

**Engineering Dr. Karl Ableidinger**

and

**F. BAUERNSTÄTTER GmbH.**

**A-1040 Wien, Belvederegasse 6/54**

Tel: +43-1-505 88 23; Fax: +43-1-505 24 79

e-mail: [ableidinger@karlableidinger.at](mailto:ableidinger@karlableidinger.at)

web page: [www.karlableidinger.at](http://www.karlableidinger.at)

## **SiO<sub>2</sub> CAUSED PENETRATION AND "DOUBLE SKINNING DEFECTS"**

Under the term "Double Skinning Defects" one understands the metallic penetration of the first layer of chromite sand which can also form through the zircon coating producing a defect of 1 - 5 mm thickness that can be very hard to remove or sometimes if you are lucky easily removable as large sheets.

If one observes chromite sand under the microscope that has been regenerated/reclaimed several times, it will have an appearance very different to that of new chromite sand grains.

Chromite sand is a spinel consisting of FeO and Cr<sub>2</sub>O<sub>3</sub> and also contains MgO, Al<sub>2</sub>O<sub>3</sub> and SiO<sub>2</sub>.

Under oxidizing atmosphere FeO forms Fe<sub>2</sub>O<sub>3</sub>. Under reducing conditions and a long solidification time Fe<sup>2+</sup> ions are reduced to iron. The iron forms on the sand surface under the presence SiO<sub>2</sub> to a flux called Fayalite.

Cr<sub>2</sub>O<sub>3</sub> and Fe<sub>2</sub>O<sub>3</sub> evaporate from the grain surface above 1500°C. The MgO contained in the spinel and FeO increases at these temperatures due to this sublimation.

This different behaviour of the Cr oxide, Fe oxide, Al oxide and Mg oxide as a function of atmosphere and temperature affect the suitability of reuse of the regenerated chromite sand.

A high content of iron oxide on the surface of the chromite spinel as well as the contact between the grains of chromite sand and the very liquid slag of the liquid steel is disadvantageous.

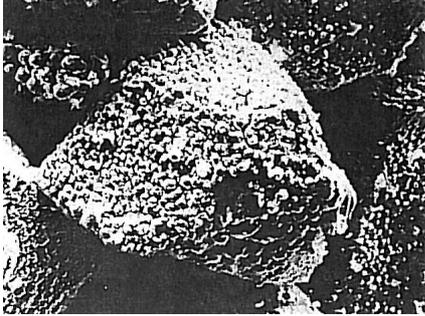
If the reclaimed chromite sand grain is covered with iron or fayalite (Fe<sub>2</sub>[SiO<sub>4</sub>]) the grain will be more wetted by the liquid steel and this creates, mainly on hot spots, surface defects which is called "Double Skinning".

However, with the help of a good zircon coating these defects can be minimised but seldom eliminated if the reclaim chromite is not in good condition.

For this reason the quantity of magnetic separated and dust free reclaimed chromite sand that can be reused is limited and it should be worked always as a mixture of new and reclaimed chromite sand.



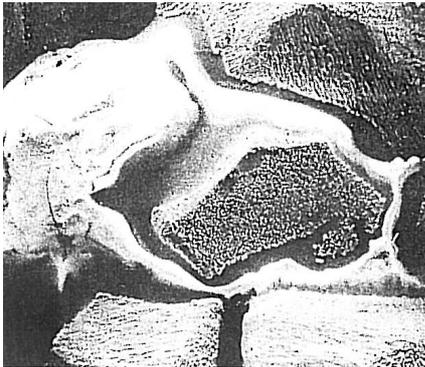
New chromite sand



Several times reclaimed  
chromit sand

### **CHROMITE SAND SEPARATION:**

It can also turn out very disadvantageous to simply increase the sand throughput of the magnetic separation, because the quantity of  $\text{SiO}_2$  sand carried over rises in the reclaimed chromite sand and this flux creates also a sinterisation or "Double Skinning Defect".



Penetration caused by a mixture of  $\text{SiO}_2$   
and Fe-oxide from the surface of the  
reclaimed chromite sand forming a low  
melting silicate phase