

Kotowski, A. Hydraulic Analysis of Phenomena Reducing Pipeline Flowability. *Ochrona Srodowiska* 2010, Vol. 32, No. 1, pp. 27–32.

Abstract: While in service, water pipelines undergo corrosion and develop incrustations, which is attributable to the chemical instability of tap water. This study reports the following findings. Tap water corrosivity tests can be regarded as a useful tool for the preliminary estimation of the increase in pipeline roughness, provided that no significant changes in water quality were observed at the time of the research. Compared to smooth pipes (in hydraulic terms), even a slight increase in the wall roughness of the pipes becomes a substantial contributing factor in the decrease of pipeline flowability. At a high wall roughness, the decrease in the flowability of the pipeline is attributable primarily to the physical reduction in the pipe cross-section; the contribution of flow resistance is less important. The author has demonstrated, both by analysis and by experiments, that relating the value of the roughness coefficient (n) in Manning's equation to Reynolds number and roughness (k) renders this method of pipeline dimensioning as accurate as the method based on Darcy-Weisbach and Colebrook-White equations.

Keywords: Water pipelines, water corrosivity, incrustation, pipelines roughness, flow resistance, hydraulic efficiency.