

3M™ Boron Nitride Suspension Cast-C Release Agent and Protective Coating for the Aluminium Industry

3M™ Boron Nitride Suspension Cast-C is a boron nitride coating with unrivalled release and protection properties for use on ceramic substrates.

Properties

Molten aluminum is processed at temperatures between 680 °C and 800 °C. As it is transported, the molten aluminum is in contact with the refractory lining of the casting troughs, tables, etc. The melt, as well as the developing oxide skin, attack the refractory lining, which must therefore be protected against the molten metal. At the same time, particles must be prevented from dislodging from the refractory lining and contaminating the melt. The best way to do this is by applying a release coating on the refractory lining.

A material particularly suitable for this is hexagonal boron nitride, which is not wetted by liquid aluminum.

However, boron nitride on its own does not adhere. Adhesion is provided by the addition of a refractory binder system. Therefore, unlike bone ash, which is currently widely used, a boron nitride coating can be used to produce multiple castings.

Advantages

Patented Nanobinder:

- This binder permits an unparalleled adhesion to all kinds of substrates. It is immaterial whether the substrate is a non-porous cement or a highly porous fiber material. No particular pretreatment of the substrate is necessary.
- The binder permits coating thicknesses up to 1 mm without the risk of flaking off. That makes it easy to make local repairs to damaged coatings.
- The coatings can be applied thickly to repair holes and cracks in the refractory lining. This eliminates the laborious removal of existing boron nitride coatings that would otherwise be needed with refractory materials.
- The number of castings per coating can be increased.
- Thixotropy prevents the solid particles separating out and sedimenting during storage.

The additives offer the following benefits:

- The coating remains flexible and does not flake off over the entire temperature range from room temperature to 750 °C.
- High scratch resistance and thereby better resistance for the removal of dross.
- The coating is gray before the first use and therefore easily visually recognizable during application. The coating takes on an ivory color after contact with liquid aluminum. The additives do not contain any heavy metal chromophores.

The outstanding benefits of 3M™ Boron Nitride Suspension Cast-C are even evident when it is applied unevenly. The better durability of 3M™ Boron Nitride Suspension Cast-C means reduced downtimes during casting and reduces labor costs for coating. In this way, 3M™ Boron Nitride Suspension Cast-C improves the efficiency of casting.

Specification

Typical material properties	3M™ Boron Nitride Suspension Cast-C
Color	gray before first use, ivory after contact with temperatures > 700 °C
Solid content (BN)	≤ 30 %
Solvent	water
pH	slightly acidic
Binder (patented)	inorganic
Density	1.2 – 1.3 g/cm ³
Application temperature	1,400 °C vacuum 900 °C air

Applications

3M™ Boron Nitride Suspension Cast-C can be applied by spraying, brushing or dipping. The thixotropic property of the coating means that it can be dispersed just by brief shaking. Care should be taken in diluting it, since this can change the properties of the binder. It does not need to be heat treated before use, since the properties of the baked coating develop directly when it comes into contact with molten aluminum. The coating can be dried with gas burners.

Note:

Although the coating dries very rapidly, there may be residual moisture in the refractory lining underneath. On contact with molten aluminum, this may cause flash evaporation and splashes of molten aluminum.

Application examples:

- Troughs
- Dampers
- Valves
- Stoppers
- Floats
- Hot-top rings
- Nozzles

Storage

Keep the containers tightly closed and protect against freezing.

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