

JCM Fittings and Recommended Bolt Torque Levels

JCM Industries provides recommended bolt torques for each product and the bolting sequence for maximum performance. While involving our team of Technical Sales and Professional Engineers to directly address all the calculations and formulas can provide specifics for analyzation, it is the field base information needed we will address.

JCM provides recommended bolt torques to aid the installer in achieving a successful installation of the fitting that will provide maximum performance. Proper bolt tightening is determined by each product and its intended service. Fittings with larger areas of gasket to pipe surface require a specific number and size of bolts to provide proper gasket compression and prevent escape of the line content. For example, full circumferential gasket clamps or tapping sleeves include a greater number of bolts the larger the size of the fitting. Each bolt plays a role in providing the amount of “tension” on the metal components to compress the rubber gasket and withstand working pressures (numbers are based on calculated formulas). It is the same for outlet seal gasket tapping sleeves or service saddles which have a limited amount of gasket to pipe surface area – less number of bolts can supply the needed tension to compress the gasket and meet the PSI requirements. Torque is a measurement of energy that it takes to spin the nut along the thread. Torque must be applied to tension a bolt.

It is the bolt material, size and threads that determine the available tension for the bolt. The threads convert applied bolt “torque” (twist) into an expected amount of “tension” (bolting power) – it is the amount of tension created that is critical to the installation. The tension in the bolt generates a “clamping” force between the two fitting components. Should the force be too low, the fasteners can work loose due to movement, vibration between the parts or line harmonics – failing to provide gasket compression to its application. If the force is too great on the bolt – it can permanently stretch (elongation) the bolt and it could fail to provide the tension needed to compress the gasket.

These are the base factors involved – additional field environment factors include thread/nut lubrication, cleanliness, weather and most importantly – the tightening mechanism. Manual vs. pneumatic wrench tightening. Fastener material responds differently to “heat” built up during the friction of pneumatic tightening – too hot and the nuts can gall/lock up on the bolt (resistance in the threads).

JCM product torque level recommendations are based on both engineering calculation and actual laboratory & field tests. These are the optimum numbers to refer to during the installation along with the specified tightening sequences for each type of product/gasket. Sequences become as important as the amount of bolt torque in that gaskets should be preloaded/compressed in a particular direction. Other influences are washers – their type of material, thickness and fit to the bolt to affect the friction service of the nuts gaskets – they should be allowed to seat/rest and then measured again for torque and retighten if needed – this aids in maintaining the gasket compress at the finish of the installation.