

## G1. What is a BoltEx<sup>®</sup> flange clamp?

BoltEx<sup>®</sup> flange clamps are designed to act as a safety barrier that enables safe exchange of the fasteners on bolted flanged connections whilst they remain pressurised - a practice which is commonly known as “hot bolting”. Since the exchange process is performed one fastener at a time this activity is alternatively referred to as “single stud replacement”.

## G2. When would BoltEx<sup>®</sup> flange clamps typically be used?

The most common use of BoltEx<sup>®</sup> clamps is to facilitate the online replacement of corroded flange fasteners that have been identified via in-service inspection and reported as bolting “anomalies”. BoltEx<sup>®</sup> clamps enable these anomalies to be rectified under normal plant operating condition and thus in a timely manner.

BoltEx<sup>®</sup> clamps are also often utilised before planned shutdowns to confirm that bolted flanged connections at key pressure isolation boundaries are in an acceptable condition and thus reduce the risk of any emergent problems occurring during the shutdown that may jeopardise planned activity sequences or the overall schedule.

## G3. Where have BoltEx<sup>®</sup> clamps been used up to now?

BoltEx<sup>®</sup> have been used globally across a variety of different industries with supply arrangements tailored to the client e.g., sale or hire. Case studies can be provided on request.

## G4. What are the key components of BoltEx<sup>®</sup>?

BoltEx<sup>®</sup> comprises four clamp segments (halves) that are positioned around and on either side of the flange connection and bolted together. The key component is the GPS (Gasket Protection System) which prevents the gasket from being overloaded or crushed during the bolt exchange process.

## G5. Has BoltEx<sup>®</sup> design been tested or independently verified?

BoltEx<sup>®</sup> has been strength tested to 1.5 times design pressure with all flange bolts removed. The design has also been independently verified by Bureau Veritas. A copy of the Independent Review Certificate can be provided on request.

## G6. What flange types can BoltEx<sup>®</sup> be used on?

BoltEx<sup>®</sup> is designed to fit ASME/ANSI B16.5 compliant flange assemblies. However, it can also be used on certain API flanges.

## **G7. Is BoltEx<sup>®</sup> one size fits all?**

Each BoltEx<sup>®</sup> model is designed to fit a specific flange size and rating. Our standard range spans across multiple 4 and 8 bolt ASME/ANSI B16.5 flanges from ½” to 8”, and from 150# up to 1500# rating. Full details can be found here: [BoltEx<sup>®</sup> Technical Datasheet](#). BoltEx<sup>®</sup> clamps to suit other flange sizes and ratings are available upon request.

## **G8. What flange body materials can BoltEx<sup>®</sup> be used on?**

BoltEx<sup>®</sup> can be used on all metallic flanges. It can also be used on GRE flanges, although an extension kit (sold separately) may be required to compensate for the thicker flanges.

## **G9. Can BoltEx<sup>®</sup> clamps be used to change out bolts on connections that incorporate spectacle blinds?**

Extension kits are available for BoltEx<sup>®</sup> to enable the clamps to bridge a larger gap between the flanges. These kits comprise longer fasteners and extension pieces that extend the operating envelope of the GPS (gasket protection system). With an extension kit BoltEx<sup>®</sup> clamps can be used on four-bolt flanges that incorporate a spectacle blind (conforming to ASME B16.48).

## **G10. What training/qualifications are required to use BoltEx<sup>®</sup>?**

BoltEx<sup>®</sup> is designed to be used by individuals that are trained and competent with the torquing and replacement of bolts. SRJ provides an installation procedure, training pack and online assessment module to be undertaken by those holding a recognised flange bolting qualification. The online training takes around one hour to complete, and a certificate is provided to those that achieve the pass mark in the online assessment. SRJ recommends that personnel using BoltEx<sup>®</sup> have the recognised flange bolting qualification to a standard appropriate to their region e.g. EN, ASME, ECITB.

## **G11. How many people are required to perform bolt exchange using BoltEx<sup>®</sup>?**

Ideally two people are required to perform bolt exchange using BoltEx<sup>®</sup>, though for smaller units it is possible with one person.

## **G12. What tools are required to install a BoltEx<sup>®</sup> clamp?**

BoltEx<sup>®</sup> can be installed with basic equipment that is readily available, namely: an adjustable spanner, a calibrated torque wrench and a socket set.

### **G13. Are manual handling aids required to install BoltEx<sup>®</sup> clamps?**

For the majority of BoltEx<sup>®</sup> clamps the individual parts weigh less than 10 kg, so for most uses manual handling aids are not required. All BoltEx<sup>®</sup> units incorporate suitable fixing locations for lanyards for safe handling to limit the risk of dropped objects if working at height.

### **G14. How long does it take to perform bolt replacement using BoltEx<sup>®</sup>?**

The time taken for removal and replacement of flange bolts will vary dependent on flange condition and accessibility, bolt quantity, and condition of fasteners being replaced. Based on experience from use in the field over multiple assets, the average time taken for bolt replacement using BoltEx<sup>®</sup> is around one hour per flange.

### **G15. If the flange bolts cannot be removed, can BoltEx<sup>®</sup> be left in place?**

BoltEx<sup>®</sup> can be left in-situ for a defined period as determined by an operational risk assessment.

### **G16. Can BoltEx<sup>®</sup> be reused?**

Yes, BoltEx<sup>®</sup> is designed to be reused multiple times.

### **G17. What is the service life of a BoltEx<sup>®</sup> clamp?**

The anticipated service life of a BoltEx<sup>®</sup> clamp in regular use is around 3 years, as in that time it is likely there will be a loss of coating around the contact areas along with general wear and tear. If clamps have not been in regular use and suitably stored, then the service life can be longer.

### **G18. Are BoltEx<sup>®</sup> clamps supplied with any spare parts?**

BoltEx<sup>®</sup> clamps are shipped with spare spring pins, which are used to join the clamp segments (halves) together. We stock spares for the hollow spacers that comprise the GPS.

### **G19. Can SRJ provide a full hot bolting service?**

We work very closely with selected service partners globally to provide a full hot bolting service to asset operators when requested. We can analyse flange anomaly data and define work scopes and work packs as required to deliver a focused bolting anomaly rectification program for your asset.

## **G20. What information does SRJ require to do a hot bolt scope assessment?**

We can work with the available information, as we recognise that not everyone has a fully populated flange register and/or anomaly register. We will work with your team to arrive at the most efficient solution given the available data to hand and we can help plug any data gaps along the way. We invite our customers to complete a [BoltEx<sup>®</sup> Customer Enquiry Form](#) that will help us get started.

## **G21. Are BoltEx<sup>®</sup> clamps available for purchase or hire?**

BoltEx<sup>®</sup> is available for purchase as well as hire. It is typically more commercially viable for our customers to purchase BoltEx<sup>®</sup> and make it part of the standard toolbox for flange bolt management.

## **G22. Can BoltEx<sup>®</sup> be used to reinforce a flange of questionable integrity?**

BoltEx<sup>®</sup> can be used on a temporary basis to reinforce a flange, considering the condition of the flange and other integrity risks.

## **G23. Does the condition of flanges affect the installation of BoltEx<sup>®</sup>?**

The condition of flanges should always be assessed prior to undertaking any bolt replacement work. Flanges should also be tidied and freed of loose corrosion debris.

BoltEx<sup>®</sup> can be used on flanges with significant corrosion; indeed, the BoltEx<sup>®</sup> hollow spacers are sized to accommodate a degree of thinning of the flange due to corrosion. The additional load put on to the flange by BoltEx<sup>®</sup> is low, so any damage to an even badly corroded flange is unlikely. However, the BoltEx<sup>®</sup> tooth sections do require a flat flange surface to prevent point loading.

From experience in the field if a flange is too badly corroded to install a BoltEx<sup>®</sup> it is likely that the flange (and possibly also the associated spool) will need to be replaced.

## **G24. Are there any operating temperature limitations for using BoltEx<sup>®</sup>?**

SRJ recommends that hot bolting be avoided on piping systems operating below -20°C or above 200°C.