"State-of-the-Art" Cold-Setting Working Lining Mixes for Tundish

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Introduction

Continuous steel casting is a widely-used process, with currently more than 90% of global raw steel production being continuously cast. An indispensable component in the continuous casting process is the tundish, and it is the last refractory lined vessel through which molten metal flows before solidifying in the mold. In addition to its main functions as a flow divider and metallurgical vessel, the tundish is also the most relined unit in the steel plant.

Tundish refractory linings have a similar construction worldwide, based on an insulation layer, a permanent lining that can be brick or cast monolithic, and a wear lining layer. The wear or working lining is the most significant refractory material used in the Tundish. This article focuses on an innovative and unique basic wear lining material, "state-of-the-art", termed cold-setting mix.

Cold-Setting Mix—Product Description and Binder Technology

Although originally designed as an alternative to slurry gunning mixes and dry vibe mixes, it is only more recently that cold setting tundish mixes have found wider acceptance. Developments in the field of tundish wear lining techniques are mainly focused on simplifying lining procedures, achieving time and energy savings, and increasing vessel availability. RHI addressed these trends by developing an innovative cold setting mix system based on a unique and "state-of-the-art" patented binder technology. The product series is termed ANKERTUN SH.

The cold-setting binding system is free of silica, sulfur, alkalis, and phenol. It requires no liquid binder or esters to set the material at ambient temperature. The cold setting mix is delivered in big bags and only needs the addition of a small amount of water (1.3–1.5 wt.% H_2O) to start the exothermic chemical reaction. The main binder system is based on a nontoxic organic acid that as a solute reacts when mixed with the component raw materials. Following the formation of an organic salt, the water is converted back to a non-chemically bonded form. As a result, the water added to the specially developed RHI cold setting mix can evaporate during drying at ambient temperature,