Oxygen technology applied to stainless steel production

Successful installation of BSE Chemical Energy System at renowned stainless steel producer

Due to the expected further increase of electrical energy prices the motivation of using chemical energy as a substitute has become of great interest also for stainless steel producers.
In June 2011, BSE signed a contract with a renowned stainless steel producer on the supply of a Chemical Energy System with multiple point installation of Virtual Lance Burners in a 120 tons AC furnace.

CONCEPT

For stainless steel production the use of lancing oxygen is more sophisticated and a different metallurgical approach is required.
For example, it is essential to balance the injected oxygen with the charge materials and their compositions to prevent a high chromium oxidation.
Further challenges are to lance the required oxygen amount into the steel bath and to go through the stiff slag layer to completely penetrate the steel bath. Nevertheless, the main challenge of the combined burner operation is to maintain the Cr_2O_3 content in the slag at the same level as before.

TARGETS

- Reduction of electrical energy consumption
- Reduction of power-on time
- Improvement of melting behaviour
- Prevention of skull formations at the side wall panels
- Removing of the water-cooled door lance
- Reduction of maintenance costs
- Reduction of mechanical delays
- Automation of EAF operation

SCOPE OF SUPPLY

In order to realise these targets the EAF has been equipped with three Virtual Lance Burners (VLBs) as key components installed in the side wall panels providing an efficient burner function as well as an oxygen lancing function. The required injected oxygen is calculated by a model for each heat based on scrap compositions and chemical compositions of charged alloys and reductants respectively.

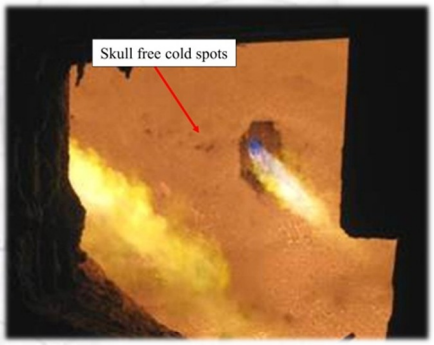
RESULTS / BENEFITS

The Chemical Energy System was commissioned and successfully installed in December 2011 / January 2012 and has effectuated a homogeneous scrap meltdown without skull formation and the following impressive improvements in efficiency since:

Achieved efficiency improvement after start-up	
Power input	**+6%**
Electrical energy	**-10%**
Power-on time	**-9%**

The new system also guarantees a higher arc stability, an improved stirring of the steel bath as well as a more homogeneous oxidation of the silicon and temperature distribution in the bath.

Skull formation at cold spots before installation …



… and skull free cold spots after installation

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