

RefractoryBEAT

A quarterly by Cement Refractory BU of Dalmia-OCL

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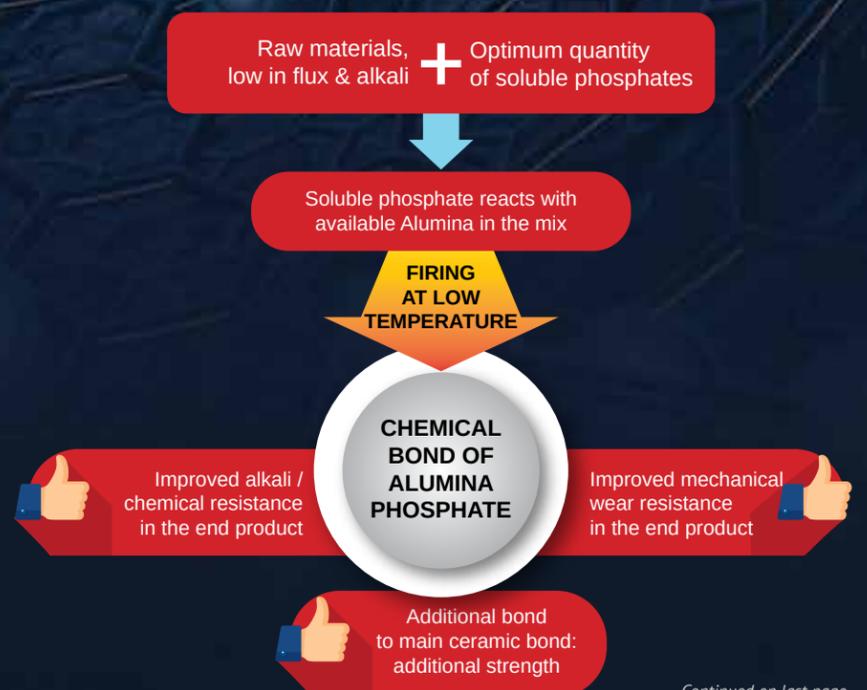
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How to find the right castable for your specific need

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Dalmia Seven gets an all-new production line which is also India's most modern castable manufacturing facility

The Name's Bond. Phosphate Bond.

Ever wondered why some refractory bricks are better than others? How some are better at handling higher thermal loads, promise low permeability, demonstrate better abrasion and alkali resistance, or are simply more coating-friendly! All such advantages are directly or indirectly related to just one aspect: the strength and nature of bonds between grains of refractory material. While normal bricks feature a single type of bond, most premium quality bricks, including the ones manufactured by Dalmia-OCL, contain an additional bond which ensures greater strength, or in other words better overall performance.

Alumina-phosphate, the extra bond
 During high temperature firing, uniform crystal bonds develop between refractory grains. These are ceramic bonds which can be tweaked for performance by using additives to help obtain specific service properties e.g. improved volume stability, greater resistance to chemical attacks, higher refractoriness or higher abrasion resistance. Strength of these ceramic bonds usually determines the overall strength of the refractory brick. Until, another type of bonding occurs. Adding low-flux and low-alkali raw materials along with soluble phos-



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Introducing Special Castables For Critical Applications

A favourable business outlook mixed with heightened competition is pushing cement kilns all across the country to produce more. Needless to say, this has led to greater strain on production equipment and systems, including at a refractory level.

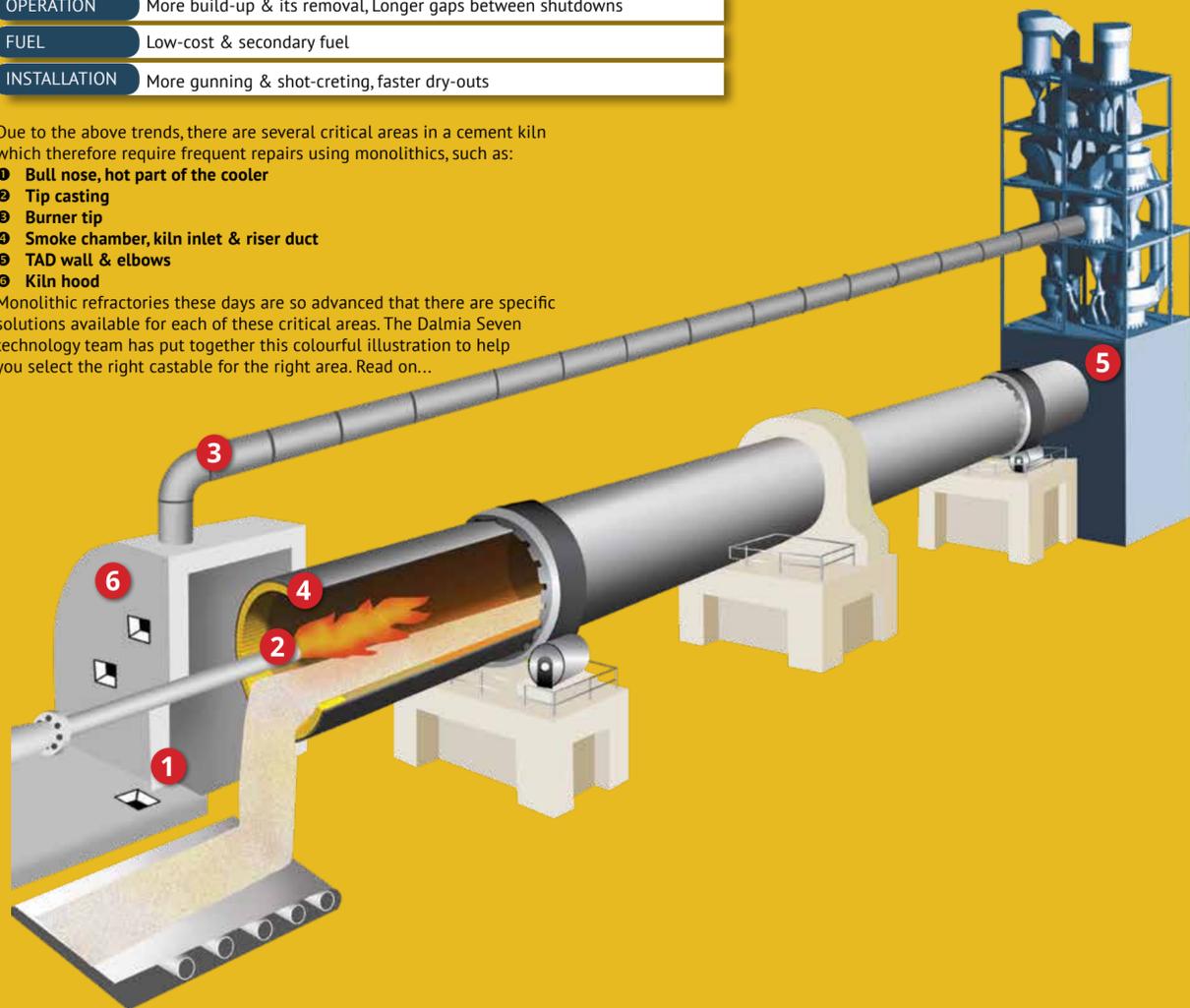
Some interesting trends can be spotted as far as critical areas of the rotary kiln go:

ROTARY KILN	Shorter in length, increasing slope, higher thermal & volumetric loads
MAIN BURNER	Ability to fire multiple fuels
COOLER	Higher efficiency
SECONDARY AIR	Higher temperatures, higher stream
OPERATION	More build-up & its removal, Longer gaps between shutdowns
FUEL	Low-cost & secondary fuel
INSTALLATION	More gunning & shot-creting, faster dry-outs

Due to the above trends, there are several critical areas in a cement kiln which therefore require frequent repairs using monolithics, such as:

- 1 Bull nose, hot part of the cooler
- 2 Tip casting
- 3 Burner tip
- 4 Smoke chamber, kiln inlet & riser duct
- 5 TAD wall & elbows
- 6 Kiln hood

Monolithic refractories these days are so advanced that there are specific solutions available for each of these critical areas. The Dalmia Seven technology team has put together this colourful illustration to help you select the right castable for the right area. Read on...



1 Bull nose, hot part of the cooler

Typical concern

The usual problem in the bull nose area as well as the area around it (hot part of the cooler) are:

- Under normal conditions the bull nose is set to work in the temperature range 1050 - 1150 °C, but plant overloading or clinker hard to burn may end up in delivering high temperatures well above 1300 °C, releasing this high thermal load to the refractory lining.
- In case the TAD inlet is close to the bull nose, the turbulence generated locally can further stress refractories with thermal shocks and abrasion.
- The possible formation of the snowman (esp. IKN design) adds further stress, especially when it has to be removed.

The right castable

- Low cement, Andalusite based (for thermal shock resistance)
- Preferably doped with 10-30% SiC + special additives (for abrasion / alkali resistance)
- Having high CCS close to or more than 1000 kg/cm² (for mechanical abrasion resistance)

2 Burner tip

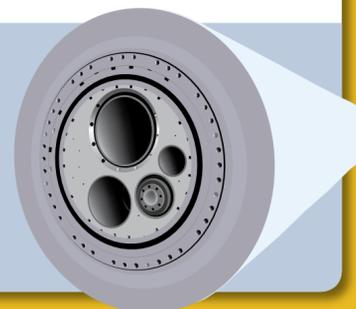
Typical concern

Burner tip needs application with high thermal and mechanical load. This area can be influenced by several elements:

- Lance type / clinker type
- Fuel (pet-coke and RDF may be more aggressive than pulverized coal)
- Position of the burning zone (closer or further away)
- Plant overloading
- Position of the TAD and its impact on the secondary air stream (hot secondary air)

The right castable

- Low cement castable, high Alumina Mullite based or Andalusite based having good thermal stability at high temperatures
- Good alkali resistance / thermal shock resistance / abrasion resistance
- High CCS > 1000 kg/cm² at 800 °C - 1200 °C



3 TAD walls/elbows

Typical concern

- The Tertiary Air Duct helps recover valuable energy
- The air stream in TAD leaves the grate cooler at a temperature of about 1050 °C and is filled with highly abrasive clinker dust as well as residual alkali vapours
- The speed through the duct can easily reach 25-30 m/s resulting in wear of refractory linings, especially at bends and dampers

The right castable

- High Alumina bauxite based
- Excellent anti abrasion behaviour for high wear & tear
- CCS > 1000 Kg/Cm² at 800 °C - 1200 °C
- Abrasion resistance < 3 cc

4 Tip casting

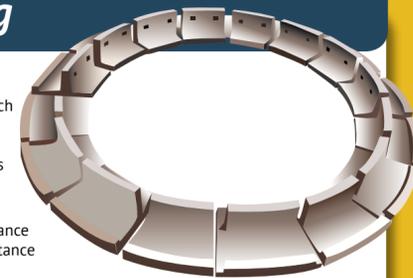
Typical concern

Tip casting is a critical area which requires the best monolithic refractories with precise installation. The castable for this area should have:

- Excellent thermal shock resistance
- Mechanical and abrasion resistance
- Chemical attack resistance

The right castable

- Low cement, Andalusite based (for thermal shock resistance)
- Preferably doped with 10-30% SiC + special additives (for abrasion/alkali resistance)
- Having high CCS close to or more than 1000 kg/cm² (for mechanical abrasion resistance)



5 Smoke chamber / kiln inlet / riser duct

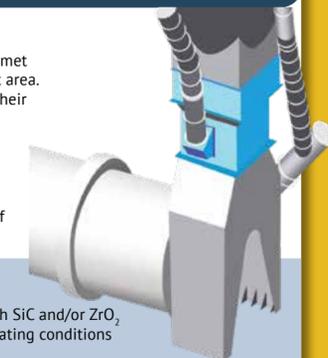
Typical concern

The worst chemical conditions are probably met in the smoke chamber, kiln inlet & riser duct area. Sulphur, chlorine and alkali may show here their worst consequences:

- Build ups
- Anchor corrosion
- Spalling because of alkali condensation
- Abrasion especially in corners and bends of riser duct

The right castable

- Low cement andalusite based & doped with SiC and/or ZrO₂
- Good anti build up behaviour for severe coating conditions
- Good thermal shock resistance
- Good alkali/chemical attack resistance
- Good mechanical abrasion resistance
- CCS > 1000 kg/cm² at 800 °C - 1200 °C



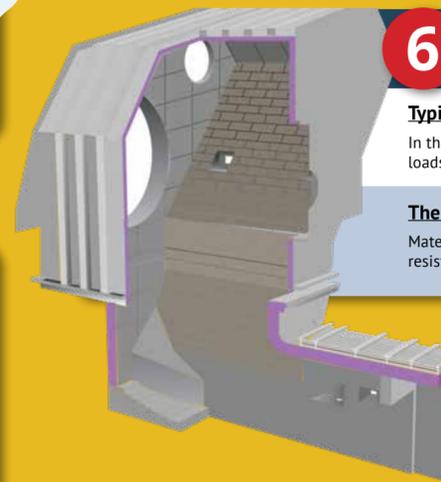
6 Kiln hood

Typical concern

In this area, the thermal and mechanical loads are high.

The right castable

Materials need refractoriness, strength, resistance against chemical attack



Dalmia Seven now offers a made-in-India portfolio of advanced monolithic refractories that meet stringent criteria for application in critical areas of a rotary kiln. Email us at Comms@DalmiaOCL.com to learn more.

Contest

Did you catch the beat?

Find out by simply answering a couple of questions. And should you want, email your answers to Comms@DalmiaOCL.com for a FREE Beat t-shirt! But hurry, only 20 t-shirts are up for grabs and will be given away on first-come-first-served basis to those who get their answers right. Here goes...

Q1. Ceramic bonds are uniform crystal bonds formed between refractory grains during high temperature firing.

(a) True (b) False

Q2. A chemical bond with an Alumina-phosphate base, over and above a normal ceramic bond in Alumina bricks has been proven to greatly improve resistance to

(a) Chemical attacks (B) Alkali attacks (C) Mechanical wear (D) All of the above



Now Reduce Your Fuel Costs With The All-New Alite

ALITE is a high-strength Low-Alumina energy-saving brick which not only withstands abrasion from kiln feed for a longer campaign life, but also reduces thermal energy losses. Specially developed for calcination & inlet zones (0-15 M), ALITE has excellent Alkali and Sulphur resistance properties. Compared to denser 40% Al₂O₃ bricks, ALITE is nearly 45% more effective in controlling radiation losses. The best part is, with fuel cost savings it pays back for itself in under 3 months.

Advertisement



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phates to the mix creates fertile ground for formation of an additional bond. During firing at low temperatures, soluble phosphates react with available Alumina to form a chemical bond (an Alumina-phosphate bond) which augments the refractory with additional strength and alkali resistance.

Most premium quality bricks (and all manufactured by Dalmia-OCL) therefore have two bonds for higher performance:

- Ceramic bond
- Alumina-orthophosphate bond

Advantage of twin-bond structure

A chemical bond with an Alumina-phosphate base, over and above the normal ceramic bond in Alumina bricks, has been proven to greatly improve resistance to chemical attacks, alkali attacks and even mechanical properties like wear resistance. This puts phosphate bonded bricks at a great advantage over normal Alumina bricks in attaining properties related to better refractory performance in all kinds of cement kilns. Email <> if you'd like to learn about phosphate bonded bricks from the house of Dalmia-OCL.

NAME OF CUSTOMER	QUALITY
J.K.LAKSHMI CEMENT LTD.	LF-60-20-PB / LF-70-20-PB
ULTRATECH CEMENT LIMITED - ADITYA	HG-45-20-PB / LF-60-20-PB
ULTRATECH CEMENT LIMITED - BALAJI	HG-45-20-PB / LF-60-20-PB
ULTRATECH CEMENT LIMITED - KOVAYA	LF-60-20-PB HG-45-20-PB
ULTRATECH CEMENT LIMITED - KOTPUTLI	HG-45-20-PB / LF-60-20-PB
ULTRATECH CEMENT LIMITED - BAGA	LF-60-20-PB
ULTRATECH CEMENT LIMITED - DALLA	LF-60-20-PB / LF-70-20-PB
ULTRATECH CEMENT LIMITED - DHAR	LF-80-20-PB
ULTRATECH CEMENT LIMITED - ADITYA	HG-45-20-PB
ULTRATECH CEMENT LIMITED - SEWAGRAM	HG-45-20-PB / LF-70-20-PB
ULTRATECH CEMENT LIMITED - BELA	LF-70-20-PB
ULTRATECH CEMENT LIMITED - RAJESHREE	LF-70-20-PB

Dalmia Seven Commissions India's Most Advanced Monolithic Refractory Production Line in Katni (MP) India



In early May, Dalmia Seven (a JV between the Dalmia Bharat Group and Seven Refractories of Europe) and part of the Group's refractory business, inaugurated a new monolithics production line at its 7 acres facility in Katni, Madhya Pradesh. The new production line is the 'first-of-its-kind' in India and equipped

to manufacture a wide range of advanced monolithic refractories. With the expansion, the capacity of the manufacturing plant is enhanced to 45,000 MT per annum. This expansion will help meet the rising demand of high grade refractory products from Iron & Steel and Cement producers in India.

A highly automated line with faster production cycles and minimal human intervention

The new monolithics production line features a high level of automation which enables precision dosing of several raw materials for efficient production of high-grade refractory products. The new line allows for faster production cycles with minimal human intervention making it the most advanced monolithics refractory production line which ensures highest standards of technology and quality. Products manufactured from the new facility will support steel industry to make high grade steel while the enhanced annual capacity of 45,000 MT will help substitute imports. The new line brings the best of global technology to India ensuring that our customers leverage the benefits of our cutting edge refractory supplies and precision.

Celebrating 'Day-1'

Earlier in May 2019, Dalmia Seven hosted around 50 customers at its facility in Katni, MP to celebrate 'Day-1' of operations of the new monolithics production line. The delegation that joined us for this proud Make-in-India occasion included professionals from Steel and Cement sectors. The 'Day-1' featured interactions among many national and international refractory experts along with a facility tour of the new automated monolithics production line.



Facility Tour



Customers participating in Monolithic Dialogues - Technical Session

Monolithic Dialogues - Technical Session

Monolithic Dialogues - a technical session held at Katni, MP brought together local and global refractory professionals to discuss on what's latest in the world of monolithics. The session that lasted half a day focused on addressing key challenges faced by refractory professionals. The Question-Answer session was led by Mr Bikash Nandi, COO, Dalmia Seven. The customers used this opportunity to put up their refractory related issues to get recommendations from our refractory experts who joined us from Seven Refractories, Europe. The team also shared briefings on Dalmia Seven products and technologies. 'Monolithic Dialogues' was well appreciated and recognized as informative and enriching by the customers.

Commenting on the announcement, Mr Sameer Nagpal, Group CEO - Refractory Business, Dalmia Bharat Group said "Dalmia Seven is committed to bringing the best in global technology to Indian steel and cement manufacturers. The new development not only addresses the increasing demand for clean steel production in India but also fulfills our commitment to continued technological investment as our country ramps up its infrastructural growth."

Production Line Tour

The technical session was followed by a facility tour which allowed the attendees to get a first-hand look of Dalmia Seven's new monolithics production line at Katni, MP. Erik Zobec, Group CEO, Seven Refractories led the group around the facility demonstrating the new technology and explaining how it all translates into tangible benefits for Dalmia Seven customers.

Commenting on the association between Dalmia Bharat Group and Seven Refractories, Erik Zobec, Group CEO, Seven Refractories stated: "We are excited to be a part of India's growth story. Our collaboration with Dalmia Bharat Group is growing day by day and with this advancement, we look forward to give Indian customers the best of quality, technology, service and flexibility. An innovative and reliable refractories partner is now available at their doorstep."



Celebrating 'Day-1'

How do you like The Refractory Beat? Bouquets, brickbats, suggestions & feedback - email us all at Comms@DalmiaOCL.com. We'd love to hear from you.