

THE SELECTION OF PUMPS FOR HANDLING WASTE WATERS

Roger Francis
[RFMaterials Ltd, UK]

ABSTRACT

The term “waste water” can cover a multitude of compositions, and means different things to different people. In the water industry, this can mean treated sewage water or treated effluent from chemical plants. In the oil and gas industry this is often a mixture of sour water, possibly with aerated water and various chemicals from the refinery. Chemical Industry waste can be particularly varied, and can be acidic, neutral or alkaline and may contain small amounts of aggressive species that would severely corrode carbon steel or low alloy CRA's. Of particular importance is the redox potential, which strongly affects performance of many alloys. Impurities such as copper and iron can make the solution oxidizing, while species such as sulphide or nitrite make it reducing. In some processes the waste water will be treated with chemicals, such as potassium permanganate, which is a strong oxidizer. This will significantly affect alloy selection in many cases, and may mean that the first choice material will not last long because of corrosion due to the high redox potential. This paper points out how to evaluate the waste water and select suitably resistant materials for pumps. As many valves also have cast parts, the same principals apply to valve alloy selection. It also stresses the need for suitable procurement specifications, testing and rigorous QA/QC, over and above the requirements of standards like ASTM, if good quality material is to be obtained. Some case studies show how suitable CRA's were selected for these projects and why lower cost materials would not have worked. The paper stresses the need for an experienced corrosion engineer or metallurgist to ensure that all the possible corrosion mechanisms are addressed prior to purchasing.