

# Oxidation Reduction Potential for Ferric Chloride Endpoint Control

For over 40 years Powell Oxidation Reduction Potential Electrodes (ORP or Redox) have been used to monitor the endpoint of the reaction of ferrous chloride ( $\text{FeCl}_2$ ) and chlorine ( $\text{Cl}_2$ ) to produce ferric chloride ( $\text{FeCl}_3$ ).

The Powell ORP electrodes are in-line instruments that are typically mounted with redundant sets in bypass lines to allow maintenance to be performed without shutting the process down.

The MVDC signal from the electrodes are connected to any industrial quality ORP to 4/20 mA current transmitter such as Rosemount, Yokogawa, and many others. The signal can be used to operate alarms, automatic valves, etc. at the endpoint of the reaction.

Some basic information on the MVDC signal during the reaction is as follows:

Temperature (F)	Corrected Specific Gr.	Ferric (%)	Ferrous (%)	HCl (%)	ORP MVDC
120	1.4904	11.92	34.00	0	525
120	1.4596	12.47	31.59	0.15	485
134	1.4038	13.44	27.47	0.3	500
138	1.4328	12.67	26.50	0	521
156	1.5058	45.60	0.25	0	731
128	1.485	44.00	0.17	0.32	719
132	1.4585	40.62	0.17	0	726
134	1.4313	40.00	0.15	0.19	741

As seen by the chart above, keeping the free acid as low as possible in the ferrous/ferric chloride reaction will result in more repetitive end point control.

Please contact Powell for further information. Powell can assist in all phases including chlorine unloading, chlorine scrubbers, Tefzel magnetic drive pumps, Titanium pumps, heat exchangers, valves and piping products.

