

# FastLUBE Bolting Lubricants



- **Anti-Galling**
- **Reduced Friction**
- **Rust & Corrosion Prevention**
- **High Pressure Applications**
- **High Temperature Stability**
- **Thread Sealant**

LEADING PROVIDER OF BOLT LOADING & REMOVAL SOLUTIONS

Products and Prices are subject to updates and changes. Please contact us for current quote.

2013

# FastLUBE

## Designed to Make Bolting Better

### FastLUBE AG

#### Stops Galling - Great Sealant

Superior lubricant for eliminating galling on stainless steel threaded connections and achieving metal-to-metal seal. AG lowers torque requirements, reduces friction under pressure and is equally effective on other gall-susceptible materials, ferrous alloys, and more common types of carbon steel. AG contains a high percentage of PTFE flakes that will seal off a leak path, prevent the passage of fugitive emissions at pressures up to 20,000 psi, and eliminates the need for Teflon tape.

### FastLUBE RS18

#### Stops Galling - Smooth Application

A film-forming lubricant with strong polar attraction, applies readily to threads and other machined parts that are subjected to heavy loads and fictional heat. Eliminates wear and gall on stainless and other threaded connections. Completely water-insoluble, recommended for shafts and other gall-susceptible mechanisms. No stirring needed.

### FastLUBE 70+

#### High-Pressure Threading

Provides smooth make-up and breakout and prevents rust and corrosion plus an H2S inhibitor! Contains over 70% pure molybdenum disulfide (more than any other moly-paste.) Perfect for general use on threaded connections and press fits and ideal for use on nut splitter chisels. Use for wear-in applications and a variety of jobs where sliding friction is present.

### FastLUBE 444

#### Waterproof Lubricant

Get excellent protection from wear and grinding pressures of slow-moving machinery with 444. Contains a 40% blend of lubricating solids and ideal for use on open gears and in heavy duty applications where resistance to water is important. Provides long-term rust and corrosion protection, also contains additives to prevent damage from salt and other corrosives. Performs well on splines, u-joints, chucks, pillow block bearings, and most high-impact surfaces and heavily loaded mechanisms.



Available in Convenient Sizes to Meet Job Needs

Purchase by single container or by case.

| Lubricant Function        | AG | RS18 | 444 | 70+ |
|---------------------------|----|------|-----|-----|
| Anti-Galling              | E* | E*   | G   | G   |
| Water Resistance          | F  | G    | E*  | G*  |
| Chemical Resistance       | G  | G    | G   | G   |
| Rust/Corrosion Prevention | F  | F    | E*  | E*  |
| Heat Stability            | F  | F    | G   | G   |
| Sealing                   | E* | N    | N   | N   |

E=Excellent; G=Good; F=Fair; N=Not Applicable

\* Indicates that this feature is the lubricant's primary feature



# FastLUBE

## Lubricant Fundamentals

The purpose of any lubricant is to reduce friction between moving surfaces, which come in contact with each other. The reduction of friction depends largely on two factors: (1) the speed at which the surfaces are moving relative to one another, and; (2) how much pressure is being exerted between surfaces at the point of contact. Ambient conditions such as extreme heat or salt water may also be determining factors.

Lubrication of threaded connections (nuts and bolts, pipe and fittings, etc.) is a good example of a low speed/extreme pressure application. This is what thread compounds like FastLUBE AG, RS18 and 70+ are designed to do. FastLUBE 444 can also be used as a thread compound, but it was formulated primarily for open gears - another heavily loaded, low speed mechanism.

To maintain a smooth bearing surface for flanks of threads or heavily loaded gears to slide against, solid lubricants are required. Oil or grease alone will squeeze out under pressure, leaving the contact area essentially dry. Fastorq thread compounds contain between 50 and 72% lubricating solids. The

heavier concentration of solids means that the mechanical barrier which Fastorq lubricants provide remains in place more effectively; and that the required torque values are lower and more consistent. Another factor considered in the formulation of our solids packages is that the specific combinations of materials will be very smooth and slippery under pressure.

All of these solids are very soft compared to the metal surfaces they lubricate. As the pressure between these surfaces increases, the mechanical barrier finally wears away. At this point, while some of the lubricant particles have been literally ground into the metal, there is little left to prevent a sharp increase in direct "rubbing together" of the metal causing wear, tearing and galling. Heat from this friction activates a chemical barrier. Additives are included in the lubricant, which react chemically with the metal surfaces. Very small wear particles resulting from this reaction contribute to the lubricating barrier between contact surfaces. In this way, the wear process is controlled so that welding cannot occur.

## Lubricant Q&A

### Why should I use lubricant?

Friction between mating threads and between nut face and flange absorbs about 90% of the energy used to torque (tighten) a threaded fastener (bolt), 10% of the energy creates bolt pre-load. Reducing friction by using a better lubricant reduces the amount of energy (work) required by a factor of ten to one.

### How can I prevent bolts and nuts from freezing up (galling) when tightening or taking them apart?

Threads gall due to metal to metal contact between thread surfaces. To avoid galling use a lubricant with a high percentage of solids which will remain on the threads during the service life of the system. Choose a lubricant with a temperature rating higher than the temperature experienced by the bolt in service.

### Is tighter always better?

No - Threaded fasteners are designed to apply clamping force within a range dictated by the minimum yield strength of the bolt material and the clamping force required to secure the two or more parts in an assembly.

### If the lubricant is too slippery- won't the nut loosen more easily?

No, a low coefficient of friction of the lubricant by itself will not cause loosening unless dynamic forces are present which momentarily reduce the preload and subsequently the friction in the bolt and allow the nut and bolt to turn relative to each other. Dynamic forces may be created by vibration or temperature change among others. If preload is greater than the loads

created by the dynamic forces, bolt load loss (loosening) will be avoided or at least minimized.

### How much torque should I put on an 'X' sized bolt?

The amount of torque depends on a large number of factors. The following is a list of the most common factors required to determine torque.

1. What lubricant is being used?
2. What is the diameter and thread pitch of the bolt?
3. What is the minimum yield strength of the bolt material?
4. What is the bolt material? i.e. ASTM A193 B7, SAE J429 Grade 8, etc.
5. What temperature are the bolts when being lubricated and tightened?
6. What bolt load (tension) do you want to achieve?

Are there critical factors involved such as the maximum compression load allowed on a gasket or sealing surface?

If a torque value is specified for the job you are doing; check the factors involved to insure you are getting the result the designer intended.

### Why is it required to use a "star" or "criss-cross" pattern and two or three passes when tightening bolts in a pattern?

These methods are used to apply uniform bolt load in each bolt. The designer has specified the size and number of bolts to secure the parts of an assembly. If some bolts are tightened to a greater bolt load than others; they may carry a greater load in operation, causing a bolt failure.



# FastLUBE AG

AG thread lubricant is proven to eliminate galling on stainless steel threaded connections. It performs as an excellent sealant and lowers torque requirements, as proper make-up is achieved quickly with minimum torque.

In addition to eliminating galling on stainless steel threads, AG is equally effective on other gall-susceptible materials, as well as ferrous alloys and may also be used on more common types of carbon steel. It has passed both the "Shrimp Test" (drilling fluid toxicity test) and the Static Sheen Test in accordance with EPA standards.

AG contains a high percentage of PTFE flake that will seal off a leak path and prevent the passage of fugitive emissions at pressures up to 20,000 PSI. The need for Teflon tape is eliminated. AG contains no metals or other ingredients which may be hygienically or environmentally harmful.

AG is an excellent lubricant for reducing friction. With the use of this superior lubricant, a connection can be tightened until a metal to metal seal is achieved - without galling. This reduced friction under pressure means that proper make-up can be achieved quicker and with less torque. AG is recommended for use as a thread compound in applications such as bolted joints, pipe and fittings, and for temperatures not exceeding 550°F.

*AG Demonstrated: The threads of a stainless steel bolt have been distorted or flattened by hammering. Normally, the threads would be ruined and the bolt discarded. FASTORQ A/G was applied to the damaged threads. A nut was run down over the bolt and the threads were reformed to their original shape. The mating surfaces were once again smooth and even. In another demonstration, a 316 stainless bolt was used to chase new threads in an aluminum block.*

| Information        | FastLUBE AG  |
|--------------------|--|
| Classification     | Paste  |
| Appearance         | Bright yellow, grainy                                    |
| Solids Description | PTFE and a synergistic blend of other lubricating solids |
| Solids Content     | 72% by weight  |
| Temperature Range  | -30°F to 550°F   |
| Fluid Description  | Synthetic and natural oils                               |
| Oil Viscosity, SUS | 60   |
| Evaporation Rate   | None   |
| Solubility         | Nil  |
| Thickener          | Complex Soap   |



*"Based on these test results, I believe this compound [Fastorq AG] can probably provide an effective solution to many, if not all, of the routinely occurring stainless steel thread galling problems."*

*- Joe Greenslade  
"New Compound Overcomes  
Stainless Bolt and Nut Thread Galling"  
January/February 2003 edition*

| Information            | FastLUBE RS18                  |
|------------------------|--------------------------------|
| NLGI Grade             | 2                              |
| Primary Functions      | Extreme pressure, anti-galling |
| Appearance             | Yellow, smooth                 |
| Solids Content         | 50%                            |
| Temperature Range      | 0°F to 300°F                   |
| Oil Description        | Synthetic                      |
| Viscosity, SUS @ 100°F | 730                            |
| Evaporation Rate       | None                           |
| Solubility             | Nil                            |
| Thickener              | Inorganic                      |

# FastLUBE RS18

RS18 is an excellent thread lubricant that also eliminates galling on stainless or other gall-susceptible threaded connections. The smooth consistency makes it easy to apply. RS18 does not reduce torque requirements to levels below those of other compounds. This is an important feature for applications involving rotary shouldered connections or in other situations where over-torquing is a concern.

RS18 is also recommended for lubrication of shafts or other gall-susceptible mechanisms, which would normally be lubricated with smooth extreme pressure grease. It is intended for use at temperatures ranging from zero to 300°F. In addition, it is completely water-insoluble.

RS18 is a film forming lubricant. It has a strong polar attraction to metal surfaces and applies readily to threads or other machined parts. During use, a thin resilient coating is formed on areas subject to heavy loading and frictional heat. This thin layer helps prevent further abrasive contact between surfaces. No stirring is needed prior to use.



# FastLUBE 70+

70+ is a thread compound formulated to provide smooth make-up and breakout of threaded connections. Another primary function is the prevention of rust and corrosion.

70+ contains well over 70% pure molybdenum disulfide, more than any other moly paste. For decades, moly has been recognized for its lubricity under pressure and its ability to pack solidly and smoothly into the pores of metal surfaces. It is also noted for its chemical stability at temperatures below 750°F. It contains a significant concentration of rust and corrosion inhibitors. An H2S inhibitor is also included.

70+ is recommended for general use on threaded connections and press fits, and performs well as a lubricant for nut splitter chisels. It can also be used on seal rings and as a dressing for packing and o-rings.

70+ works well as a wear-in lubricant and a variety of other applications where sliding friction is present. It is recommended for use at temperatures not exceeding 750°F.

| Information                   | FastLUBE AG                         |
|-------------------------------|-------------------------------------|
| Classification                | Paste                               |
| Appearance                    | Dark gray, smooth                   |
| Solids Description            | Pure molybdenum disulfide           |
| Solids Content                | Over 70% by weight                  |
| Oxidation of Solids           | Begins at 750°F                     |
| Oil Description               | Mixture: petroleum & synthetic oils |
| Viscosity, SUS                | Not determined                      |
| Evaporation Rate              | None                                |
| Solubility                    | Nil                                 |
| Thickener                     | Complex Soap                        |
| 5% Salt Spray (ASTM B117)     | 90 Days, Pass (No Rust)             |
| Humidity Cabinet (ASTM D1748) | 90 Days, Pass (No Rust)             |

| Information            | FastLUBE 444                       |
|------------------------|------------------------------------|
| NLGI Grade             | 4                                  |
| Primary Functions      | EP/anti-wear, corrosion protection |
| Appearance             | Brown, slightly grainy             |
| Solids Content         | 40%                                |
| Temperature Range      | 30°F to 300°F                      |
| Oil Description        | Synthetic                          |
| Viscosity, SUS @ 100°F | 2000                               |
| Evaporation Rate       | None                               |
| Solubility             | Nil                                |
| Thickener              | Inorganic                          |

# FastLUBE 444

444 contains a 40% blend of lubricating solids, which provide excellent protection from wear and grinding pressures of slow moving heavy machinery. This grease is primarily intended for use on open gears. It may also be used as a heavy-duty thread compound, especially where resistance to water washout is important.

444 offers the added advantage of long term rust and corrosion protection. It is not only waterproof but also contains additives specifically designed to prevent the damaging effects of salt and other corrosive elements.

444 may be used in other applications that involve splines, u-joints, chucks, pillow block bearings and most high impact surfaces & other heavily loaded, slow moving mechanisms. It can also be used in freezing temperatures, or at temperatures as high as 300°F.



# FastLUBE

## Application Table

| Product / Application   | Features   | Temperature Range | Appearance                    |
|---|--|-------------------|-------------------------------|
| <b>FastLUBE AG</b><br><b><i>Stops Galling - Great Sealant</i></b><br>1. Eliminates galling on stainless steel threads<br>2. Provide high pressure sealing to 20,000 PSI eliminates teflon tape<br>3. Protect tooling on cold forging & swaging, reduce scrap rate<br>4. Reduce torque requirements on bolts and threaded fittings | 1. Solids content allows threads to reform<br>2. PTFE flake content seals leak paths<br>3. Reduced friction under pressure prevents galling on tooling and parts<br>4. "K" factor of .11 reduces friction, thereby reducing torque requirement           | - 30°F to 550°F   | Bright Yellow<br>Grainy Paste |
| <b>FastLUBE RS18</b><br><b><i>Stops Galling, Smooth Application</i></b><br>1. Eliminates wear and galling on stainless steel threads<br>2. Provide extreme pressure lubrication on shafts and threads<br>3. Rotary shoulder connections such as drill pipe and oilfield tubulars  | 1. Smooth combination of solids prevents galling<br>2. Film forming lubricant with strong polar attraction to metals<br>3. No solid flakes or granules, therefore no "stand off" at shoulder   | 0°F to 300°F      | Bright Yellow<br>Smooth Paste |
| <b>FastLUBE 70+</b><br><b><i>High Pressure Threading</i></b><br>1. Extreme load thread lubricant<br>2. Prevents rust and corrosion on threads, shafts and gears<br>3. Nut Splitter chisel lubricant<br>4. 5% Salt spray ASTM B117<br>5. Humidity Cabinet ASTM D1748   | 1. Contains 70% pure molybdenum disulfide, more than any competitor<br>2. Contains a high concentration of rust, corrosion and H2S inhibitors<br>3. Excellent lubricity at high sliding friction<br>4. 90 days pass, no rust<br>5. 90 days pass, no rust | Up to 750°F       | Dark Gray<br>Smooth Paste     |
| <b>FastLUBE 444</b><br><b><i>Waterproof Lubricant</i></b><br>1. Lubrication of slow moving gears and machinery such as u-joint, fifth wheels, rack and pinions<br>2. Prevention of rust and corrosion on surfaces exposed to sea water and salt spray   | 1. Water proof – will not wash out with rain or salt water<br>2. Contains an additional package designed to prevent corrosion  | 30°F to 300°F     | Brown Thick Paste             |



# FastLUBE in the Media



## New Compound Overcomes Stainless Bolt and Nut Thread Galling

by Joe Greenslade

Several times each year I receive calls from suppliers who have sold stainless steel bolts and nuts to a customer who is encountering thread galling problems during assembly at the time of their call. Stainless steel fastener users usually jump to the conclusion that the bolt threads are out of specification. Evaluation of the bolt and nut threads usually indicates that the threads are within specification and that is not the root cause of the problem.

For reasons not completely understood, some stainless steel bolts and nuts gall and seize in the threads while being assembled, even before the bearing surfaces come in contact with the assembly components. It is felt by many that thread roughness on either or both the internal and external thread is at least one of the factors contributing to thread galling.

Several years ago I wrote an article about this subject and stated that there are three possible solutions to stainless steel thread galling:

- Add a lubricant to the bolt.
- Slow the driver speed if the fasteners are being installed with a power driver.
- Mismatch the grades of stainless (make the bolts of 302 stainless and the nuts of 316 stainless) if possible.

All of these are still valid suggestions, but none of them is a fool-proof solution. Those having a galling problem

might have to try all three approaches to find the one that resolves their particular situation. The addition of some type of lubricant is probably the most commonly utilized solution.

Since writing the previous article on the subject of stainless steel thread galling, I have continued to seek even more dependable solutions to suggest for solving this troublesome problem. Recently a supplier told me of a new anti-galling compound he had tried that provided some amazing results. I was told that this compound could be put on severely nicked stainless bolts threads and that a nut of the same grade of stainless could be completely assembled onto the bolt without thread seizing and galling.

I like to verify performance claims for myself before passing the information on to others. In this case, I obtained some of the anti-galling compound directly from the compound manufac-

turer and conducted my own test. The pictures in this article are a record of my test.

The threads of a 1/2-13 302 stainless steel bolt were severely damaged by striking them repeatedly with a hammer. It was reasonable to assume that a 302



Anti-galling compound placed on bolt's end threads.



Nut goes entire length of bolt thread without seizing.



Stainless steel bolt with intentionally damaged threads.



*Joe Greenslade has been active in the fastener industry since 1970. He has held positions with major fastener producers in sales engineering, marketing, product design, manufacturing management, and research and development management.*

*Mr. Greenslade holds twelve U.S. patents on various fastener related products. He has authored over 136 trade journal articles on fastener applications, manufacturing and quality issues. He is one of the fastener industry's most frequent speakers at trade association meetings and conferences. He is the youngest person ever inducted to the Fastener Industry Hall of Fame.*

*Mr. Greenslade is active in numerous fastener industry associations and societies holding office in several of them.*

*In addition to guiding the activities of Greenslade & Company, Mr. Greenslade works as a consultant with fastener suppliers and end users on product design, applications engineering, and quality issues. In this capacity he works to resolve fastener applications problems, to help select the best fastening approaches in new product designs, to assist in the standardization of fasteners used within an organization, and to provide training on various aspects of fastening technology and fastener quality assurance. He also serves as Expert Witness in litigation involving fastener related issues. He can be reached at: phone 817-870-8888, fax 817-870-9199 or email: greensladeandcompany@sbcglobal.net.*

# FastLUBE in the Media

*American Fastener Journal* article cont.

stainless steel nut would not go on this bolt without completely seizing on the bolt's thread due to thread galling.

The compound was rubbed on the last three to five threads of the bolt's point end and the nut was started on the bolt. As would be expected, as soon as the nut encountered the bolt's thread nicks the torque required to rotate the nut immediately increased. What was not expected was that the nut could be screwed the full length of the bolt thread without the threads seizing together as a result of galling.

I would never suggest that a user try to use bolts with threads as severely damaged as those in my test. Based on these test results, I believe this compound can probably provide an effective solution to many, if not all, of the routinely occurring stainless steel thread galling problems.

Fastener suppliers who regularly supply stainless steel threaded fasteners should obtain some of this compound and conduct this simple, but dramatic test themselves. If they find the same results I did, they should consider keeping some of this material available for their customers when galling problems occur.

The anti-galling compound used in this test is called "*Fastorq*<sup>®</sup> A/G." This anti-galling compound is manufactured by *Fastorq*<sup>®</sup> Bolting Systems. Those wanting more information can contact *Fastorq*<sup>®</sup> at 800-231-1075 or go to their website at [www.fastorq.com](http://www.fastorq.com). ■



**Electro-Optical**

**From:** Jeff Knox  
**To:**  
**Subject:** Monel/Stainless Galling Tests

**Background**

A large diameter Monel 400 Coupling Ring (7.1875-32 UNS 3B threads) was severely galled after being assembled repeatedly to the 304 stainless mating part (submarine periscope Outer Tube, 7.1875-32 UNS 3A threads). Both materials have significant nickel composition, similar hardness, and an oxide film. These surface properties probably lead to adhesive wear conditions, and with high thread loads generated by very tight fitting class 3 threads, severe adhesive wear (galling)

**Test Objective**

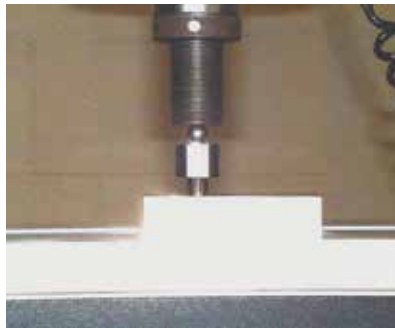
The purpose of the test was to rank the galling threshold of material couples simulating the stainless steel/monel combination used on the Outer Tube/Coupling Ring joint. This material couple was then compared to the stainless steel/monel couples using various lubricants. Standard Test Method ASTM G98 provided the procedure for testing. It is "designed to rank material couples in their resistance to the failure mode caused by galling" and further is applicable to "sliding systems that are slow moving and operate intermittently. The galling and seizure of threaded components is a classic example which this test method most closely simulates".

**Test Procedure**

The test procedure is simple. Half inch diameter monel "buttons" were loaded in compression against a stainless steel block. The button was then rotated through 360 degrees, the material couple was unloaded, separated and checked for evidence of galling. This procedure was repeated for various loads until a transition between galling and no galling was determined. Figures 1-3 show the overall test set-up and an example of a galled material couple.



*Figure 1. Intron Compression Test Machine*



*Figure 2. Monel Test Button and Stainless Steel Block in Test Machine*



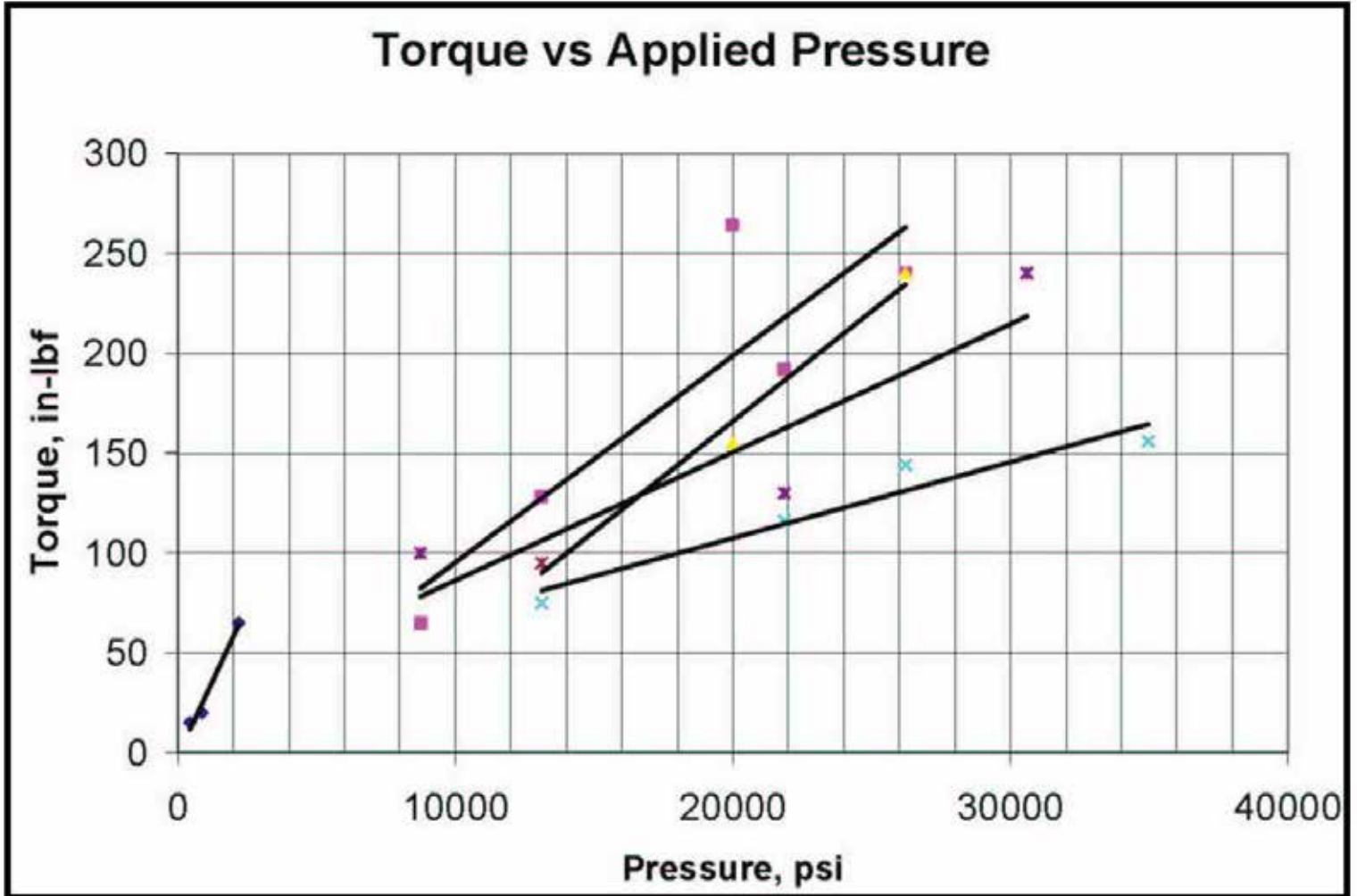
*Figure 3. Galled Test Button and Block*

**Test Results**

The following graph shows applied load (contact pressure) vs torque required to rotate the test button through 360 degrees. Torque is an indicator of shear stress at the contact surface and therefore high torque is a by-product of galling.

# FastLUBE

KOLLMORGEN cont.



---

# FastLUBE Technical Bulletin

|                              |   |
|------------------------------|---|
| <b>Subject:</b>              | <b>Pipe &amp; Tube Swaging/Upsetting</b>  |
| <b>Bulletin #:</b>           | <b>#01-01</b>   |
| <b>Lesson Learned:</b>       | Use of specialized anti-gall lubricant can substantially reduce friction that causes galling during the swaging/upsetting process. This is true with all materials and especially stainless steel.  |
| <b>Application:</b>          | Specialized anti-gall lubricant can be applied where there is galling or seizing of the mandrel in the tube during the upsetting process.   |
| <b>Project:</b>              | A major pipe and tube swaging/upsetting facility in Houston, Texas  |
| <b>Experience:</b>           | Utilized FastLUBE AG Swaging Compound to keep the mandrel from seizing in the tube during the swaging/upsetting process.  |
| <b>Details:</b>              | <p>During the upsetting process the mandrel has a tendency to gall. This causes it to seize in the tube making it difficult and sometimes impossible to remove. The project experimented with most of the standard lubricants (i.e. Die Plate, Slip Plate #3, MP50, anti-seize) with low success. Fastorq A/G was used to swage 7-5/8" 13 chrome casing with a wall thickness of .812 with a titanium nitrate coated mandrel.</p> <p>Prior to each swaging operation the FastLUBE AG Swaging Compound was applied at approximately 1/16" thickness to inside of tube (approximately 12" deep) and to the entire surface of the mandrel. Full coverage was critical for proper operation. After several tests it was determined that the swaging process worked best in two steps. Step 1 swaged the tube approximately 1/2 of the required depth, mandrel was removed from tube, mandrel and tube were re-lubricated and the 2nd swaging process swaged tube to full depth. Galling and seizing were reduced to zero.</p> |
| <b>Costs &amp; Benefits:</b> | FastLUBE AG Swaging Compound will reduce rework and equipment failure associated with the mandrel seizing in the tube.  |
| <b>Implementation:</b>       | FastLUBE AG Swaging Compound should be specified on the shop work order as the lubricating compound to be used. This will eliminate the need to rely on the equipment operator to identify the need.  |



---

# FastLUBE Technical Bulletin

**Subject:** Lubrication Theory - Fastorq Lubricants

**Bulletin #:** #01-02

Most fundamentally, the purpose of any lubricant is to reduce friction between moving surfaces which come in contact with each other. How this reduction of friction is to be accomplished depends largely on two factors: (1) the speed at which the surfaces are moving relative to one another and (2) how much pressure is being exerted between surfaces at the point of contact. Ambient conditions such as extreme heat or salt water may also be determining factors.

Lubrication of threaded connections (nuts and bolts, pipe and fittings, etc.) is a good example of a low speed/extreme pressure application. This is what “thread compounds” like FastLUBE AG, FastLUBE 72 and FastLUBE A70+ are designed to do. FastLUBE 444 can also be used as a thread compound but it was formulated primarily for open gears, another heavily loaded, low speed mechanism.

Of course, the question is: HOW FASTORQ LUBRICANTS DO THEIR JOB and WHY THEY DO IT BETTER THAN OTHERS.

To maintain a smooth bearing surface for flanks of threads or heavily loaded gears to slide against, solid lubricants are required. Oil or grease alone will squeeze out under pressure leaving the contact area essentially dry.

Fastorq’s three thread compounds each contain a between 50-72% lubricating solids. This heavier concentration of solids means that the “mechanical barrier” which our lubricants provide remains in place more effectively and that our required torque values are lower and more consistent.

Another factor considered in the formulation of our solids packages is that the specific combinations of materials will be very smooth and slippery under pressure. With the exception of the nickel particles in FastLUBE A72, all of these solids are very soft compared to the metal surfaces they lubricate. As the pressure between these surfaces increases the mechanical barrier finally wears away. At this point, while some of the lubricant particles have been literally ground into the metal, there is little left to prevent a sharp increase in direct “rubbing together” of the metal causing wear, tearing and galling. Heat from this friction activates what we call a “chemical barrier.” Additives included in the lubricant, react chemically with the metal surfaces. Very small wear particles resulting from this reaction themselves contribute to the lubricating barrier between contact surfaces. In this way, the wear process is controlled so that welding cannot occur.



# FastLUBE Project Management

**LESSON LEARNED**  
submit to LERA

**TITLE/SUBJECT:** Stainless Steel Bolting Technique

**LESSON LEARNED:** Use of specialized bolt lubricant can substantially reduce galling and lower required torque values for stainless steel bolting applications.

**APPLICATION:** Specialized bolt lubricants can be applied anywhere galling is a problem. This includes bolting and threaded piping applications.

**PROJECT EXPERIENCE:** The Port Arthur Ethylene Expansion utilized a specialized bolt lubricant to allow sufficient tension to be applied to structural connections in cryogenic service.

**DETAILS:** Utilizing a Skidmore bolt tension calibrating tool, it was identified that the stainless steel bolts were yielding due to torsional stress before the appropriate tensile stress could be developed. The 3/4" diameter bolts, fabricated with 100ksi material and designed to be loaded to 28 kips (33 kips yield), were failing when loaded with only 26 kips (79% of yield). The project experimented with most of the standard lubricants (i.e. wax, anti-seize) without success. We contacted our steel fabricator, who in turn had us contact Fastorq. Fastorq was able to provide us with a specialized bolt lubricant which eliminated the friction problem.

**COST & BENEFITS:** Specialized lubricants, when specified, will reduce rework associated with over-torqued bolting applications.

**IMPLEMENTATION:** Specialized bolt lubricants should be specified on the design documents. This will eliminate the need to rely on the constructor to identify the need.

**CATEGORY:** Constructibility

**CONTACTS:** Fastorq, 800-231-1075, New Caney, TX  
Originator - KRKimball, E-mail KRKI

**ADDITIONAL DATA:**  
**SUBMITTED BY:** KRKimball

