

## 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 potentials. 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

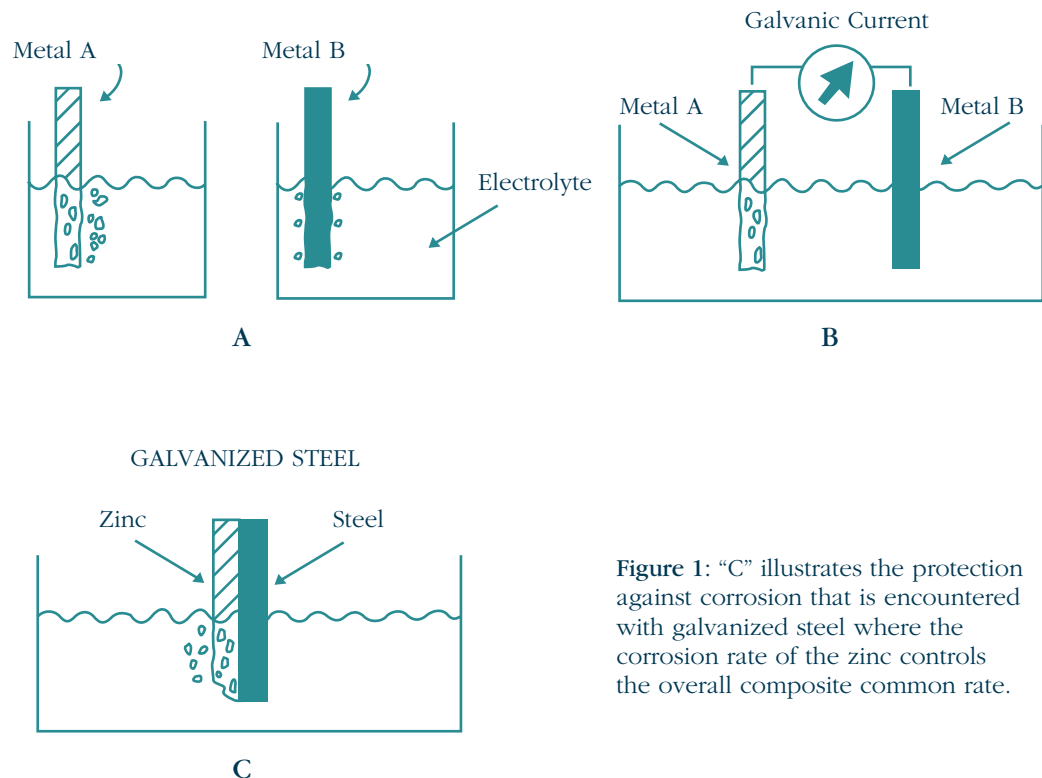


Figure 1: "C" illustrates the protection against corrosion that is encountered with galvanized steel where the corrosion rate of the zinc controls the overall composite common rate.

	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

The information and advice contained in this Bulletin is of a general nature only, and has not been prepared with your specific needs in mind. You should always obtain specialist advice to ensure that the materials, approach and techniques referred to in this Bulletin meet your specific requirements.

BlueScope Steel Limited makes no warranty as to the accuracy, completeness or reliability of any estimates, opinions or other information contained in this Bulletin, and to the maximum extent permitted by law, BlueScope Steel Limited disclaims all liability and responsibility for any loss or damage, direct or indirect, which may be suffered by any person acting in reliance on anything contained in or omitted from this document.

BlueScope is a trade mark of BlueScope Steel Limited.

*Please ensure you have the current Technical Bulletin as displayed at [www.bluescopesteel.com.au](http://www.bluescopesteel.com.au)*

## BlueScope Steel

Copyright © 2003 BlueScope Steel Limited

BlueScope Steel Limited ABN 16 000 011 058  
BlueScope Steel (AIS) Pty Ltd ABN 19 000 019 625



AUSTRALIA	SYDNEY	Telephone: (02) 9795 6700
	MELBOURNE	Telephone: (03) 9586 2222
	BRISBANE	Telephone: (07) 3845 9300
	ADELAIDE	Telephone: (08) 8243 7333
	PERTH	Telephone: (08) 9330 0666

OVERSEAS	BlueScope Steel (Malaysia) Sdn Bhd	Telephone: (603) 3250 8333
	BlueScope Steel (Thailand) Limited	Telephone: (66 38) 685 710
	PT BlueScope Steel Indonesia	Telephone: (62 21) 570 7564
	BlueScope Steel Southern Africa (Pty) Limited	Telephone: (27 21) 555 4265

