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 sur-faces 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 sur-faces. 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 creat ed 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.

FASTORQ®
The Speed of Innovation.