CORROSION BEHAVIOR OF DUPLEX STAINLESS STEEL (22Cr) WELDS FOR MECHANICALLY CLAD OFFSHORE PIPELINES

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Abstract

The use of duplex stainless steels (22Cr) weld material as an alternative to nickel alloy 686 for girth welds for mechanically clad or lined clad pipe for subsea gas flowlines is becoming more wide-spread in the oil and gas industry, particularly where corrosion resistance / stress corrosion cracking resistance is required for gas containing CO2 at temperatures higher than 130 °C. It is well recognized that the susceptibility of 22Cr welded clad or lined pipe to various forms of corrosion, particularly stress corrosion cracking (SCC), pitting and crevice corrosion is largely influenced by the welding process conditions, weld composition and microstructure.

The focus of this paper was to systematically study the corrosion properties of 22Cr and alloy 622 girth welded 316L clad pipe, both with and without 22Cr weld overlays, used for the transportation of gas. Pitting and crevice corrosion tests were carried out in accordance with ASTM G78 and four point bend testing for stress corrosion cracking susceptibility in accordance with a modified ASTM G79 test procedure was conducted. The findings from this study are presented in this paper.

Keywords: CRA, Mechanical Clad, Lined Clad, stress corrosion cracking, Pitting and crevice corrosion

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