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## Corrosion and Cavitation resistance of P/T91 Steel

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### ABSTRACT

The electrochemical behaviour of the P/T91 steel with martensitic microstructure as well as its behaviour in cavitation conditions has been investigated in this study. The electrochemical techniques used to analyze corrosion behaviour include Linear Polarization Resistance (LPR), Electrochemical Impedance Spectroscopy (EIS) and Linear Sweep Voltammetry (LSV). Corrosion rate determination was performed in a solution that simulates the industrial atmosphere. In laboratory conditions, ultrasonic vibratory cavitation test set up (stationary specimen method) has been applied on specimens made of P/T91 steel. Scanning electron microscopy technique has been applied to analyze the morphology of the eroded surfaces and to interpret the results of the cavitation tests. Test results have shown that, from the point of view of corrosion, P/T91 steel has a favourable chemical composition but the unfavourable lamellar-martensite microstructure. Also, the morphology of surface damage from cavitation of P/T91 steel resembles the features of the fatigue failure. In order to evaluate the resistance to cavitation of investigated material, its cavitation rate was compared with those of some other martensitic steels used in fabrication of various industrial components for application in thermal power plants.

**Keywords:** P/T91 steel, LPR, EIS, LSV, cavitation rate