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The effect of water fraction in condensate on corrosion behavior of oil country tubular goods (OCTG) material

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Abstract: In order to investigate corrosion behavior of representative Oil Country Tubular Goods (OCTG) materials in environments of gas condensate/water/CO₂ or CO₂+H₂S, laboratory and field corrosion tests were carried out. The laboratory tests were carried out in CO₂ or CO₂+H₂S environments by using an autoclave. Test specimens were set in liquid and gas phases of the autoclave and the water fraction ratio of condensate and water mixture was changed to study the effects of water fraction on corrosion behavior of OCTG materials in oil and gas well environment. In the field tests, Down hole coupon (DHC) tests were carried out in a sour gas well in the United Arab Emirates. The DHC tests were performed at three different well depths with different water fraction. The laboratory liquid phase test results indicated that corrosion occurs by water wetting on material after emulsion break. The laboratory gas phase test results show that the vapor of condensate acts as corrosion barrier. The comparison between the laboratory and the field tests results indicates that localized corrosion occurred on carbon steel in the field test but did not occur in the laboratory gas phase test, although corrosion rate in the field test was almost the same as that in the laboratory gas phase test. This is because localized water wet condition could not be reproduced in the laboratory gas phase test. From these results, tubing material used for gas well should be selected with taking account of localized water wet conditions, even if a water fraction of bulk fluid is significantly low.

Key words: [CO₂ corrosion](#), [CO₂+H₂S corrosion](#), [condensate](#), [water wet](#), [corrosion product](#), [OCTG](#)

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