



## Investigation into the effects of phosphonic inhibitors on the formation of calcium sulfate scales

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### ABSTRACT

The effects of several phosphonic additives on the formation of calcium sulfate scale on metal surface in a flow system were investigated thoroughly using multiple pipe flow system. Their chemical structure, concentration and run time are to be the main factors that influence the inhibitory capability of these anti-scalants. The relationships between these factors and the scale rate were established. The Langmuir adsorption isotherm is applied to predict the critical concentrations above which complete inhibition of scaling will occur. The inhibition efficiency order of the investigated organic additives is found as follows: EDTP > NTMP > NDPA > HEDP > NPDA, which corresponds to the number of phosphonate groups that the additives possess.

*Keywords:* Phosphonic inhibitors; Calcium sulfate scales; Pipe; Langmuir adsorption isotherm

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