

Effect of inhibitor treatment on corrosion of steel in a salt solution

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Abstract: This study examined experimentally different chemicals for inhibition of steel corrosion in a simulated aqueous solution for the industrial marine atmosphere of the Arabian Gulf region. The literature reported various inhibitors that can help in protection against metal corrosion in aqueous environments. Among them, 10 inhibitors (calcium silicate, cyclohexylamine, n-methylcyclohexylamine, dicyclohexylamine nitrite, sodium benzoate, sodium nitrate, sodium nitrite, sodium phosphate, sodium dihydrogen orthophosphate, and magnesium nitrate hexahydrate) were obtained and corrosion resistance of inhibitor applied steel specimens were examined in the simulated solution (2 wt.% NaCl and 1 wt.% Na₂SO₄). Test specimens were prepared from locally produced reinforcing steel products. Treatment of steel with either dicyclohexylamine nitrite or sodium dihydrogen orthophosphate both at 10 mM concentration for 1 day at room temperature resulted in significant inhibition of corrosion. No significant improvement in corrosion inhibition was observed either with an increase in inhibitor concentration at room temperature or with an increase in inhibitor application temperature at 10 mM concentration. A further study is planned to examine the inhibition performances of the two inhibitors under actual atmospheric conditions in the Arabian Gulf region (industrial marine environment).