METALLURGICAL AND ELECTROCHEMICAL BEHAVIOR OF S295 STEEL TUBES IN STEEL COOLING CIRCUITS

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Abstract : Corrosion damage to industrial cooling systems in steel mills is a serious problem for industry and the environment. In order to reduce this phenomenon by the subsequent development of organic-based corrosion inhibitors, a preliminary identification study of the base material and the surrounding environment of the cooling circuits is essential. To monitor the electrochemical behavior of unalloyed steel tubes, we studied the influence of the "industrial cooling water" environment and the most influential physical parameters. This behavior of S295 grade steel will be determined by different stationary and non-stationary electrochemical methods, notably electrochemical impedance spectroscopy. These investigations enabled us on the one hand the metallurgical knowledge of the base material, the nature of the corrosive medium, and on the other hand the evaluation of the potentials and the corrosion rates and to define the different reactions at the metal interface. middle. In conclusion, the tubes studied in unalloyed steel have a low resistance to corrosion under the effect of the aggressiveness of the surrounding environment (Figure 1) in this case industrial cooling water hence the need to introduce corrosion inhibitors in cooling circuits. In our case, we will focus on natural organic inhibitors that ensure an economic and environmental balance. Figure.1: Stationary and frequential electrochemical curves of the material / medium interaction

Keywords : steel, corrosion, behavior, cooling water, impedance, Temperature