

Revolutionizing tundish operations with SURCAST QuickStart: Faster turnarounds, lower costs, and a greener future

Feature-rich tundish safety lining addresses the challenges posed by expensive energy, achieves faster turnaround time, and reduces shell temperature.

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Fig 1 Flow consistency



Fig 2 Tundishes lined with SURCAST QUICKSTART

Surcast Quick Start

General

- Tundish safety lining castable designed for a rapid heating cycle, known as the "QuickStart" heating cycle.
- Completes the QuickStart technology product family alongside Basite and Basivite

Heating Capabilities

- Tundish with SURCAST QuickStart lining can be heated at a rate of 50°C/h: up to 540°C, then at 100°C/h until the highest terminal temperature is reached.
- Lining can be ready within ~25h, enabling it to undergo severe thermal curing cycle




Fig 3 Product differentiation

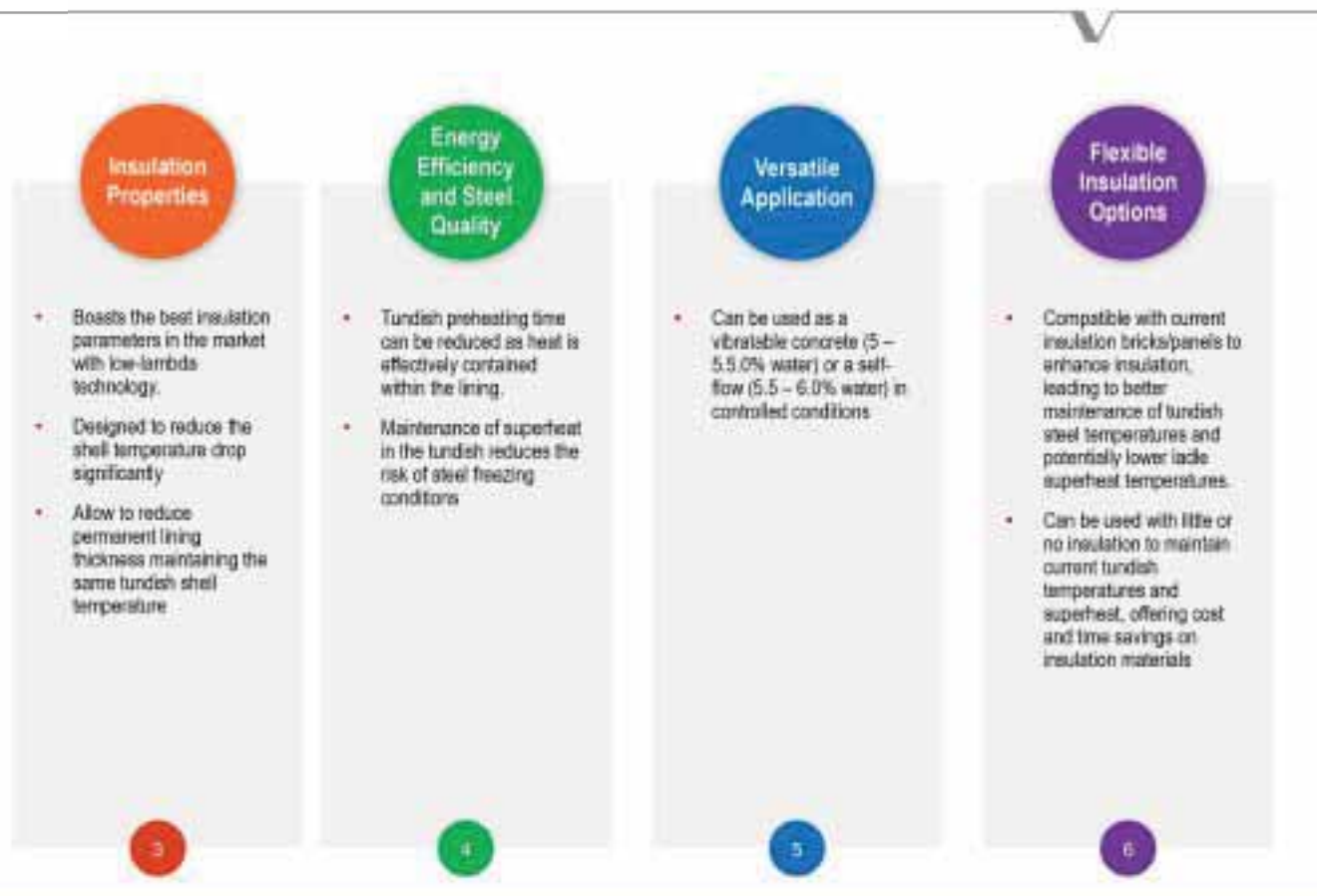
INTRODUCTION

The steel industry continuously strives for progress, focusing on innovation to streamline operations, minimize environmental impact, and optimize costs. Tundish linings play a critical role in ensuring the quality and safety of molten steel. Traditional castables employed in the tundish permanent lining pose a significant bottleneck. Installing a complete lining can take up to a week to prepare, hindering production and impacting energy consumption.

REFRACTORY LININGS IN TUNDISH OPERATIONS

The refractory of the tundish permanent lining is

made with castables containing alumina, with a content ranging from 60% to 80%. These linings are designed for long-term use and can last from 200 to 2,000 ladle heat sequences. High-alumina linings work best in situations with minimal thermal cycling. Some mills use steel fibers in the castable to reduce spalling and crack propagation. High alumina content is beneficial for addressing slagline-cutting issues but is less critical for overall strength in this application. Hence, the specific choice for individual steel mills is often a trade-off between optimal slag and thermal shock resistance. Mills accustomed to specific lining behaviors have established tolerances for these trade-offs. →



Many tundish working linings contain sodium silicate, or phosphate binders. The vapor transport of these from working lining can lead to premature failure of permanent linings. Increasing the silica content of the permanent refractory lining can help to reduce the corrosion rate caused by alkali compounds, but also affects the thermal and mechanical properties. Refractory materials are chosen for their ability to minimize heat transfer and if these linings provide inadequate insulation, they cause excessive heat loss and shell damage. The newer generation castables must be designed to expel chemical water quickly and achieve fast drying.

INNOVATIVE SOLUTION: SURCAST QUICKSTART

Vesuvius has developed SURCAST QUICKSTART to address these challenges head-on. It is a revolutionary refractory lining that opens a new era for steel manufacturers. This innovative lining has properties that redefine efficiency, sustainability, and safety in tundish operations. SURCAST QUICKSTART stands out for its exceptionally rapid turnaround times. Unlike conventional linings, this innovative solution requires only 24 hours for drying. This translates to significant time savings and expedited production restarts, maximizing steelmakers' operational output and efficiency. It is designed to have a tortuous pore network, which leads to decreased available pathways for aggressive slag and vapor, hindering their ability to penetrate deep into the material.

Building upon this foundation, SURCAST QuickStart has a 25% reduction in thermal conductivity compared with traditional 70% alumina-based linings, translating to a significant decrease in tundish shell temperature and minimizing heat loss. Additionally, the "QuickStart" heating cycle allows for accelerated heating rates of up to 50°C/h, dramatically reducing the preheating time from the conventional 100 hours to a mere 24 hours for linings up to 150mm thick. This leads to a substantial reduction in production downtime and associated costs.

CASE STUDIES AND FIELD PERFORMANCE

Trials conducted at various customer sites across the globe have demonstrated the remarkable

capabilities of SURCAST QUICKSTART. The installation does not require any change in the current customer practice. Often, traditional products require more water for casting than recommended because of the mixer's inefficiency, water TDS, pH, temperature, and other parameters. *Figure 1* shows that the product has an excellent flow characteristic and does not stick to the mixer. One customer reported that they could save ~300kg, equivalent to 5% of total consumption, due to the minimal waste in the mixer.

One customer specifically needed to eliminate their conventional week-long installation cycles. Vesuvius conducted a benchmarking study of the preparation of their conventional lining and implemented the QUICKSTART cycle. For this tundish, the drying was completed within 24 hours, resulting in substantial time and energy savings. Its faster turnaround times and reduced exposure to hot surfaces have enhanced worker safety and comfort. *Figure 2* show different tundishes lined with Surcast QUICKSTART.

During another installation, six thermocouples were deployed on the tundish shell for temperature monitoring during the casting and compared with another tundish cast with conventional lining. A tundish with a SURCAST QUICKSTART lining exhibited a shell temperature drop of up to 100°C, significantly reducing energy consumption and improving process efficiency. *Figure 3* represents the product differentiation.

CONCLUSION

SURCAST QUICKSTART is a revolutionary tundish backup lining that combines rapid heating with excellent safety and performance. Innovative properties and proven field performance make it an ideal solution for steelmakers seeking to improve process efficiency, reduce energy consumption, and enhance sustainability. As the industry moves towards "green steel" initiatives, SURCAST QUICKSTART is a valuable tool for reducing carbon emissions and promoting environmental responsibility. **MS**

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