations.		
Chemical Composition	Rating Code	Gasket Grade
Acrylonitrile	NR	
Alkyl Chloride	NR	
Amyl Chloride	NR	
Anthraquinone	NR	
Anthraquinone Sulfonic Acid	NR	
Arylsulfonic Acid	NR	
Butyne Dial	NR	
Chloralhydrate	NR	
Chlorobromomethane	NR	
Chlorosulphonic Acid	NR	
Ethylene Oxide	NR	
Fluorine Gas Wet	NR	
Freon 21	NR	
Furan	NR	
Gallic Acid	NR	
Hydrogen Phosphide	NR	
Lauryl Chloride	NR	
Methyl Isobutyl Ketone	NR	
Napthalene	NR	
Perchloric Acid	NR	
Pydraul F -9 and F - 150	NR	
Solvasol #74	NR	
Steam	NR	
Tetra Hydrofuran	NR	
Tetralin	NR	
Thiophene	NR	

Water and Air Services		
*R recommended for water only. Not recommended for steam service, except where couplings are accessible for frequent gasket replacement.		
Chemical Composition	Rating Code	Gasket Grade
Air, Temp. -20°F to 200°F / -29°C to +93°C (no oil vapors)	G	E
Air, Temp. -30°F to 230°F / -34°C to +110°C (no oil vapors)	G	E
Air, Temp. 230°F to 350°F / 110°C to 177°C (no oil vapors)	G	L
Air, Oil Vapor, Temp. 0°F to 150°F / -18°C to 66°C	G	T
Air, Oil Vapor, Temp. 150°F to 300°F / 66°C to 149°C	G	O
Water, Temp. to 150°F/66°C	G	E/T
Water, Temp. to 200°F/93°C	G	E/M
Water, Temp. to 230°F/110°C *	G	E
Water, Acid Mine	G	E/T
Water, Bromine	G	V
Water, Chlorine	C	E/M
Water, Deionized	G	E/M
Water, Seawater	G	E
Water, Waste	G	E/T

Rating Code	Rating Code Key
G	Good
C	Conditional
NR	Not Recommended

Standard Pipe Wall Thickness

Standard pipe wall thickness(including GB/T 3091、ANSI B36.10/B36.19)

Size		GB/T 3091		ANSI B36.10/B36.19								
Nominal Dia.	Actual O.D.	Std.	Thicken	Sch. 5S	Sch. 5	Sch. 10S	Sch. 10	Sch. 20	Sch. 30	Sch. 40	Sch. Std.	Sch. 80
DN Inches	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches
20	26.9	2.8	3.5	1.65	1.65	2.11	---	---	---	2.87	2.87	3.91
3/4	1.050	0.110	0.138	0.065	0.065	0.083	---	---	---	0.113	0.113	0.154
25	33.7	3.2	4.0	1.65	1.65	2.77	---	---	---	3.38	2.87	4.55
1	1.327	0.126	0.157	0.065	0.065	0.109	---	---	---	0.133	0.113	0.179
32	42.4	3.5	4.0	1.65	1.65	2.77	---	---	---	3.56	3.56	4.85
1 1/4	1.660	0.138	0.157	0.065	0.065	0.109	---	---	---	0.14	0.14	0.191
40	48.3	3.5	4.5	1.65	1.65	2.77	---	---	---	3.68	3.68	5.08
1 1/2	1.900	0.138	0.177	0.065	0.065	0.109	---	---	---	0.145	0.145	0.2
50	60.3	3.8	4.5	1.65	1.65	2.77	---	---	---	3.91	3.91	5.54
2	2.375	0.150	0.177	0.065	0.065	0.109	---	---	---	0.154	0.154	0.218
65	73.0	---	---	2.11	2.11	3.05	---	---	---	5.16	5.16	7.01
2 1/2	2.875	---	---	0.083	0.083	0.12	---	---	---	0.203	0.203	0.276
65	76.1	4.0	4.5	---	---	---	---	---	---	---	---	---
2 1/2	3.000	0.157	0.177	---	---	---	---	---	---	---	---	---
80	88.9	4.0	5.0	2.11	2.11	3.05	---	---	---	5.49	5.49	7.62
3	3.500	0.157	0.197	0.083	0.083	0.12	---	---	---	0.216	0.216	0.3
90	101.6	---	---	2.11	2.11	3.05	---	---	---	5.74	5.74	8.08
3 1/2	4.000	---	---	0.083	0.083	0.12	---	---	---	0.226	0.226	0.318
100	114.3	4.0	5.0	2.11	2.11	3.05	---	---	---	6.02	6.02	8.56
4	4.500	0.157	0.197	0.083	0.083	0.12	---	---	---	0.237	0.237	0.337
125	139.7	4.0	5.5	---	---	---	---	---	---	---	---	---
5	5.500	0.157	0.217	---	---	---	---	---	---	---	---	---
125	141.3	---	---	2.77	2.77	3.4	---	---	---	6.55	6.55	9.53
5	5.563	---	---	0.109	0.109	0.134	---	---	---	0.258	0.258	0.375
150	168.3	4.5	6.0	2.77	2.77	3.4	---	---	---	7.11	7.11	10.97
6	6.625	0.177	0.236	0.109	0.109	0.134	---	---	---	0.28	0.28	0.432
200	219.1	---	---	2.77	2.77	3.76	---	6.35	7.04	8.18	8.18	12.7
8	8.625	---	---	0.109	0.109	0.148	---	0.25	0.277	0.322	0.322	0.5
250	273.0	---	---	3.4	3.4	4.19	---	6.35	7.8	9.27	9.27	15.09
10	10.750	---	---	0.134	0.134	0.165	---	0.25	0.307	0.365	0.365	0.594
300	323.9	---	---	3.96	3.96	4.57	---	6.35	8.38	10.31	9.53	17.48
12	12.750	---	---	0.156	0.156	0.18	---	0.25	0.33	0.406	0.375	0.688

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Pipe Coatings

To ensure the highest rated working pressure and end load and other performance parameters published in this catalog, the maximum coating thickness of LIFECO products shall not exceed 250 μm. If additional corrosion protection is required, apply a layer of anti-corrosion after installation. In addition, the pipe end of the coating thickness should not exceed 250μm. In particular, the thickness of the coating on the surface of the gasket seat of the pipeline and the entire circumference of the groove should also be guaranteed to be below 250μm.

Pipe ends and product surface coatings such as over 250 μm will reduce the performance of pipe connections.

Pipe Size

Before making groove, should assure the size of the pipe, the most important are the pipe diameter, ovality, pipe end perpendicularity and wall thickness etc. These dimensions will directly affect the performance of pipe connections

The pipe O.D. shall not exceed tolerance specified in the groove parameters.

The maximum allowable pipe ovality cannot exceed 1% of the pipe standard OD.

The requirements for pipe end verticality are as follows

DN20~DN90 ($\frac{3}{4}$ "~3 $\frac{1}{2}$ "): ≤0.8mm

DN100~DN150 (4"~6"): ≤1.1mm

DN200~DN300 (8"~12"): ≤1.5mm

Pipe wall thickness values will affect the coupling connection strength, it should not less than the groove data sheet parameter values

Pipe Tools & Machines



DKG—III Roll grooving machine

Performance parameters	
Steel pipe range	DN25~DN100 (1"~4")
Maximum WT	5mm
Output speed	23r/min
Three-phase motor parameters	
Voltage	380V
Power	550W
Frequency	50~60Hz
Weight	109kg
Package Size	660X600X1080



DKC—III Pipe cutting machine

Performance parameters	
Steel pipe range	DN50~DN300 (2"~12")
Maximum WT	10mm
Output speed	23r/min
Three-phase motor parameters	
Voltage	380V
Power	750W
Frequency	50~60Hz
Weight	132kg
Package Size	670X720X960



DKG—II Roll grooving machine

Performance parameters	
Steel pipe range	DN50~DN300 (2"~12")
Maximum WT	10mm
Output speed	23r/min
Three-phase motor parameters	
Voltage	380V
Power	750W
Frequency	50~60Hz
Weight	119kg
Package Size	870X470X860



DKC—IV Pipe cutting machine

Performance parameters	
Steel pipe range	DN150~DN400 (6"~16")
Maximum WT	12mm
Output speed	23r/min
Three-phase motor parameters	
Voltage	380V
Power	750W
Frequency	50~60Hz
Weight	158kg
Package Size	770X720X1100



DKG—IV Roll grooving machine

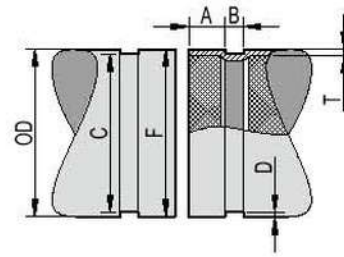
Performance parameters	
Steel pipe range	DN200~DN300 (8"~12")
Maximum WT	13mm
Output speed	15r/min
Three-phase motor parameters	
Voltage	380V
Power	1500W
Frequency	50~60Hz
Weight	334kg
Package Size	1030X830X1400



DKH—III Hole machine

Performance parameters	
Opening hole area	16"~114mm
Maximum WT	10mm
Output speed	110r/min
Three-phase motor parameters	
Voltage	380V
Power	550W
Frequency	50~60Hz
Weight	26kg
Package Size	300X300X560

Roll Groove Parameters

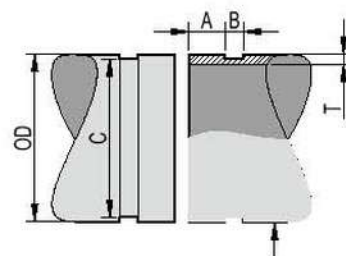


Standard Roll Groove Specifications-Steel and Other IPS Pipe

Size				Gasket Seat	Grv. Width	Grv. Diameter C		Grv. Depth	Min. Wall	Max. Flare
Nominal Dia.	Actual O.D.	Tolerance		A	B	Std.	Tolerance	D(Ref.)	T	F
DN Inches	mm Inches	mm Inches	mm Inches	±0.76mm ±0.03in.	±0.76mm ±0.03in.	mm Inches	mm Inches	mm Inches	mm Inches	mm Inches
20	26.9	0.25	0.25	15.88	7.14	23.83	-0.38	1.42	1.65	29.2
3/4	1.050	0.01	0.01	0.625	0.281	0.938	-0.015	0.056	0.065	1.15
25	33.7	0.33	0.33	15.88	7.14	30.23	-0.38	1.6	1.65	36.3
1	1.327	0.013	0.013	0.625	0.281	1.19	-0.015	0.063	0.065	1.43
32	42.4	0.041	0.041	15.88	7.14	38.99	-0.38	1.6	1.65	45
1 1/4	1.660	0.016	0.016	0.625	0.281	1.535	-0.015	0.063	0.065	1.77
40	48.3	0.048	0.048	15.88	7.14	45.09	-0.38	1.6	1.65	51.1
1 1/2	1.900	0.019	0.019	0.625	0.281	1.775	-0.015	0.063	0.065	2.01
50	57.0	0.57	0.57	15.88	8.74	53.85	-0.38	1.6	1.65	59.7
2	2.250	0.022	0.022	0.625	0.344	2.12	-0.015	0.063	0.065	2.35
50	60.3	0.61	0.61	15.88	8.74	57.15	-0.38	1.6	1.65	63
2	2.375	0.024	0.024	0.625	0.344	2.25	-0.015	0.063	0.065	2.48
65	73.0	0.74	0.74	15.88	8.74	69.09	-0.46	1.98	2.11	75.7
2 1/2	2.875	0.029	0.029	0.625	0.344	2.72	-0.018	0.078	0.083	2.98
65	76.1	0.76	0.76	15.88	8.74	72.26	-0.46	1.98	2.11	78.7
2 1/2	3.000	0.03	0.03	0.625	0.344	2.845	-0.018	0.078	0.083	3.1
80	88.9	0.89	0.79	15.88	8.74	84.94	-0.46	1.98	2.11	91.4
3	3.500	0.089	0.031	0.625	0.344	3.344	-0.018	0.078	0.083	3.6
90	101.6	1.02	0.79	15.88	8.74	97.38	-0.51	2.11	2.11	104.1
3 1/2	4.000	0.04	0.031	0.625	0.344	3.834	-0.02	0.083	0.083	4.1
100	108.0	1.07	0.79	15.88	8.74	103.73	-0.51	2.11	2.11	110.5
4	4.250	0.042	0.031	0.625	0.344	4.084	-0.02	0.083	0.083	4.35
100	114.3	1.14	0.79	15.88	8.74	110.08	-0.51	2.11	2.11	116.8
4	4.500	0.045	0.031	0.625	0.344	4.334	-0.02	0.083	0.083	4.6
120	127	1.27	0.79	15.88	8.74	122.78	-0.51	2.11	2.41	129.5
4 1/2	5.000	0.05	0.031	0.625	0.344	4.834	-0.02	0.083	0.095	5.098
125	133.0	1.32	0.79	15.88	8.74	129.13	-0.51	2.11	2.77	135.9
5	5.250	0.052	0.031	0.625	0.344	5.084	-0.02	0.083	0.109	5.35
125	139.7	1.42	0.79	15.88	8.74	135.48	-0.51	2.11	2.77	142.2
5	5.500	0.056	0.031	0.625	0.344	5.334	-0.02	0.083	0.109	5.6
125	141.3	1.42	0.79	15.88	8.74	137.03	-0.56	2.13	2.77	143.8
5	5.563	0.056	0.031	0.625	0.344	5.335	-0.022	0.084	0.109	5.66
6	152.4	1.42	0.79	15.88	8.74	148.08	-0.56	2.16	2.77	154.9
60D	6.000	0.056	0.031	0.625	0.344	5.83	-0.022	0.085	0.109	6.1
150	159.0	1.6	0.79	15.88	8.74	154.5	-0.56	2.16	2.77	161.3
6	6.250	0.063	0.031	0.625	0.344	6.082	-0.022	0.085	0.109	6.35
150	165.1	1.6	0.79	15.88	8.74	160.9	-0.56	2.16	2.77	167.6
6	6.500	0.063	0.031	0.625	0.344	6.334	-0.022	0.085	0.109	6.6
150	168.3	1.6	0.79	15.88	8.74	163.96	-0.56	2.16	2.77	170.9
6	6.625	0.063	0.031	0.625	0.344	6.455	-0.022	0.085	0.109	6.73
200	216.3	1.6	0.79	19.05	11.91	211.61	-0.64	2.34	2.77	220.7
8	8.500	0.063	0.031	0.75	0.469	8.331	-0.025	0.092	0.109	8.69
200	219.1	1.6	0.79	19.05	11.91	214.4	-0.64	2.34	2.77	223.5
8	8.625	0.063	0.031	0.75	0.469	8.441	-0.025	0.092	0.109	8.8
250	267.4	1.6	0.79	19.05	11.91	262.6	-0.69	2.39	3.4	271.8
10	10.500	0.063	0.031	0.75	0.469	10.339	-0.027	0.094	0.134	10.7
250	273.0	1.6	0.79	19.05	11.91	268.28	-0.69	2.39	3.4	277.4
10	10.750	0.063	0.031	0.75	0.469	10.562	-0.027	0.094	0.134	10.92
300	318.4	1.6	0.79	19.05	11.91	312.9	-0.76	2.77	3.96	322.8
12	12.500	0.063	0.031	0.75	0.469	12.319	-0.03	0.109	0.156	12.71
300	323.9	1.6	0.79	19.05	11.91	318.29	-0.76	2.77	3.96	328.2
12	12.750	0.063	0.031	0.75	0.469	12.531	-0.03	0.109	0.156	12.92

- ✦ Pipe standard OD and tolerance OD: Confirmed before rolling the groove pipe, if not, then the pipe is not suitable for rolling groove;
- ✦ Sealing surface A: confirm the sealing surface size in line with the requirements of the above table, if it is too large, it will affect the joint installation, too small will affect the joint sealing performance;
- ✦ Groove width B: Confirm that the width of the groove conforms to the above requirements, if it exceeds the requirement, it will affect the flexibility of the flexible coupling;
- ✦ Groove bottom diameter C: The standard value is its maximum, which has only negative tolerances. It affect the pressure bearing capacity and the various indicators of sex, if C is too large will appear the possibility of joint tripping;
- ✦ Groove depth D: for reference only. When the pipe outer diameter is the standard outer diameter, it is the minimum depth of the groove.
- ✦ Minimum wall thickness T: control the quality of the pipeline after rolling groove, if it is too small, there will be pipeline cracking or lowering pipe pressure capacity;
- ✦ Max.flare F: After the pipe grooved, the pipe-end flare will generally occur. If it is oversized or over-pressed, it may exceed the requirements in the following table, which will lead to the installation quality of the joint and the seal exposed Sealing performance.

Cut Groove Parameters



Standard Roll Groove Specifications-Steel and Other IPS Pipe

Size				Gasket Seat	Grv. Width	Grv. Diameter C		Grv. Depth	Min. Wall
Nominal Dia.	Actual O.D.	Tolerance		A	B	Std.	Tolerance	D(Ref.)	T
DN Inches	mm Inches	mm Inches	mm Inches	±0.76mm ±0.03in.	±0.76mm ±0.03in.	mm Inches	mm Inches	mm Inches	mm Inches
20 3/4	26.9 1.060	0.25 0.01	0.25 0.01	15.88 0.625	7.95 0.313	23.83 0.938	-0.38 -0.015	1.42 0.056	2.87 0.113
25 1	33.7 1.327	0.33 0.013	0.33 0.013	15.88 0.625	7.95 0.313	30.23 1.19	-0.38 -0.015	1.6 0.063	3.38 0.133
32 1 1/4	42.4 1.660	0.041 0.016	0.041 0.016	15.88 0.625	7.95 0.313	38.99 1.53	-0.38 -0.015	1.6 0.063	3.56 0.140
40 1 1/2	48.3 1.900	0.048 0.019	0.048 0.019	15.88 0.625	7.95 0.313	45.09 1.77	-0.38 -0.015	1.6 0.063	3.68 0.145
50 2	57.0 2.250	0.57 0.022	0.57 0.022	15.88 0.625	7.95 0.313	53.85 2.12	-0.38 -0.015	1.6 0.063	3.91 0.154
50 2	60.3 2.375	0.61 0.024	0.61 0.024	15.88 0.625	7.95 0.313	57.15 2.25	-0.38 -0.015	1.6 0.063	3.91 0.154
65 2 1/2	73.0 2.875	0.74 0.029	0.74 0.029	15.88 0.625	7.95 0.313	69.09 2.72	-0.46 -0.018	1.98 0.078	4.78 0.188
65 2 1/2	76.1 3.000	0.76 0.03	0.76 0.03	15.88 0.625	7.95 0.313	72.26 2.845	-0.46 -0.018	1.98 0.078	4.78 0.188
80 3	88.9 3.500	0.89 0.039	0.79 0.031	15.88 0.625	7.95 0.313	84.94 3.344	-0.46 -0.018	1.98 0.078	4.78 0.188
90 3 1/2	101.6 4.000	1.02 0.04	0.79 0.031	15.88 0.625	7.95 0.313	97.38 3.834	-0.51 -0.02	2.11 0.083	4.78 0.188
100 4	108.0 4.250	1.07 0.042	0.79 0.031	15.88 0.625	9.53 0.375	103.73 4.084	-0.51 -0.02	2.11 0.083	5.17 0.203
100 4	114.3 4.500	1.14 0.045	0.79 0.031	15.88 0.625	9.53 0.375	110.08 4.334	-0.51 -0.02	2.11 0.083	5.17 0.203
120 4 1/2	127 5.000	1.27 0.05	0.79 0.031	15.88 0.625	9.53 0.375	122.78 4.834	-0.51 -0.02	2.11 0.083	5.17 0.203
125 5	133.0 5.250	1.32 0.052	0.79 0.031	15.88 0.625	9.53 0.375	129.13 5.084	-0.51 -0.02	2.11 0.083	5.17 0.203
125 5	139.7 5.500	1.42 0.056	0.79 0.031	15.88 0.625	9.53 0.375	135.48 5.334	-0.51 -0.02	2.11 0.083	5.17 0.203
125 5	141.3 5.563	1.42 0.056	0.79 0.031	15.88 0.625	9.53 0.375	137.03 5.385	-0.56 -0.022	2.13 0.084	5.17 0.203
150 6	152.4 6.000	1.42 0.056	0.79 0.031	15.88 0.625	9.53 0.375	148.08 5.83	-0.56 -0.022	2.16 0.085	5.56 0.219
150 6	159.0 6.250	1.6 0.063	0.79 0.031	15.88 0.625	9.53 0.375	154.5 6.082	-0.56 -0.022	2.16 0.085	5.56 0.219
150 6	165.1 6.500	1.6 0.063	0.79 0.031	15.88 0.625	9.53 0.375	160.9 6.334	-0.56 -0.022	2.16 0.085	5.56 0.219
150 6	168.3 6.625	1.6 0.063	0.79 0.031	15.88 0.625	9.53 0.375	163.96 6.455	-0.56 -0.022	2.16 0.085	5.56 0.219
200 8	216.3 8.500	1.6 0.063	0.79 0.031	19.05 0.75	11.13 0.438	211.61 8.331	-0.64 -0.025	2.34 0.092	6.05 0.238
200 8	219.1 8.625	1.6 0.063	0.79 0.031	19.05 0.75	11.13 0.438	214.4 8.441	-0.64 -0.025	2.34 0.092	6.05 0.238
250 10	267.4 10.500	1.6 0.063	0.79 0.031	19.05 0.75	12.7 0.500	262.6 10.339	-0.69 -0.027	2.39 0.094	6.35 0.250
250 10	273.0 10.750	1.6 0.063	0.79 0.031	19.05 0.75	12.7 0.500	268.28 10.562	-0.69 -0.027	2.39 0.094	6.35 0.250
300 12	318.4 12.500	1.6 0.063	0.79 0.031	19.05 0.75	12.7 0.500	312.9 12.319	-0.76 -0.03	2.77 0.109	7.09 0.279
300 12	323.9 12.750	1.6 0.063	0.79 0.031	19.05 0.75	12.7 0.500	318.29 12.531	-0.76 -0.03	2.77 0.109	7.09 0.279

- ✦ Pipe standard OD and tolerance OD: Confirmed before rolling the groove pipe, if not, then the pipe is not suitable for rolling groove;
- ✦ Sealing surface A: confirm the sealing surface size in line with the requirements of the above table, if it is too large, it will affect the joint installation, too small will affect the joint sealing performance;
- ✦ Groove width B: Confirm that the width of the groove conforms to the above requirements, if it exceeds the requirement, it will affect the flexibility of the flexible coupling;
- ✦ Groove bottom diameter C: The standard value is its maximum, which has only negative tolerances. It affect the pressure bearing capacity and the various indicators of sex, if C is too large will appear the possibility of joint tripping;
- ✦ Groove depth D: for reference only. When the pipe outer diameter is the standard outer diameter, it is the minimum depth of the groove.
- ✦ Minimum wall thickness T: control the quality of the pipeline after rolling groove, if it is too small, there will be pipeline cracking or lowering pipe pressure capacity;



Introduction

This LIFECO General Catalog has been written for the piping system installer, designer, specification writer and owner as a basic reference guide for data about LIFECO mechanical piping methods. This catalog is organized to provide information in the context and form most readily usable. For easy identification of major sections of interest, see the condensed table of contents, for a fully detailed index. For more detailed information, consult Design Data.

Important Information

After more than a decade of experience in grooved-connected pipelines, LIFECO has developed multi-gauge and multi-pressure ratings of grooved products for use with different pipe materials.

LIFECO standard grooved piping system products are designed for use only with pipes and fittings that conform to the global groove standard as AWWA C606. Piping must be prepared in accordance with the groove specifications published by LIFECO and the performance data listed in this catalog is based on the correct preparation of the piping. In particular, installer must choose the right rubber seal material to suit applications. It should be noted that some special applications are not recommended to use the standard sealing material. Please refer to the "Rubber Gasket" section of this catalog for a list of applications where rubber sealant materials are recommended, as well as applications not recommended for use. LIFECO rubber gasket must be lubricated to facilitate proper installation and use. The seal lubricant must comply with LIFECO regulations or approval. Fully lubricate the outer surface of the gasket, including the lips and tube ends, and the housing cavity for lubrication, which will help prevent the rubber gasket from crinkling during installation.

Notice

The technical and performance data, weights, dimensions and specifications published in this catalog supersede all previously published data.

LIFECO Company maintains a policy of continual product improvement and, therefore, reserves the right to change product specifications, designs, and standard equipment without notice and without incurring obligation.

For the most up-to-date LIFECO product information, please visit www.lifeco-uk.com

All data & information presented in this catalog is intended for piping design reference in utilization of LIFECO products for their intended application. It is not intended as a substitute for competent, professional assistance which is an obvious requisite to any specific application.

Design

Reference should always be made to design information available at no charge on request from LIFECO. Good piping practices should always prevail. Specific pressures, temperatures, external or internal loads, performance standards and tolerances must never be exceeded. Many applications require recognition of special conditions, code requirements and use of safety factors. Qualified engineers must make these decisions.

While every effort has been made to ensure its accuracy, LIFECO Company, its subsidiaries and affiliated companies, make no express or implied warranty of any kind respecting the information contained in this catalog or the material referred to herein.

Anyone making use of the information or material contained herein does so at their own risk and assumes any and all liability resulting from such use.



Designations of global pipe sizes

LIFECO product data is utilized worldwide and all technical data is shown in both imperial (U.S.) and metric terms. The following chart shows a comparison between typical metric and IPS pipe sizes.

Size		Design Date	ISO	ANSI	BS	DIN	JIS	GB
Nominal Dia.		Actual O.D.	Actual O.D.	Actual O.D.	Actual O.D.	Actual O.D.	Actual O.D.	Actual O.D.
Metric	Inches	Metric mm	Metric mm	Metric mm	Metric mm	Metric mm	Metric mm	Metric mm
15	1/2	21.3	21.3	21.3	21.3	21.3	21.7	21.3
20	3/4	26.9	26.9	26.7	26.9	26.9	27.2	26.9
25	1	33.4	33.7	33.4	33.7	33.7	34.0	33.7
32	1 1/4	42.4	42.4	42.2	42.4	42.4	42.7	42.4
40	1 1/2	48.3	48.3	48.3	48.3	48.3	48.3	48.3
50	2	54.0	-	-	-	-	-	54.0
		57.0	-	-	-	-	-	57.0
		60.3	60.3	60.3	60.3	60.3	60.5	60.3
65	2 1/2	73.0	-	73.0	-	-	-	73.0
		76.1	76.1	-	76.1	76.1	76.3	76.1
80	3	88.9	88.9	88.9	88.9	88.9	89.1	88.9
90	3 1/2	101.6	-	101.6	101.6	101.6	101.5	102.0
100	4	108.0	-	-	-	-	-	108.0
		114.3	114.3	114.3	114.3	114.3	114.3	114.3
120	4 1/2	127.0	-	127.0	-	-	-	127.0
125	5	133.0	-	-	-	-	-	133.0
		139.7	139.7	-	139.7	139.7	139.8	139.7
		141.3	-	141.3	-	-	-	141.3
150	6	152.4	-	152.4(600)	-	-	-	152.0
		159.0	-	-	-	-	-	159.0
		165.1	-	-	165.1	-	165.2	165.1
		168.3	168.3	168.3	-	168.3	-	168.3
175	7	194.0	-	193.7	193.7	193.7	-	194.0
200	8	203.2	-	203.2(800)	-	-	-	203.0
		216.3	-	-	-	-	216.3	-
		219.1	219.1	219.1	219.1	219.1	-	219.1
225	9	241.8	-	-	-	-	241.8	-
		245.0	-	245.0	-	-	-	245.0
250	10	254.0	-	254.0(1000)	-	-	-	-
		267.4	-	-	-	-	267.4	267.0
		273.0	273.0	273.0	273.0	273.0	-	273.0
275	11	299.1	-	299.1	-	-	-	299.0
300	12	304.8	-	304.8(1200)	-	-	-	-
		318.5	-	-	-	-	318.5	318.5
		323.9	323.9	323.9	323.9	323.9	-	325.0
350	14	355.6	355.6	355.6	355.6	355.6	355.6	356.0
		377.0	-	-	-	-	-	377.0
400	16	406.4	406.4	406.4	406.4	406.4	406.4	406.0
		426.0	-	-	-	-	-	426.0
450	18	457.2	457.2	457.2	457.2	457.2	457.2	457.0
		480.0	-	-	-	-	-	480.0
500	20	508.0	508.0	508.0	508.0	508.0	508.0	508.0
		530.0	-	-	-	-	-	530.0
550	22	558.8	-	558.8	559.0	558.8	558.8	560.0
600	24	609.6	610.0	609.6	610.0	609.6	609.6	610.0
		630.0	-	-	-	-	-	630.0
700	28	711.2	711.0	711.2	711.0	711.2	711.2	711.0
		720.0	-	-	-	-	-	720.0
800	32	812.8	813.0	812.8	813.0	812.8	812.8	813.0
900	36	914.4	914.0	914.4	914.0	914.4	914.4	914.0
1000	40	1016.0	1016.0	1016.0	1016.0	1016.0	1016.0	1016.0
1050	42	1066.8	1067.0	1066.8	-	1066.8	-	1067.0
1100	44	1117.6	1118.0	1117.6	-	1117.6	1117.6	1118.0
1200	48	1219.2	-	1219.2	-	1219.2	1219.2	1219.0



Metric / Inch Conversion Chart

This chart is provided as a guide for converting imperial and metric measurements provided within this catalog.

	Metric		Conversion		Conversion		Inch
Length	mm	X	0.03937	⇄	25.4	X	In
	m	X	3.28084	⇄	0.3048	X	Feet(ft)
	km	X	0.621371	⇄	1.609344	X	mile
Area	mm ²	X	0.00155	⇄	645.16	X	in ²
	m ²	X	10.7639	⇄	0.0929	X	ft ²
LIQUID	m ³	X	264.172	⇄	0.0037854	X	usgal
	m ³	X	61023.7	⇄	0.0000164	X	In. ³
	m ³	X	35.303	⇄	0.02832	X	ft ³
Pressure	kpa	X	0.145	⇄	6.8948	X	PSI
	kpa	X	0.01	⇄	100	X	bar
	bar	X	14.5	⇄	0.068948	X	PSI
Temperature	°C	X	°C X 1.8 + 32	⇄	(°F - 32) / 1.8	X	°F
Torque	N·m	X	0.7375	⇄	1.356	X	ft·lbf
Force	N	X	0.2248	⇄	4.4482	X	lbs.
Mass	g	X	0.035274	⇄	28.3495	X	oz.
	kg	X	2.2026	⇄	0.4536	X	lbs.
Power	W	X	0.001341	⇄	745.7	X	hp
	W	X	0.737562	⇄	1.35582	X	ft·lbf/s
Quantity of Flow	L/min	X	0.2642	⇄	3.785	X	Gal. per Min. (GPM)
	m ³ /min	X	264.2	⇄	3.7865	X	10 ⁻³ Gal. per Min.(GPM)

Design Considerations

The LIFECO piping method may be used for joining a variety of piping systems for a wide variety of services. It may be utilized for varied pipe sizes, pipe materials and wall thickness. Products are available to provide rigid or flexible systems. For specific product information relating to use on varied pipe materials refer to the appropriate sections of this catalog.

As with any piping method, the nature of the method should be considered in designing the piping systems. This design data applies primarily to grooved end pipe, however, much of the information applies to other piping products used in conjunction with grooved components.

The material presented is intended solely for piping design reference in utilization of LIFECO products for their intended application. It is not intended as a replacement for competent professional assistance which is an obvious requisite to any specific application. Good piping practice should always prevail. Specific pressures, temperatures, external or internal loads, performance standards and tolerances must never be exceeded.

While every effort has been made to ensure its accuracy, LIFECO Company, its subsidiaries and affiliated companies, make no express or implied warranty of merchantability or fitness for a particular purpose respecting the information contained in this Catalog or the materials referred to therein. Illustrations shown within this catalog are not drawn to scale and may have been exaggerated for clarity. Anyone making use of the information or material contained herein does so at his own risk and assumes any and all liability resulting from such use.

Rigid Coupling

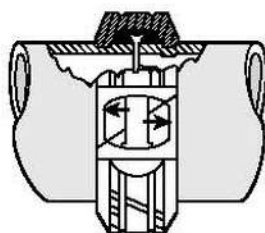
Rigid grooved end piping systems (including Styles 1G, 1GS, 1X, and others) provide a mechanical and frictional interlock onto the pipe ends sufficient to result in a rigid joint.

1G type, 1GS type rigid coupling adopts internal and external male and female mouth, socket type and meshing design. It uses the gap between the male and female mouth socket and the pipe to mesh with the joint to form a rigid coupling.

Type 1X rigid coupling is designed with a 60° angle pad design. This design assembles and tightens the coupling housing obliquely rather than vertically, resulting in a smaller internal diameter, which holds the pipe tightly and creates a rigid connection. This oblique sliding also forces the joint housing keys to form double-sided contact on opposite sides of the inner and outer edges of the groove so that axial and radial movements cannot be generated after the tubes are connected, and the rigid connecting pipe is actually achieved.



Model 1G, Model 1GS Rigid Coupling



Model 1X Style Rigid Coupling

These products can be considered to have system behavior characteristics similar to those of welded or flanged systems, in that all piping remains in strict alignment and is not subject to deflections during operation. For this reason, these products require support techniques similar to those used in traditional flanged or welded systems.

Systems incorporating rigid couplings require the calculated thermal growth/contraction of the piping system to be fully compensated for in the design of the piping system. This requires adequate use of flexible components, (i.e. flexible couplings, expansion joints, expansion loops using flexible couplings at the elbows, etc.) such that no bending moments can be developed and imparted at the pipe joints. Please refer to The following sections for further details.

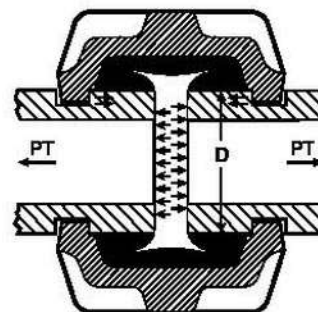
Flexible Coupling

The following factors must be considered when designing or installing flexible grooved end piping systems (including Styles 1G, 1GS, 1X, and others).

Pressure Thrust

When a flexible grooved type mechanical coupling is sustaining forces trying to separate the pipe ends, the shoulder of the groove is pulled hard against the inside face of the coupling key. This is what prevents the pipes from separating.

The allowable force which a joint can sustain varies for different types of couplings, pipe wall thickness, types of pipes and grooving. The product data under the column "Maximum Permissible End Load" shows the maximum allowable end force due to internal pressure and external loading that different couplings will sustain.



When this end force is due to a closed end or change in direction, the pressure thrust transmitted by the joint can be computed from the formula:

$$PT = \frac{\pi}{4} D^2 P$$

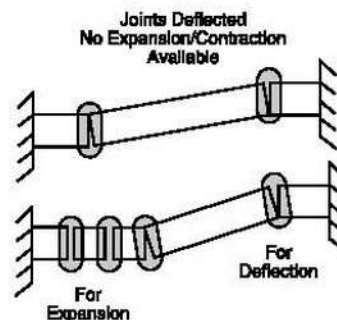
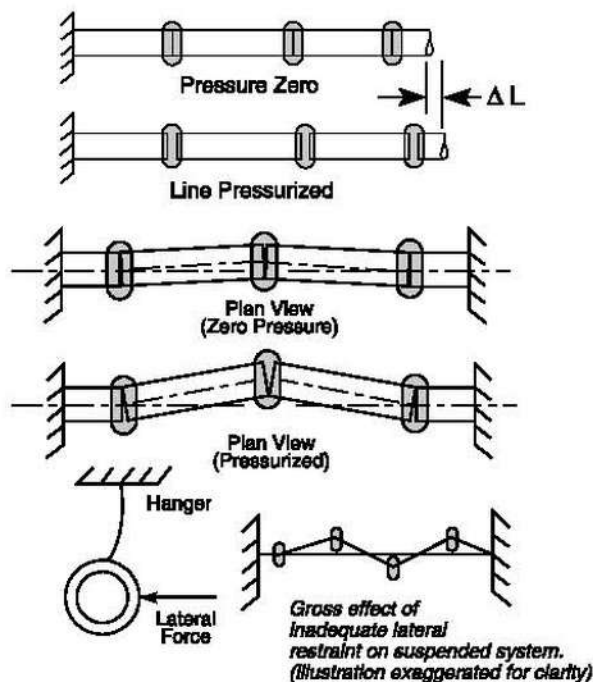
Where:

PT = Pressure thrust or end load (lbs.)

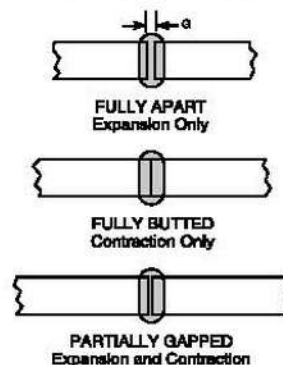
D = Outside diameter of pipe (inches)

p = Internal pressure (psi)

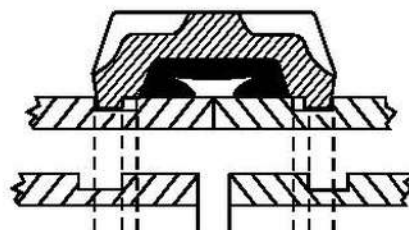
Pipe will be moved to the full extent of the available pipe end gaps when allowed to float. Ensure resulting movement of randomly installed systems is not harmful to joints at changes in directions or branch connections or to parts of structure or other equipment. Note also that thermal expansion of pipes will add to total movement in these cases.



The grooved piping method will not allow both maximum linear movement and maximum angular movement simultaneously at the same joint. If both are expected simultaneously, systems should be designed with sufficient joints to accommodate both, including allowance for recommended tolerances. Flexible couplings do not automatically provide for expansion or contraction of piping. Always consider best setting for pipe end gaps. In anchored systems, gaps must be set to handle combinations of expansion and contraction. In free floating systems offsets of sufficient length must be used to accommodate movement without over deflecting joints.



Linear movement available at flexible grooved pipe joints is published under performance data for each ufeccoupling style. These values are MAXIMUMS. For design and installation purposes, these figures should be reduced by the following factors to allow for pipe groove tolerances.



Suggest :

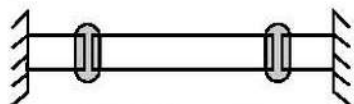
DN25~DN80(1"~3") Reduce published figures to 50% ,

DN100~DN300(4"~12") Reduce published figures to 75%

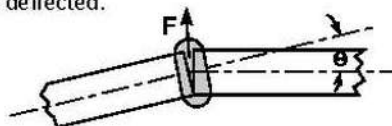
Standard cut grooved pipe will provide double the expansion/contraction or deflection capabilities of the same size standard roll groove pipe.

For anchored systems, where pressure thrusts do not act to hold the joints in tension, or in systems where the joints have been intentionally deflected (e.g., curves), provide lateral restraint to prevent movement of the pipes due to pressure thrusts acting at deflections. Lightweight hangers are not adequate in preventing sideways movement of pipes. It should be anticipated that small

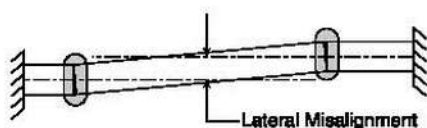
deflections will occur in all straight lines and side thrusts will be exerted on the joints.



Angular deflection at butted or fully spaced joints is not possible unless the ends of the pipes are free to move as required. Unrestrained deflected joints will straighten up under the action of axial pressure thrusts or other forces acting to pull pipes apart. If joints are to be maintained deflected, then lines must be anchored to restrain pressure thrusts and end pull forces, otherwise sufficient lateral force must be exerted to keep joint deflected.

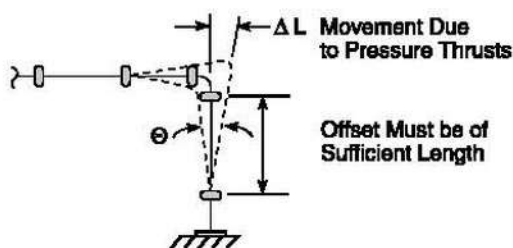


Lateral forces (F) will always act on deflected joints due to internal pressure. A fully deflected joint will no longer be capable of providing the full linear movement normally available at the joint.



At least two flexible couplings are required to provide for lateral misalignment of pipes. Angular deflection of each joint must not exceed Maximum Deflection From Centerline published for each LIFECO coupling style

OFFSETS AND BRANCH CONNECTIONS

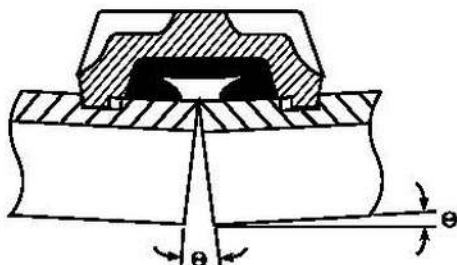


Ensure that branch connections and offsets are sufficiently long so that the maximum angular deflection of coupling (shown in Performance Data for each coupling style) is never exceeded and can accommodate anticipated total movement of pipes. Otherwise, anchor system to direct movement away from these. Also ensure that adjacent pipes can move freely to provide anticipated movements. (Refer to the following sections for more details.)

Angular Deflections

Angular deflection available at flexible grooved pipe joints is published under Performance Data for each LIFECO coupling style. These values are MAXIMUMS. For design and installation purposes these figures should be reduced by the following factors to allow for pipe grooving tolerances.

θ = Maximum angular deflection between center lines as shown under Performance Data.



DN25~DN80(1"~3") Reduce published figures to 50%.

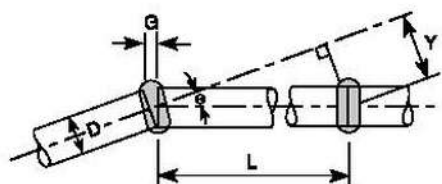
DN100~DN300(4"~12") Reduce published figures to 75%.

Standard cut grooved pipe will provide double the expansion/contraction or deflection capabilities of the same size standard roll groove pipe.

The angular deflection available at a LIFECO flexible grooved pipe joint is useful in simplifying and speeding installation.

NOTE: Joints which are fully deflected can no longer provide linear movement. Partially deflected joints will provide some portion of linear movement.

NOTE: Pressure thrusts will tend to straighten deflected pipe.



Where:

Y = Misalignment (Inches)

G = Maximum Allowable Pipe End Movement (Inches) as shown under Performance Data (Published value to be reduced by Design Tolerance.)

θ = Maximum Deflection (Degrees) from Center Line as shown under Performance Data (Published value to be reduced by Design Tolerance.)

D = Pipe Outside Diameter (Inches)

L = Pipe Length (Inches)

Misalignment

Pipe misalignment can be accommodated with a LIFECO flexible grooved piping system. Note that at least two flexible couplings must be used for the combined lateral displacement and angular deflection (Y). (Refer belowing sections for details.)



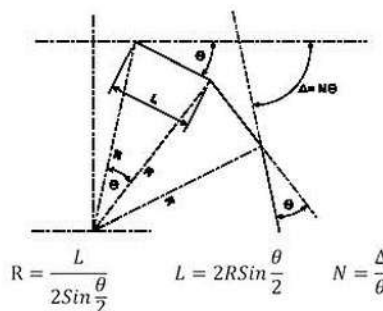
The movement available can be calculated from the flexible coupling Performance Data.

Curve Layout

Curves may be installed with straight pipe lengths utilizing the angular deflection (under performance data) available at each flexible coupling.

Note that if the maximum angle of deflection at the couplings is used to lay the curve, no allowance is left for expansion/contraction.

NOTE: Pressure thrusts will tend to straighten the curve. Consideration must be given to proper anchoring.



Where:

N = Number of Couplings

R = Radius of Curve (Feet)

L = Pipe Length (Feet)

θ = Deflection from Centerline (°) of each Coupling (See Data Sheets- Published value to be reduced by Design Tolerance)

Δ = Combined Angular Deflection of all couplings

For curves of less than 90° total deflection, the data shown on the previous page can be used to determine:

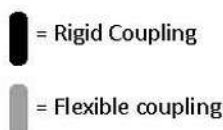
1. The radius of curvature that can be made using pipes of a given length and utilizing either the full or partial angle of deflection available from the couplings used. Alternatively, the maximum length of pipe that can be used to negotiate a curve of a certain radius using either the maximum or partial angle of deflection available from the couplings.
2. The total number of flexible couplings required to negotiate a curve having a given deflection angle.

Pipe Support Anchorage and Guidance

Rigid Coupling & Flexible Coupling

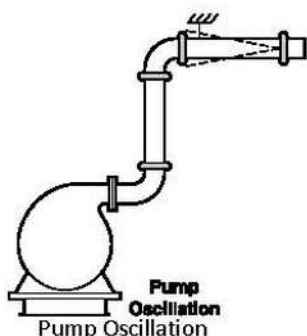
When designing anchorage, support and guidance systems for piping joined with flexible or rigid mechanical grooved type couplings, it is necessary to give consideration to certain characteristics of these couplings. These characteristics distinguish flexible grooved type couplings from other types and methods of pipe joining. When this is understood, the designer can utilize the many advantages that these coupling provide.

Coupling Key:



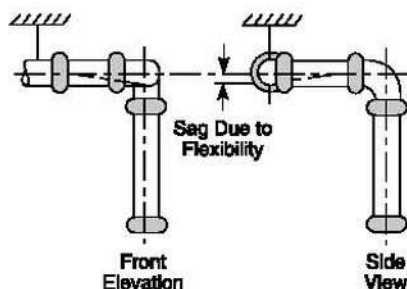
USE OF HANGERS AND SUPPORTS

The use of hangers and supports offering freedom of movement in one or more directions has to be considered to allow pipes to move freely. Spring hangers are good practice at change of direction to allow freedom of pipe movement.

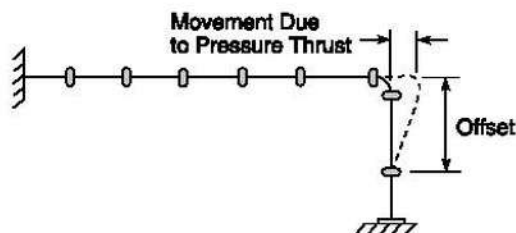


Accommodating Coupling Flexibility

Flexible grooved type couplings allow angular flexibility and rotational movement to take place at joints. These features provide advantages in installing and engineering piping systems, but must be considered when determining hanger and support spacing.



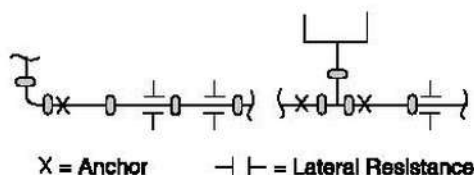
As illustrated, it is obvious that this system would require further hangers to eliminate the drooping of the pipes that would occur. Hanger positions must therefore be considered in relation to the angular and rotational movement that will occur at joints. Good use can be made of 1X style rigid couplings in boiler and machinery rooms. These will increase rigidity where needed.



In the system illustrated, if the joints had all been installed butted or only partially open when pressurized, the pipe ends would all move to the maximum extent allowed by the coupling and this movement would all accumulate at the end of the system. The offset would have to be capable of deflecting sufficiently, otherwise harmful bending moments would be induced in the joints of the offset.

Note, if the pipes were to expand due to thermal changes, then further growth of the pipes would also take place at the ends.

Anchorage and Support



Ensure anchorage and support is adequate. Use anchors to direct movement away from or to protect critical changes in direction, branch connections and structure. Spacing and types of supports should consider anticipated pipe movements. If rigid couplings are used, consideration must be given to use of expansion joints if thermal movement is expected.

Rules Applicable to Long Runs of Pipe

For long pipe runs incorporating flexible couplings, it is normal practice to anchor or block all changes in direction of piping to prevent pressure thrusts from creating linear growth at the flexible joints. It may be necessary to guide the pipe to prevent lateral movement of the pipe between the anchors. Intermediate anchors can be installed to control pipe movement in selected areas and to reduce pipe end forces on joints. When changes in direction are located in a structure (i.e. pump room) a main anchor can be used at the change in direction to handle loads created by pressure thrusts. The anchor would also prevent unwanted movement of the piping at equipment connections.

Pipe Support

Rigid Coupling & Flexible Coupling

Piping joined with grooved type couplings, like all other piping systems, requires support to carry the weight of pipes, equipment and fluid. Like all other methods of joining pipes, the support or hanging method must be such as to eliminate undue stresses on joints, piping and other components. Additionally, the method of support must be such as to allow movement of the pipes where required and to provide for other special requirements such as drainage, etc. as may be required by the designer. The support system for flexible mechanical grooved type pipe couplings must consider some of the special requirements of these couplings. The tables show suggested maximum span between pipe supports for horizontal straight runs of standard weight steel pipe carrying water or similarly dense liquids. They are not intended to be used as specifications for all installations. These DO NOT apply where critical calculations are made or where there are concentrated loads between supports.

Do not attach supports directly to the couplings. Support adjoining pipe and equipment only.

Rigid Systems

For LIFECO rigid coupling Styles 1G, 1GS, 1X, and others, the Maximum Hanger Spacing below may be used.

Size		Suggested Maximum Span Between Supports					
Nominal Dia.		Water Service			Gas or Air Service		
		1	2	3	1	2	3
DN	Inches	m Feet	m Feet	m Feet	m Feet	m Feet	m Feet
25	1	2.1 7	2.7 9	3.7 12	2.7 9	2.7 9	3.7 12
32	1 1/4	2.1 7	3.4 11	3.7 12	2.7 9	3.4 11	3.7 12
40	1 1/2	2.1 7	3.7 12	4.6 15	2.7 9	4.0 13	4.6 15
50	2	3.1 10	4.0 13	4.6 15	4.0 13	4.6 15	4.6 15
65	2 1/2	--	--	--	--	--	--
80	3	3.7 12	4.6 15	4.6 15	4.6 15	5.2 17	4.6 15
100	4	4.3 14	5.2 17	4.6 15	5.2 17	6.4 21	4.6 15
125	5	--	--	--	--	--	--
150	6	5.2 17	6.1 20	4.6 15	6.4 21	7.6 25	4.6 15
200	8	5.8 19	6.4 21	4.6 15	7.3 24	8.5 28	4.6 15
250	10	5.8 19	6.4 21	4.6 15	7.3 24	9.5 31	4.6 15
300	12	7.0 23	6.4 21	4.6 15	9.1 30	10.1 33	4.6 15
350	14	7.0 23	6.4 21	4.6 15	9.1 30	10.1 33	4.6 15
400	16	8.2 27	6.4 21	4.6 15	10.7 35	10.1 33	4.6 15
450	18	8.2 27	6.4 21	4.6 15	10.7 35	10.1 33	4.6 15
500	20	9.1 30	6.4 21	4.6 15	11.9 39	10.1 33	4.6 15
600	24	9.8 32	6.4 21	4.6 15	12.8 42	10.1 33	4.6 15

1. Spacing corresponds to ASME B31.1 Power Piping Code.

2. Spacing corresponds to ASME B31.9 Building Services Piping Code.

3. Spacing corresponds to NFPA 13 Fire Sprinkler Systems.

Flexible Systems

For coupling Styles including 1N, 1ZN. Standard grooved-type couplings allow angular, linear and rotational movement at each joint, to accommodate expansion, contraction, settling, vibration, noise and other piping system movement. These features provide advantages in designing piping systems but must be considered when determining hanger and support bracing and location.

Maximum Hanger Spacing

For straight runs without concentrated loads and where full linear movement is required.

Size	Average Hangers per Pipe Length Evenly Spaced									
	Pipe Length m Pipe Length Feet									
	Nominal Dia.									
DN	Inches	2.1	3.0	3.7	4.6	6.1	6.7	7.6	9.1	10.7
		7	10	12	15	20	22	25	30	35
20~25 3/4~1		1	2	2	2	3	3	4	4	5
32~50 1 1/4~2		1	2	2	2	3	3	4	4	5
65~100 2 1/2~4		1	1	2	2	2	2	2	3	4
125~200 5~8		1	1	1	2	2	2	2	3	3
250~300 10~12		1	1	1	2	2	2	2	3	3
350~400 14~16		1	1	1	2	2	2	2	3	3
450~600 18~24		1	1	1	2	2	2	2	3	3
700~1050 28~42		1	1	1	1	2	2	2	3	3

No pipe length should be left unsupported between any two couplings

Maximum Hanger Spacing

For straight runs without concentrated loads and where full linear movement is not required.

Pipe Size	Suggested Maximum Span Between Supports
Nominal Dia.	
DN	M
Inches	Feet
20~25 3/4~1	2.4 8
32~50 1 1/4~2	3.0 10
65~100 2 1/2~4	3.7 12
125~200 5~8	4.3 14
250~300 10~12	4.9 16
350~400 14~16	5.5 18
450~600 18~24	6.1 20
700~1050 28~42	6.4 21

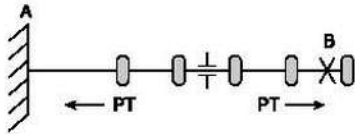
Anchors

Rigid Coupling & Flexible Coupling

Anchors can be used to prevent movement due to pressure thrust. There are two types of anchors which are commonly used:

A. Main anchors

B. Intermed



A. MAIN ANCHORS

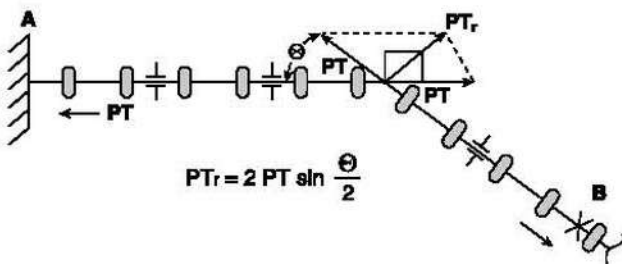
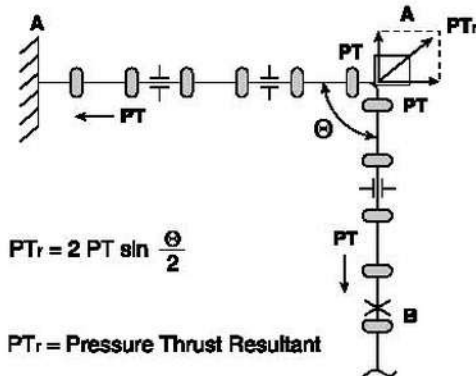
Main anchors are installed at or near terminations and changes of direction of a pipe line. The forces acting on a main anchor will result from internal pressure thrust. These forces can generate substantial loads which may require structural analysis.

$$PT = \frac{\pi}{4} D^2 P$$

PT = Pressure Thrust (Pounds)

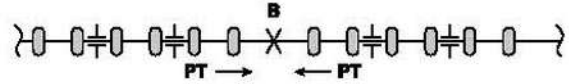
D = Outside Diameter of Pipe (Inches)

P = Internal Pressure (PSI)

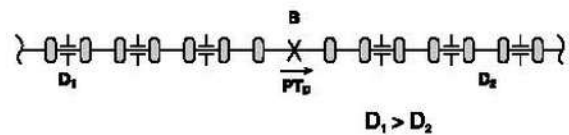


B. INTERMEDIATE ANCHORS

Intermediate anchors divide a long pipe run, with main anchors at each end, into individual expanding sections. The pressure thrust



Where there is a change in pipe diameter, there will be a differential pressure thrust acting on an intermediate anchor.



The differential pressure thrust PTD is calculated by:

$$PTD = p \left(\frac{\pi D_1^2}{4} - \frac{\pi D_2^2}{4} \right)$$

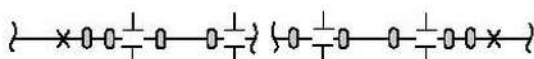
To keep pipe in alignment, guidance to prevent lateral movement or deflection at flexible coupling joints may be required. An alternative would be to use rigid couplings to keep joints from deflecting where not desired.

Pipe Support

The following are shown to call attention to the mechanical advantages of the grooved piping method; how they can be utilized to the piping systems designer's benefit. These are presented to stimulate thought and should not be considered as recommendations for a specific system. The LIFECO grooved piping method, when used in a piping system, should always be utilized in designs consistent with good piping practice. The design considerations for engineering and installing grooved piping systems covered elsewhere in this manual should always be referred to.

Thermal Expansion and/or Contraction

Movement in piping systems due to thermal changes can be accommodated with the grooved piping method. Sufficient flexible joints must be available to accommodate anticipated movement, including Movement Tolerance. If anticipated movement will be greater than provided by the total number of joints in the system, additional expansion must be provided. Rigid systems will necessitate use of expansion joints or flexible couplings at offsets where system movement is required.



Example 1

Example 1:

condition :120 M Long, straight piping system

DN150(6",165.1)pipe ,Length 6m

Maximum pipe end expansion of each coupling 3.2mm (1N-165flexible coupling)

Lowest operating temperature 10 °C

The maximum operating temperature 43 °C

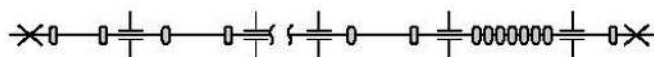
The known coefficient of thermal expansion of a steel pipe is 0.012mm/m °C

So : Total length/Each tube length = $120/6 = 20$ Joints

Total stretch $20 \times 3.2 = 64$ mm

Considering the safety factor, the pipeline can provide $64 \times 0.75 = 48$ mm stretch The total length of thermal expansion of the steel pipe is $120 \times (43-10) \times 0.012 = 47.5$ mm

Therefore, the piping system can provide 48mm stretch and can withstand 33 °C thermal expansion.



Example 2

Example 2:

Condition: 120 M Long, straight piping system

DN150(6",165.1)pipe ,Length 6m

Maximum pipe end expansion of each coupling 3.2mm (1N-165flexible coupling)

Lowest operating temperature 15 °C ;The maximum operating temperature 80 °C

The known coefficient of thermal expansion of a steel pipe 0.012mm/m °C

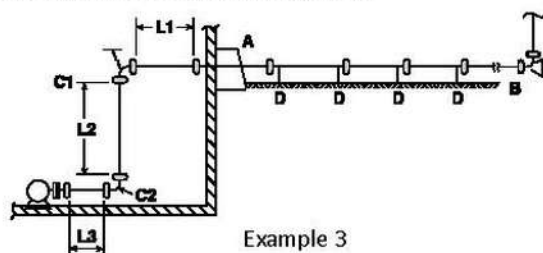
So: Total length/Each tube length = $120/6 = 20$ Joints

Total stretch $20 \times 3.2 = 64$ mm

Considering the safety factor, the pipeline can provide $64 \times 0.75 = 48$ mm stretch

The total length of thermal expansion of the steel pipe is $120 \times (80-15) \times 0.012 = 93.6$ mm

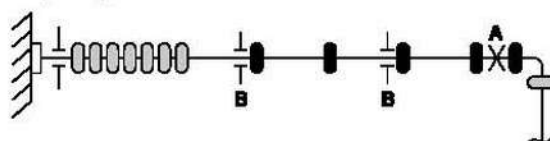
Therefore, the pipe system can only provide 48mm of stretch , to be able to withstand 65OC thermal expansion. The expansion joint must be installed or a reasonable amount of extension should be made with multiple flex joints.



Example 3

Example 3:

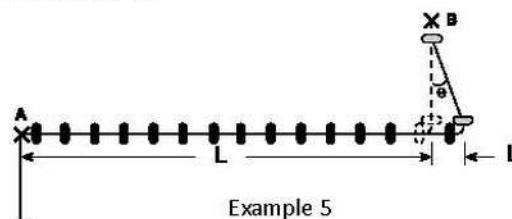
To properly restrain this system, it would be necessary to provide a pressure thrust anchor at "A" to prevent the piping outside being forced inside by the pressure thrust acting at the elbow "B." Inside, it would be necessary to provide a hanger at point C1, or a base support at point C2. Providing any expected pipe movements, no anchoring would be required and the self-restraining feature of the joints would hold the piping securely together. Outside, it would be necessary to ensure that the maximum end load of the joints was not exceeded due to thermal movement of the pipes. Intermediate anchors may be required. Pipe must be properly supported ("D") and guided. Where flexible couplings are not required, rigid couplings can reduce supports and offsets (except where thermal movement is anticipated).



Example 4

Example 4:

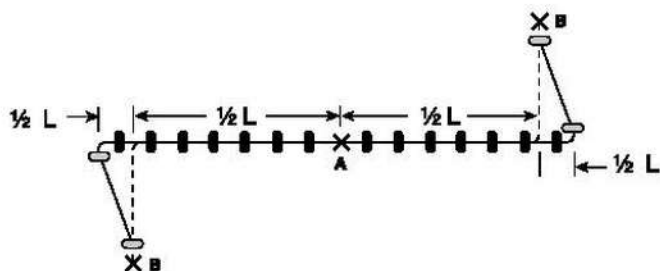
Anchor at "A" to prevent pressure thrust from moving expansion unit. Provide guides at points "B" to direct movement into expansion joint. See related section for pipe support suggestions.



Example 5

Example 5:

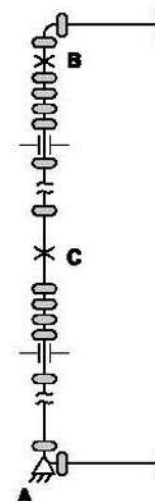
Anchor "A" at one end of the long run. A sufficiently long pipe between two flexible couplings, prior to a "fixed location" "B", may be used to accommodate the growth/contraction of the entire long run. Use rigid couplings on the long run to eliminate movement due to pressure thrust.



Example 6

Example 6:

Anchor "A" in the center of the long run. $1/2$ of the movement will be directed towards each elbow. A sufficiently long pipe between two flexible couplings, prior to a "fixed location" "B", may be used to accommodate the growth/contraction of the long run. Use rigid couplings on the long run to eliminate movement due to pressure thrust.



A typical system is illustrated. Adequate guidance must be provided. This system will require pressure thrust anchors at "A" and "B" and also, dependent upon the length of the stack, intermediate anchors such as at "C" to break up the pipe

movement and carry some of the total weight if necessary. When using this method, it is necessary to consider that if pipes are stacked (i.e., end butted) then couplings joining pipes cannot accommodate expansion so that it may be necessary to consider hanging pipes from points "C" and "B." Also, consider movement so that shear forces are not added at any branches.

2. Treatment of Risers With Branch Connections—Free moving risers can cause shear forces at branch connections due to pressure thrusts and/or thermal movement. The pipe should be anchored at or near the base with a major pressure thrust anchor "A" capable of supporting the full pressure thrust and local weight of pipe and fluids. Any movement of horizontal pipe at the bottom of the riser must be considered independently with adequate provision for movement. When flexible couplings are used, the system can be anchored at the top "B" with an anchor capable of withstanding full pressure thrust at the top of the riser plus local weight of pipe. The use of this upper anchor prevents any possibility of closed joints opening under pressure and causing movement at the riser top.

Anchorage and Support of Vertical Pipes

Flexible System

Risers are commonly installed with anchors at the base and riser top with the piping in between guided at every other floor to prevent "snaking" of the line. Pre-gapping of the pipe ends will allow for thermal expansion up to the maximum published in our literature. Risers with branch connections should have intermediate anchors or offsets to prevent system movement at these locations which could cause shearing of components or branches.

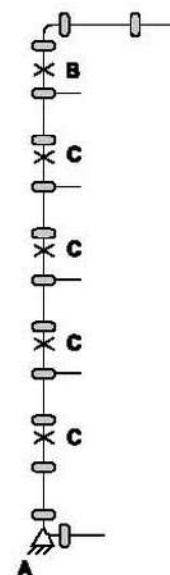
Rigid System

Risers consisting entirely of rigid couplings can get treated similar to welded systems and, where thermal movement is required, expansion joints or offsets will be necessary to prevent system movement and damage to components. These systems are obviously most advantageous where rigidity is desired as in mechanical equipment rooms, at pump connections, etc.

Combination System

By designing risers with the combination system, you can make use of the 1 X rigid couplings to reduce guiding requirements, and use a combination of flexible couplings to accommodate thermal movement as required.

1. Risers With Supplementary Thermal Compensators—When greater pipe movement is required, the movement at the joints can be supplemented by the use of combination of flexible couplings

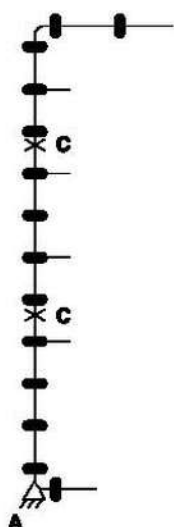


This method is often used for fire standpipe or similar systems where movement would cause shearing of intermediate components or branches.

Piping between upper "B" and lower "A" anchors should be supported by intermediate anchor ("C") capable of supporting local pipe weight and preventing lateral movement.

Intermediate clamps should be placed a minimum of every other pipe length. Proper gapping of pipe to allow adequate thermal movement should be considered depending on nature of movement expected. (Refer to Design Considerations.)

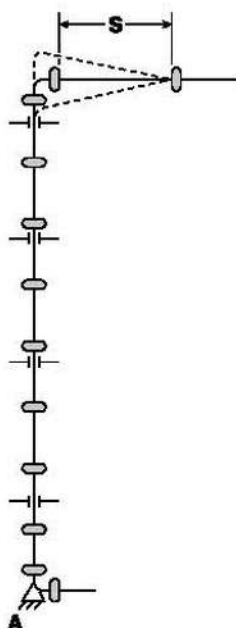
An alternative would be to use rigid couplings which would not allow "closed joints" to open. The system can be anchored at "A" also, and intermediate anchors at "C" can be used to support local pipe weight. Allowance for thermal movement should be considered depending on application.



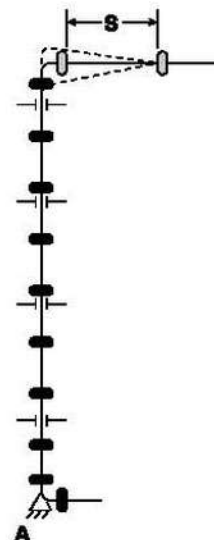
3. Treatment of Risers Without Branch Connections for Flexible Couplings

With this method, a major thrust anchor is again created at the bottom of the stack "A" supports the total weight of pipe and fluids.

Guidance is necessary at suitable intervals to prevent buckling of the riser.

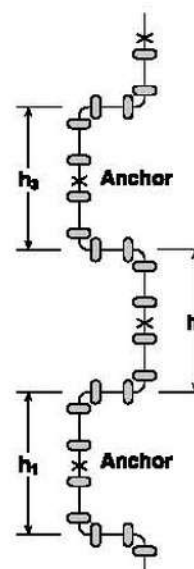


It is necessary that the pipe length "S" at the top of the stack be long enough to accommodate the total vertical movement. This movement is the result of the combined effect of pipe being moved to full extent of the available pipe end gaps due to pressure thrusts and thermal growth.



Rigid couplings also could be used to prevent opening of "closed joints." For offset "S" at the top of the stack to accommodate thermal growth, it would be necessary to use the required number of flexible couplings depending on the angular deflection.

4. Treatment of Risers To Eliminate Concentrated Anchor Loads



When structural requirements dictate that base anchor load or upper anchor loads must be minimized, then the use of a "looped" system (as shown) should be considered. In the system illustrated, each anchor carries the local weight of pipe. This method is often considered in tall buildings where high anchor loads would be generated. The offsets must be long enough to accommodate movement in the pipes due to flexible couplings opening up under pressure plus any thermal or other movements of pipes or supports. The use of rigid couplings could be considered to prevent joints from opening up and where thermal movement is anticipated, it should be accommodated with the use of flexible couplings or expansion joints.