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## Design Engineer - Fasteners Sealing

### Seals solve nuclear problem

The Maintenance Manager of a large Nuclear Power Generating Plant said that after regular scheduled maintenance, they were in the process of bringing one of their turbine units back on line, and had discovered a great many leaks with the flared fittings in the EHC hydraulic system. The Electric Hydraulic Control system regulates the speed of the steam turbine which drives the electrical generator.

The aggressive phosphate-ester hydraulic fluid can be dangerous, is harmful to humans, and was leaking in a critical containment area. They had retightened each fitting, without success.

Adding to the problem, their scheduled maintenance downtime was due to expire shortly. Additional days of downtime would cost the company millions in lost revenue.

Close inspection revealed that the fittings were 37degree flared fittings mated with 316 stainless steel tubing. Sizes ranged from 3/8-in through 2-in tube diameters.

Standard practice would require cutting out the old fittings and re-tubing the system. This option was rejected due to time constraints and the excessive costs involved. Flare-tite Seals were recommended as a preferred solution.

Flare-tite Seals are unique seals. They are stamped from stainless steel or copper with patented sealing ribs around the sealing face.

When the seal is installed in a standard fitting and the fitting is tightened, the sealing ribs are compressed. Each independent rib acts similar to a lock washer on a nut and bolt, maintaining constant pressure on the sealing faces.

During times of high vibration and large temperature cycles, this pressure insures that the fitting remains leak-free. Most seals are also coated with a Loctite coating, which adds a second level of protection to the seal design.

The plant engineering department and the OEM control system manufacturer approved the use of Flare-tite seals. Plain seals, without coating, were selected to minimize the potential of radiation degradation of the Loctite sealant polymer, which normally coats each seal.

The patented sealing rings of the Flare-tite Seal were deemed adequate to seal the leaks. The permanent 'leak-free' nature of the seal added to their appeal.

To further insure that each seal was properly installed, open ended Torq-tite Wrenches were utilised to tighten all the various sized fittings to the exact fitting manufacturer's torque recommendation.

Many manufacturers state that their fittings should be fingered tightened and then rotated an additional wrench flat or two.

This is extremely subjective and leads to over tightening most small fittings, and under tightening most larger fittings. Common torque wrenches are based upon a socket design, with 'crows feet' adapters offered when a socket is not applicable. The angle at which the crows foot is applied to the fitting severely effects the actual applied torque.

The Torq-tite wrench removes these technical problems by offering a truly 'open-ended' torque wrench style which regulates the applied torque to each fitting. Recommended torque values are listed for each style of fitting to insure that the fitting is properly assembled.

To add versatility, the torque value of each wrench can be adjusted, and the 'open-ended' attachment is interchangeable with other hex sizes.

The Flare-tite Seals worked perfectly. The maintenance personnel were impressed and quite pleased at this simple fix and the ease of adding a Flare-tite seal to their existing fittings.

No fittings had to be replaced; and no tubing needed to be cut, re-flared, or replaced!

The power plant has subsequently order Flare-tite Seals for their other turbine systems scheduled for future maintenance.

Variations of the Flare-tite Seal are available for the following applications:

- High temperature and steam fittings
- Nuclear power fittings.
- Standard carbon fittings.
- Marine and corrosive fittings.
- Aluminium and brass fittings.

Ultimately four flared joint standards will be covered by Flare-tite's product range:



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