

WINK'S WORDS

NEWS & VIEWS ABOUT NUTS & BOLTS

Why Corrosion Resistant Fasteners?

Buying them by the millions as we do, we are painfully aware of the cost of stainless and exotic alloy fasteners. Is it worth it to make a similar investment, rather than buying relatively lower priced steel or plated-steel fasteners? When the price of fasteners in a completed assembly can range from 1% up to 15% it may be tempting to

lower the total cost slightly by using low-price fasteners. Yet, the technical, legal and financial risks can be tremendous. As a service to our readers we'd like to begin a series of short articles on corrosion basics to help in your decision making.

CORROSION

The Three Key Ingredients

Remember when your scout leader said that there were three things needed to start a fire? Oxygen, heat and fuel, right? The reaction between the oxygen and fuel (wood, for example) at high temperatures causes combustion, which consumes the wood.

Corrosion of metal fasteners also involves 3 key elements: oxygen; an electrolyte, such as water; and the metals used in the fastened joint. The reaction in this case is called a *galvanic effect*, created when two metals are held in contact, or coupled, with one another. The combination of these elements forms a type of electrical circuit between one metal (the fastener) and the other (the base metal), causing one to corrode in preference to the other.

Don't bail out yet! Understanding the concept of galvanic effect is not that hard, plus it's a great way to impress those pesky metallurgists!

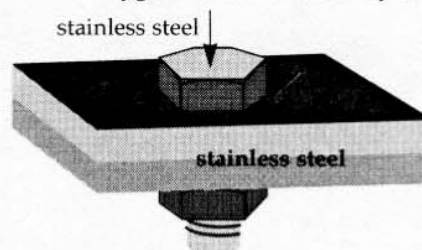
The Role Different Alloys Play

What makes one metal alloy different from another (lets say steel from stainless steel) is the way their electrons are structured. In essence all metals have electrons which are free, more or less, to move. Its the *ease* at which these electrons can move that makes one metal part, or the other, more likely to corrode when the two are fastened together.

Ever hear of a plain steel bolt mysteriously "rusting" when fastened, or coupled, to a piece of stainless sheet stock?

The Solution

To slow down corrosion we've got to look at each part of our three-part circuit. In some cases we could possibly eliminate oxygen from our assembly (through the use of



Stainless steel bolt is unaffected

inhibitors in the water, for example). We may also be able to eliminate the electrolyte, by keeping our structure totally dry. In the real world

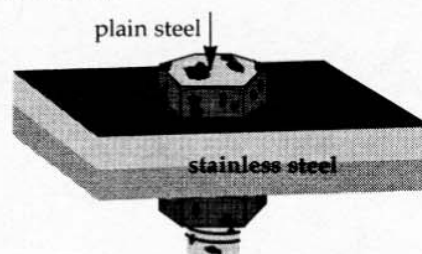
either of these may be tough to do. Ever try adding an inhibitor to rain? The best solution comes through proper fastener selection to diminish the galvanic effect.

GENERAL RULE

Always use fasteners of the same metal as the base metal, or fasteners of higher corrosion resistance than the base metal.

Some Guidelines

If you're fastening stainless pieces together always try to use a stainless steel fastener. It can be acceptable to use exotic alloy fasteners such as Hastelloy or other nickel-base alloys. **Never**, however, use plain steel or plated fasteners.



Galvanic action causes plain steel bolt to corrode when coupled with stainless stock



Vol. 6 No. 2
Published and
Distributed
FREE by:

WINK
WINK
FASTENERS, INC. 

Your One-Stop Solution for
Corrosion Resistant Fasteners.

804-966-8111
quotes@winkfast.com
www.winkfast.com