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Effect of Inhibitors on Weld Corrosion under Sweet Conditions Using Flow Channel

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Abstract : The aim of this paper is to compare the effectiveness and electrochemical behaviour of typical oilfield corrosion inhibitor with previous oilfield corrosion inhibitor under same electrochemical techniques to control preferential weld corrosion of X65 pipeline steel in artificial seawater saturated with carbon dioxide at a pressure of one bar. A secondary aim is to investigate the conditions under which current reversal takes place. A flow channel apparatus was used in the laboratory to simulate the actual condition that occurs in marine pipelines. Different samples from the parent metal, the weld metal and the heat affected zone in the pipeline steel were galvanically coupled. The galvanic currents flowing between the weld regions were recorded using zero-resistance ammeters and tested under static and flowing conditions in both inhibited and uninhibited media. The results show that a current reversal took place when 30 ppm of both green oilfield inhibitors were present, resulting in accelerated weld corrosion.

Keywords : weld corrosion, carbon steel, inhibitor, carbon dioxide, current reversal
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