# Technical Guidance

# Galvanic Corrosion

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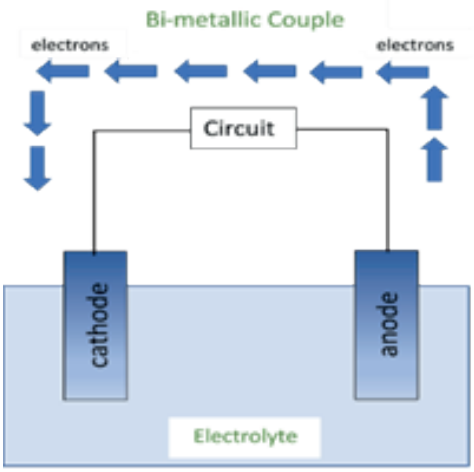
**Galvanic corrosion** (also called **bimetallic corrosion** or **dissimilar metal corrosion**) refers to corrosion damage induced when two dissimilar metals are coupled together in the presence of an electrolyte (electrically conductive liquid e.g. water).

This is an electrochemical process (similar to a battery) and occurs as a result of the flow of very small electric currents being able to flow between the two dissimilar metals via an electrolyte, the two metals must have differing potentials, this process causes the more anodic of the two metals to corrode faster whilst the more noble or cathodic metal remaining mainly unaffected.

To complete the cell, a conductive liquid must bridge the contact metals.

The more electrically conductive the liquid is, the greater the danger of corrosion. Seawater or salt laden moist air is more of a risk than contact with rain water or towns water.

**If the metals are dry, bimetallic (galvanic) corrosion cannot occur.**




Metals near each other in the galvanic series have little effect on each other. Generally, as the separation between metals in the series increases, the corroding effect on the metal higher in the series increases as well.

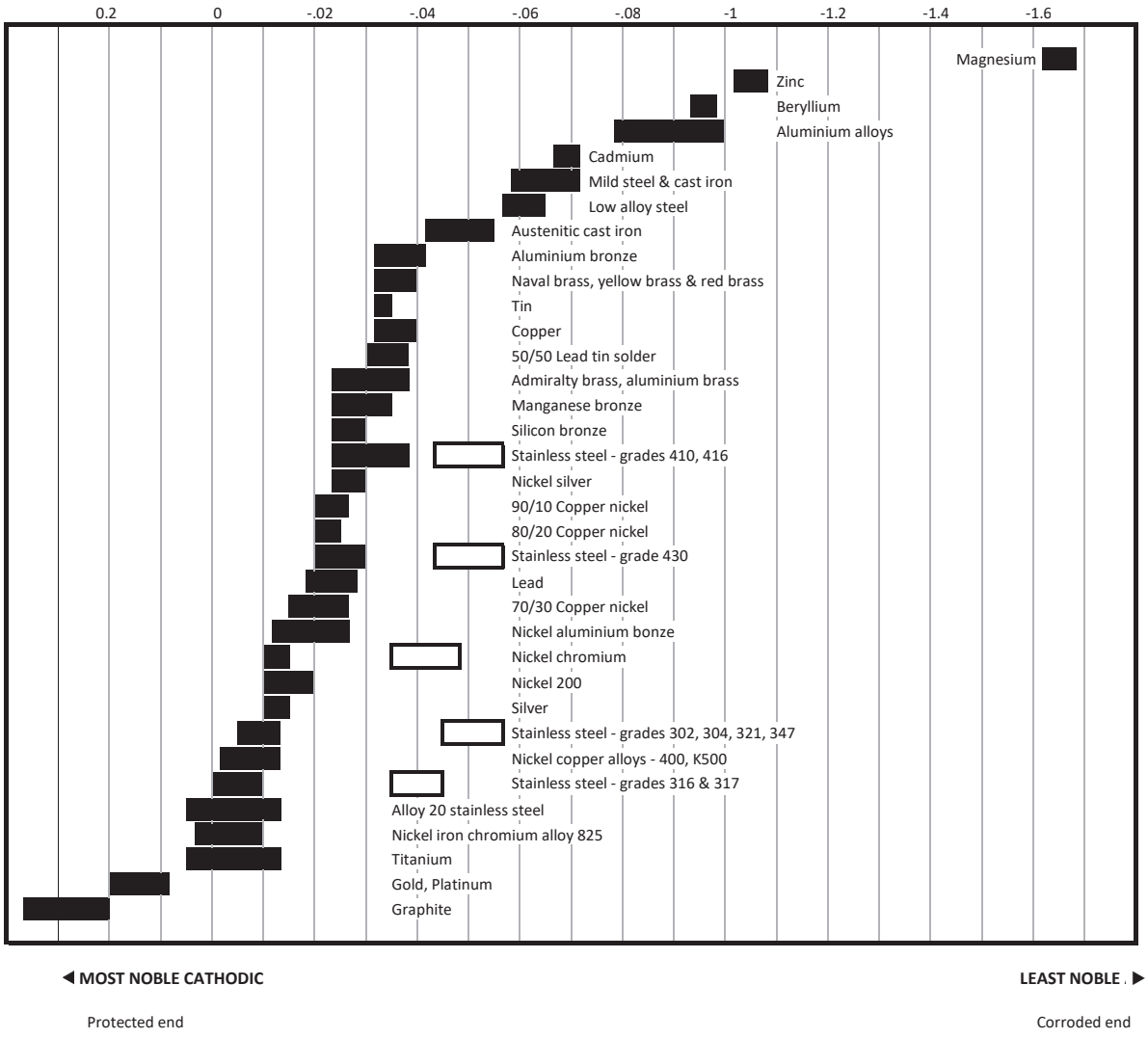
Relative surface areas of contacting dissimilar metals is also relevant in determining which metal exhibits accelerated corrosion. It is undesirable to have a large cathode surface in contact with a relatively small anode surface.

The metal higher in the galvanic series of metals (see below), the anode, provides protection for the metal lower in the series, the cathode. As can be seen from the galvanic series, zinc protects the lower-order steel.

With respect to contacting surface areas of the two metals, although the corrosion current that flows between the cathode and anode is independent of area, the rate of penetration at the anode does depends on current density. Thus, a large anode area in contact with a relatively small cathode area is generally not problematic. Regardless, environmental conditions remain large determinants of corrosion rates.

The further apart the metals are, in terms of relative potentials, the greater the driving force in a cell. So, for example, stainless steel in contact with copper is less likely to be a risk than when it is in contact with aluminium or galvanised (zinc coated) steel.

## Galvanic Series




Galvanic corrosion potential is a measure of how dissimilar metals will corrode when placed against each other in an assembly. Metals close to one another on the chart generally do not have a strong effect on one another, but the farther apart any two metals are separated, the stronger the corroding effect on the one higher in the list. This list represents the potential available to promote a corrosive reaction, however the actual corrosion in each application is difficult to predict. Typically, the presence of an electrolyte (e.g. water) is necessary to promote galvanic corrosion. (Please see chart above)

**Summary**
Requirements for Galvanic Corrosion:

In order for galvanic corrosion to occur, three elements are required.

1. Two metals with different corrosion potentials

2. Direct metal-to-metal electrical contact

3. A conductive electrolyte solution (e.g. water) must connect the two metals on a regular basis. The electrolyte solution creates a “conductive path”. This could occur when there is regular immersion, condensation, rain, fog exposure or other sources of moisture that dampen and connect the two metals.

If any of these elements is missing, galvanic corrosion cannot occur.

# About Albion Valves (UK) Ltd

Albion has been supplying valves and fittings to the building services and industrial markets for the past 40 years.

Albion was created with the sole purpose of providing quality products at an affordable price. With a growing reputation for quality and reliability, Albion is now an established brand providing the industry with a trusted alternative to premium-priced products.

Our commitment to setting the highest standards in all areas of our business means, if you're looking for quality, service, delivery and choice — you'll find it's all at Albion.

## Quality

Whatever you need, you can rest assured that if it comes from Albion it has been designed and manufactured to deliver optimum performance and is accredited with the necessary approvals. Our in-house quality department are always on hand too!

## Service

We pride ourselves on our customer service – we have even won awards for it! Our cradle to grave approach means you will never be on your own!

## Delivery

We know that time is money, and when a priority project depends on a part you can trust Albion to deliver – next day for all orders placed before 4:00PM.

## Choice

We may have started out with a single brass ball valve, but our range has grown substantially since and we now consider ourselves to be a 'One Stop Shop' with our comprehensive range. It is becoming more and more apparent to the industry, that it really is all at Albion.