Effective May 24, 2002
Cancels all previous publications

U.S. Price $12.95

JCM INDUSTRIES, INC.

FITTINGS AND FABRICATIONS

DESIGNED AND ENGINEERED

FOR

HIGH DENSITY POLYETHYLENE PIPE

JCM Industries, Inc.
P.O. Box 1220
Nash, TX 75569-1220
Call Toll Free 800-527-8482
Outside U.S. 903-832-2581
Fax Toll Free 800-874-9524
Fax Outside U.S. 903-838-6260
www.jcmindustries.com

JCM Industries, Inc.

Fittings and Fabrications Designed and Engineered for High Density Polyethylene Pipe

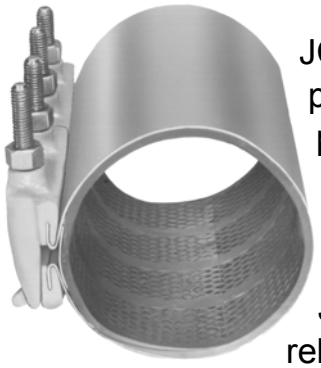
JCM Industries, Inc.
P. O. Box 1220
Nash, TX 75569-1220

Call Toll Free 800-527-8482
Outside U.S. 903-832-2581
Fax Toll Free 800-874-9524
Fax Outside U.S. 903-838-6260

©2002 JCM Industries, Inc.

JCM Industries, Inc.

JCM Industries' Pipe Fittings and Fabrications for Polyethylene Pipe have design features which specifically address the working characteristics of HDPE. With the assistance of PE Pipe manufacturers, JCM has designed and engineered our standard products to meet the design needs of Polyethylene Pipe.



JCM and the PE Pipe manufacturers recommend specific JCM products for PE Pipe. These products include: Clamps, Couplings, Tapping Saddles and Tapping Sleeves. Each of these product lines offer several models to accommodate various application requirements.

JCM products are time and field proven for performance and reliability. By monitoring field applications and requirements, JCM provides the most engineering advanced design to the industry.

General Application Information

JCM Products for repairing, connecting and tapping PE pipe have been tested and evaluated for their suitability and design capability. In each case JCM products have performed satisfactorily in respect to their design application.

Test criteria range from short-term for special applications to long-term 1000 hour evaluations with the most common applications. Temperature and pressure cycles are also incorporated to fully address the pipe characteristics and full range of occurrences. Special monitoring equipment is utilized to produce accurate test data and for historical reference.

High Density Polyethylene Pipe (HDPE) has several unique characteristics which must be taken into consideration. HDPE has a high coefficient of thermal expansion and a low modulus of elasticity. This sensitivity to pressure and temperature causes HDPE to expand and contract more than traditional water and sewer piping materials. HDPE will also relax ("creep") at lower stress levels than other piping materials. Due to these special characteristics, the following parameters should be adhered to when utilizing JCM products for HDPE (ANSI/AWWA C901-88, C906-90). The disregard of these guidelines and/or the installation instructions supplied with each fitting may cause unsatisfactory results and void the expressed product warranty.

- Restraint must be considered when joining plain end pipe to ensure against pipe pull out. JCM bolted couplings allow for a maximum of 3/8" linear expansion or contraction. JCM Universal Clamp Couplings allow for zero expansion/contraction. JCM Sur-Grip Restrainers are designed to resist pull out forces based on the maximum working pressure rating of the pipe. Forces experienced due to expansion/contraction of the pipe require special consideration.

- JCM products for HDPE are designed for underground pressurized fluid service and are pressure rated to match the pipe SDR pressure rating or with a maximum service rating of 150 PSI (Temperature 35^{o} - 75^{o} F/Maximum test pressure limited to rated pipe pressure).

- Pipe stiffeners must be used when joining, or connecting to, HDPE. Pipe systems must be engineered to prevent movement causing fittings to slide or rotate on the pipe.

Eighteen years of successful performance has been one of the most stringent proving grounds for JCM products and their application with Polyethylene Pipe. Generally speaking, most common potable water pressure applications utilize HDPE SDR 17 through 11. For applications on thinner wall pipe, special applications, higher pressure ratings and product usage recommendations, please contact JCM.

Note: JCM recommends fusion joints as a primary method of connection. Mechanical fittings are a secondary and limiting choice. The information included on this page is provided to address the known factors when joining or tapping HDPE with mechanical fittings.

JCM PRODUCTS FOR POLYETHYLENE PIPE

JCM Industries manufactures a number of products which have proven to be very applicable to HDPE Pipe. Working characteristics of polyethylene pipe require special attention to the repair, connection and tapping procedures performed in systems using this type of pipe.

JCM Industries products especially applicable to HDPE pipe include:

COUPLINGS AND REPAIR CLAMPS
101 - 102 Universal Clamp Couplings
131 - 132 All Stainless Steel Universal Clamp Couplings
136 Heavy Duty All Stainless Steel Repair Clamp
201 Steel Couplings
210 Ductile Iron Couplings
215 - 216 Long Ductile Iron Couplings

TAPPING SLEEVES AND SADDLES
412 - 422 Tapping Sleeves (6” size and larger, contact JCM for smaller sizes)
432 All Stainless Steel Tapping Sleeve
452 All Stainless Steel Tapping Sleeve with Outlet Seal Gasket
462 Stainless Steel Tapping Sleeve with Carbon Steel Flange

418 Fabricated Threaded Outlet Tapping Sleeve (1/2” - 4” Outlets)
438 Stainless Steel Threaded Outlet Tapping Sleeve
Best all round saddle in nominal sizes 6” through 24”

404 - 406 Service Saddle with Double Stainless Steel Straps
(3/4” thru 2-1/2” outlets, 2” - 24” sizes)

OTHER PRODUCTS
610 - 621 Sur-Grip Restrainers
230 HDPE Pipe Stiffeners

Success in these products is largely due to the design criteria that took the working characteristics of HDPE Pipe into consideration. Design characteristics inherent to JCM clamps, couplings, tapping sleeves, saddles and other products are as follows:

GASKETS - Tapping sleeve and service saddle gaskets should have wide cross section with enough volume to store compression energy. Gaskets should be of a hardness which will flex with pipe pressure fluctuations. Outlet seals should have a mechanical sealing lip that utilizes line pressure to increase seal. Outlet gaskets should be externally and internally confined.

TAPPING SLEEVE OR CLAMP BODY - Tapping sleeve or clamp coupling body should conform to the HDPE pipe and support it and the branch (in cases of outlets). Width of sleeve should be such that it spreads the load to prevent point loading or deformation of the pipe.

BOLTING - Bolts and bolting should be replaceable, self-aligning and heavy enough to properly load the gasket and assure an adequate safety factor.

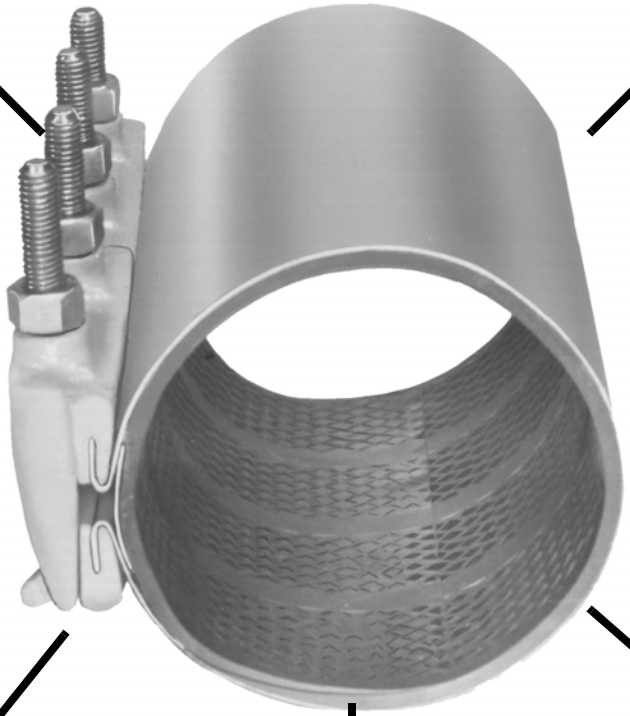
Data Included Within This Presentation

Information Description **Page Number**

JCM Universal Clamp Couplings for Polyethylene Pipe

Recommended JCM Universal Clamp Couplings for HDPE include:

JCM 101 Universal Clamp Coupling - Standard Range
JCM 102 Universal Clamp Coupling - Extended Range
JCM 131 All Stainless Steel Univ. Clamp Cplg. - Standard Range
JCM 132 All Stainless Steel Univ. Clamp Cplg. - Extended Range



JCM Universal Clamp Couplings for Polyethylene Pipe

JCM 101 - 102 Universal Clamp Couplings
JCM 131 - 132 All Stainless Universal Clamp Couplings

JCM Universal Clamp Couplings have several design features which specifically address the working characteristics of HDPE. These fittings have been time proven in the field on Polyethylene Pipe applications including repair and connection. Design features include:

- Stainless steel band which conforms to and supports HDPE on the full circumference of the pipe.
- Manufactured to accommodate the pipe outside diameter and the characteristic fluctuations.
- Thick gasket (1/4”) stores compressed energy and flexes with pipe pressure.
- Low profile lugs perform an efficient transfer of energy from the bolting system directly to gasket compression. Low profile lugs also stay close to the pipe, facilitating slip lining applications when a fusion machine is unavailable.
- Mutually supporting sliding fingers with self-aligning bolts evenly compress gasket with distortion free tightening eliminating undue stress on thin pipe.
- Large diameter clamps increase lug, bolt and stainless sizes to provide the sealing pressure and gasket compression required to successfully repair or join large O.D. pipe.
- All stainless steel construction of the Models 131 and 132 provides superior corrosion resistance in hot soils or corrosive environments.
- Various gasket materials are available for acidic or corrosive line contents. Includes: Buna-N, EPDM, Hypalon and Viton.
- Nominal sizes 1-1/2” through 54”.

Note: Pipe stiffeners are required for applications joining HDPE pipe.

Typical Specifications

JCM 101 Universal Clamp Couplings
JCM 102 Multi-Band Universal Clamp Couplings

JCM 101 Universal Clamp Couplings - JCM 102 Multi-Band Clamps (sizes 4" through 8")

All full circumferential single and multi-band repair clamps 1-1/2" and larger shall have a minimum material standard of certifiable prime 304 Stainless Steel band; heavy duty, low profile Ductile Iron Lugs (ASTM A536) with mutually sup-porting sliding fingers; 5/8" corrosion resistant alloy bolts, per AWWA Standard C-111, ANSI 21.11, (or Stainless Steel 18-8 Type 304 bolts) and 1/4" thick gridded gasket with tapered lap joint ends and a 304 stainless steel quarter hardened bridge plate molded flush into the gasket. To provide extra tightening capability, the band shall be permanently attached to the lugs by crimping the lug and locking it in place with a minimum of three stainless welds per lug. Clamp shall be similar to JCM 101 Universal Clamp Coupling, JCM 102 Universal Clamp Coupling or approved equal.

JCM 101 Universal Clamp Couplings - JCM 102 Multi-Band Clamps (sizes 10" and larger)

All full circumferential single and multi-band repair clamps 10" and larger shall have a minimum material of 17 gauge certifiable prime 304 Stainless Steel band; heavy duty Ductile Iron Lugs (ASTM A536) with mutually supporting sliding fingers; 3/4" corrosion resistant alloy bolts, per AWWA Standard C-111, ANSI 21.11, (or Stainless Steel 18-8 Type 304 bolts) and a 1/4" thick gridded gasket with tapered lap plate molded flush into the gasket. To provide extra tightening capability, the band shall be permanently attached to the lugs. The attachment shall withstand a minimum of 100 ft. lbs. of torque per bolt. Clamp shall be similar to JCM 101 Universal Clamp Coupling, JCM 102 Universal Clamp Coupling or approved equal.

JCM 100 Series Universal Clamp Couplings are ANSI/NSF Standard 61 Certified.

JCM Universal Clamp Couplings - Material Specifications

BAND: Type 304 Stainless Steel

LUGS: Ductile Iron ASTM A-536

BOLTS: Corrosion resistant low alloy per AWWA C-111, ANSI A21.11.
Optional Stainless Steel 18-8 Type 304.

GASKETS: Compounded for use with water, salt solutions, mild acids and bases. Other gaskets available upon request.

TAPPED OUTLET (Models 103, 104): 18-8 Type 304 Stainless Steel

Typical Specifications

JCM 131 All Stainless Universal Clamp Couplings
JCM 132 All Stainless Multi-Band Universal Clamp Couplings

JCM 131 All Stainless Universal Clamp Couplings - JCM 132 All Stainless Multi-Band Clamps (sizes through 8")

All full circumferential single and multi-band repair clamps 1-1/2" and larger shall have a minimum material standard of certifiable prime 304 stainless steel band and bolts; low profile CF-8 Cast Stainless Steel lugs - equivalent to 18-8 type 304 stainless steel, with mutually supporting sliding fingers and minimum 9/16"(11/16" clamps 10" and larger) replaceable 304 stainless steel bolts. The gasket shall be 1/4" thick and gridded with tapered lap joint ends and a 304 stainless steel quarter hardened bridge plate molded flush into the gasket. Clamps shall be similar to JCM 131 All Stainless Universal Clamp Coupling, JCM 132 All Stainless Clamp or approved equal.

JCM 132 All Stainless Multi-Band Clamps (sizes 10" and larger)

All full circumferential single and multi-band repair clamps 10" and larger shall have a minimum of 17 gauge certifiable prime 304 stainless steel band and bolts; CF-8 Cast Stainless Steel lugs with mutually supporting sliding fingers, replaceable 304 stainless steel bolts with an oval neck, a 1/4" thick gridded gasket with tapered ends and a 304 stainless steel quarter hardened bridge plate molded flush into the gasket. Length of clamps shall be 12" minimum. Lugs shall be heavy duty design providing a minimum range of 1/2" and shall have a minimum of 9/16" diameter bolts (sizes 4" through 8") and 11/16" (sizes 10" and larger) diameter bolts. Clamps shall be JCM 132 All Stainless Universal Clamp Coupling or approved equal.

JCM Series 130 All Stainless Steel Universal Clamp Couplings are ANSI/NSF Standard 61 Certified.

JCM All Stainless Steel Universal Clamp Couplings - Material Specifications

BAND: 18-8 Type 304 Stainless Steel

LUGS: CF-8 Cast Stainless Steel (equivalent to 18-8 Type 304 Stainless Steel)

BOLTS: 18-8 Type 304 Stainless Steel

GASKET: Compounded for use with water salt solutions, mild acids bases and sewage. Other gaskets available upon request.

TAPPED OUTLET (Models 133, 134): 18-8 Type 304 Stainless Steel

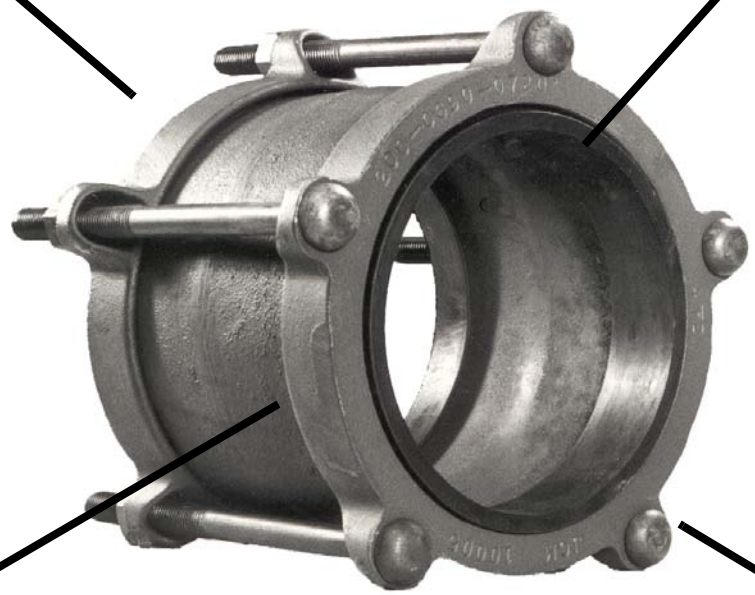
JCM Couplings for Polyethylene Pipe

Recommended JCM Couplings for HDPE include:

JCM 201 Steel Couplings
JCM 210 Series Ductile Iron Couplings
JCM 240 Optimum Couplings

Optional Fusion Epoxy Coating and Stainless Steel Bolts

Wide Gasket for maximum gasket to pipe contact and stored energy.



Mechanical Joint Principle allows system to be disassembled for maintenance.

Maximum Number of Bolts

JCM Couplings for Polyethylene Pipe

JCM 201 Steel Couplings
JCM 210 - 211 Ductile Iron Couplings
JCM 215 - 216 Long Ductile Iron Couplings
JCM 240 Optimum Couplings

JCM Couplings use the mechanical joint principle for joining plain end pipe. Several features of the JCM Couplings are designed with Polyethylene Pipe in mind. Working characteristics of Polyethylene systems require specific criteria to be met when joining pipe ends, or meeting up to a flanged connection. JCM Couplings design criteria includes:

- Wide gasket profile provides maximum gasket to pipe contact. The broad surface gasket provides a secure seal on the pipe at the joint and adapts to HDPE fluctuations during thermal changes.

- Maximum number of bolts on the fitting circumference provides the bolt spacing necessary to completely and evenly compress the gasket into the coupling eliminating gasket misalignment.

- The bolted mechanical joint principle design allows the systems to be disassembled for maintenance and reassembled. This portable connection also lends itself to accommodate a temporary installation.

- Couplings can be provided with optional Fusion Epoxy Coating (AWWA C-213) and stainless steel bolts for additional protection from abrasive or corrosive environments.

- Various gasket materials are available for unique line contents.

- Also available with the above design criteria are transition couplings, reducing couplings, flanged coupling adapters straight and reducing.

- Nominal sizes 2” through 54”.

Note: Pipe stiffeners are required for applications joining HDPE pipe. Applications in which pipe may move out of the coupling, correct anchorage of the pipe must be provided.

Typical Specification - JCM 201 Steel Couplings

JCM 201 Steel Couplings

Couplings shall consist of one steel middle ring, length and thickness to be specified, two steel follower flanges, two compounded wedged gaskets and a proper amount of bolts to correctly compress the gaskets into the coupling for the application.

Each coupling shall be assembled on the job in a manner to assure a permanent joint under reasonable conditions, shifting and settlement, unavoidable variations in trench gradient and any other unforeseen changes in environment.

JCM 200 Series Steel Couplings are ANSI/NSF Standard 61 Certified.

JCM 201 Steel Couplings - Material Specifications

Sizes 1/2" through 1-1/2":
MIDDLE RING: ASTM A513
FOLLOWERS: Ductile Iron ASTM A536

Sizes 2" and Larger:
MIDDLE RING: ASTM A513 or ASME SA 675 GR60
FOLLOWERS: AISI C1012 or ASME SA36

GASKETS: Specially compounded new rubber polymer for superior shelf life and resistance to permanent set. Recommended for water, salt solutions, mild acids, bases and natural gas.

BOLTS: Corrosion resistant, high strength low alloy (AWWA C-111, ANSI A21.11), Optional Stainless Steel 18-8 available.

FINISH: Heavy coat of corrosion resistant shop coat primer. Optional fusion epoxy coating available.

JCM 201 Steel Coupling

Typical Specification - JCM 210- 211 Series Ductile Iron Couplings

JCM 210 - 211 Ductile Iron Couplings

Couplings for pipe sizes 2" - 16" shall be of ductile iron construction. Couplings shall be of the wide range type to fit Steel, Cast Iron, Ductile Iron, PVC, HDPE and Asbestos-Cement with only a change of gaskets. Coupling sleeves shall be 5" in length on 2" - 2-1/2" pipe sizes, 6" in length on pipe sizes 3" - 12" and 7" in length on pipe sizes 14" and 16". Ductile Iron couplings shall be JCM 210, 211 or approved equal.

JCM 200 Series Ductile Iron Couplings are ANSI/NSF Standard 61 Certified.

JCM 200 Series Ductile Iron Couplings - Material Specifications

SLEEVE AND FLANGES:
Ductile Iron Per ASTM A-536

GASKETS: Specially compounded new rubber polymer for superior shelf life and resistance to permanent set. Recommended for use on water, salt solutions, mild acids and bases.

BOLTS: Corrosion resistant, high strength low alloy bolts and nuts per AWWA C-111, ANSI 21.11. Optional stainless steel 18-8 Type 304.

FINISH: Corrosion resistant shop coat paint primer. Optional fusion applied epoxy coating per AWWA C-213.

JCM 210 - 211 Ductile Iron Coupling

Typical Specification - JCM 240 Optimum Range Coupling

JCM 240 Optimum Range Coupling

Couplings for pipe sizes 2" - 12" shall be of ductile iron construction. Couplings shall be of the wide range type to fit Steel, Cast Iron, Ductile Iron, PVC, HDPE and Asbestos-Cement without change of gasket or modification. Coupling sleeves shall be 10" in length on 2" - 12" pipe sizes, Ductile Iron couplings shall be JCM 240 Optimum Range Coupling or approved equal.

JCM 200 Series Couplings are ANSI/NSF Standard 61 Certified.

JCM 240 Optimum Coupling - Material Specifications

FLANGES: Ductile Iron Per ASTM A-536

MIDDLE RING: Ductile Iron Per ASTM A-536

GASKETS: Specially compounded new rubber polymer for superior shelf life and resistance to permanent set. Recommended for use on water, salt solutions, mild acids, bases and sewage.

BOLTS: Corrosion resistant, high strength low alloy bolts and nuts per AWWA C-111, ANSI 21.11. Optional stainless steel 18-8 Type 304.

FINISH: Corrosion resistant shop coat paint primer. Optional fusion applied epoxy coating per AWWA C-213.

JCM 240 Optimum Range Coupling

JCM 230 and 231 HDPE Pipe Stiffeners

New, Advanced Design Provides...

- **Corrosion Resistance**
- **Rigid Reinforcement of Pipe Wall for Pipe Connections**
- **Accurate Pipe I.D. Sizing maintains proper Outside Diameter**
- **1/8" Tapered Insert End provides for Easy Installation**
- **90° 1/8" Flared End Secures Stiffener to End of Pipe**
- **Positive Reinforcement without interference**

JCM HDPE Pipe Stiffeners are designed to support the interior wall of HDPE for critical pipe joining applications. Recommended for all pipe end connections utilizing mechanical bolt-on fittings, the JCM Pipe Stiffeners support the pipe's end and controls the "necking down" reaction to the pressure applied during normal installation of fittings used in pipe joining applications.

The JCM HDPE Pipe Stiffeners are formed of stainless steel, 304 or 316 material, to the **actual inside pipe diameter provided by the customer**. This accurate formation provides for ease of installation and maintains the proper outside diameter for a successful, trouble free application that provides long-term service.

JCM Pipe Stiffeners are available for Steel Size and Ductile Iron Size HDPE in SDR11,13.5, 17, 21, 26, 32.5
JCM Pipe Stiffeners Material Specifications: ASTM - 240 - TP 304 Stainless Steel or 316 Stainless Steel

Nominal Pipe Size	230 Stiffener 6" Width	231 Stiffener 12" Width
4	230-04-xxxx	231-04-xxxx
6	230-06-xxxx	231-06-xxxx
8	230-08-xxxx	231-08-xxxx
10	230-10-xxxx	231-10-xxxx
12	230-12-xxxx	231-12-xxxx
14	230-14-xxxx	231-14-xxxx
16	230-16-xxxx	231-16-xxxx
18	230-18-xxxx	231-18-xxxx
20	230-20-xxxx	231-20-xxxx
22	230-22-xxxx	231-22-xxxx
24	230-24-xxxx	231-24-xxxx
30	230-30-xxxx	231-30-xxxx
36	230-36-xxxx	231-36-xxxx

Smallest I.D./O.D. available 3.65 - Sizes larger than 36" available upon request
Stiffeners provided as 304 Stainless Steel. Optional 316 Stainless Steel available.
Nominal Size Stiffeners 4" - 22" are 17 Gauge Stainless Steel Material
Nominal Size Stiffeners 24" - 36" are 12 Gauge Stainless Steel Material

HOW TO ORDER

1. Select nominal pipe size of HDPE.
2. Select Width of Stiffener (Model 230 - 6" wide or Model 231 - 12" wide).
3. Insert **actual HDPE pipe I.D. (provided by customer) @ xxxx**. The pipe I.D. determines the stiffener O.D. and completes the order number.

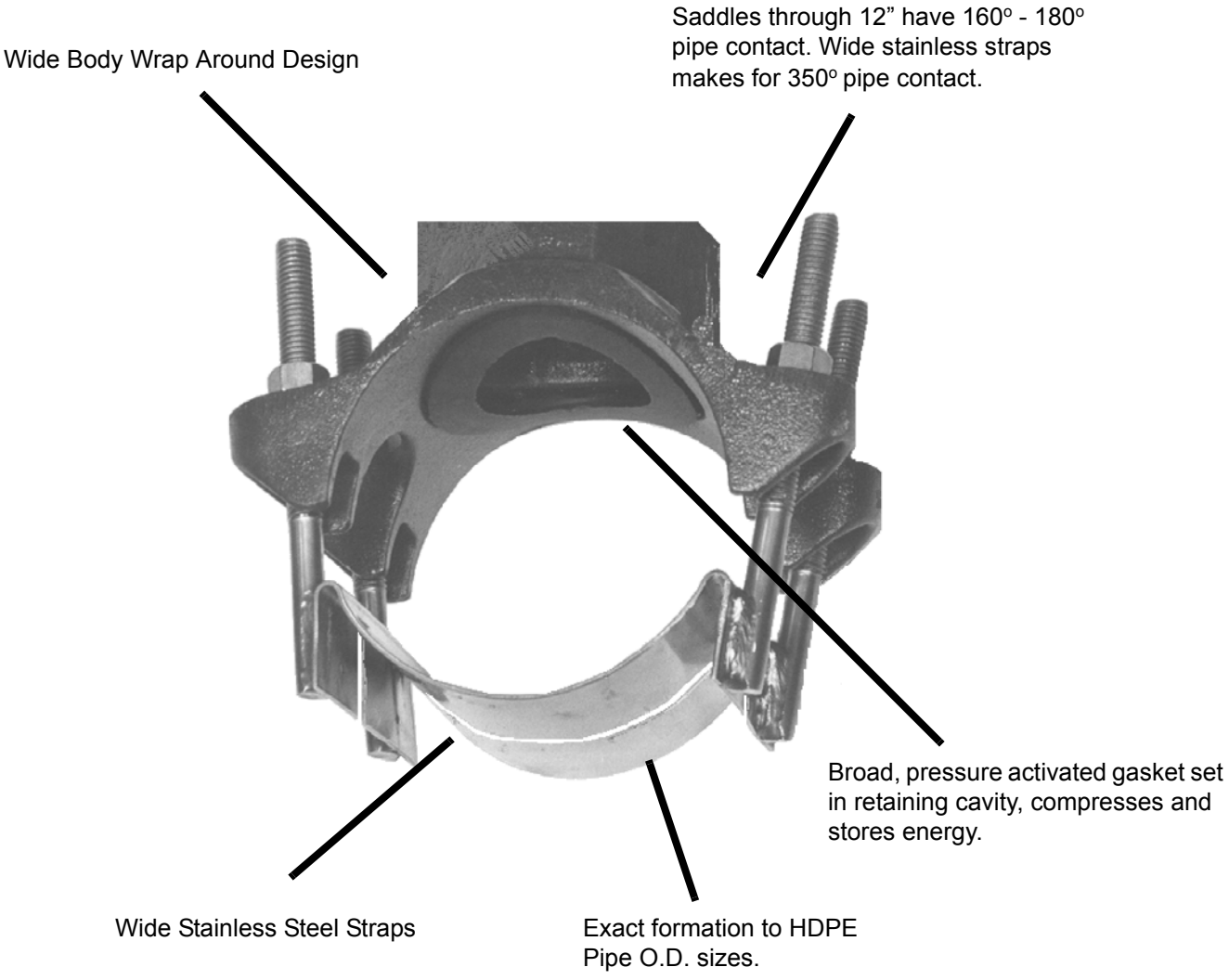
Example: To order a 304 stainless, 12" wide stiffener, for steel size 8" nominal SDR 17 pipe, with an actual pipe I.D. of 7.55, order number: 231-08-0755.

Note: JCM recommends fusion joints as a primary method of connection. Mechanical fittings are a secondary and limiting choice. JCM 230 Pipe Stiffeners are designed for use with mechanical couplings, clamps and fittings where stiffening of the pipe is necessary for proper gasket seal. Caution needs to be taken to prevent (1) shear loading on the joint, (2) migration of the stiffener out of the end of the pipe from lack of a back load on stiffener rim or load on the stiffener. Applications in which pipe may move out of the fitting, correct anchorage of the pipe must be provided.

JCM Service Saddles for Polyethylene Pipe

Recommended JCM Service Saddles for HDPE Include:

JCM 404 Service Saddle with Double Stainless Steel Straps
JCM 406 Coated Service Saddle with Double Stainless Steel Straps



JCM Service Saddles for Polyethylene Pipe

JCM 404 Service Saddle with Double Stainless Steel Straps
JCM 406 Coated Service Saddle with Double Stainless Steel Straps

JCM Service Saddles provide a dependable and economical process for making taps 1/2" - 2-1/2" in Polyethylene Pipe. JCM Saddles are designed for maximum safety and performance, especially on HDPE. JCM recommends using the Models 404 and 406 for service taps on Polyethylene Pipe. Several design features makes using these JCM Saddles the quickest and safest procedure. These include:

- Wide body wrap around design supports and reinforces the pipe while providing excellent stability for the outlet area.

- Wide stainless steel straps increase the load bearing area and prevent point loading on the circumference of the pipe.

- The broad pressure activated gasket provides high performance on both low and high pressure applications. Permanently set in a retaining cavity, the contoured gasket produces a positive seal which increases with increase in line pressure.

- Exact formation of the saddle to the Polyethylene Pipe's outside diameter provides a custom fit to the pipe circumference and a low profile stance. This exact formation eliminates the need for pulling a large range saddle down to the pipe O.D. which puts unnecessary stress on the pipe wall.

- Saddles through 12" have 160^{o} - 180^{o} contact. The wide stainless steel strap makes for 350^{o} pipe contact.

- Optional Fusion Plastic Coating provides superior corrosion resistance in hot or acidic environments. Stainless steel straps compliment this corrosion resistance.

- Nominal sizes 2" - 24".

Typical Specifications

JCM 404 Service Saddle with Double Stainless Steel Straps

Service Saddles for pipe sizes 2" through 12" shall have a wrap around design with a ductile iron body coated with a shop primer. The gasket shall be a broad pressure acti-vated design, molded of virgin rubber and bonded into a cavity in the saddle body, which provides internal as well as external gasket retention. The straps, bolts, nuts and washers shall be 18-8 stainless steel with all welds passivated for resistance to corrosion. The combined strap width shall be 3-1/4" to provide a wide stance on the pipe. Service saddles for pipe sizes 14" through 24" shall have two (2) 2-3/4" wide stainless steel straps.

Service Saddles shall be JCM 404 or approved equal.

JCM 406 Coated Service Saddle with Double Stainless Steel Straps

Service Saddles for pipe sizes 2" through 12" shall have a wrap around design with a ductile iron body, fusion plastic coated. The coating thickness shall be a minimum of 12 mils with a dielectric strength of over 12,000 volts. The gasket shall be a broad pressure activated design, molded of virgin rubber and bonded into a cavity in the saddle body which provides internal as well as external gasket retention. The straps, bolts, nuts and washers shall be 18-8 stainless steel with all welds passivated for resistance to corrosion. The combined strap width shall be 3-1/4" to provide a wide stance on the pipe. Service saddles for pipe sizes 14" through 24" shall have two (2) 2-3/4" wide stainless steel straps.

Service Saddles shall be JCM 406 or approved equal.

JCM 400 Series Service Saddles are ANSI/NSF Standard 61 Certified.

JCM 404 - 406 Service Saddle with Double Stainless Steel Straps - Material Specifications

JCM Service Saddles are constructed of ductile iron and have 18-8 Type 304 Stainless Steel straps, nuts and washers for high corrosion resistance. These saddles meet or exceed AWWA C-800 Standards for service line fittings.

BODY CASTING: Wrap around design of Ductile Iron ASTM A-536.

GASKET: Molded virgin rubber with a pressure activated hydro mechanical design. Gasket is bonded into a cavity for internal and external retention. Gasket is suitable for water, salt solutions, mild acids, bases, and sewage.

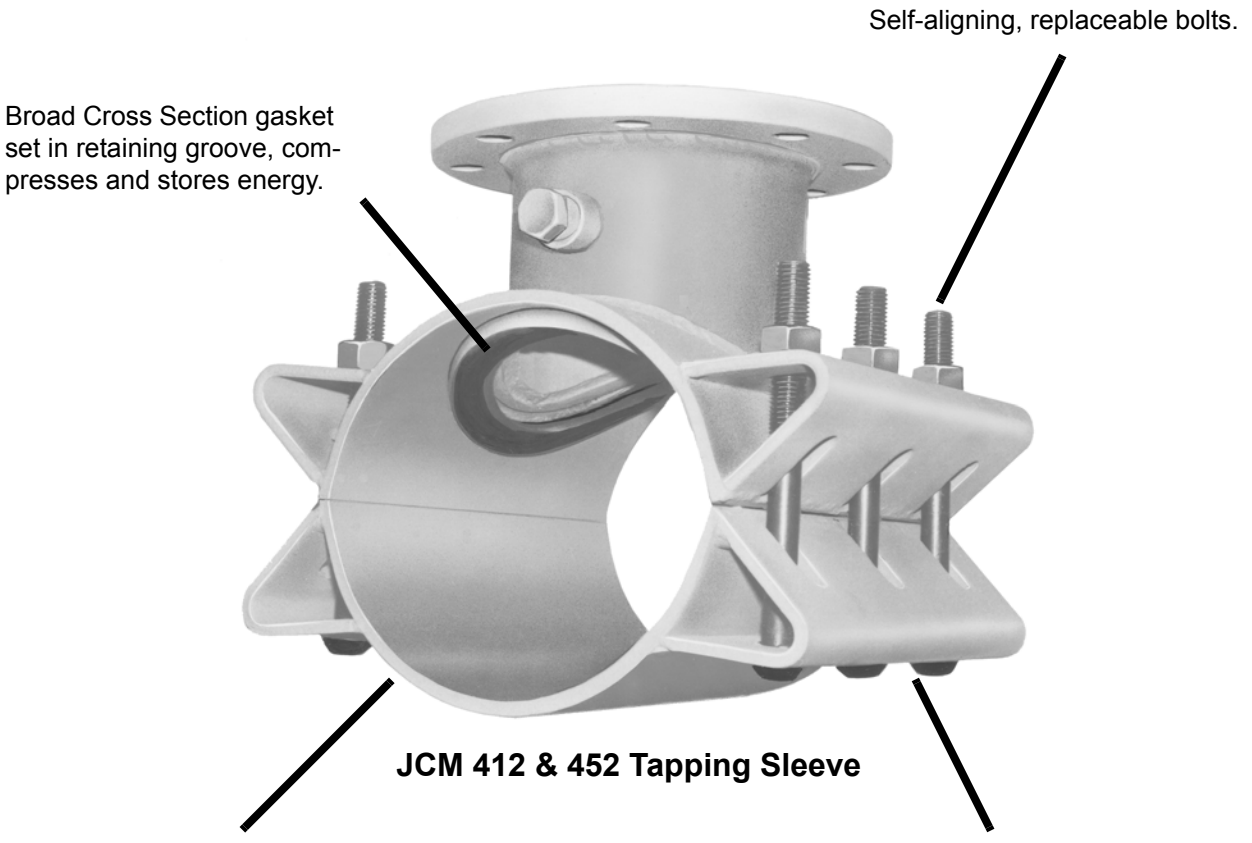
STRAPS: Stainless steel, 18-8 Type 304, Straps are 14 gauge stainless steel. Nominal sizes 2" through 12" shall have two (2) stainless steel straps which have a combined width of 3-1/4" to provide a wide stance on the pipe. Nominal sizes 14" through 24" shall have two (2) 2-3/4" wide stainless steel straps. Straps are passivated for corrosion resistance.

BOLTS, NUTS WASHERS: Stainless Steel, 18-8 Type 304, passivated for corrosion resistance. Coated with antiseize compound to reduce friction and galling.

FINISH: JCM 404 coated with shop primer coating; JCM 406coated with fusion bonded high density blue plastic, 12 mils minimum thickness, with a dielectric strength of over 12,000 volts. Water absorption less than .20% (less than nylon) prevents undercutting and blistering.

JCM Tapping Sleeves for Polyethylene Pipe

JCM 422 Fabricated Tapping Sleeve
JCM 412 Fabricated Tapping Sleeve
JCM 418 Threaded Outlet Tapping Sleeve
JCM 432 All Stainless Steel Tapping Sleeve
JCM 438 All Stainless Steel Threaded Outlet Tapping Sleeve
JCM 452 All Stainless Steel Tapping Sleeve with Outlet Seal Gasket
JCM 462 Stainless Steel Tapping Sleeve with Carbon Steel Flange



JCM 412 & 452 Tapping Sleeve

JCM Tapping Sleeves for Polyethylene Pipe

JCM 422 Fabricated Tapping Sleeve
JCM 412 Fabricated Tapping Sleeve
JCM 418 Threaded Outlet Tapping Sleeve
JCM 438 All Stainless Steel Threaded Outlet Tapping Sleeve
JCM 452 All Stainless Steel Tapping Sleeve with Outlet Seal Gasket
JCM 462 Stainless Steel Tapping Sleeve with Carbon Steel Flange

JCM's full line of tapping sleeves offer more selection, more benefits and tremendous availability. JCM Tapping Sleeves are manufactured in a variety of sizes and styles to accommodate each application on Polyethylene Pipe. Success with these fittings on HDPE is due largely to the fact the JCM's design criteria took into consideration the working characteristics of Polyethylene Pipe. Generally, the features of these tapping sleeves for Polyethylene Pipe include:

- Wide body design distributes weight load over large area of pipe surface providing direct support and stability at the tap area while eliminating point loading and stress.

- Broad cross section gasket set in retaining groove confines the gasket both internally and externally eliminating gasket displacement from pressure or vacuum. The hydromechanical gasket is of a hardness which will store compressed energy and increases sealing capability with increases in line pressure.

- JCM Tapping Sleeves can be manufactured to the exact pipe diameter to assure a custom fit and a working range which accommodates the flexing characteristics of Polyethylene Pipe.

- Self-aligning bolts evenly load the tapping sleeve and provide compression of the gasket with distortion free tightening.

- Various gaskets are available for unique line content.

- Optional Fusion Epoxy Coating and stainless steel bolts are available for carbon steel tapping sleeves. All stainless construction is available for corrosive environments.

- JCM Tapping Sleeves have an immediate availability. Emergency sleeves can usually ship within 24 hours.

Individually each Model of JCM Tapping Sleeves offers the right answer to Polyethylene Pipe tapping installations.

JCM 422 Fabricated Tapping Sleeve

- Designed with the exact O.D. of Polyethylene Pipe in nominal sizes 6” through 12”, the 422 supports and reinforces the pipe at the tap area. This is especially important with HDPE such as SDR 26 and 21.

- The JCM 422 is standard Fusion Epoxy Coated. Optional stainless steel bolts are available for hot soils or corrosive environments.

- Special gaskets are available for unique line contents.

JCM 412 Fabricated Tapping Sleeve

- The JCM 412 can be fabricated to exact pipe diameters with a tolerance range to accommodate the changes in Polyethylene Pipe in extreme thermal conditions. The 412 is available in larger pipe sizes and can be manufactured in millimeter pipe sizes.

- Larger pipe sizes are manufactured with thicker gaskets to provide additional energy storage for absorption of pipe fluctuations.

JCM 418 Threaded Outlet Tapping Sleeve
JCM 438 All Stainless Steel Threaded Outlet Tapping Sleeve

- The JCM 418 is the best all round saddle for nominal sizes 4” through 54” for taps 1/2” through 4”. Constructed of fabricated steel, the 418 provides a wide body stance on the pipe (8” wide minimum) with a broad pressure activated gasket with a 4” I.D. This wide design provides full sleeve support, stability and pipe reinforcement. Especially recommended for larger service connections and air relief valves. The JCM 438 incorporates the same design as the 418 and is constructed of all stainless steel for corrosive and acidic environments.

JCM 452 All Stainless Steel Tapping Sleeve With Outlet Seal Gasket

- Manufactured of ALL stainless steel, the 452 has been designed for installations involving large diameter pipe with higher working pressures in corrosive or aggressive environments. The 452 All Stainless steel Tapping Sleeve combines the design features of the 412 with the superior corrosion resistance of stainless steel. The heavy duty construction and thicker metal provide extra reinforcement of the pipe and outlet. The extra bolting power and body thickness eliminate problems inherent with light weight stainless sleeves.

Typical Specification

JCM 422 Fabricated Tapping Sleeve for PVC and Steel Pipe for HDPE

Tapping sleeves for 6" through 12" PVC and steel pipe shall be the high strength type having a wide body, made of a minimum of 283 Grade C Steel, which conforms to and reinforces the pipe. The sleeve shall be sized to fit the exact dimension of the pipe and have 5/8" hot dip galvanized bolts on 3" centers. Optional stainless steel bolts (18-8 Type 304) are available. The sleeve shall be fusion epoxy coated and furnish with a 3/4" stainless steel (type 304) plug in the test outlet. Fusion applied epoxy coating, minimum 12 mils thickness, per AWWA C-213. The sleeves shall have a minimum 7/8" wide recessed Buna-N gasket around the outlet. Flanged outlets shall be indexed per MSS-SP60 to accept a tapping valve. Tapping Sleeves shall be JCM 422 or approved equal.

JCM 400 Series Tapping Sleeves are ANSI/NSF Standard 61 Certified.

JCM 422 Fabricated Tapping Sleeve for PVC and Steel Pipe - Material Specifications

BODY: ASTM 283 Grade C or ASTM A-36 Steel

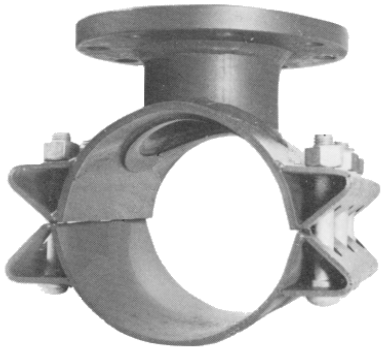
BOLTS: High strength steel, hot dipped galvanized. Optional stainless steel 18-8 Type 304.

FLANGE: AWWA C207 Class D, ANSI 150 lb. Drilling, recessed for tapping valve MSS-SP60.

GASKET: Buna-N Blend compounded for use with water, salt solutions, mild acids, bases and sewage.

FINISH: Fusion applied epoxy coating, minimum 12 mils thickness per AWWA C-213.

SERVICE RATING: 4" to 12" Outlets: 175 PSI. Higher service rating available for specific applications and sizes.



JCM 422 Tapping Sleeve

Typical Specification

JCM 412 Fabricated Tapping Sleeve for HDPE

Tapping Sleeves shall be the high strength type having a wide body, made of a minimum of ASTM 283 Grade C Steel, which conforms to and reinforces the pipe. The sleeves shall have as a minimum 7/8" wide recessed Buna-N gasket around the outlet, 3/4" corrosion resistant alloy bolts (per AWWA C-111, ANSI 21.11), a 3/4" forged steel test outlet and hydrostatic test pressure capability of 300 PSI in 12" and smaller outlet sizes. Flanged outlet shall be indexed per MSS-SP60. Tapping Sleeve shall be furnished with corrosion resistant shop coat paint primer.

Epoxy Coated sleeves shall be furnished with a 3/4" stainless steel type 304 plug in the test outlet and optional stainless steel 18-8 type 304 bolts.

Tapping Sleeve for pipe sizes 36" and larger shall be of the heavy duty type with a body width of 4" wider than smaller sizes and integral strengthening of the outlet half to provide additional gasket sealing and pressure holding capability. Tapping Sleeves shall be JCM 412 or approved equal.

JCM 400 Series Tapping Sleeves are ANSI/NSF Standard 61 Certified.

JCM 412 Fabricated Tapping Sleeve - Material Specifications

BODY: ASTM 283 Grade C or ASTM A-36 Steel

BOLTS: Corrosion resistant, high strength low alloy (AWWA C-111, ANSI 21.11). Optional stainless steel 18-8 Type 304.

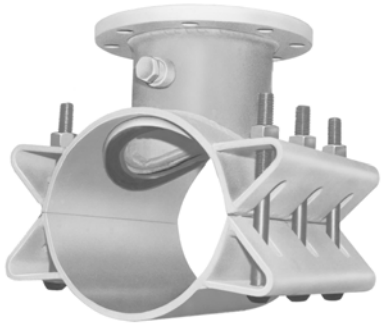
FLANGE: AWWA C207 Class D, ANSI 150 lb. Drilling, recessed for tapping valve MSS-SP60. Optional flanges available upon request.

GASKET: Compounded for use with water, salt solutions, mild acids and bases.

FINISH: Heavy coat of corrosion resistant metal primer. Optional fusion epoxy coating available per AWWA C-213.

SERVICE RATING: 4" to 12" Outlets: 175 PSI. Higher service rating available for specific appli-cations and sizes.

JCM 412 Tapping Sleeve



Typical Specification

JCM 418 Fabricated Threaded Outlet Tapping Sleeve for HDPE

Service fittings shall be the high strength type fabricated of a minimum of ASTM 283 Grade C Steel, which conforms to and reinforces the pipe. Sleeve shall be minimum 8" wide and be sized to fit and reinforce the pipe circumference.

Sleeve outlet shall have a minimum 3/4" wide Buna-N gasket recessed in a machined groove around the threaded outlet.

Service fitting shall be furnished with a corrosion resistant shop coat paint primer with high strength, low alloy corrosion resistant bolts and nuts (AWWA C-111, ANSI 21.11). Optional Fusion applied epoxy coating (AWWA C-213) and stainless steel bolts and nuts available.

Service fittings shall be JCM 418 Threaded Outlet Tapping Sleeve or approved equal.

JCM 400 Series Tapping Sleeves are ANSI/NSF Standard 61 Certified.

JCM 418 Threaded Outlet Tapping Sleeve - Material Specifications

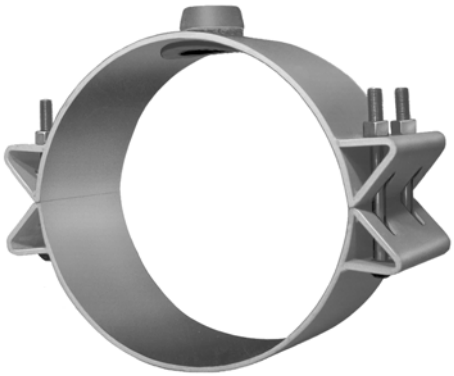
BODY: ASTM 283 Grade C or ASTM A-36 Steel

BOLTS: Corrosion resistant, high strength low alloy (AWWA C-111, ANSI 21.11). Optional stainless steel 18-8 Type 304.

GASKET: Compounded for use with water, salt solutions, mild acids, bases and sewage. Suitable for temperatures through 212° F.

FINISH: Heavy coat of corrosion resistant metal primer. Optional fusion epoxy coating available.

SERVICE RATING: 3/4" - 4" outlets: 250 PSI. Higher service rating available for specific applications and sizes.



JCM 418 Threaded Outlet Tapping Sleeve

Typical Specification

JCM 438 Stainless Steel Threaded Outlet Tapping Sleeve

Service fittings shall be the high strength Stainless Steel 18-8 Type 304 (optional 316 stainless steel), which conforms to and reinforces the pipe. Sleeve shall be minimum 8" wide and be sized to fit and reinforce the pipe circumference.

Sleeve outlet shall have a minimum 3/4" wide Buna-N gasket recessed in a machined groove around the threaded outlet.

Service fitting shall be furnished with 18-8 Type 304 stainless steel bolts, nuts and washers.

Service fittings shall be JCM 438 Stainless Steel Threaded Outlet Tapping Sleeve or approved equal.

JCM 400 Series Tapping Sleeves are ANSI/NSF Standard 61 Certified.

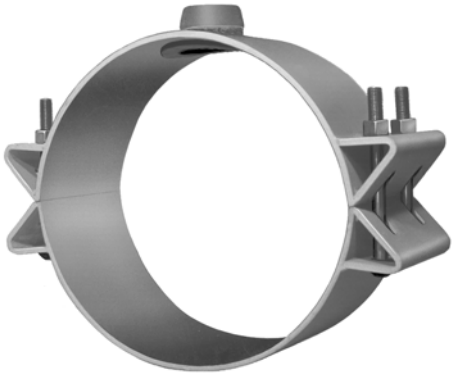
JCM 438 Stainless Steel Threaded Outlet Tapping Sleeve - Material Specifications

BODY: Stainless Steel 18-8 Type 304. Optional 316 Stainless Steel.

BOLTS: Stainless Steel 18-8 Type 304. Optional 316 Stainless Steel.

GASKET: Compounded for use with water, salt solutions, mild acids, bases and sewage. Suitable for temperatures through 212^{o} F.

SERVICE RATING: 3/4" - 4" outlets: 250 PSI. Higher service rating available for specific applications and sizes.



JCM 438 All Stainless Steel Threaded Outlet Tapping Sleeve

Typical Specification

JCM 452 All Stainless Steel Tapping Sleeve

Tapping Sleeve shall be of the high-pressure type having a wide body, made of corrosion resistant 304 stainless steel (optional 316 stainless steel), which conforms to and reinforces the pipe. The sleeves shall have a Buna-N gasket with a hydromechanical activated lip captured in a recessed groove around the outlet, replaceable stainless steel bolts (18-8 type 304) nuts and washers. Stainless tapping sleeve shall be furnished with a 3/4" stainless steel test plug in the test outlet. Flanged outlets shall be indexed per MSS-SP60 to accept tapping valve. The 452 is fully passivated to return the stainless steel to its highest corrosion resistance. Tapping sleeve shall be ANSI/NSF Standard 61 Certified. Tapping Sleeve shall be JCM 452 or approved equal.

JCM 400 Series Tapping Sleeves are ANSI/NSF Standard 61 Certified.

JCM 452 All Stainless Steel Tapping Sleeve - Material Specifications

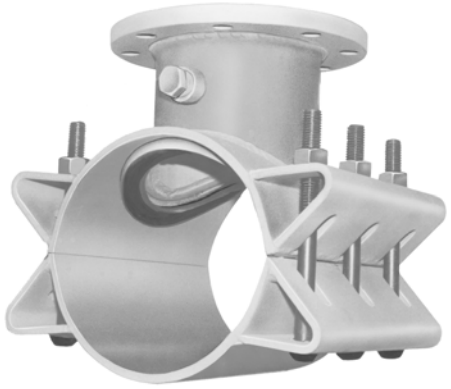
BODY: Stainless Steel 18-8 Type 304. Optional 316 Stainless Steel.

BOLTS: Stainless Steel 18-8 Type 304. Optional 316 Stainless Steel.

FLANGE: CF8 Cast Stainless Steel or equivalent 304 Stainless Steel. Flange outlets shall be indexed per MSS-SP60 to accept tapping valve. Optional 316 Stainless Steel.

GASKET: Compounded for use with water, salt solutions, mild acids and bases.

SERVICE RATING: 4" - 12" Outlets: 175 PSI. Service rating of 250 PSI or higher available with specified flange.

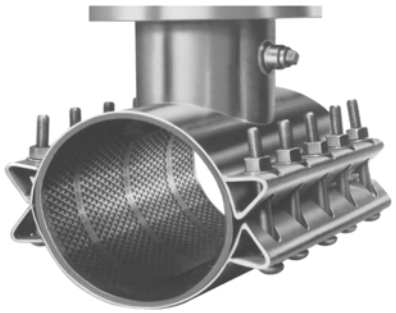


JCM 452 All Stainless Steel Tapping Sleeve

JCM 432 All Stainless Steel Tapping Sleeve
JCM 462 Stainless Steel Tapping Sleeve With Carbon Steel Flange

The JCM 432 and 462 Tapping Sleeves provides several individual features which provide superior service. These include:

- Stainless Steel Construction. The stainless material provides superior corrosion resistance for aggressive environments.
- Full circumferential gasket seals on the full circumference of the pipe providing support to the tap area and to the pipe across from the outlet.
- Extra heavy stainless steel neck provides the stability and strength necessary for the tapping procedure and valve connection.
- Separate, self-aligning bolts are replaceable and can be torqued to 150 ft. lbs. for high sealing capability.
- The true tapping sleeve design of the 432 and 462 utilizes low profile lugs to facilitate conversion of high bolt torques to high gasket pressure.
- Thick gasket is of a hardness which stores compressed gasket energy to allow pipe flexing and fluctuations.
- Nominal sizes 6” - 12”.



JCM 432 All Stainless Steel Tapping Sleeve

JCM 462 Stainless Steel Tapping Sleeve with Carbon Steel Flange

Typical Specification - JCM 432 All Stainless Steel Tapping Sleeve

Tapping sleeve shall be fabricated from 304 Stainless Steel or its equivalent, CF8 Cast Stainless Steel. They shall have a pass through bolt design and provide 360o seal around the pipe. The 432 is fully passivated to return the stainless steel to its highest corrosion resistance. Sleeves shall be manufactured to meet the following minimum specifications.

Body Construction: To provide the proper strength, support and safety factor for the valve, drilling machine operation and load forces, the body construction shall be a minimum of:

Outlet Half (load bearing half):	
Sleeve Sizes 0450 through 1392, Outlet sizes 2" - 8”	12 gauge Stainless Steel
Sleeve Sizes 1075 through 1392, Outlet sizes 10" and 12”	10 gauge Stainless Steel
Sleeve Sizes 1420 and larger, all outlets	10 gauge Stainless Steel
Back Half (conforming half):	14 gauge Stainless Steel

Length:

Outlet Size	Length
2" - 6	"15"
8	"21"
10	"27"
12	"30"

Outlet Construction: For proper strength, support and rigidity for the valve, drilling machine operation and load forces, the outlet construction shall be minimum of:

Outlet: Schedule 10 Stainless Steel pipe sized to accept full size cutter.

Flange: CF8 Cast Stainless Steel or equivalent 304 Stainless Steel. Flange outlets shall be indexed per MSS-SP60 to accept tapping valve.

Bolting System: The lugs shall have a pass-through bolt design, to avoid alignment prob-lems and allow tightening from either side of the pipe. Bolts shall not be integrally welded to the sleeve.

Lug: Of triangular design with a maximum of 3" bolt center spacing.

Bolts, Nuts & Washers:
304 Stainless Steel, the bolts shall be track head type and furnished with permanently lubricated heavy-hex nuts and stainless washers.

Gasket: The full circumferential gasket shall be molded of synthetic rubber compounded for use with water salt solutions, mild acids, bases and sewage. The gasket shall have a gridded surface, be a full 1/4" thick with 304 stainless steel bridge plates molded flush into the gasket and have a raised hydromechanical outlet seal to seal against line surges and water hammer.

Tapping Sleeves shall be JCM 432 or approved equal.
JCM 400 Series Tapping Sleeves are ANSI/NSF Standard 61 Certified.

Typical Specification - JCM 462 Stainless Steel Tapping Sleeve

Tapping sleeve shall be fabricated from 304 Stainless Steel. They shall have a pass through bolt design and provide 360° seal around the pipe. The 462 is fully passivated to return the stainless steel to its highest corrosion resistance. Sleeves shall be manufactured to meet the following minimum specifications.

Body Construction: To provide the proper strength, support and safety factor for the valve, drilling machine operation and load forces, the body construction shall be a minimum of:

Outlet Half (load bearing half):	
Sleeve Sizes 0450 through 1392, Outlet sizes 2" - 8”	12 gauge Stainless Steel
Sleeve Sizes 1075 through 1392, Outlet sizes 10" and 12”	10 gauge Stainless Steel
Sleeve Sizes 1420 and larger, all outlets	10 gauge Stainless Steel
Back Half (conforming half):	14 gauge Stainless Steel

Length:

Outlet Size	Length
2" - 6	"15"
8	"21"
10	"27"
12	"30"

Outlet Construction: For proper strength, support and rigidity for the valve, drilling machine operation and load forces, the outlet construction shall be minimum of:

Outlet: Schedule 10 Stainless Steel pipe sized to accept full size cutter.

Flange: AWWA C207 Class D, ANSI 150 lb. drilling, corrosion resistant coating and recessed for tapping valve MSS-SP60.

Bolting System: The lugs shall have a pass-through bolt design, to avoid alignment prob-lems and allow tightening from either side of the pipe. Bolts shall not be integrally welded to the sleeve.

Lug: Of triangular design with a maximum of 3" bolt center spacing.

Bolts, Nuts & Washers:
304 Stainless Steel, the bolts shall be track head type and furnished with permanently lubricated heavy-hex nuts and stainless washers.

Gasket: The full circumferential gasket shall be molded of synthetic rubber compounded for use with water salt solutions, mild acids, bases and sewage. The gasket shall have a gridded surface, be a full 1/4" thick with 304 stainless steel bridge plates molded flush into the gasket and have a raised hydromechanical outlet seal to seal against line surges and water hammer.

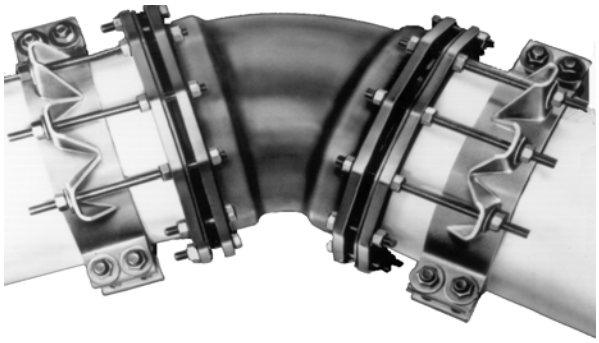
Tapping Sleeves shall be JCM 462 or approved equal.
JCM 400 Series Tapping Sleeves are ANSI/NSF Standard 61 Certified.

JCM Sur-Grip Restrainers for Polyethylene Pipe

JCM 610 Sur-Grip Fitting Restrainers
JCM 621 Sur-Grip Joint Restrainers

JCM Sur-Grip Restrainers provide an immediate, reliable method of anchoring HDPE (4” - 12” Cast Iron O.D. and 14” - 24” Cast Iron and Steel O.D.) pipe to mechanical joint and push-on fittings as well as adding restraint to critical fused joints. Sur-Grips are designed to provide maximum resistance to surge pressure within the piping system. The supportive circumferential pipe contact and wide serrated inside surface provides the gripping action to properly restrain the joint, preventing pipe separation. JCM Sur-Grips are applicable to various installations of joining HDPE to different types of pipe including: steel, asbestos cement, cast iron and PVC. JCM Sur-Grip design criteria include:

- Wide serrated area, distributes restraint load over a large pipe surface to prevent point loading of HDPE pipe.
- Proper installation of JCM Sur-Grip Restrainer provides for placement away from the critical pipe end and allows mechanical joint fittings to function as their design specifies.
- Sur-Grip Restrainers can be used in all soil types. Weak and unstable soil conditions are overcome by JCM Sur-Grips. Special coatings and bolts are available for aggressive and acidic soils.



Note: JCM Sur-Grip Restrainers are designed to resist pull out forces based on the maximum working pressure rating of the pipe. Forces experienced due to expansion and contraction of the pipe require special consideration.

JCM Sur-Grip Restrainers are Factory Mutual Approved.

Typical Specification

Sur-Grip Restrainer (Sizes 4” - 12” CI-O.D.)

Restraint for High Density Polyethylene Pipe shall be provided by mechanical means separate from the mechanical joint gasket sealing gland. The restrainer shall provide wide, supportive contact around the full circumference of the pipe and be equal to the listed widths. Means of restraint shall be machined serrations on the inside surface of the restrainer equal to or greater than the listed serrations per inch and width. Loading of the restrainer shall be by a ductile iron follower that provides even circumferential loading over the entire restrainer. Design shall be such that restraint shall be increased with increases in line pressure.

Serrated restrainer shall be Ductile Iron ASTM A-536-80 with a ductile iron follower; bolts and nuts shall be corrosion resistant, high strength alloy steel.

The restrainers shall have a pressure rating of, or equal to that of the pipe on which it is used, which ever is lesser, and be capable of withstanding a minimum test pressure of 2 times the pressure rating. Restrainers shall be JCM Industries Sur-Grip or equal.

Nominal Size	Restraint Width	Serrations per inch
4”, 6”	1 - 1/2”	8
8”, 10”, 12”	1 - 3/4”	8

Sur-Grip Restrainer (Sizes 14” - 24” CI & Steel O.D.)

Restrainers for High Density Polyethylene Pipe 14” and larger shall be provided by mechanical means separate from the mechanical joint gasket sealing gland.

The restrainer shall be a split, two piece configuration with a serrated inside surface and provide a wide supportive contact around the full circumference of the pipe. Restrainer body shall be manufactured from steel per ASTM A-285 Grade C and be fusion epoxy coated on all surfaces except the serrations. Width and serrations per inch shall be as listed. The restrainer fasteners shall be per AWWA C-111, ANSI 21.11. Restrainers shall have a pressure rating equal to that of the pipe on which it is used and be capable of withstanding a minimum test pressure of 2 times the pressure rating. Restrainers shall be JCM Industries Sur-Grip or equal.

Nominal Size	Restraint Width	Serrations per inch
14”, 16”, 18”	5”	6
20”, 24”	7”	6

Polyethylene Pipe Sizes and Dimensions

Polyethylene Pipe Dimensions

Nominal Pipe Size	SDR11		SDR17		SDR21		SDR26		SDR 32.5	
	O.D.	Wall Thickness	O.D.	Wall Thickness	O.D.	Wall Thickness	O.D.	Wall Thickness	O.D.	Wall Thickness
2	2.38	.216	2.38	.140						
3	3.50	.318	3.50	.206	3.50	.167	3.50	.135	3.50	.108
4	4.50	.409	4.50	.265	4.50	.214	4.50	.173	4.50	.138
6	6.63	.602	6.63	.390	6.63	.315	6.63	.255	6.63	.204
8	8.63	.784	8.63	.507	8.63	.411	8.63	.332	8.63	.265
10	10.75	.977	10.75	.632	10.75	.512	10.75	.413	10.75	.331
12	12.75	1.159	12.75	.750	12.75	.607	12.75	.490	12.75	.392
14	14.00	1.273	14.00	.824	14.00	.667	14.00	.538	14.00	.431
16	16.00	1.455	16.00	.941	16.00	.762	16.00	.615	16.00	.492
18	18.00	1.636	18.00	1.059	18.00	.857	18.00	.692	18.00	.554
20	20.00	1.818	20.00	1.176	20.00	.952	20.00	.769	20.00	.615
24	24.00	2.182	24.00	1.412	24.00	1.143	24.00	.923	24.00	.738
30	30.00	2.727	30.00	1.765	30.00	1.429	30.00	1.154	30.00	.923
36	-	-	36.00	2.118	36.00	1.714	36.00	1.385	36.00	1.108

IMPORTANT: This Pipe O.D. Guide is furnished for your convenience and is based on the latest pipe standards and information supplied by pipe manufacturers. Due to occasional changes and variances in outside diameters, the pipe O.D. should always be verified before ordering fittings.

All JCM Fittings and Fabrications related to the NSF Standard 61 - Drinking Water Systems Components are NSF 61 Certified. For additional information, contact the JCM Sales Team.