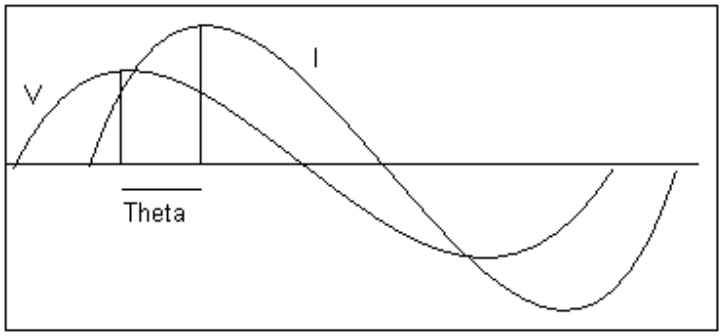
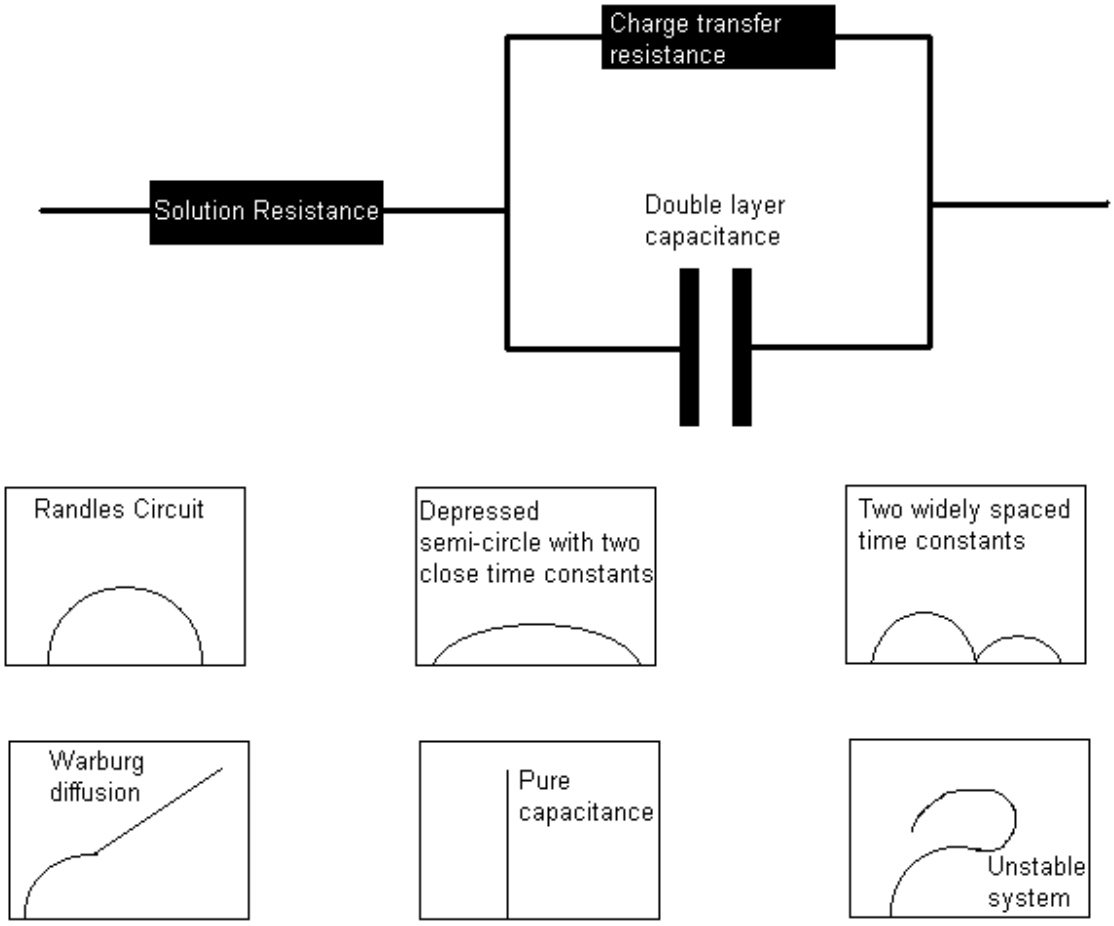
ACM Instruments

AC Impedance

The Gill AC; Gill 8; Gill 12 and the Field Machine are all used for this test. A typical experiment sweeps from 10 kHz to 0.01 Hz with a 10 mV perturbation around the rest potential. The usual result is an nyquist impedance plot of half a semi-circle: the high frequency part giving the solution resistance and the width of the semi-circle giving the corrosion rate in the same manner as LPR. The analysis of this data is performed by circle fitting in the analysis software. One useful benefit of AC is the ability to measure the solution resistance at high frequency. This allows any instrument that incorporates AC to perform automatic IR compensation during DC tests.



At each frequency a sine wave is generated and fed into the potentiostat. This wave is then imposed on the cell and its potential and current flow measured. The measured values of current and voltage are compared for amplitude and phase and an impedance calculated. This is repeated for the rest of the frequencies and a plot generated. The standard starting point with AC impedance is the basic Randles circuit below.



An alternate name for AC impedance is Electrochemical Impedance Spectroscopy (EIS).