High Performance Coating

PTFE Coated Fasteners Continue to Solve Problems

Abedin.M.Gunderwala

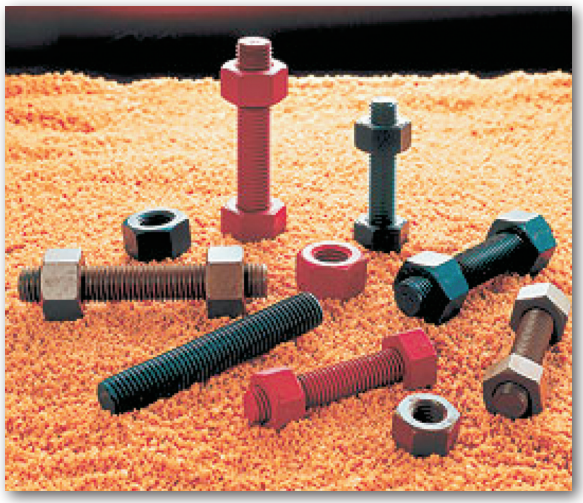
The biggest problem that the oil and gas companies faced was preventing corrosion, which other wise cost thousands of dollars for the maintenance of the metallic parts and equipments in such companies. Thus rouse a need to protect machine component parts from corrosion and make them corrosion and chemical resistance.

Corrosion is the primary means by which metals deteriorate. Most metals corrode on contact with water or moisture in the air, acids, bases, salts, oils, aggressive metal polishes and other solid and liquid chemicals. Metals also corrode when exposed to gaseous materials like acid-vapours, formaldehyde gas, ammonia gas and sulphur containing gases. Corrosion specifically refers to any process involving the deterioration or degradation of metal components. The best known case is that of the rusting of metal corrosion processes are usually electrochemical in nature.The biggest problem that the oil and gas companies faced was preventing corrosion which other wise cost thousands of dollars for the maintenance of the metallic parts and equipments in such companies. Thus rouse a need to protect machine component parts from corrosion and make them corrosion and chemical resistant.

The need for a superior high performance coating for specific application and resistance to chemicals and metals was the answer. What emerged was Fluoropolymer coating.

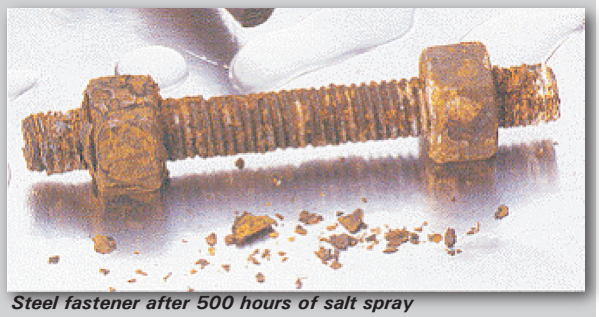
A New Beginning

Fluoropolymer coatings are blends of high performance resins and fluoropolymer lubricants. Most of the useful properties of fluoropolymer are due to fluorine, the most electro-negative element and the most reactive non-metal. Its atomic radius is the smallest next to hydrogen and it forms extremely strong bonds with other elements. When reacted with carbon in fluoropolymer, the extremely strong, tight bond produces an extraordinary combination of properties. These single coat thin films provide excellent corrosion and chemical resistance. Other benefits of fluoropolymer coatings include reduced friction, resistance to galling, non stick, non wetting, electrical resistance and abrasion resistance. Fluoropolymer coatings are applied to fasteners and various OEM components to provide a longer life before replacement. Fluoropolymer coatings are extremely durable with most other type of coatings, discussed later, that results in exposer of bare metal that quickly begins to show corrosion and causes the coating to fail. However fluoropolymer coating ensures superior corrosion resistance and continues to provide protection even under the harshest conditions. Polytetrafluorethylene (PTFE) is the most widely used fluoropolymer coating on Fasteners.

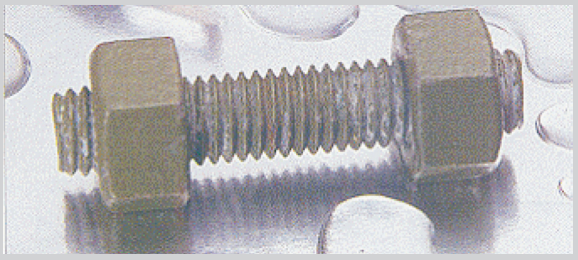


It's different!

Extensive testing and field use have proven the superiority of FluoroKote#1® coated fasteners. Previously, hot dipped galvanized, cadmium or zinc plated fasteners were considered the standard. But these coatings could not stand up to the corrosive atmospheres prevalent in many industries. After 1,000 hours of salt spray testing (ASTM B117), fasteners coated with these conventional methods showed severe corrosion and in some cases failure. Fasteners coated with PTFE coating withstood these harsh conditions with no noticeable deterioration. Even after as many as 4,000 hours, PTFE coated fasteners still could be easily disassembled.



Steel fastener after 500 hours of salt spray (ASTM B 117). Metal flakes off, fastener nears failure.



Steel fastener with pretreatment and PTFE after 500 hours of salt spray (ASTM B 117). Metal flakes off, fastener functions perfectly

What is in it for me!

PTFE Coating possesses a low coefficient of friction which reduces torque requirements. When PTFE coated fasteners are used, galling and seizing become problems of the past. Due to the absence of nut locking oxides after extensive exposure to corrosive environments, fasteners coated with our process do not need to be removed by torching, cutting or nut splitting. The easy on/easy off properties exhibited by these fasteners provide safe removal with wrenches. The costs entailed with other coatings can be staggering when factors such as man-hours, down time, safety and equipment damage are considered. Fasteners coated with PTFE proved to be longer lasting, safer and more cost effective than any other coated fastener. Lower your plant maintenance cost and increase safety by using PTFE coated fasteners.

PTFE coating has solved problems in many different industries and applications. Due to its unique benefits, PTFE coating is applied to various types and grades of fasteners. The most widely used application is on B7 studs with 2H nuts. These fasteners are commonly used by turnaround groups, operations and maintenance departments and contractors at many chemical plants, refineries, and offshore platforms. The

coating's chemical resistance and easy on/easy off characteristics are excellent for these environments. Water utilities take advantage of PTFE coatings' superior corrosion resistance by coating T-head bolts for underground service. Stainless steel fasteners used in many different industries are coated for lubricity and anti-galling. The uses for PTFE coating are limitless.

The Process and the Testing

Surface preparation of the fastener prior to coating is a very important step. Latest industry accepted methods are used to thoroughly clean all the contaminants from the fasteners. Manufacturing oils, rust and scale are removed to ensure the highest quality coating. Superior corrosion resistance is created by the application of a series of coatings. A metallic base coat is applied first, followed by an adhesion coat. The adhesion coat creates a chemical bond between the base coat and the top coat. The top coat, a heat cured fluoropolymer coating containing PTFE, is used to seal the two under coatings and give easy on/easy off characteristics.

PTFE coated fasteners are checked for cure, thickness, adhesion and overall coverage. Concentrations and temperatures of all solutions and chemicals used in the process are strictly controlled and written records are maintained. Advanced, computer controlled, automated equipment keeps the coating thickness precise and extremely uniform. Great care has to be taken during the process so that fasteners with a specified minimum hardness of Rockwell C32 or higher are not exposed to the absorption and entrapment of hydrogen which can cause hydrogen embitterment failure. Testing can be done In-House or even Third party agencies do the testing as per the requirements with certification.

Brilliant Results

Black, cadmium plate and hot dip galvanized bolts will freeze when subjected to the corrosive environment found in manufacturing plants, offshore oil rigs and other companies. Most often removing nuts requires a cutting torch. With PTFE coating these same nuts and bolts reveals easy-on and easy-off characteristics, in an endeavour for the safety of the workers involved.

Cadmium plated and hot dip galvanized bolts offers similar corrosion resistance. These coatings have undergone standard salt fog test and has been rated at 96 hours of corrosion resistance. With PTFE coated bolt that rating soars to as much as 1000 hours. The additional corrosion resistance allows fasteners to be disassembled quickly, saving lost down time and man-hours.

Galvanizing produces a coating that is uneven, rough and thick. The rough surfaces make assembling difficult and sometimes a tight tension is creating on bolts making the task impossible. If used in sealing joints such as flanges, heads or inspection covers, the inconsistent tension forms an uneven fit resulting in a high probability of leaks which results in accidents. With PTFE coated bolt the tighting is realized with less required torque.

A Happy Ending

The costs entailed with other coatings can be staggering when factors such as man-hours, down time, safety and equipment damage are considered. Fasteners coated with PTFE coating prove to be longer lasting, safer and more cost effective than any other coated fastener. PTFE coating has solved problems in many different industries and applications. Due to its unique benefits, PTFE coating is applied to various types and grades of fasteners.

Wherever corrosive environments exist, PTFE coated fasteners will continue to solve problems and offer superior performance. ■

Abedin M Gunderwala is Director for Reliable Polymer Inds.
Email:- info@rpiindia.com

McNally Bharat Engineering Appoints Pronob Mukerji as Head of Oil & Gas Strategic Business Unit (SBU)

Kolkata: In its quest to bring the finest talent on board, McNally Bharat Engineering is proud to announce the appointment of Mr. Pronob Mukerji as Head of the Oil & Gas SBU.

His last assignment was with Punj Lloyd Ltd. as Head of Engineering and off- shore projects SBU. Previous to this, he was with EIL for 36 years rising to be the Director (Projects). He joins the group at a time when the company is in a state of aggressive expansion and has embarked on a major diversification into Oil & Gas projects. As Head of the SBU Mr. Mukerji will be responsible for strategizing for the development of the SBU.

Mr.Mukherji is an alumnus of IIT, Kharagpur and the Faculty of Management Studies, Delhi. Mr. Mukerji is also a member of The Institution of Civil Engineers, U.K. and Chartered Engineer, U.K. 1980.

He brings with him 40 years of valuable experience in refineries, oil/gas installation, onshore/offshore pipelines and offshore platforms.