TECHNICAL NEWS BULLETIN

CHALLENGES WITH GALVANIC CORROSION IN A PIPELINE

HART
Sure Seal O-Ring Unions

WHAT IS GALVANIC CORROSION?

Galvanic corrosion, also known as bimetallic corrosion, is a common mode of corrosion failure that is, for the most part, entirely preventable by proper pipeline corrosion design. Galvanic corrosion occurs when two dissimilar metals are in contact with each other while in the presence of an electrolyte, such as saltwater or soil. One metal becomes the anode and corrodes faster than normal, while the other becomes the cathode, which corrodes slower than normal. This is important as the greater the difference between the two metals, the greater rate of galvanic corrosion.

COST & IMPLICATIONS

The presence of galvanic corrosion within an industrial pipeline system should not be underestimated, taken seriously and not ignored. Galvanic corrosion will eventually lead to potential dangerous results characterized by the type of failure within the pipeline. Galvanic induced failure will result in leaks, pipeline blockage, pipe joint deterioration, and ultimately high costs to retrofit the situation.The consequences range from EH&S or OSHA fines, unsafe workplace, lost production hours, plant shutdown, and the high labor costs to properly repair.

Typical failure noted below in Figure 1

Figure 1

CHOOSING THE CORRECT PREVENTIVE SOLUTION

Contending with galvanic corrosion is arguably one of the industry's most pressing problems and taking a proactive design approach is always better than the costly alternative. Many of the traditional "over the counter" dielectric unions utilized today have been known to fail at some point during service. Many of these failures are caused by the users misunderstanding of the dielectric union's long-term performance limitations specific to their application.

In order to make the correct dielectric union choice, it is critical to fully understand the environmental conditions the dielectric union will be subjected to. This is especially important when the piping system will be subjected to fluctuations of high pressure (>150 psi) and high temperatures (>180F). Most of the "over the counter", imported, or lower cost dielectric unions contain a plastic barrier ring (sleeve) and rubber washer to provide the isolation protection between the two dissimilar substrates. Under normal ambient working conditions, this type of union will work. However, the galvanic protection and long term reliability are greatly affected by high temperatures, media flowing through the system, thermal joint fluctuations, and high internal system pressure. All of these factors will have a direct impact on joint failure due to galvanic corrosion.

Proper dielectric connection isolation is shown below in Figure 2

Figure 2

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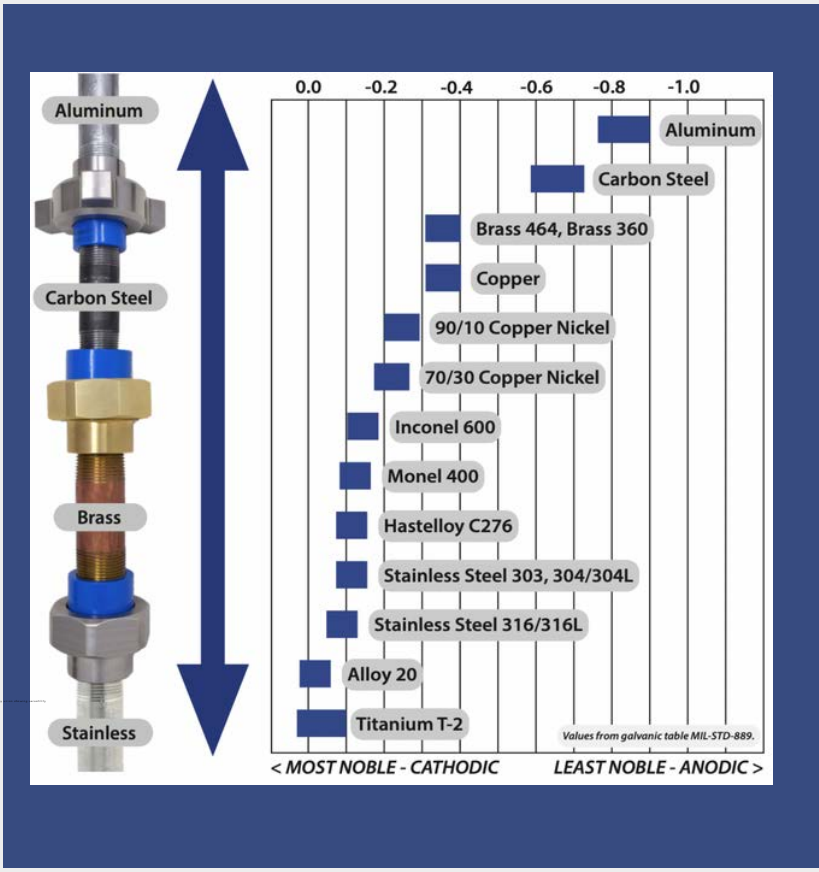
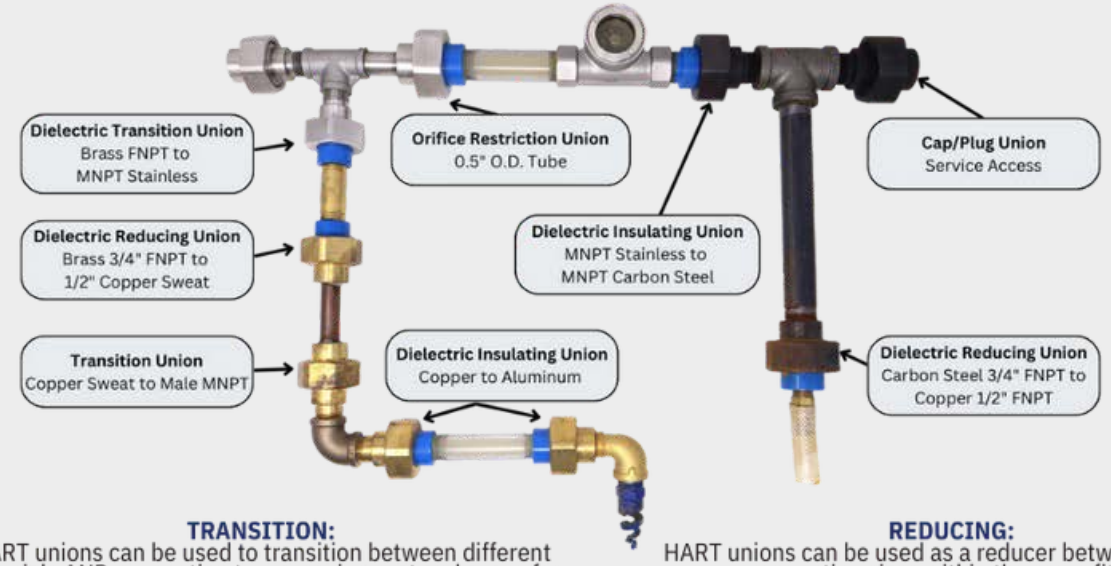
PATH OF LEAST RESISTANCE

HART has engineered a solution to address these common failures in the industry. HART manufactures a high-quality dielectric union that is designed to prevent galvanic corrosion when transitioning between two dissimilar metals and handles system pressures to 3000psi (standard) and temperatures to 400F while providing excellent chemical resistance to both polar and non-polar fluids and gases.

Our insulated unions work by introducing a proprietary dielectric insulation which acts as a "protective barrier" between the two dissimilar metals. This proven technology offers electrical insulation of over 600V per mil of thickness, which prevents the flow of current between them and thereby stops the corrosion from occurring. HART Dielectric Unions are the lowest total cost solution to ensure long-term performance reliability and custom engineered to meet the requirements of the customer application. HART has decades of engineering expertise to offer the perfect solution for your application.



Endless Dielectric Connection Capabilities Within HART Unions!



TRANSITION:
HART unions can be used to transition between different materials AND connection types, saving cost and space for multiple fittings!

REDUCING:
HART unions can be used as a reducer between different connection sizes within the same fitting!

HART Unions are available in nearly any combination of connection types, sizes, reductions, transistions, material combinations, and o-ring seals for any application. Our expert engineers are ready to help specify the perfect union to meet your application needs.