



## **STAR9 REFRASTECH**

Building the future, restoring the past.

**ISO 9001 : 2015 CERTIFIED**



## INDUSTRIES WE SERVE :

Steel



Petrochemicals



Aluminium



Fertilizer



Cement



Boilers



Foundry



Copper



Power



Incinerator





# ABOUT US :

In a 2019, the journey of Star9 Refratech start for achieve goal of success with passionate hard work; we have evolved from a small Refractory Unit with a capacity of 200 TPM in area of 5000 sq.ft. And within 3 years journey we expanded facility in 15000 sq.ft. Capacity increased upto 1200 TPM of Refractory Castables

Journey started by entrepreneur Mr. Vipul Patel in refractory field from 2003. During 2003 to 2019 period developed so many products for serve in different industries. Looking in to growth of refractory sector we decided to start our own facility and start walk baby steps and slowly start running in same path.

We offer the complete range of Alumina based refractory products, ranging from Low to high Alumina. We supplement our products basket with Metallic Anchors , Insulation material for support all our Customers by Offering Quality Refractory Materials in Difference Sectors like : Steel, Cement, Ceramics, and Others like Ferrous & Non-Ferrous, Glass, Aluminium, Forging & Foundries etc





## MISSION

"Constantly move upward in technology, product development and infrastructure, and to ensure best quality output with knowledge, experience & expertise."

In the business of heat management, our products offer immense value to our customers, We help them maximize their operational efficiency, Productivity, earnings and savings. We also help our customers in minimizing plant shutdowns, maintenance costs & heat losses.

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## VISION

"To be the leading producer of top Quality High Alumina Refractories, with sound business practices, performing to the complete satisfaction of all stakeholders all the times."

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## FUTURE PATH

- ✓ To develop Magnesia and Chrome based Monolithics to serve various industries .
- ✓ An additional separate facility occupied approx. 25000 sq. feet area for further growth plan.
- ✓ Shaped refractory products





# OUR INFRASTRUCTURE



## EXPERTISE IN :

Our team is very experienced and practical in same refractory manufacturing unit. Our team is continuing busy for development new products as well as practicing to find out new raw material for replacement of existing. Our team jointly root cause analysis of if any failure with our product or any other supplier, we always providing technical support to customers





# PRODUCT DESCRIPTION

## Conventional Product Family :

Brand Name: -	SR CRETE NORMAL	SR CRETE SUPER	SR CRETE LT	SR CRETE SPECIAL	SR BOILER PATCH
Type	45 % Alumina Castable	70 % Alumina Castable	Low Temperature Castable	60% Alumina Castable	40 % Alumina Castable
Nature of Bond	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Installation	Vibration Casting	Vibration Casting	Vibration Casting	Vibration Casting	Patching Purpose
Raw Material Base	Calcined Clay	Calcined Bauxite	Calcined Clay	Calcined Clay	Calcined Clay
Max Service Temp.	1400°C	1450°C	800°C	1400°C	1250°C
Max Grain Size	5 mm	5 mm	5 mm	5 mm	5 mm
Water Required for Casting	11-13%	10-13%	11-13%	12-14%	13-16%
<b>Chemical Analyses: - (%)</b>					
Al <sub>2</sub> O <sub>3</sub> :	45.0 Min	68.0 Min	30.0 Min	60.0 Min	40.0 Min
Fe <sub>2</sub> O <sub>3</sub> :	4.0 Max	5.0 Max	4.00 Max	4.0 Max	4.0 Max
<b>Physical Properties: -</b>					
B. D (gm/cc) Drying at 110°C/24 SRs.	2.10 Min	2.50 Min	1.90 Min	2.20 Min	2.00 Min
<b>Cold Crushing Strength (Kg/cm<sup>2</sup>):</b>					
Drying at 110°C/24 Hrs.	250 Min	350 Min	250 Min	300 Min	200 Min
Fired at 800°C/3 Hrs.	---	---	---	---	---
Fired at 1100°C/3 Hrs.	---	---	---	---	---
Fired at 1350°C/3 Hrs.	225 Min	---	---	300 Min	250 Min
Fired at 1450°C/3 Hrs.	---	450 Min	---	---	---
<b>Thermal Properties: -</b>					
<b>Permanent Linear Change (%)</b>					
Fired at 800°C/3 Hrs.	---	---	± 1.0 Max	---	± 0.50 Max
Fired at 1100°C/3 Hrs.	---	---	---	---	± 0.50 Max
Fired at 1350°C/3 Hrs.	± 1.0 Max	---	---	± 1.5 Max	---
Fired at 1450°C/3 Hrs.	---	± 1.0 Max	---	---	± 1.50 Max



## LCC Product Family :

Brand Name: -	SR LCC 45	SR LCC 60	SR LCC 70	SR LCC 80	SR LCC 90	SR LCC 95	SR LCC 70 M	SR LCC 70 LI	SR LCC 60 A	SR LCC 60 S
Type	45% Alumina LC Castable	60% Alumina LC Castable	70% Alumina LC Castable	80% Alumina LC Castable	90 % Alumina LC Castable	95 % Alumina LC Castable	Mullite Based 70% Alumina LC Castable	70% Alumina LC Castable Low Iron	Andalusite Based 60% Alumina LC Castable	LC Castable Low PLC
Nature of Bond	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Installation	Vibration Casting	Vibration Casting	Vibration Casting	Vibration Casting	Vibration Casting	Vibration Casting	Vibration Casting	Vibration Casting	Vibration Casting	Vibration Casting
Raw Material Base	Calcined Clay	Calcined Clay & Calcined Bauxite	Calcined Clay & Calcined Bauxite	Calcined Bauxite	Brown Fused Alumina (BFA)	White Tabular Alumina (WTA)	Mullite	Calcined Clay & BFA	Andalusite	Calcined Clay & Silimanite
Max Service Temp.	1550°C	1600°C	1600°C	1700°C	1700°C	1800°C	1700°C	1650°C	1600°C	1600°C
Max Grain Size	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm
Water Required for Casting	5.0- 5.5%	5.0-6.0%	5.0-6.0%	5.0-6.0%	5.0-6.0%	5.0-6.0%	5.0-6.0%	5.0-6.0%	5.0-6.0%	5.0-6.0%
<b>Chemical Analyses: - (%)</b>										
Al <sub>2</sub> O <sub>3</sub> :	45.0 Min	60.0 Min	70.0 Min	80.0 Min	90.0 Min	94.0 Min	70.0 Min	70.0 Min	60.0 Min	58.0 Min
Fe <sub>2</sub> O <sub>3</sub> :	1.5 Max	1.50 Max	1.50 Max	1.80 Max	1.0 Max	0.30 Max	0.50 Max	0.80 Max	0.80 Max	1.0 Max
CaO :	1.7 Max	1.80 Max	1.90 Max	1.90 Max	1.60 Max	1.30 Max	1.80 Max	1.80 Max	1.60 Max	1.80 Max
<b>Physical Properties: -</b>										
B. D (gm/cc) Drying at 110°C/24 hrs.	2.30 Min	2.60 Min	2.65 Min	2.90 Min	3.00 Min	3.10 Min	2.60 Min	2.65 Min	2.60 Min	2.55 Min
<b>Cold Crushing Strength (Kg/cm<sup>2</sup>):</b>										
Drying at 110°C/24 hrs.	700 Min	700 Min	750 Min	800 Min	950 Min	1000 Min	700 Min	700 Min	700 Min	750 Min
Fired at 1100°C/3hrs.	900 Min	900 Min	---	---	1100 Min	1100 Min	900 Min	800 Min	800 Min	850 Min
Fired at 1500°C/3hrs.	1000 Min	1000 Min	---	---	---	---	---	---	---	---
Fired at 1550°C/3hrs.	---	---	1000 Min	1150 Min	1200 Min	1250 Min	1100 Min	1000 Min	900 Min	1000 Min
<b>Thermal Properties: -</b>										
<b>Permanent Linear Change (%)</b>										
Fired at 1100°C/3hrs.	± 0.3 Max	± 0.3 Max	± 0.3 Max	± 0.3 Max	± 0.3 Max	± 0.3 Max	± 0.2 Max	± 0.2 Max	± 0.2 Max	± 0.2 Max
Fired at 1500°C/3hrs.	± 1.00Max	± 1.00Max	---	---	---	---	---	---	---	---
Fired at 1550°C/3hrs.	---	---	± 1.00Max	± 1.00Max	± 0.8 Max	± 0.8 Max	± 0.60 Max	± 0.70 Max	± 0.80 Max	± 0.60 Max



Water requirements indicated are based on laboratory test conditions. Actual water requirement may vary subject to site conditions. The properties shown are for vibratory cast material only unless specified otherwise. All values are based on test results on standard bars of size 160x40x40 mm. Test methods are guided by and based on various Indian Standards (IS).



## EAF & VD Delta Roof Castable :



<b>Product Name</b>	<b>Delta Castable for EAF/VD Roof</b>	
<b>Description</b>	<b>STAR9 REFRATECH</b> has developed the Delta Castable for EAF Delta to achieve highest refractoriness in a wide range of operating conditions including thermal shock, steel slag washing and gas attack, high-temperature radiation and the air abrasion caused by dust flow. Delta Castable is produced by ultrafine powder technology, high-quality binders and additives, and the precise distribution of the grain size to meet with different customers' needs.	
<b>Features</b>	<ul style="list-style-type: none"> <li>Ø Good thermal shock resistance</li> <li>Ø Good volume stability and long service life</li> <li>Ø Excellent in erosion and corrosion resistance</li> <li>Ø High temperature impact from electrodes</li> <li>Ø High temperature radiation during melting and treatment of steel</li> <li>Ø Suitable for normal EAF, Ultra High Power EAF, Refining Furnace and VD Furnace Roof</li> </ul>	
<b>TECHNICAL SPECIFICATIONS</b>		
<b>Brand Name</b>	<b>SR Delta Roof Castable (EAF ROOF)</b>	<b>SR Delta Roof Castable SPL (VD ROOF)</b>
<b>Type of Material</b>	High Alumina Aggregate based Low Cement Castable with Cr <sub>2</sub> O <sub>3</sub> and Steel Fiber	WTA, BFA Based Ultra Low Cement Castable with Cr <sub>2</sub> O <sub>3</sub> and Steel Fiber
<b>PROPERTIES OF MATERIALS:</b>		
<b>Grain Size</b>	0 - 10 mm	0 - 10 mm
<b>Installation</b>	Vibration	Vibration
<b>Bond Type</b>	Hydraulic	Hydraulic
<b>Max Service Temp.</b>	1700°C	1750°C
<b>B. D (gm/cc) 110°C/24 hrs.</b>	2.90 Min	3.20 Min
<b>Water Required for Casting</b>	4.5 – 6.0 %	4.0 – 5.5 %
<b>Cold Crushing Strength, Kg/Cm<sup>2</sup></b>		
<b>Drying at 110°C/24 hrs.</b>	300-500	500-600
<b>Firing at 1550°C/3 hrs.</b>	700-900	900-1100@ 1650°C/3hrs.
<b>Chemical Analyses: - (%)</b>		
<b>Al<sub>2</sub>O<sub>3</sub> :</b>	83.00 Min.	88.00 Min.
<b>Fe<sub>2</sub>O<sub>3</sub> :</b>	1.0 Max.	0.3 Max.
<b>Cr<sub>2</sub>O<sub>3</sub> :</b>	3.00 Max.	4.00 Max.
<b>CaO :</b>	2.00 Max.	1.50 Max.
<b>Steel Fiber</b>	Additional Max .2.0%	Additional Max. 2.0%
<b>Permanent Linear Change, %</b>		
<b>Fired at 1000°C/3hrs.</b>	± 0.3 Max	± 0.1 Max
<b>Fired at 1550°C/3hrs.</b>	± 0.8 Max	± 0.5 Max @ 1650°C/3hrs.
<b>Shelf Life</b>	6 Months	3 Months
<b>Packing 25 Kgs.</b>		
The data shown are based on average results on production samples and are subject to normal variation on individual tests hence cannot be taken as specification. Max and min. values are given separately for testing purpose.		
<b>Note: Water requirements indicated are based on laboratory test conditions. Actual water requirement may vary subject to site conditions. The properties shown are for vibratory cast material only unless specified otherwise. All values are based on test results on standard bars of size 160x40x40 mm. Test methods are guided by and based on various Indian Standards (IS).</b>		



# High Purity Product Family :



Brand Name: -	SR WHYTE A BFA BASED	SR WHYTE A BAUXITE BASED	SR WHYTE A SUPER	SR WHYTE A HS	SR WHYTE A SP	SR CAST 94 W	SR CAST 97 W	SR 95 HPM
Type	90% Alumina Dense Castable	85% Alumina Dense Castable	90% Alumina Dense Castable Super Strength	88% Alumina Dense Castable High Strength	Spinel Added High Alumina Dense Castable	94% Alumina Dense Castable (High Strength)	95% Alumina Dense Castable	95% Alumina High Purity Dense Castable
Nature of Bond	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Installation	Vibration Casting	Vibration Casting/Patching	Vibration Casting	Vibration Casting	Vibration Casting	Vibration Casting	Vibration Casting	Vibration Casting/Ramming
Raw Material Base	Brown Fused Alumina	Low Ferric Bauxite	Brown Fused Alumina	Brown Fused Alumina	HAA 86, CAC 75, Spinel 78	White Tabular Alumina	White Tabular Alumina	White Tabular Alumina
Max Service Temp.	1750°C	1700°C	1750°C	1700°C	1700°C	1800°C	1850°C	1750°C
Max Grain Size	5 mm	4 mm	5 mm	5 mm	5 mm	5 mm	5 mm	5 mm
Water Required for Casting	8.0-9.0%	10.0-11.0%	8.0-9.0%	8.0-9.0%	9.0-11.0%	8.5-9.5%	8.5-9.5%	8.5-9.5%
<b>Chemical Analyses: - (%)</b>								
Al <sub>2</sub> O <sub>3</sub> :	90.0 Min	85.0 Min	90.0 Min	88.0 Min	84.0 Min	94.0 Min	96.0 Min	94.0 Min
Fe <sub>2</sub> O <sub>3</sub> :	0.8 Max	2.0 Max	0.8 Max	0.8 Max	1.8 Max	0.3 Max	0.3 Max	0.5 Max
CaO :	---	---	---	---	---	5.0 Max	2.8 Max	3.10 Max
<b>Physical Properties: -</b>								
<b>B. D (gm/cc)</b>								
Drying at 110°C/24 hrs.	2.75 Min	2.60 Min	2.85 Min	2.75 Min	2.70 Min	2.80 Min	2.80 Min	2.80 Min
<b>Cold Crushing Strength (Kg/cm<sup>2</sup>):</b>								
Drying at 110°C/24 hrs.	600 Min	600 Min	850 Min	650 Min	530 Min	600 Min	400 Min	255
Fired at 1100°C/3hrs.	---	---	---	---	---	400 Min	250 Min	510 @1650 °C
Fired at 1550°C/3hrs.	---	---	---	---	---	700 Min	400 Min	255
<b>Thermal Properties: -</b>								
<b>Permanent Linear Change (%)</b>								
Fired at 1100°C/3hrs.	---	± 0.20	± 0.20	---	± 0.30	---	---	---
Fired at 1550°C/3hrs.	± 0.80 Max	± 1.50 Max	± 0.60 Max	± 1.00 Max	± 1.00 Max	± 0.50 Max	± 0.80 Max	± 1.00 Max @1650 °C
<b>Water requirements indicated are based on laboratory test conditions. Actual water requirement may vary subject to site conditions. The properties shown are for vibratory cast material only unless specified otherwise. All values are based on test results on standard bars of size 160x40x40 mm. Test methods are guided by and based on various Indian Standards (IS).</b>								

Brand Name: -	SR WHYTE C	SR WHYTE C SPL	SR WHYTE K	SR WHYTE K SPL	SR WHYTE M	SR GUN 45	SR GUN 55
Type	50% Alumina Dense Castable	50% Alumina Dense Castable High Strength	60% Alumina Dense Castable	60% Alumina Dense Castable High Strength	80% Alumina Dense Castable	45% Alumina Gunning Mass	50-55% Alumina Low Cement Gunning Mass
Nature of Bond	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Installation	Vibration Casting	Vibration Casting	Vibration Casting	Vibration Casting	Vibration Casting	Gunning	Gunning
Raw Material Base	Calcined Clay	Calcined Clay	Calcined Bauxite Clay	Calcined Bauxite Clay	BFA , Calcined Diaspore	Calcined Clay	Calcined Clay
Max Service Temp.	1500°C	1500°C	1600°C	1600°C	1700°C	1450°C	1550°C
Max Grain Size	5 mm	5 mm	5 mm	5 mm	5 mm	6 mm	6 mm
Water Required for Casting	10.5-11.5%	10.0-11.0%	10-11%	10-11%	9.5 - 10.5%	12-14% (As per Nozzle)	7-8% (As per Nozzle)
<b>Chemical Analyses: - (%)</b>							
Al <sub>2</sub> O <sub>3</sub> :	50.0 Min	50.0 Min	60.0 Min	60.0 Min	80.0 Min	45.0 Min	52.0 Min
Fe <sub>2</sub> O <sub>3</sub> :	1.30 Max	1.30 Max	1.0 Max	1.0 Max	1.5 Max	2.0 Max	1.0 Max
CaO :	---	---	---	---	---	---	---
<b>Physical Properties: -</b>							
<b>B. D (gm/cc)</b>							
Drying at 110°C/24 hrs.	2.10 Min	2.10 Min	2.20 Min	2.10 Min	2.60 Min	2.00 Min	2.25 Min
<b>Cold Crushing Strength (Kg/cm<sup>2</sup>):</b>							
Drying at 110°C/24 hrs.	350 Min	400 Min	350 Min	450 Min	550 Min	150 Min	400 Min
Fired at 1100°C/3hrs.	---	---	---	---	---	---	---
Fired at 1500°C/3hrs.	---	---	---	---	---	---	---
Fired at 1550°C/3hrs.	---	---	---	---	550 Min	200 min @ 1400 °C	350 Min
<b>Thermal Properties: -</b>							
<b>Permanent Linear Change (%)</b>							
Fired at 1100°C/3hrs.	---	---	---	---	± 0.20 Max	---	---
Fired at 1500°C/3hrs.	± 1.0 Max	± 1.0 Max	---	---	---	---	---
Fired at 1550°C/3hrs.	---	---	± 1.5 Max	± 1.5 Max	± 1.00 Max	± 1.00 Max @1400 °C	± 1.50 Max
<b>Water requirements indicated are based on laboratory test conditions. Actual water requirement may vary subject to site conditions. The properties shown are for vibratory cast material only unless specified otherwise. All values are based on test results on standard bars of size 160x40x40 mm. Test methods are guided by and based on various Indian Standards (IS).</b>							



# Insulating Product Family :



Brand Name: -	SR INSULCAST 4	SR INSULCAST 7	SR INSULCAST 9	SR INSULCAST 11	SR INSULCAST 13	SR INSULCAST 15	SR POURABLE INSULATION	SR INSULCAST 11 LI	SR INSULCAST 11 Lz
Type	Low Density Insulating Castable	Low Density Insulating Castable	Medium density insulating Castable	Medium density insulating Castable	Moderate density insulating Castable	Moderate density insulating Castable	Insulating Castable Used By Pouring	Medium density insulating Castable	Medium density Insulating Castable
Nature of Bond	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Installation	Tamping	Tamping	Tamping	Tamping	Tamping	Tamping	Pouring	Tamping	Tamping
Raw Material Base	Exfoliated Vermiculite	Exfoliated Vermiculite	Insulating Aggregate	Insulating Aggregate	Insulating Aggregate	Insulating Aggregate	Exfoliated Vermiculite	Insulating Aggregate	Insulating Aggregate
Max Service Temp.	1000 °C	1100 °C	1200°C	1300°C	1350°C	1350°C	900°C	1350°C	1300°C
Max Grain Size	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm
Water Required for Casting	70-100 %	40-70 %	35-40%	25-35%	25-30%	23-28%	55-70%	30-35%	40-45%
<b>Chemical Analyses: - (%)</b>									
Al <sub>2</sub> O <sub>3</sub> :	---	---	-	-	-	---	---	-	---
Fe <sub>2</sub> O <sub>3</sub> :	11.0 Max	8.5 Max	6.0 Max	3.50 Max	3.50 Max	3.20 Max	9.0 Max	1.50 Max	1.20 Max
CaO :	---	---	-	-	-	---	---	-	---
<b>Physical Properties: -</b>									
B. D (gm/cc) Drying at 110°C/24 hrs.	0.55 Max	0.85 Max	1.00 Max	1.25 Max	1.45 Max	1.60 Max	0.70 Max	1.25 Max	1.00 Max
<b>Cold Crushing Strength (Kg/cm<sup>2</sup>):</b>									
Drying at 110°C/24 hrs.	4 Min	12 Min	15 Min	35 Min	50 Min	90 Min	15 Min	45 Min	15 Min
Fired at 800°C/3hrs.	2 Min	4 Min	6 Min	25 Min	30 Min	60 Min	12 Min	30 Min	10 Min
Fired at 1100°C/3hrs.	---	6 Min	---	25 Min	30 Min	60 Min	---	30 Min	8 Min
Fired at 1200°C/3hrs.	---	---	10 Min	---	---	---	---	---	---
Fired at 1300°C/3hrs.	---	---	---	40 Min	50 Min	70 Min	---	50 Min	15 Min
<b>Thermal Properties: -</b>									
<b>Permanent Linear Change (%)</b>									
Fired at 800°C/3hrs.	± 0.40 Max	± 0.80 Max	± 0.60 Max	± 0.20 Max	± 0.20 Max	---	± 1.50 Max	---	---
Fired at 1000°C/3hrs.	± 0.60 Max	± 1.20 Max	---	---	---	---	---	---	---
Fired at 1100°C/3hrs.	---	---	± 1.00 Max	± 1.00 Max	± 0.80 Max	± 0.20 Max	---	± 0.20 Max	± 0.20 Max
Fired at 1300°C/3hrs.	---	---	---	---	---	± 1.00 Max	---	± 1.00 Max	± 1.00 Max
<b>Thermal Conductivity , K Cal/m/hr/OC</b>									
@500 °C	0.10 Max	0.18 Max	0.28 Max	0.31 Max	0.33Max	0.44Max	0.20 Max	0.21	0.22Max

Water requirements indicated are based on laboratory test conditions. Actual water requirement may vary subject to site conditions. The properties shown are for vibratory cast material only unless specified otherwise. All values are based on test results on standard bars of size 160x40x40 mm. Test methods are guided by and based on various Indian Standards (IS).

Brand Name: -	SR INSULCAST 13 LI	SR INSULCAST 15 LI	SR INSULCAST 8 S	SR INSULCAST 10 S	SR CAST 97 L	SR INSULCAST 9 HS
Type	Moderate density insulating Castable	Moderate density insulating Castable	Low density insulating Castable	Medium density insulating Castable	Insulating Castable For 1800° C Temp.	Medium density insulating Castable (High Strength)
Nature of Bond	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Installation	Tamping	Tamping	Tamping	Tamping	Tamping	Tamping
Raw Material Base	Insulating Aggregate	Insulating Aggregate	Insulating Aggregate	Insulating Aggregate	Bubble Alumina	Insulating Aggregate
Max Service Temp.	1400°C	1400°C	1300°C	1100°C	1800°C	1200°C
Max Grain Size	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm
Water Required for Casting	25-30%	23-28%	46-50%	40-46%	13-18 %	35-40%
<b>Chemical Analyses: - (%)</b>						
Al <sub>2</sub> O <sub>3</sub> :	-	---	40 Min	-	94.0 Min	40.0 Min
Fe <sub>2</sub> O <sub>3</sub> :	1.50 Max	1.50 Max	1.0 Max	6.0 Max	0.3 Max	3.0 Max
CaO :	-	---	-	-	5.0 Max	8.0 Max
<b>Physical Properties: -</b>						
B. D (gm/cc) Drying at 110°C/24 hrs.	1.45 Max	1.60 Max	0.900 Max	1.10 Max	1.65Max	1.00 Max
<b>Cold Crushing Strength (Kg/cm<sup>2</sup>):</b>						
Drying at 110°C/24 hrs.	80 Min	130 Min	25 Min	20 Min	70 Min	20 Min
Fired at 800°C/3hrs.	40 Min	75 Min	20 Min	15 Min	60 Min	8 Min
Fired at 1100°C/3hrs.	40 Min	75 Min	---	---	40 Min	---
Fired at 1200°C/3hrs.	---	---	---	12 Min	---	15 Min
Fired at 1350°C/3hrs.	---	90 Min	30 Min	---	---	---
Fired at 1550°C/3hrs.	50 Min	---	---	---	60 Min	---
<b>Thermal Properties: -</b>						
<b>Permanent Linear Change (%)</b>						
Fired at 800°C/3hrs.	---	---	± 0.30 Max	± 0.80 Max	± 0.20 Max	± 0.60 Max
Fired at 1100°C/3hrs.	± 0.20 Max	± 0.20 Max	± 0.50 Max	± 1.20 Max	± 0.20 Max	± 1.00 Max
Fired at 1350°C/3hrs.	---	± 1.00 Max	---	---	---	---
Fired at 1550°C/3hrs.	± 0.80 Max	---	---	---	± 1.00 Max	---
<b>Thermal Conductivity , K Cal/m/hr/OC</b>						
@500 °C	0.40Max	0.44Max	0.22 Max	0.22 Max	1.10 Max	0.28 Max

Water requirements indicated are based on laboratory test conditions. Actual water requirement may vary subject to site conditions. The properties shown are for vibratory cast material only unless specified otherwise. All values are based on test results on standard bars of size 160x40x40 mm. Test methods are guided by and based on various Indian Standards (IS).



# INSTALLATION OF **CASTABLE REFRACTORIES**

- Castable Refractories are hydraulic setting materials.
- They must be installed under controlled conditions to ensure that the resultant concrete has low permeability and a dense structure.
- To obtain the best results from these Castables, the following instructions must be followed.

## **Temperature :**

- In hot summer casting is done at a higher ambient temperature – the temperature of the dry materials and the water to be added should be around 20 °C.
- During the cold season, portable clean-up tap water is adequate.
- If the temperature is lower, the setting time is longer – just as a higher temperature accelerates the setting time

## **Anchoring :**

If anchoring is required, care must be taken to ensure that it is firmly welded position according to relevant specifications proper coating of the anchor must be ensured before casting.

## **Forms :**

These should be watertight and strong enough to remain rigid & undistorted during casting. Forms must be tested in the following manner before fixing to make it watertight and to achieve easy release after curing.

- Coat all the forms required for casting with suitable mould oil.
- For preventing the absorption of water, make porous working surfaces impervious.
- All form works preferably made of MS with proper stiffeners.

## **Joints :**

Care must be taken to provide expand / construction joints as per design requirements.

## **Mixing :**

Proper mixing of castable refractories is very much essential for getting optimum results utmost care is required for mixing castable refractories.

## **Water :**

- Use only portable tap water and maintain the water temperature as mentioned in beginning.
- Use the specified quantity of water, Excess water would lead to bleeding.
- Excess water also defoliates the strength of castable.
- Lesser quantity of water would affect the bonding of castable.
- Make sure that the mixer is first washed and cleaned.
- Castable refractories look very dry at the beginning but become fluid after mixing.
- To determine the optimal quantity of water the best way is to vibrate the contents using a small improvised mould or alternatively a bell in a hand



### Mixer :

Use the pan type of mixer. A concrete mixer is not suitable. The speed of the mixer may according to a type of constables. Generally, a mixer with 28 to 36 rpm is suitable for mixing the Castables



### Consistency :

Consistency could be checked to arrive at the correct moisture and flow ability. **The method is given below:**

Make a 3" ball of mix in the hand and shake horizontally. If the mix is right it appears like an oily-looking ball, if too dry, it crumbles; and if too wet, its flatness tends to flow out.

### Placing :

- Castable is a high-performance product. Their placement must be effected with the use of a high-frequency vibrator of a diameter 1 - 7/8" 2 1/2" (or approximately 40mm) working at around 14,000 VPM should be used.
- Move the vibrator slowly through the mix, withdrawing gently to prevent voids.
- Add batches of materials progressively, using vibrations until design thickness is achieved.
- Placing of each batch should be done successively within 15 to 20 minutes and care should be taken not to return excess material to the mix.
- The appearance of a plain and shining surface indicates good densification.
- Also, check the specific density from the ratio of the quantity placed and the volume of the hardware in which it is placed.
- Castables are recommended for placement by vibration not by hand due to the inherent thixotropic nature of the material.

### Finishing :

Trowel the surface only enough to make it level; avoid excessive trowelling of the surface. The castable surface should never be towelled to a slick finish.

### Removal of Forms :

Ensure that refractory castable is thoroughly set before removing forms. The work should then be covered with polyethylene sheets or by damped gunny bags/cloths.

### Curing and Drying :

Castables must be prevented from drying for at least 24 hours after the initial set. Covering with a polyethylene sheet best carries this out. Strength will continue to improve. On completion of curing, air dry for at least 24 hours, allowing free air circulation over the whole installation

### Initial Heat up :

These Castables can be heated at rates similar to standard Castables. The resultant concrete has a dense structure and care must be exercised during the initial heating. Listed below are specific recommendations for heating rates for various thicknesses

### Typical dry-out schedule for a single layer, 9" (230 mm) thick lining is given below:

Ambient Temperature to 110° C	---- 25° C per hour
Hold at 110° C	---- 1 hour per inch thickness
110° C to 550° C	---- 40° C per hour
Hold at 550° C	---- 1 hour per inch thickness
550° C to Max. Working/Using Temperature	---- 100° C per hour



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