

Longer Heat Exchanger Lifecycles with Duplex Stainless Steels

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Abstract

As many as 50% of expensive scheduled or unscheduled shutdowns in process plants are attributed to unavoidable repairs due to corrosion damage in tube and pipe or associated equipment. Although certain material problems can be ascribed to other factors, effects of corrosion remain a substantial concern for refineries the world over and cause significant increases in **operational and maintenance costs**.

Ever greater demands are being placed on tubes in heat exchanger equipment that are used to recover heat from hot gas streams while transferring it to water or oils in refinery processes. Because such processes are dependent on the efficient transfer of heat from one medium to another, heat exchangers are at the forefront of refineries' economical and environmentally compliant processes.

Traditionally duplex stainless steels have been regarded as the most reliable material in heat exchangers. The use of duplex stainless steels is shown to distinctly **reduce** types of equipment failure caused by corrosion that are otherwise evident in a range of materials such as copper-based alloys and different types of austenitic stainless steels, while also **proving cost-effective**. Nevertheless intensifying performance demands in petrochemical plants, coupled with the ongoing decline in crude oil quality, make it clear that further improved duplex steel grade is needed to withstand the increasingly tough operating conditions. This has led to the development of lean duplex, super duplex and hyper duplex stainless steels.

To address the greater demands that are being placed on materials for heat exchangers, a key approach is to select materials that enable the running of equipment for longer periods of time thereby helping refineries to achieve **major reductions** in plant costs. An in-depth understanding of the reasons for corrosion in refineries on the process side is essential in order to identify the most-effective replacement material to suit these higher operating demands.

This presentation will focus on **three success stories** where the use of **duplex stainless steels** for heat exchanger applications has **reduced life cycle costs** in refineries.