

Influence of Long Chain Acrylate Ester Polymers as Wax Inhibitors in Crude Oil Pipelines

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Abstract

Reliable technical methods for wax build up control in pipelines are critical to the production of crude oil in deep cold water environments. The effectiveness of groups of acrylate ester copolymers of varying alkyl side chains as pour point depressants (PPD) and as wax deposit inhibitors during the flow of crude oil in subsea pipeline was investigated. Three crude oil samples from different oil fields in the Niger Delta of Nigeria were employed. The overall average wax inhibition (OAWI) of 15 – 35% obtained with the acrylate ester copolymers was an improvement compared to the values of 8 – 23% reported from the previous studies.

Polymer of similar chemical structures as the crude oil was observed to be effective in the inhibition of wax deposits of such crude oil. Wax inhibition percentages of 25-55% were obtained at high coolant temperatures (above 20°C), but many of the inhibitors exhibited poor performance at low temperatures (below 10°C), with wax inhibition percentage as low as -8%. Addition of demulsifier to the solution of the oil and the polymer was found to improve the wax inhibiting ability. The overall average wax inhibition (OAWI) value of 15.6% was recorded by the use of the demulsifier as against the value of 7.4% without the demulsifier.

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