

Galvanic Compatibility



All dissimilar materials have the potential to react with each other when they are brought together in the presence of a catalyst. In most circumstances this reaction is so mild as to be of no importance, however when the wrong materials are used in combination and then exposed to an electrolyte such as water or high humidity the effects can become much more problematic. For applications where humidity is low then you can generally ignore galvanic corrosion. If on the other hand you are working on a project for use in damp conditions or outside then it is best to pay some regard to the possible effects of galvanic corrosion.

As a rule it is best to use metals which are as close together as possible in the Anodic Index Table below. Doing this will help to eliminate any possibility of galvanic corrosion.

- Harsh environments, such as outdoors, high humidity, pool plantroom, indoor pool halls and salt environments fall into this category. Typically there should be not more than 0.15 V difference in the "Anodic Index". For example; silver - nickel would have a difference of 0.15V being acceptable.
- For normal environments, such as storage in warehouses or non-temperature and humidity controlled environments. Typically there should not be more than 0.25 V difference in the "Anodic Index".
- For controlled environments, such that are temperature and humidity controlled, 0.50 V can be tolerated. Caution should be maintained when deciding for this application as humidity and temperature do vary from regions to region.

Metallurgical Category

Index (V)

Gold, solid and plated, Gold-platinum alloy	0.00
Rhodium plated on silver-plated copper	0.05
Silver, solid or plated; Monel metal. High nickel-copper alloys	0.15
Nickel, solid or plated, titanium and alloys, Monel	0.30
Copper, solid or plated; low brasses or bronzes; silver solder; German silvery high copper-nickel alloys; nickel-chromium alloys	0.35
Brass and bronzes	0.40
High brasses and bronzes	0.45
18% chromium type corrosion-resistant steels (304 & 316 Grade Stainless Steel)	0.50
Chromium plated; tin plated; 12% chromium type corrosion-resistant steels (405 Grade Stainless Steel)	0.60
Tin-plate; tin-lead solder	0.65
Lead, solid or plated; high lead alloys	0.70
Aluminum, wrought alloys of the 2000 Series	0.75
Iron, wrought, grey or malleable, plain carbon and low alloy steels	0.85
Aluminum, wrought alloys other than 2000 Series aluminum, cast alloys of silicon type	0.90
Aluminum, cast alloys other than silicon type, cadmium, plated and chromate	0.95
Hot-dip-zinc plate; galvanised steel	1.20
Zinc, wrought; zinc-base die-casting alloys; zinc plated	1.25
Magnesium & magnesium-base alloys, cast or wrought	1.75
Beryllium	1.85