

## PRODUCT DESCRIPTION

Low cement castable refractories (LCC™) is a high-tech heat-resistant mass made from a combination of calcium-alumina cement, fillers and additives. In them, the presence of fine powder particles of very soft oxides (on the order of microns) as a suitable substitute for calcium aluminate cements, has caused the consumption of cement to be greatly reduced compared to other types of traditional and conventional castings. Reducing the amount of cement in the low-cement pourable mass is directly effective in reducing 50-75% of the water required in the mixture preparation process. As a result, Low Cement Casting mass can provide higher density, lower porosity, greater strength, and better mechanical properties than conventional or medium cement castable refractory. This advanced refractory offers Cao between 1 and 2.5%. So at high temperature (1300-1800 degrees Celsius) it can work well as a refractory. Low Cement Casting Mass refractory (LCC™) can be quickly set up and used in a short time. Low Cement castable Refractories can be used in the construction and repair of furnaces and other applications subject to heat, abrasion, etc.

## PRODUCT FEATURES

- High resistance to abrasion
- Resistant to high thermal shocks
- Ease of implementation
- Advance formulation
- High compressive strength
- Cao content less than 2.5%
- High flexural strength
- Corrosion resistant
- High stability and durability in the long term
- Resistant to washing
- quick setting
- Economic

## PRODUCT USES

Low Cement castable Refractories (LCC™) are widely used in the following industries:

- steel industry
- cement industry
- Aluminum industry
- Lime kilns
- Oil and gas and petrochemical industry

## HOW TO USE

### SURFACE PREPARATION

Before using Low Cement castable Refractories (LCC™), the surface or wall of the mold should be cleaned and prepared from any contamination using a tool such as a wire brush. The mold used in the execution of Low Cement castable Refractories should not be rusted or corroded. In addition, it must be smooth and without unevenness. Also, it should be easy to open and close. Before applying the Low Cement Refractories, the wall of the mold should be lubricated before use so that the hardened mass does not stick to the wall of the mold.



Low Cement castable-LCC™

## MIXING

Low Cement castable Refractories (LCC™) should be prepared with higher precision and sensitivity than ordinary refractory mass. Because, changes in adding water and ambient temperature affect this category of refractory masses more than ordinary castable masses. To prepare Low Cement castable, simply transfer the dry mix out of the bag and into the mixer or onto a flat surface. Low Cement castable Refractories (LCC™) can be prepared both with a mixer and manually. After removing the mixture from the bag, the contents should be mixed dry for 1 minute. Finally, according to the amount specified in the table of technical specifications of the product (5 to 7 percent by weight), add water little by little and mix with the mixture for 3 to 5 minutes. To ensure that the mass is ready, you can take a handful of it and throw it 30 cm upwards and catch it with the same hand but with open fingers. If the castable refractory mass does not spill and does not crack in the palm, the LCC™ mass is ready for use.

## APPLICATION

Low cement casting (LCC™) refractories may be cast with or without vibration depending on the flow rate. In both cases, the prepared cement must be transferred to the mold step by step. After 6-7 hours, the Low cement castable mass are set at 35°C. Molds can be removed after 8 or 10 hours to ensure curing.

## LIMITATIONS

- In the preparation of low cement castable refractory mass, drinking water with a temperature of 15 to 25 degrees Celsius and a pH between 6 and 8, without impurities, should be used.
- The amount of water used to prepare the mass should not exceed the range specified in the table of technical specifications of the product.
- The forms used in the implementation of low-cement castable mass should be smooth, without corrosion and damage.
- Rotary mixers should not be used in the preparation of low-cement castable mass. Paddle mixers are the best option to maintain granulation.
- In case of implementation of low cement refractory mass by vibration casting method, the vibration should not be so long as to lead to disturbance of granulation of the mixture.
- The best ambient temperature for using low cement refractory mass is 10 to 30 degrees Celsius. In applications with a temperature below

- 10 degrees, it is recommended to use accelerators under expert supervision.
- Low Cement castable Refractories of cement should be installed in 15 minutes.
- A trowel should not be used to smooth the final surface of low-cement refractory mass.
- Low cement castable mass should be protected against freezing. Because if the water inside the mass freezes, the structure will be damaged.

#### TECHNICAL DATA

	LCC™ 97	LCC™ 94	LCC™ 90	LCC™ 80	LCC™ 70	LCC™ 65	LCC™ 60	LCC™ 55	LCC™ 40
Materials base	Tubular alumina	Tubular alumina	Tubular alumina	bauxite	bauxite	andalusite	bauxite	Fireclay, bauxite	Fireclay, bauxite
Maximum service temperature	1880	1700	1700	1680	1650	1600	1640	1550	1300
Installation Method	vibration								
Grain dimensions (mm)	0 - 5	0 - 5	0 - 5	0 - 7	0 - 8	0 - 6	0 - 6	0 - 8	0 - 8
Amount of water required (%)	3.8 – 4.8	4.9 – 5.9	5.8 – 6.9	4.8 - 6	5.6 – 6.5	5.6 – 6.8	5.6 – 6.8	5.4 – 6.6	5.6 – 6.6
Al <sub>2</sub> O <sub>3</sub>	≥ 96.5	≥ 94.6	≥ 90.5	≥ 80.1	≥ 70.1	≥ 61.4	≥ 58.4	≥ 55.1	≥ 55.1
SiO <sub>2</sub>	≤ 0.1	≤ 2.9	≤ 4.8	≤ 11.2	≤ 23.1	≤ 31	≤ 34.5	≤ 37.7	≤ 37.7
Fe <sub>2</sub> O <sub>3</sub>	≤ 0.1	≤ 0.1	≤ 0.6	≤ 2.1	≤ 1.7	≤ 1.8	≤ 1.8	≤ 1.9	≤ 1.9
TiO <sub>2</sub>	≤ 0.1	≤ 0.02	≤ 1.2	≤ 3.1	≤ 2	≤ 2.1	≤ 2.1	≤ 1.9	≤ 1.9
CaO	≤ 1.9	≤ 1.9	≤ 1.9	≤ 2.4	≤ 2.7	≤ 2.7	≤ 2.2	≤ 2.4	≤ 2.4
Alkalis	≤ 0.3	≤ 0.4	≤ 0.5	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1
apparent specific gravity (After drying at 110 °C)	3.01 g/cm <sup>3</sup>	2.95 g/cm <sup>3</sup>	2.9 g/cm <sup>3</sup>	2.8 g/cm <sup>3</sup>	2.6 g/cm <sup>3</sup>	2.45 g/cm <sup>3</sup>	2.42 g/cm <sup>3</sup>	2.3 g/cm <sup>3</sup>	2.25 g/cm <sup>3</sup>
Ultimate resistance at room temperature	700-900 kg/cm <sup>2</sup> (after drying at 110°C (	700-900 kg/cm <sup>2</sup> (after drying at 110°C (	700-900 kg/cm <sup>2</sup> (after drying at 110°C (	650-800 kg/cm <sup>2</sup> (after drying at 110°C (	700-900 kg/cm <sup>2</sup> (after drying at 110°C (	550-700 kg/cm <sup>2</sup> (after drying at 110°C (	550-750 kg/cm <sup>2</sup> (after drying at 110°C (	500-700 kg/cm <sup>2</sup> (after drying at 110°C (	400-550 kg/cm <sup>2</sup> (after drying at 110°C (
	900-1200 kg/cm <sup>2</sup> (after heating at a temperature of 1600°C)	900-1200 kg/cm <sup>2</sup> (after heating at a temperature of 1600°C)	900-1200 kg/cm <sup>2</sup> (after heating at a temperature of 1600°C)	750-900 kg/cm <sup>2</sup> (after heating at a temperature of 1430°C)	800-1000 kg/cm <sup>2</sup> (after heating at a temperature of 1430°C)	650-800 kg/cm <sup>2</sup> (after heating at a temperature of 1430°C)	800-1000 kg/cm <sup>2</sup> (after heating at a temperature of 1430°C)	600-800 kg/cm <sup>2</sup> (after heating at a temperature of 1430°C)	500-700 kg/cm <sup>2</sup> (after heating at a temperature of 1260°C)

#### STORAGE

Low-cement refractory mass should be stored in bags installed by the manufacturer in a covered warehouse away from moisture and sunlight. Avoid stacking more than 3 pallets of low cement castable mass on top of each other. Because, the dry mixture inside the bag may harden due to the pressure. In addition, avoid throwing bags during transportation. Throwing bags containing low cement mass can disturb the distribution of aggregates in the mix. In the best conditions, LCC™ can be stored for 8 months.

#### CAUTION

Users should observe good industrial and personal hygiene. The use of hardhats, proper footwear, and ear protection should be evaluated on a site-by-site basis. In situations where installation is occurring in water, flotation devices should be utilized. In general, installers of products should wear long-sleeve shirts and pants and use safety glasses/goggles and gloves to minimize skin contact. Measures such as washing after handling the material and before eating, drinking, and/or smoking, as well as routinely washing work clothing and protective equipment to remove contaminants, should be employed.

#### CLEANUP

Dispose of material in accordance with local disposal regulations. Uncured material can be removed with approved solvents. Cured materials can only be

removed mechanically. In fact, the thinner can not completely clean the equipment, Therefore, acetone or ketone solution can be used to clean equipment.

#### FIRST AID

- In case of contact with skin, wash thoroughly with soap and water
- In case of contact with eyes, rinse immediately with plenty of water.
- Get out of space or use oxygen capsules if you have trouble breathing.
- Wash clothing before reuse

#### DISCLAIMER OF LIABILITY

AFZIR, LLC warrants its products to be free from manufacturing defects. Buyer determines suitability of product for use and assumes all risks. Buyer's sole remedy shall be limited to replacement of product. Any claim for breach of this warranty must be brought within six months of the date of purchase.

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The Buyer, by accepting the products described herein, agrees to be responsible for thoroughly testing any application to determine its suitability before committing to production.