C - 08 **CORROSION RATE EVALUATION BY THE FARADAIC RECTIFICATION METHOD**

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Electrochemical evaluation of corrosion rates is commonly accomplished through the use of the Stern-Geary equation :

$$I_{corr.} = \frac{ba.\,bc}{2.303\,(ba+be)} \cdot \frac{1}{R_p}$$

Where $I_{corr.}$ is the corrosion current, ba and bc are the anodic and cathodic Tafel slopes respectively

and R_p is the polarization resistance. This requires the use of Tafel slopes ba and bc at large polarizations. Hence these ba and bc values may not be valid at the corrosion potential, thus introducing an error into the corrosion rate measurements.

This paper describes the evaluation of corrosion rates by the faradaic rectification method which does not require any Tafel slope measurements. By making use of the Butler–Volmer type kinetics for the corrosion reaction and using equations previously reported for the rectification ratio, it has been shown that the corrosion current can be expressed by the equation,

$$I_{corr.} = \frac{RT}{-F}\left[\frac{(\Delta E/V^2)_{w \to 0_0} - (\Delta E/V^2)_{w \to 0}}{(\Delta E/V^2)_{w \to 0_0}}\right]$$

Where $(\Delta E/V^2)_{w \to 0_0}$ and $(\Delta E/V^2)_{w \to 0}$ are the rectification ratios at high and low frequencies respectively. R, T and F have their usual electrochemical meanings.

This method however, requires a signal generator capable of delivering AC signals of frequencies <10H z/z and $>$ 10MH z/z and a senstive micro-voltmeter to measure the rectification voltage ΔE.

The method described is senstitive and does not require any Tafel slope measurement and excessive polarization of the electrodes.