

Keeping up with performance with Calderys' boron-free SILICA MIX solutions



BACKGROUND
Customers needs



CONCEPT
Calderys solution



SUMMARY
Recap of
the solution



RESULTS
Concrete
benefits



The background

Calderys has been producing quartzite-based materials in Sweden since 1902 and have a broad and long experience of coreless induction furnaces.

As a sintering agent, Boron's high melting point has always been a key ingredient in refractory materials for lining surfaces. Used in SILICA MIX solutions that protect the coil and insulate the molten metal, boron helps decrease the sintering temperature of pure quartzite for our customers needs.

However, environmental concerns are causing manufacturers to seek alternatives.

The request from the customers

Volvo Group has always been a key player for sustainability and high environmental demands.

As boron is on a list of products that is monitored for use, naturally the Volvo foundry team was looking for a boron-free solution that wouldn't hinder their productivity or the refractory lining's performance.

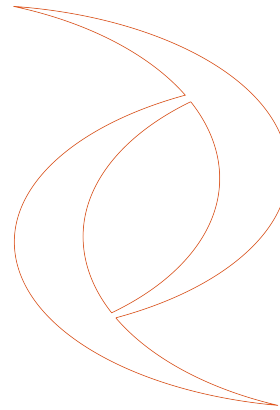
Seeing that Calderys and Volvo have a very long and good partnership and cooperation, it was decided that Volvo would take an active part in developing the new material.

Calderys SILICA MIX plant.

Åmål - Sweden



Calderys Quartzite quarry





Analysis of the customer request

A boron-free alternative to the traditional SILICA MIX sinter lowering additive required a lot of work in R&D. In Calderys technology center, a core team began to develop and test an alternative solution that would be as reliable and stable as boron oxide. One of the effects of most refractories is that when you heat it up, it expands. If the material moves, it creates tension – and depending on equipment and set up, that can cause cracks and mechanical wear. As Volvo needed a high grade stable refractory with low expansion rate, the SILICA MIX Q series that contains “Fused Silica” (pre-sintered quartzite that has already been treated at a high temperature) proved to be the best alternative to further develop.

Description of the solution developed by Calderys

As this project was of great interest for many stakeholders in Sweden, the Research Institutes of Sweden (RISE) was also involved in the trials for the new boron-free material. During a pilot phase, the usual boron-based refractory product was installed on one half of a furnace at the RISE test facilities while the other half used Calderys’ new boron-free solution, **SILICA MIX Q16 BF**. Over the whole lifetime, both halves were tested to make sure that they worked and reacted in the same way, with the expansion of the product particularly monitored. Tests at RISE and also real life tests at furnaces at Volvo’s site in Skövde confirmed that the premium boron-free silica could be integrated into Volvo’s selection of refractory products.





Benefits brought by the solution

The new SILICA MIX has an added **SAFETY** benefit: during the lifetime of the furnace and refractory, SILICA MIX goes through different stages. As it's being heated, it forms three layers: a mechanically strong glazed layer close to the metal surface; a semi-sintered layer; and then, close to the furnace body is an unsintered powdery layer that works as a natural safety zone. If a crack appears, the molten iron will not pass through the powder area.

SM Q 16

SM Q 16 BF





Product presentation

The boron-free SILICA MIX range is a quartzite-based dry vibratable material. This range is dedicated to a typical iron foundry melting base for grey and ductile cast iron. It is tailored to the lining of the coreless induction furnace.

Its featured product, SILICA MIX Q BF fits to tapping temperatures in the range of 1,500°C to 1,680°C.

The boron-free SILICA MIX is just one of many innovations from Calderys. A wide range of products are available especially for the coreless induction furnaces.

To get the best performing refractory and lining concept, please contact your local Calderys representative!

Services - Expertise

In addition to constantly developing new technologies for the foundries of tomorrow, Calderys' foundry experts have developed a full package service: from engineering & design to product installation, dry-out and commissioning as well as maintenance services.

Foundries working with Calderys also benefit from the new generation of Calderys **Foundry Service Center**. Foundry equipment, from ladles to pouring furnaces, can be relined off-site at one of our facilities. Calderys handles the entire process, from pickup to delivery of the fully refurbished equipment.



Thank you for your attention

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