

DISSIMILAR METAL CONSIDERATION

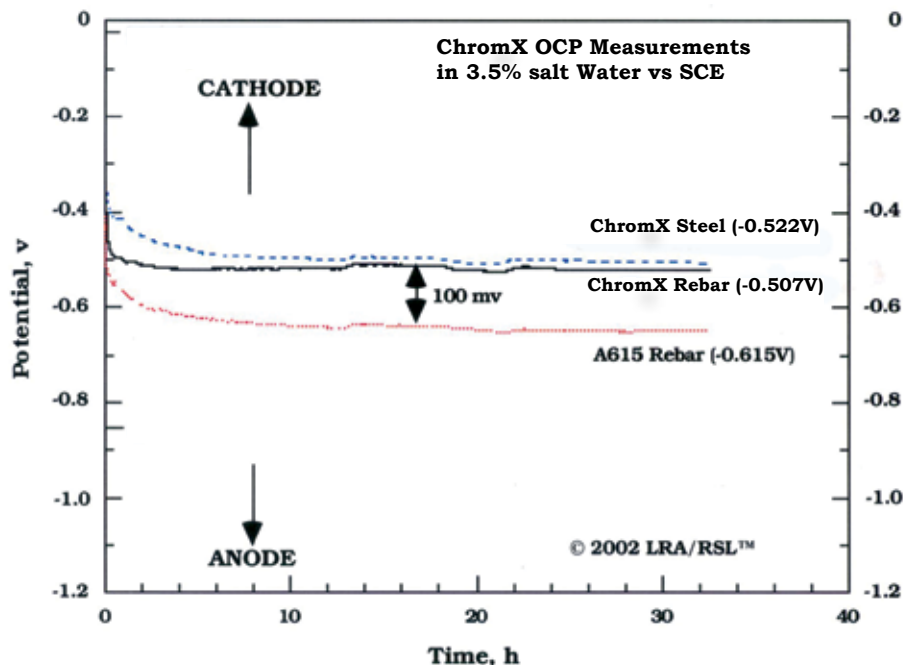
ChromX ASTM A1035 with ASTM A615 Carbon Steel Material

Significant galvanic differences between products can promote corrosive electrochemical reactions to the more active metal (anode) and produce a hydrogen rich environment in the relatively less active material (cathode) when the two materials are directly connected. These galvanic differences need to be considered in certain construction applications, and the two dissimilar materials may need to be isolated when appropriate.

The effects of mixing carbon steel bars (ASTM A615) with ChromX steel bars (ASTM A1035) have been studied and reported. Based upon chloride ponded reinforced concrete slab specimens with ChromX steel top bars and carbon steel bottom bars, William H. Hartt, Ph.D., P.E. reported that, "The analysis of data from chloride exposure of concrete specimens reinforced with 1) black bars only and 2) both black and [ChromX] bars indicated that macro-cell corrosion was essentially the same in the two cases. On this basis, there is no technical reason why black bar and [ChromX] reinforcements cannot be combined in concrete construction, including situations involving, first, field repairs and, second, new construction." ¹

A study conducted by LRA Labs/Engineering Consultants showed the measured values of the Open Circuit Corrosion Potential (OCP) of ChromX ASTM A1035 and ASTM A615 as processed steel rebar in 3.5% salt water versus a standard reference, a Saturated Calomel Electrode (SCE). The difference in the corrosion potential was only about 0.1 volts (100mv), which is less than the permissible 0.25 volts (250mv) maximum difference as measured in 3.5% Sodium Chloride Solution. ²

Galvanic Compatibility of ChromX ASTM A1035 with ASTM A615 Steel Rebar



These studies indicate no detrimental effects of connecting ChromX and carbon steel reinforcement together.

¹ "Risk of Macro-Cell Corrosion Associated with Black Bar – MMFX₂ (ASTM 1035) Combinations in Concrete", William H. Hartt, Ph.D., P.E., Hartt and Associates, Inc. (May, 2009).

² "Galvanic Compatibility of MMFX₂ with A615 Steel Bars," LRA Labs/Engineering Consultants Reports; Open Circuit Corrosion Potential Data (2002).