

Performance Evaluation of Low Dosage Hydrate Inhibitors Using Two Experimental Systems

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Clathrate hydrates or hydrates are solid compounds of water and non polar or slightly polar substances of low molar mass. Generally they are stable at high pressures and relatively low temperatures. During many years hydrate formation in operations of the gas and oil industries represented a millionaire problem, mainly because they are responsible of valves and pipelines blockage and because they cause erosion in the equipment surfaces. The traditional thermodynamic hydrate inhibitors, like methanol and ethylene glycol, were utilized to avoid hydrate formation under specific temperature and pressure conditions; however, the oil and natural gas production conditions more defiant, like in pipelines in deep water and submarine infrastructure, demanded the development of a new technology of hydrate inhibitors. Low dosage inhibitors “postpone” the hydrate formation enough time as to allow safe hydrocarbon production. These inhibitors can be of two types: Kinetic inhibitors and anti-agglomerants. In this work two experimental devices and the corresponding experimental methods were used to evaluate low dosage inhibitors: The first apparatus works with tetrahydrofurane (THF) as hydrate former and it is based on the visual determination of the appearance of hydrate crystals under atmospheric pressure and 273.15 K; whereas the second device works at high pressure with natural gas as hydrate former and it is based on the absorption of hydrocarbons in water to form the corresponding clathrate hydrate and to determine by comparison, in diagrams temperature vs. time and pressure vs. time, the efficiency of different low dosage inhibitors, at the initial pressure of 5 MPa and in the range of (290.15 to 276.15) K. In this work we report results on the performance of four different commercial products using the two apparatuses.