



ACERINOX EAFs: Improving the Efficiency in Graphite Electrodes

Member company	Acerinox S.A.
Category	emissions reduction; energy intensity reduction; material efficiency improvement; investment in new processes and products in order to deliver a defined sustainability benefit

The Challenge

The reduction of CO₂ emissions is one of the main targets in Acerinox. Because of this reason, Acerinox tried to improve the efficiency in electrodes used in EAFs (Electric Arc Furnaces). In this way, the less electrodes consumption, the less CO₂ emissions and the more energy and economical savings.

Why?

Acerinox strongly believes that the implementation of sustainable measures is the best way to achieve its purposes. The search of CO₂ reductions is directly linked with material improvements, energy efficiency and economical savings.

Needed action

It is proven that the electrodes consumption depends on the oxidation of the surface in EAFs. In this way, the Melt Shop decided to evaluate the results of coating the top of the electrodes with an antioxidant material capable of withstanding high temperatures. This material was impregnated in the microperforations that the electrodes have on the surface, which does not cause an increase in the diameter of the electrodes.

The Melt Shop compared the behaviour of standard electrodes (without treatment) and treated / impregnated electrodes. After testing both types, the obtained regression allowed us to extrapolate the data and obtain comparable results.

Action review

Specific; Acerinox decided to implement this action because it was known that the 50% of the electrodes consumption depends on the oxidation experimented in the surface when they supported really high temperatures in EAFs.

Measurable; Acerinox's tests (electrodes with/without impregnation treatment) collected data with which obtained comparable results.

Achievable; The Melt Shop contacted with specialists in the sector in order to find the right impregnation material capable of resist high temperatures and guarantee the increase of the electrodes useful life.

Realistic; Acerinox considered both, the target of the project and its implementation; realistic measures with which achieve sustainable benefits.

Time-bound; Acerinox decided to start this project testing one of the electrode



types used in EAFs. Several tests determined the effectiveness of this idea. However, the Melt Shop plans to continue investigating this theme with the aim of applying this technique to other kinds of electrodes.

Target Beneficiaries from the Action

Thanks to the good teamwork between the Melt Shop and the Environment Section, the host company (Acerinox Europa SAU) has benefited from the mentioned action.

Horizontal Expansion Capability

Acerinox is convinced that this project could be applied in member companies in order to reduce CO₂ emissions (and energy and economical savings).

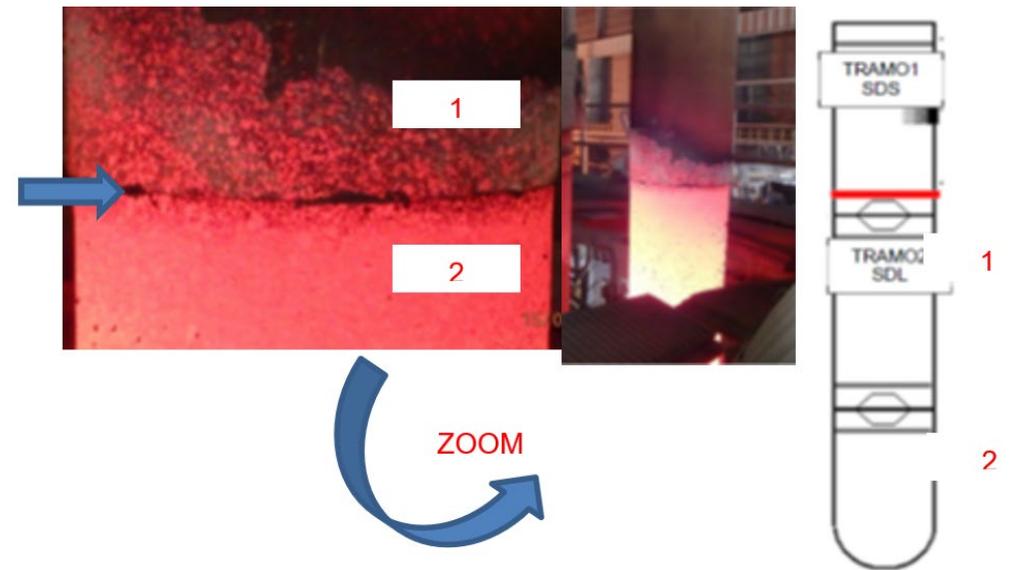
Outcome

Acerinox achieved a reduction of electrode consumption of 10%.

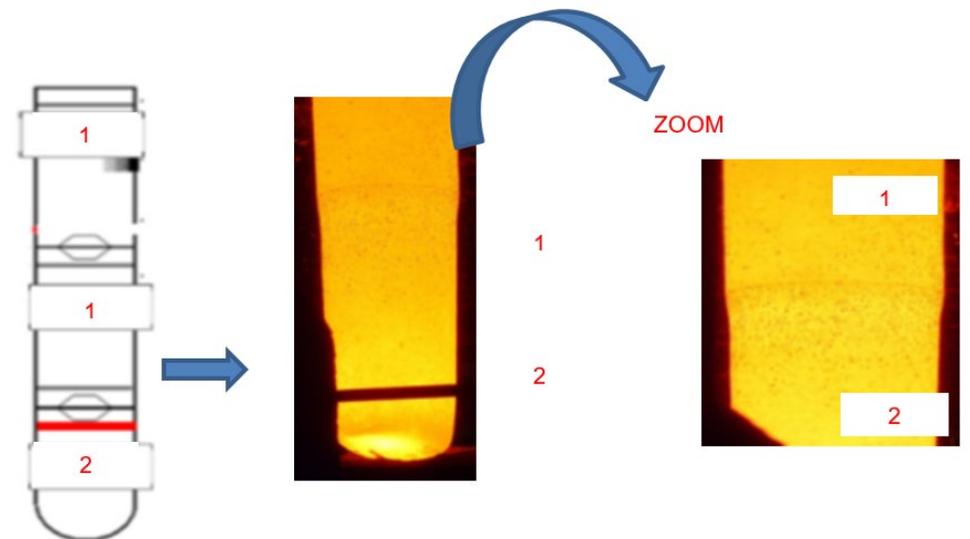
This result was obtained after several tests considering the same production conditions but modifying the type of electrodes - standard electrodes (without treatment) vs. impregnated electrodes.

This consumption reduction implies a decrease in CO₂ direct emissions. Taking as reference the CO₂ emissions associated with electrodes consumption, Acerinox achieves to reduce about 650-670 tonnes of CO₂e emissions per year. Even, as it was said, this CO₂ emission reduction is linked with energy and economical savings.

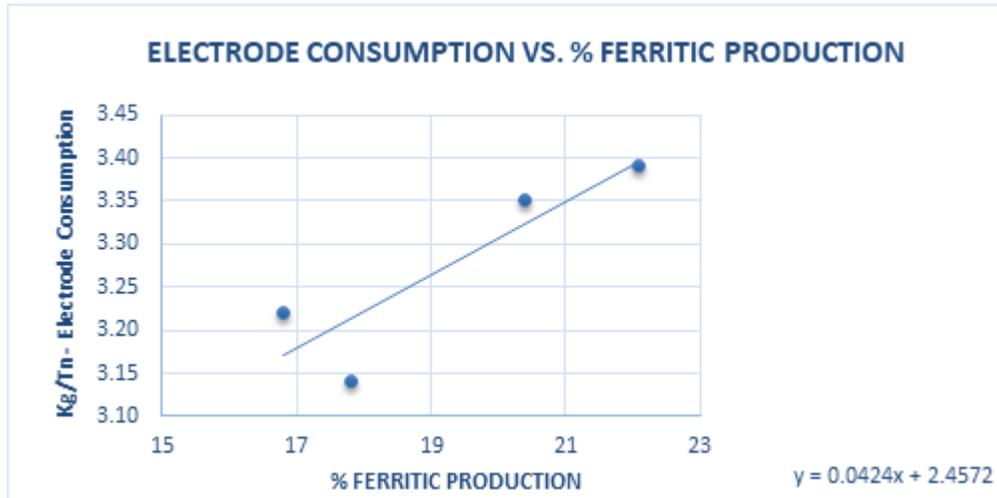
In the following pictures (two different tests), the difference between a treated electrode (1) and a standard electrode (2) - Less electrode consumption in treated electrodes.



Acerinox Picture 1: test with a treated electrode



Acerinox Picture 2: test with a standard electrode



Acerinox graph: electrode consumption vs. percentage of ferritic production