



Selection of JCM Stainless Steel Tapping Sleeves

Full Circumferential Gasket vs Outlet Seal Gasket

The JCM 452 All Stainless Steel Tapping Sleeve with outlet seal gasket incorporates the time proven heavy duty design of the fabricated steel tapping sleeve with the corrosion resistance of all stainless steel. This design utilizes a broad cross section, hydromechanical outlet gasket in lieu of the full body gasket. The outlet gasket produces a positive initial seal which increases with increase in line pressure. The 452 All Stainless Steel Tapping Sleeve has been engineered and manufactured to provide the superior corrosion resistance of stainless steel in applications requiring high pressure service. This design is also incorporated in the JCM Models 464, 459, 465, 412, 6438, 6452, 6459.

The JCM 432 Stainless steel tapping sleeve utilizing a full circumferential gasket (also in models 432, 462, 439, 469, 6432, 6439) are recommended for smaller size applications in which the pipe is susceptible to breakage, such as 4" though 6" cast iron or asbestos cement pipe. These fittings have been developed to provide a full circle wrap around gasket which will insure a watertight seal should a beam break occur during or after the tapping process. While these fittings are successful on such applications, they are not always the most suitable fitting for all applications. Tapping applications on mains which are not susceptible to breakage such as ductile iron, C-900, C-905 PVC and large diameter pipe, a standard outlet seal design tapping sleeve, such as the JCM 452, can be utilized and is recommended. The standard outlet seal tapping sleeve is also recommended for use in applications requiring higher working pressure capability, large diameter taps (above 12"), on mains experiencing water hammer and extreme flow variations and on mains requiring structural reinforcement from the tapping sleeve.

A tapping sleeve's success can be measured directly by the proportion of available bolt torque versus the total square inches of gasket to be compressed. The JCM 452's broad, hydromechanical outlet gasket allows available bolt torque energy to be applied directly to the gasket around the outlet area. As the outlet area of the tapping sleeve experiences the greatest amount of internal force (pressure thrust), it is critical that this gasket area have proper compression. To prevent the internal force from escaping, the external force must be greater; the difference between these two forces is the SAFETY FACTOR. When using a full circumferential gasket tapping sleeve the bolt torque compression energy must be shared over a broad area of gasket all around the pipe circumference whereas the JCM 452 outlet gasket has the total sum compression of all the available bolt torque. To more fully understand the necessity for maximum compression at the outlet area, the table below indicates the amount of internal force encountered at the nominal pipe size outlet area of the tapping sleeve when the main is operating at 100 PSI.

Outlet Size	Force at 100 PSI
6	2,827 lbs.
8	5,027 lbs.
10	7,854 lbs.
12	11,310 lbs.
14	15,394 lbs.
16	20,106 lbs.
24	45,239 lbs.

The internal force at the outlet area can cause the sleeve to "lift" away from the pipe and interrupt the gasket/pipe surface contact creating the opportunity for the gasket to be ripped from its seat or to completely blow out.

For example, a JCM 432-1740 x 12 All Stainless Steel full circumferential gasketed tapping sleeve has an approximate total gasket area of 1,526 square inches to be compressed as compared to a JCM 452-1740 x 12 standard outlet gasket tapping sleeve which has an approximate total gasket area of 55 square inches. Therefore, a full gasket tapping sleeve has 27 times more gasket area to be compressed than an outlet gasket tapping sleeve and withstand 11,310 lbs. of thrust at the 12" outlet

Pipe O.D.	Outlet Size	JCM Model 432 Square Inches of Gasket	JCM Model 452 Square Inches of Gasket
17.40	12	1,526	55

The thrust vs. bolt torque vs. gasket area is the basis of recommending a standard outlet gasket tapping sleeve over that of the fully gasketed sleeve on larger sizes and especially in applications operating at higher working pressures.

Engineering research into the mechanical forces involved with the tapping process, its structural stresses and line service requirements has lead JCM Industries to recommend the following guidelines for tapping sleeve selection and application:

JCM 432 All Stainless Steel Tapping Sleeve - with full circumferential gasket.

- Pipe susceptible to breakage during and after tap. Includes cast iron and asbestos cement.
- Sizes up through 12" and especially size on size taps 12" and under.
- General pressure specifications regarding tapping sleeves and valves key on flange limitations set by AWWA Standards. JCM 432 All Stainless Tapping Sleeve is structurally designed for 175 PSI for 4" through 12" outlets. This is based on the flange limitations. Flanges for higher pressure limitations are available.



JCM 452 All Stainless Steel Tapping Sleeve - with outlet seal gasket.

- Recommended for pipe not susceptible to breakage. Includes ductile iron, PVC, steel, polyethylene and fiberglass. Also recommended for larger cast iron pipe, reduced taps on all types of pipe and for applications with fluctuating pressure variations.
- Thicker bodies that are designed around hoop strength requirements with larger bolts are utilized in the JCM 452s. Whereas in the JCM 432's thinner gauge stainless must be used in order to conform to the pipe and evenly load the mat gasket throughout the 360 degree circumference of the pipe and the entire length of the sleeve. This significantly limits the performance of full circumferentially gasketed tapping sleeves.
- For all sizes of pipe and outlets. Especially for large diameter applications with higher working pressure requirements.
- General pressure specifications regarding tapping sleeve and valves key on flange limitations and limitations set by AWWA Standard. JCM 452 All Stainless Steel Tapping Sleeve is designed for 175 PSI for 4" through 12" outlets. This is based on the flange limitations. For higher working pressures, the JCM 452 pressure rating is equal to that of the flange and valve as required.



Advances and industry changes -

AWWA Standards committees continually review and refine written standards to accommodate changes and product advances in the industry. Manufacturers will adjust, modify and refine their product and submittal information to meet or exceed these standards. JCM encourages decision making personnel to keep apprised of these changes to ensure the proper standards are being met and provided for their systems.