Heraeus

Electro-Nite

SUSTAINABILITY CASE STUDY

Increasing of LF Performance by Controlling the Slag and Steel Oxygen Activities

A PRACTICAL SITE STUDY WAS CONDUCTED WITH THE İÇDAŞ STEEL IN ORDER TO DYNAMICALLY CONTROL THE STEEL AND SLAG OXYGEN ACTIVITY AND IMPROVE PROCESS PERFORMANCE - TÜRKIYE

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This study examines the relationships between steel and slag oxygen activity during the ladle furnace process, as well as the correlations with process metrics such desulphurization efficiency, alloy yields, steel cleanliness, and sustainable production at the ICDAS steel plant.

INTRODUCTION

To achieve good control of the oxygen content during ladle furnace process, it is essential to maintain equilibrium between steel and slag. During the project we have examined following questions:

How do you control slag during tapping and ladle furnace process?

What is your slag deoxidation mechanism?

How do you correlate the slag management with sustainable production?

SUMMARY

Previously, slag deoxidation practice was conducted in two batches: before the LF process and during the LF process. These procedures were used after developing novel slag management practices with instant measurements in both aluminum and silicon killed steels.

All alloy yields, desulphurization efficiency, Ca treatment yields, clogging effect, and steel cleanliness parameters were measured during the controlled experiments.

Furthermore, to test the slag oxygen effect on process parameters, factsage analysis, XRF and XRD analysis were used, and total oxygen samples were collected and studied.

RESULTS

80% REDUCTION

In Al-Killed steel grades the total aluminum consumption was reduced by 80 % per heat on average.

70% REDUCTION

Reduction of Silicon Consumption: With precise measurement tools slag deoxidizer addition applied dynamically and as a result achieved a 70 % per heat reduction in silicon powder.

600K USD/YEAR COST REDUCTION

The overall potential value in use was projected to be at least 600K USD per year for selected special steel grades.

CONCLUSION

Slag management practises were standardised across all operators, and subjective deoxidation practises were phased out. Desulphurization yield increased and manufacturing costs dropped with the prevention of excess alloying and treatment time.