CORROSION

GALVANIC PROTECTION

TECHNICAL BULLETIN CTB-2

Rev 3, November 2003
This issue supersedes all previous issues

Galvanic or sacrificial protection of a steel substrate by an active metal coating relies on the existence of a galvanic cell and the resulting flow of galvanic current.

Different metals, when placed in the same electrolyte *(water, condensation etc)* adopt different electrode potential's. A galvanic cell is then formed and galvanic protection results when two dissimilar metals *(ie with different potentials, see Table 1)* are in electrical contact. In the presence of an electrolyte, electrons will flow between the two metals and this is known as a galvanic current. This leads to increased corrosion of the more active metal and decreased corrosion of the more noble metal when compared to the metals corrosion behaviour when the two metals are not in electrical contact. The galvanic current *(Figure 1b)* produced by the corrosion reaction is a direct measure of the increase in dissolution of the more active metal and a reflection of the rate of corrosion.

Figure 1

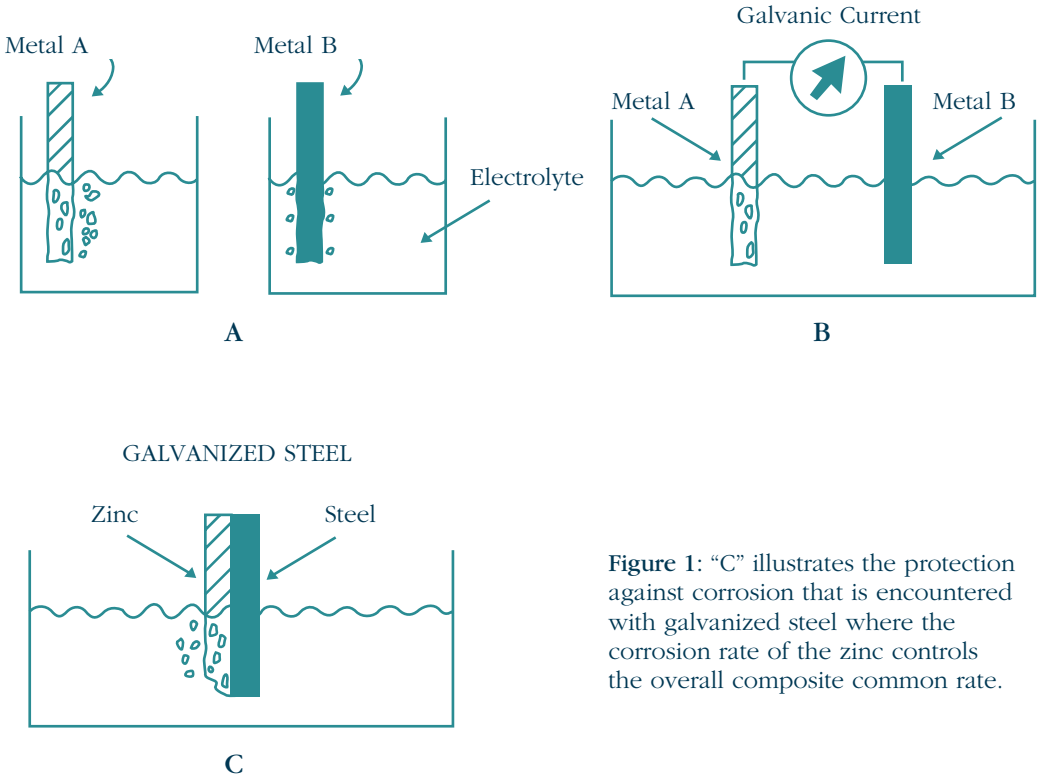

Figure 1: "C" illustrates the protection against corrosion that is encountered with galvanized steel where the corrosion rate of the zinc controls the overall composite common rate.

BLUESCOPE STEEL

	NOBLE (CATHODIC)
	Gold
	Platinum
	Titanium
	Graphite
	Silver
PASSIVE	Stainless Type 316
	Stainless Type 310
	Stainless Type 304
	Stainless Type 302
	Stainless Type 430
	Stainless Type 410
PASSIVE	80% Ni 15% Cr
	Inconel
	60% Ni 15% Cr
	Nickel
	Monel
	Copper-Nickel
	Bronzes
	Copper
	Brasses
ACTIVE	80% Ni 20% Cr
	Inconel
	60% Ni 15% Cr
	Nickel
	Tin
	Lead
ACTIVE	Stainless Type 316
	Stainless Type 310
	Stainless Type 304
	Stainless Type 302
	Stainless Type 430
	Stainless Type 410
	Cast Iron
	Carbon Steel
	Cadmium
	Aluminium
	Zinc
	Magnesium Alloys
	Magnesium
	ACTIVE (ANODIC)

Table 1: Galvanic Series of Metals and Alloys in Sea Water

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