



an EnPro Industries company

BREAKING THE METALLIC PATH; Easier Said Than Done.

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THE OLD **NORM**

Norm *noun* \ 'nɔrm \ **the norm** :

something (such as a behavior or way of doing something) that is usual or expected



INTRODUCTION

THE NEW **NORM**



BEFORE

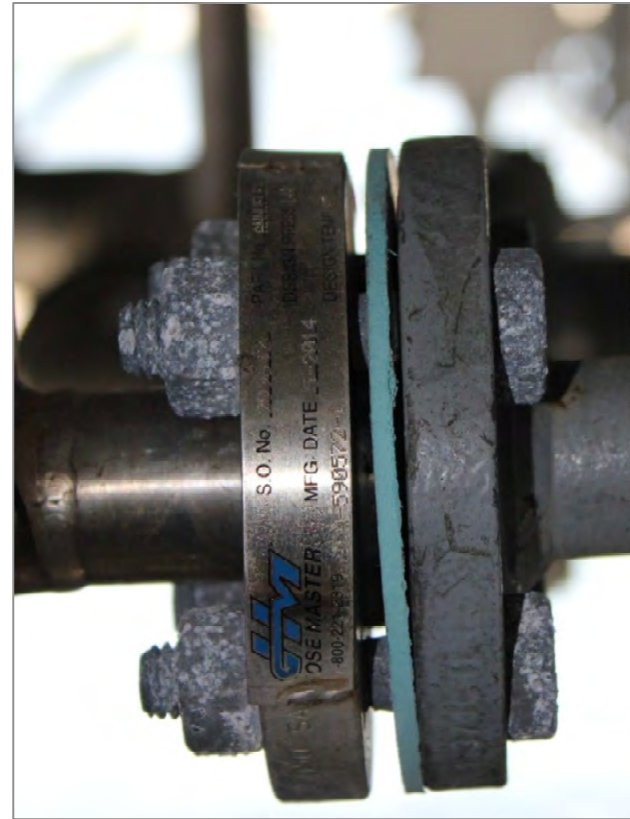


AFTER

DEALING WITH
CORROSION

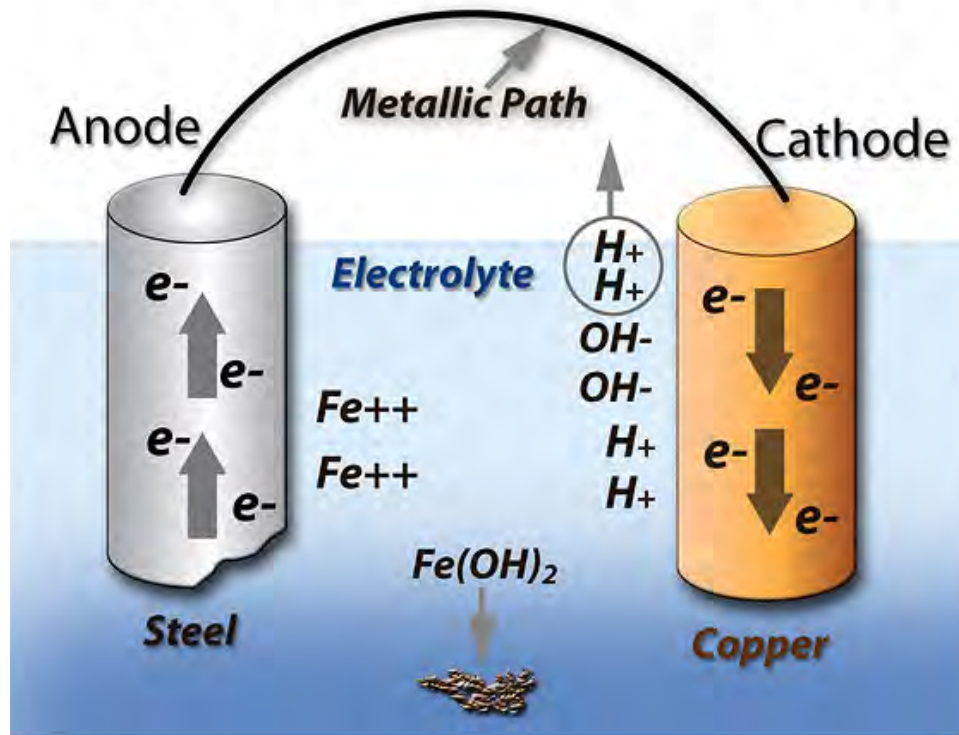
CORROSION

EASILY PREVENTABLE



HOW IT OCCURS

The Basic Corrosion Cell

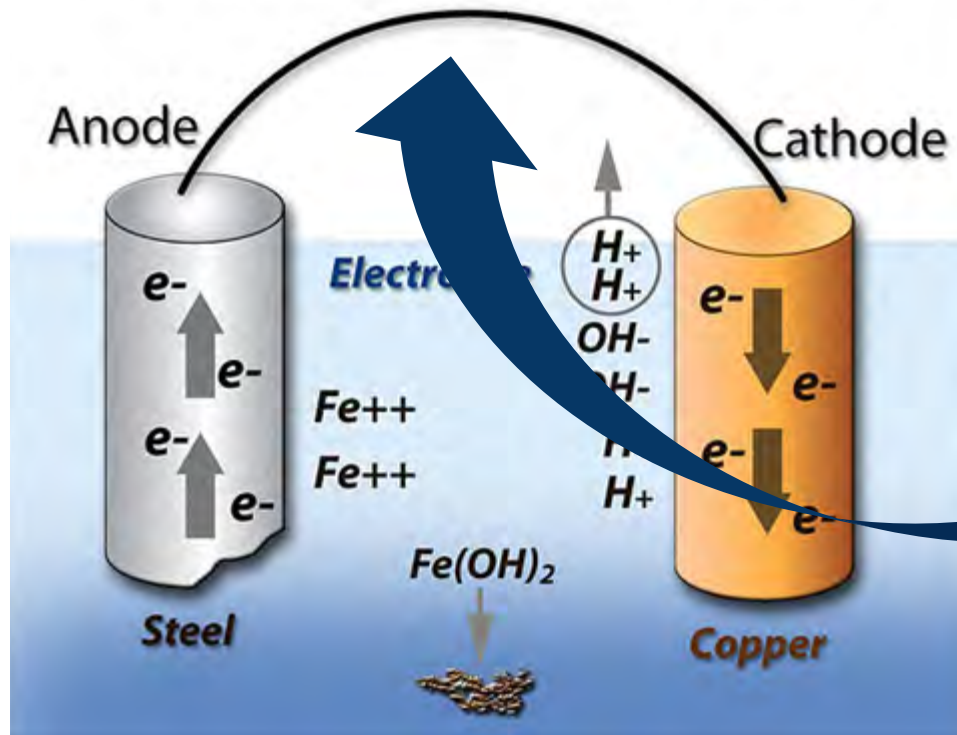


The 4 Elements Required for Corrosion to Occur:

1. Anode
2. Cathode
3. Electrolyte
4. Metallic Path

HOW TO STOP IT

The Basic Corrosion Cell

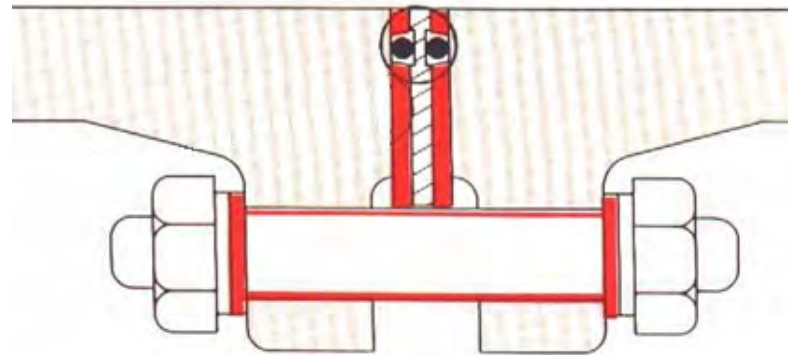
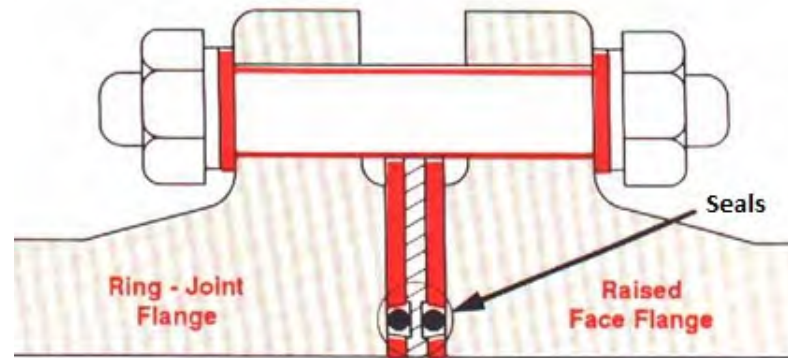


Simple... Eliminate the Metallic Path



SEALING
VULNERABILITIES

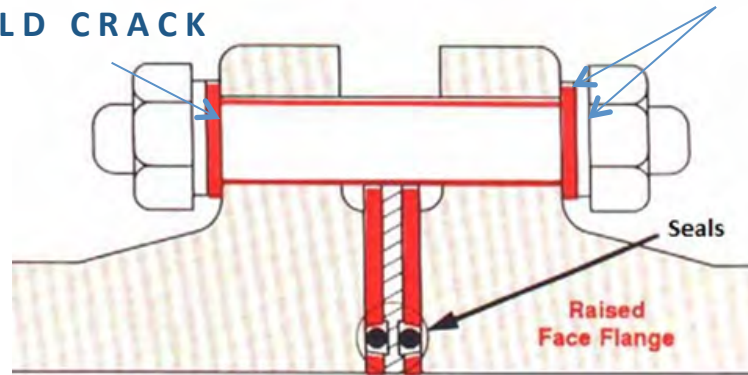
PROPERLY ISOLATED FLANGE



MODES OF FAILURE

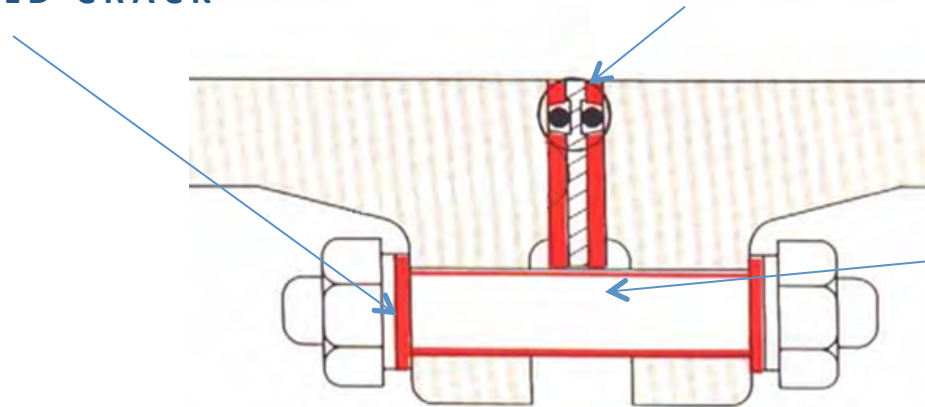
WASHER COULD CRACK

WASHERS COULD GET
REVERSED



SLEEVES COULD CRACK

GASKET COULD CRACK



GASKET COULD ABSORB
MOISTURE

CONTRIBUTORS TO **WASHER FAILURE**

- Washers were reversed during installation
- Pebble or some other foreign object lands under the GRE washer
- Washer was exposed to moisture (phenolic washer/fiber gasket)
- Washer was exposed to moisture, then cold temperature



CONTRIBUTORS TO SLEEVE FAILURE

- Sleeves were too long
- Flanges were misaligned (torsional, angular, lateral)
- Exposure to moisture



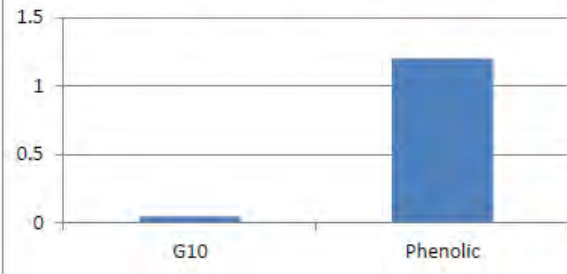
CONTRIBUTORS TO **GASKET FAILURE**

- Improper installation
- Improper torque
- Improper lubricant
- Improper material selection
- EXPOSURE TO MOISTURE

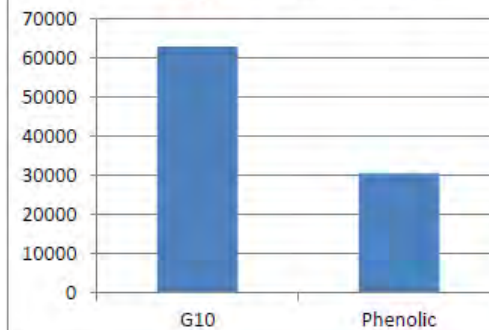


EXPOSURE TO MOISTURE

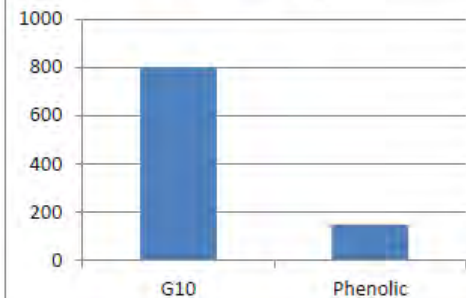
Water Absorption - Fig. 1
(% water absorbed)



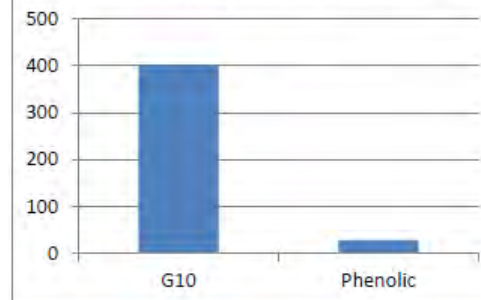
Compressive Strength
Fig. 2 PSI - (Wet)



Dielectric Strength -
Fig. 6
Volts/Mil - Dry



Dielectric Strength -
Fig. 7
Volts/Mil - Wet

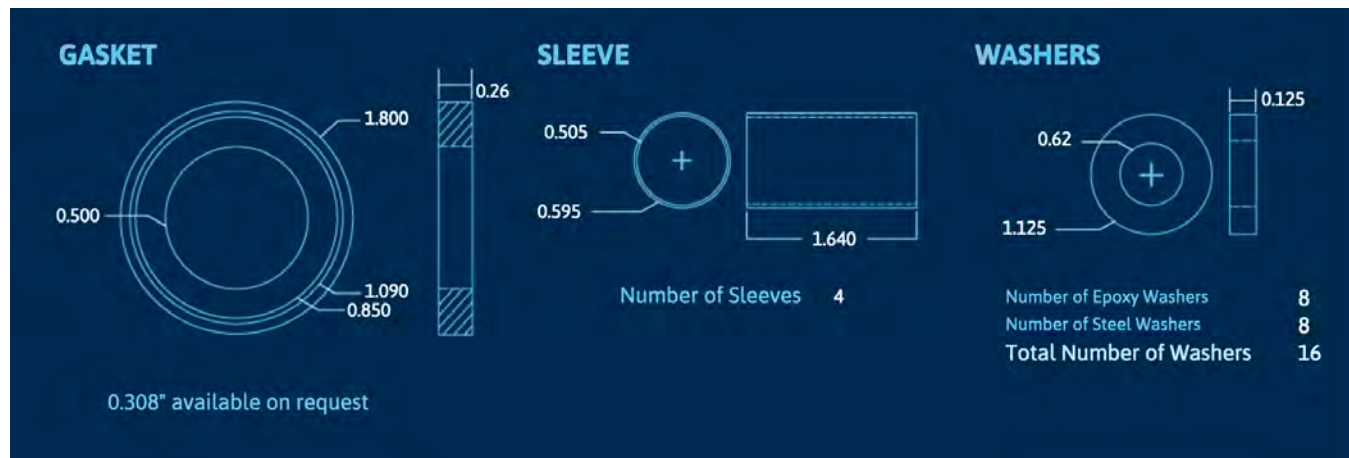




PREFERRED
SOLUTIONS

ISOLATION KITS

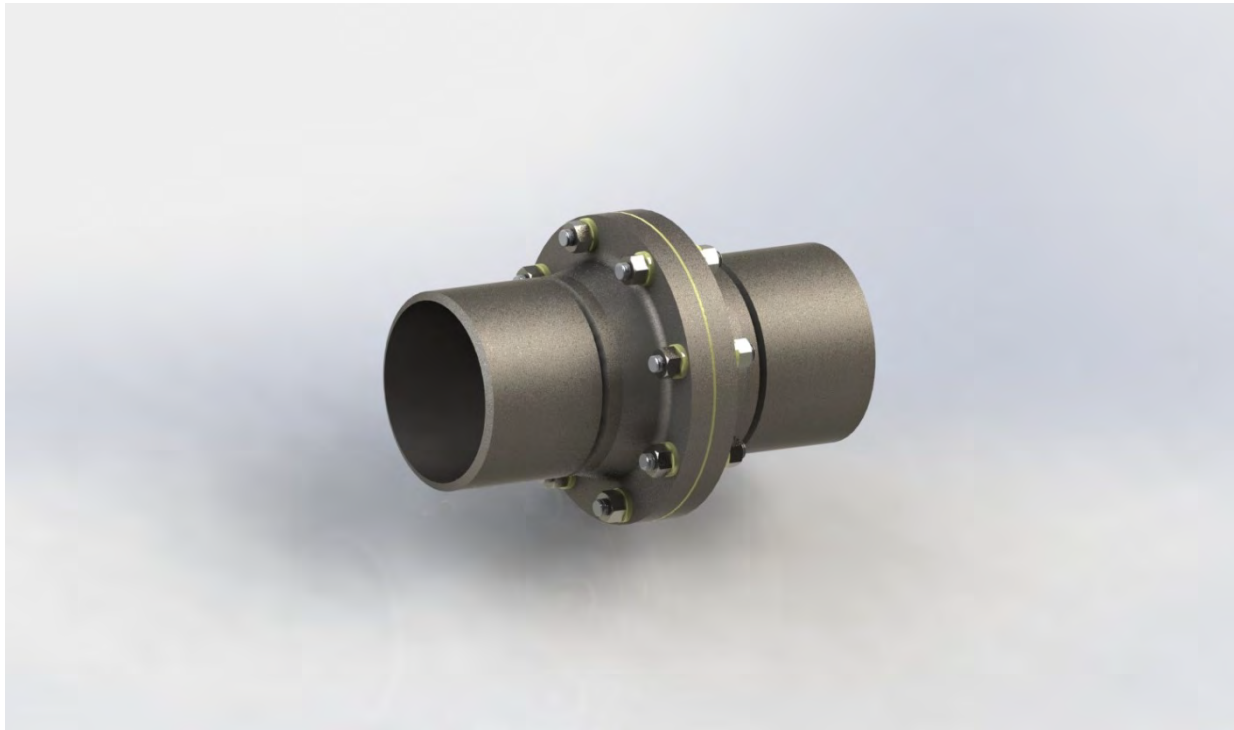
- Use G10 sleeves, washers and gaskets
- Use manufacturer recommended torques
- Use manufacturer recommended installation procedures
- ASME PCC-1: Guidelines for Pressure Boundary Bolted Flange Joint Assembly (Found in ASME Standards)
- For high chloride applications, use HCS Washers



PREFERRED SOLUTIONS

PREFABRICATED **FLANGE JOINTS**

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PREFERRED SOLUTIONS

THE SIMPLE SOLUTION

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THANK YOU!