



Flaretite Seals Solve Nuclear Problem

Application: Flaretite Seals



Nuclear Power Plant

Jim Shackelford works as a sales consultant for Control and Power, in Birmingham, Alabama. On a recent Sunday, he received an urgent telephone call from a customer, the Maintenance Manager of a large Nuclear Power Generating Plant in his area. The Maintenance Manager 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 compression tube fittings in the EHC hydraulic system. The Electric Hydraulic Control system regulates the speed of the steam turbine which drives the electrical generator. He asked Jim to survey the situation and recommend replacement fittings to stop the leaks.



Steam Turbine

That afternoon Jim met with plant maintenance personnel charged with repairing the system. This was a very serious problem. Although the leaks were small, the aggressive phosphate-ester hydraulic fluid can be dangerous, is harmful to humans, and was leaking in a critical containment area. Attempting to stop the leaks, 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.

To correctly identify the problem, Jim “suited up” in protective clothing and entered the containment area to inspect the leaking fittings. The fittings had been installed when the plant was built more than 35 years ago. Close inspection revealed that the fittings were not tube compression but 37 degree flared fittings mated with 316 stainless steel tubing. Sizes ranged from 3/8” through 2” 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.

Now that Jim knew he was dealing with flare fittings and not compression tube, he showed the customer a Flaretite Seal and recommended their installation.



Cut-a-way

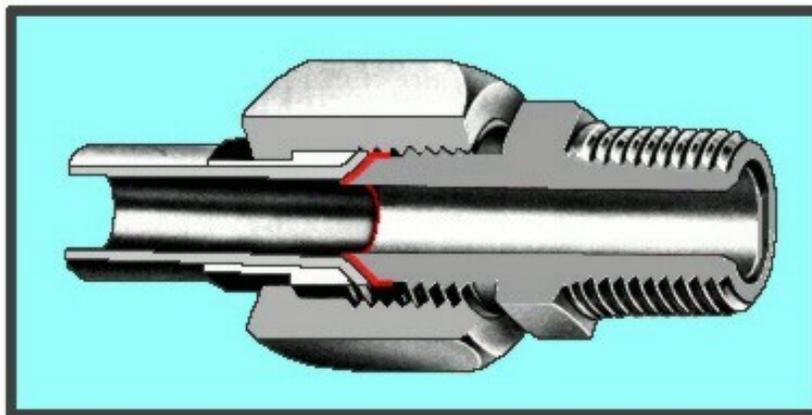


Flaretite Seal



Sealing Ribs with Loctite coating

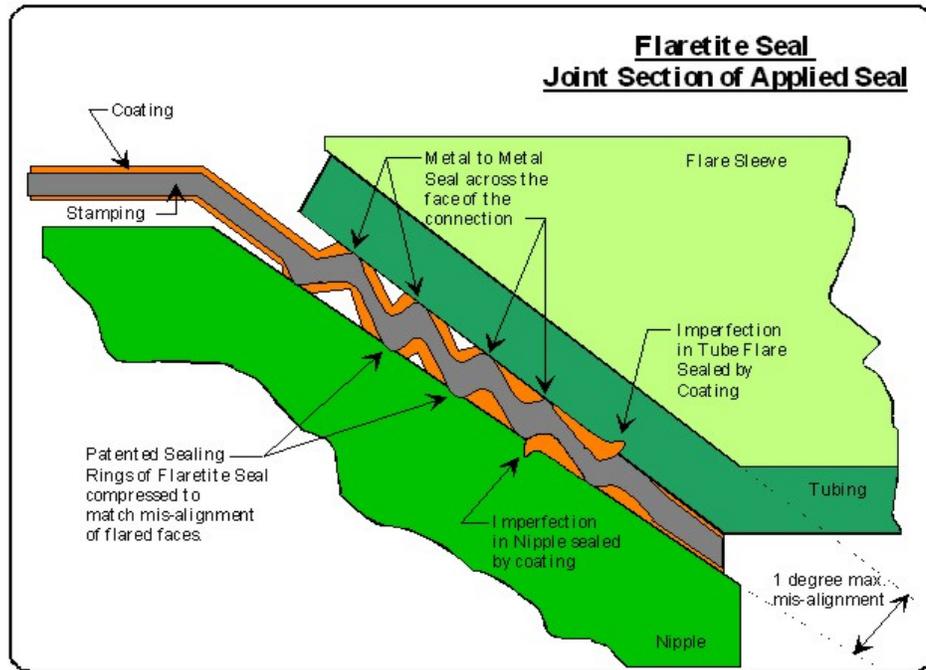
Flaretite Seals are unique seals. They are stamped from stainless steel or copper with patented sealing ribs around the sealing face. When the seal is installed in a standard fitting and the fitting is tightened, the sealing ribs are compressed. Each independent rib acts similar to a lock washer on a 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.



Flare fitting with Flaretite Seal installed

First, the plant engineering department had to insure that the seal would not compromise the system in any way. After first contacting Flaretite, the seal manufacturer, for their seal model recommendation, the original equipment manufacturer of the control system was contacted, and approval from their environmental department was requested. Only then, could the seals be approved for installation. Flaretite 316 stainless-steel seals were chosen to match the existing metallurgy. 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 Flaretite Seal were deemed adequate to seal the leaks, without the necessity of Loctite coating which is typically applied to all Flaretite Seals. The permanent “**Leak-Free**” nature of the seal added to their appeal.



Section View of Seal after installation

The Flaretite Seals were ordered and arrived the next day. They spent the next two days breaking loose all the connections and installing the Flaretite Seals. To further insure that each seal was properly installed, open ended Torqtite Wrenches were utilized to tighten all the various sized fittings to the exact fitting manufacturer’s torque recommendation.

Today’s generally accepted practice of tightening flare fittings is to rely on the installer’s intuition: “Is it tight enough?” 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 Torqtite 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.

Verifying the torque of each fitting was a huge undertaking, as the several hundred fitting connections were ten to twenty feet from the floor, requiring scaffolding and awkward working positions in the 100+ degree temperature and high humidity containment area. Their radiation protective suits just added to the misery.

Finally, the system was refilled with hydraulic fluid and pressurized. To their dismay, several fittings were still leaking. Re-inspection showed that these particular fittings were missed during the tightening sequence. Simply applying the Torqtite wrench to the leaking fitting and tightening to the required torque value stopped each leak! The Flaretite Seals worked perfectly. The maintenance personnel were impressed and quite pleased at this simple fix and the ease of adding a Flaretite 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 Flaretite Seals for their other turbine systems scheduled for future maintenance. Jim’s company, Control and Power, have also stocked the Flaretite Seal; and are enjoying their status of hero with the electrical generating maintenance personnel, thanks to Flaretite.

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