

Developments towards an Intelligent Electric Arc Furnace at CMC Texas using Goodfellow EFSOP[®] Technology

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ABSTRACT

Tenova Goodfellow Inc. (formerly Techint Goodfellow Technologies Inc.) has developed the Goodfellow Expert Furnace System Optimization Process (EFSOP[®]), which uses real-time analysis of EAF off-gases to optimize, dynamically, the chemical energy usage within the electric arc furnace. The benefits of the Goodfellow EFSOP[®] System are safety, increased process knowledge, lower conversion costs, and increased productivity.

In December 2005, Tenova Goodfellow installed and commissioned its Goodfellow EFSOP[®] system for CMC Steel at their Seguin, Texas melt-shop to optimize the operation of their 120 ton EAF. Subsequent to the initial EFSOP[®] installation and working towards continuous improvement in off-gas based optimization and control, Tenova Goodfellow has begun work at CMC Steel Texas to implement an intelligent control system for the EAF.

In addition to off-gas composition and furnace operating parameters, the program uses continuous off-gas temperature and fourth-hole static pressure measurements to calculate dynamically a gas-phase mass and energy balance for the EAF. This balance is in turn used to elucidate important steel-making information such as: rate of air in-leakage into the furnace; rate of de-carburization from the bath; rate of oxidation; rate of water in-leakage into the off-gas; and rate of energy losses from the gas-phase.

This paper will outline the path to EAF optimization and the benefits achieved at CMC Texas and present progress made towards the development of Tenova's Intelligent Furnace (iEAF[®]) system.