

JCM Industries, Inc.
Nash, TX

General Tapping Sleeve Designs

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Historic Sleeve Designs

Older tapping sleeves were of the caulk type and mechanical joint type. Caulk type sleeves were installed by using lead which was poured into the cavity between the cast body and sleeve, giving the sleeve a perfect fit on less than perfectly round pipe.

The mechanical joint sleeve was cast iron with side gaskets between the body halves and end seal gaskets that were split and fit into the cavity of the mechanical joint end on the sleeve. Split mechanical joint glands packed the gasket into the cavity utilizing the MJ flange as the stabilizing end ring.

These types of sleeves worked well until they became hard to obtain, required more skill than was available to install, and were heavier and more difficult to install than modern designs. The decline and closing of many foundries and loss of older sleeve patterns has made many larger mechanical joint sleeves unavailable.

Modern Sleeve Designs

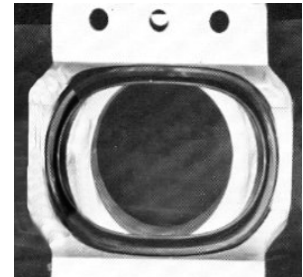
Modern sleeve types can be classified by their gasket system design. There are three basic configurations and each has unique characteristics.

The three design classifications are:

1. Outlet Seal Sleeve
2. Full Circumferential Gasket Sleeve
3. Fabricated Mechanical Joint Sleeve

Outlet Seal Sleeve

The outlet seal sleeve has two distinctly different types. One type has a broad gasket which fits into a cavity around the edges of the outlet half of the sleeve and is generally cast iron. The back half of the sleeve bolts to the top half, compressing the large gasket against the pipe. The weakness in this design is that it has a poor fit on the pipe, offers little to no support to the pipe and is only available in sizes up to 12". (U.S. Pipe Model T-28 Featured)



The second, and more commonly used type, is a split, bolt-on wide bodied fabricated sleeve that has a wide mechanical outlet seal which is recessed into a cavity. The wide body reinforces the pipe giving it a strong supporting backside through the outlet area so the pipe won't be susceptible to a beam break at that point. This sleeve is available in both carbon and stainless steel and can be manufactured for all types and sizes of pipe. This style is also commonly used for high pressure and larger pipe sizes because of its strength and availability. It is also used for older and weakened pipe because of its relatively lightweight and reinforcing capabilities. This is the sleeve most often recommended for HDPE, PVC, Cast Iron, Ductile Iron and Asbestos Cement Pipe.



Full Circumferential Gasket Sleeve

The full circumferential gasket sleeve is a derivation of a repair clamp with an outlet. The thickness of the sleeve body has been increased to provide the necessary strength to the outlet and the capability of loading and compressing of the greatly increased gasket area. These sleeves are provided in stainless steel with both stainless steel flanges and carbon steel flanges. Full circumferential sleeves are commonly used in lieu of mechanical joint sleeves in the smaller sizes where they provide an excellent working range, corrosion resistance and ease of installation. Larger sizes (above 12”), often require more safety factor (pressure wise) and ease of installation than provided by these sleeves. There are several manufacturers of these sleeves utilizing many different closure designs, metal thicknesses and gasket thicknesses. In the 30 some years this type of sleeve has been on the market, the general trend has been to go to the heavier design, with replaceable bolts and thicker gasket in order to provide the highest possible safety factor.



Fabricated Mechanical Joint Sleeve

The older and time proven mechanical joint sleeve is available in a fabricated version. This provides better availability, stronger yet lighter construction and the capability of fitting any size of pipe. With epoxy coating and corrosion resistant bolts it is more corrosion resistant than the older cast iron sleeves. This sleeve is capable of holding higher pressures, similar to that of the outlet seal sleeve only not as cost effective.



Available options for the various designs of sleeves

Buna N or EPDM gaskets

Flanged or MJ outlets

For Stainless Steel sleeves – 304 or 316

For Fabricated Sleeves - Epoxy Coatings, Stainless or Coated Hardware

Specific JCM Tapping Sleeves Design Advantages and Applications

Outlet Seal Sleeve

This style sleeve was developed in the late 1950's to tap sizes and types of pipe for which cast iron sleeves were not readily available. Over the years this sleeve has become a standard because it is cost effective, easily installed, can be manufactured to fit pipe 3" to 196" with many variations of outlets and coatings, and has high pressure holding capability.

JCM has manufactured this style of sleeve for over 30 years and has standardized on several characteristics in our design philosophy which not all manufacturers follow. Our tapping sleeve product line and designs are more complex than the general industry because we match the design to the application of the sleeve; i.e. type and size of pipe, pressure, line content, environment (corrosion factor), and outlet requirements.

JCM has a model for 4" thin wall PVC (JCM 422) with operating pressure of 24 – 160 PSI that has a reinforcing design which fits the pipe like a glove and is epoxy coated for increased corrosion resistance. (This type of fit on PVC is recommended by the Uni-Bell PVC Pipe Association.)

JCM has a model (JCM 412) that was installed on the Florida Keys Aqueduct Authority ductile iron lines (sizes 10" – 36" nominal) and was required to pass pressure tests of 425 PSI. The sleeves were furnished with epoxy coating and stainless steel bolts and nuts. JCM has a model that is fabricated of all stainless steel (JCM 452) that has a heavy (3/8" thick) stainless steel body and is furnished with either a standard flanged outlet or in the case of the model 459, has a mechanical joint outlet. These are available in larger as well as smaller sizes and have the option of the more corrosion resistant (and expensive) 316 stainless steel over the standard 304 stainless.

JCM also recommends these sleeves for HDPE pipe. We have been furnishing sleeves for this type of pipe for over 20 years. We actually went through a testing program with two of the larger HDPE pipe manufacturers to confirm the design suitability. A little known fact is that our gasket design was originated around this type of pipe because it is one of the most demanding applications. Our gasket is retained internally and externally in a groove in the body plate, has a wide 7/8" foot print on the pipe, and has a pressure activated lip which increases its seal with increases in line pressure. The volume of the gasket along with its softness (60 durometer) causes the gasket to compress and store energy to where the gasket moves with the pipe when it expands and contracts, which is a characteristic of PVC and HDPE.

Another version of the outlet seal sleeve is the JCM 415 for Concrete Steel Cylinder Pipe. This sleeve was developed in collaboration with several Concrete Steel Cylinder Pipe manufacturers to meet the needs of the unusual and specialized type of pipe. We have been manufacturing these sleeves for over 25 years and ship worldwide. The largest JCM has manufactured was 120 x 102 (144" pipe O.D.) which went into Las Vegas, Nevada to branch their main water intake from Lake Mead. Two sleeves were manufactured and installed successfully – the largest hot taps (documented) in the world.



A more refined model of this sleeve was modified and tested to tap Fiberglass pipe (RPM pipe). JCM worked with HOBAS to test these sleeves with strain gauges to make certain that long term application would not cause micro fractures to the brittle pipe. Very few manufacturers work as closely with the pipe manufacturers in product development and improvements as JCM does.

Full Circumferential Gasket Sleeve

This sleeve is a thin stainless steel (10 – 14 gauge thicknesses) band with a full circumferential gasket and a flanged outlet. The band is flexible enough that it conforms to the pipe and loads the full gasket.

These sleeves are especially good on smaller pipe which is susceptible to beam breaks, 4, 6, & 8 cast iron and asbestos cement pipe. Larger sizes have a much greater gasket surface area on which to seal. This greater gasket surface area dissipates the transferred bolt torque from the band and limits the pressure holding capabilities and safety factor of the larger size sleeves. Larger sizes do not have the pipe reinforcing capabilities of fabricated sleeves due to the flexible band of the body. Also, on larger pipe sizes (18" and larger) with large outlets (10" and larger) even though the gasket is full circumferential, there is no guarantee that the gasket will seal a beam break due to the forces involved. These sleeves also are furnished with either a flanged outlet or the popular mechanical joint outlet.



Fabricated Mechanical Joint Sleeve

This complex sleeve is a true mechanical joint sleeve design, fabricated out of carbon steel rather than cast from gray iron or ductile iron. The JCM 414 is not a split coupling, as many other manufacturers produce. The sleeve has mechanical joint flanges on the sleeve that provides the strength and rigidity necessary to make and maintain the seal on the pipe. The rigid body allows extra force to be placed on the end gasket in order to force it into non-uniform shapes to seal on older and out of round pipe. The JCM sleeve is manufactured so that it can be field modified to fit pipe which is slightly larger or smaller than expected. Versions are also available for pipe or bell repairs and line stops.

