

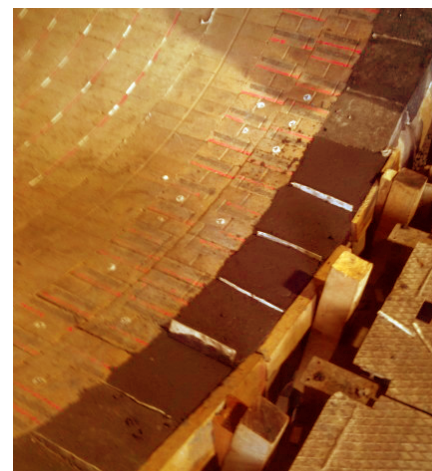
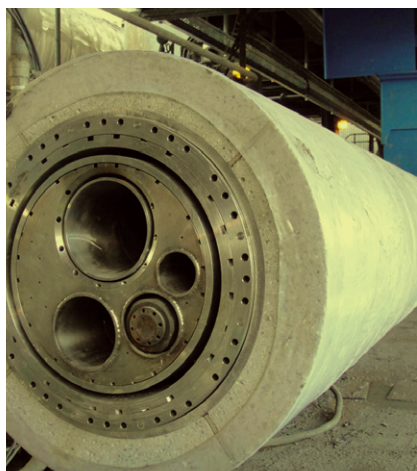
CASTABLES AND REFRACTORIES FOR CEMENT & DRI SPONGE IRON INDUSTRIES

KILN • COOLER • PREHEATER • CYCLONE

- LOW CEMENT / ULTRA LOW CEMENT CASTABLES
- GEL BONDED NO CEMENT CASTABLES
- HIGH PERFORMANCE REPAIR CASTABLES
- LOW CEMENT GUNNING CASTABLES
- ABRASION RESISTANT PLASTICS
- GUNNING PLASTICS
- PRECAST ANCHORS
- WEAR RESISTANT ALUMINA LINERS
- WEAR RESISTANT PLASTICS
- PROTECTIVE COATINGS

Introducing

*Low Cement Gunning Castables for Gunning Repair
No Cement Gel Solution for Burner Pipe*



CEMENT INDUSTRY | KILN / COOLER / PREHEATER / CYCLONE

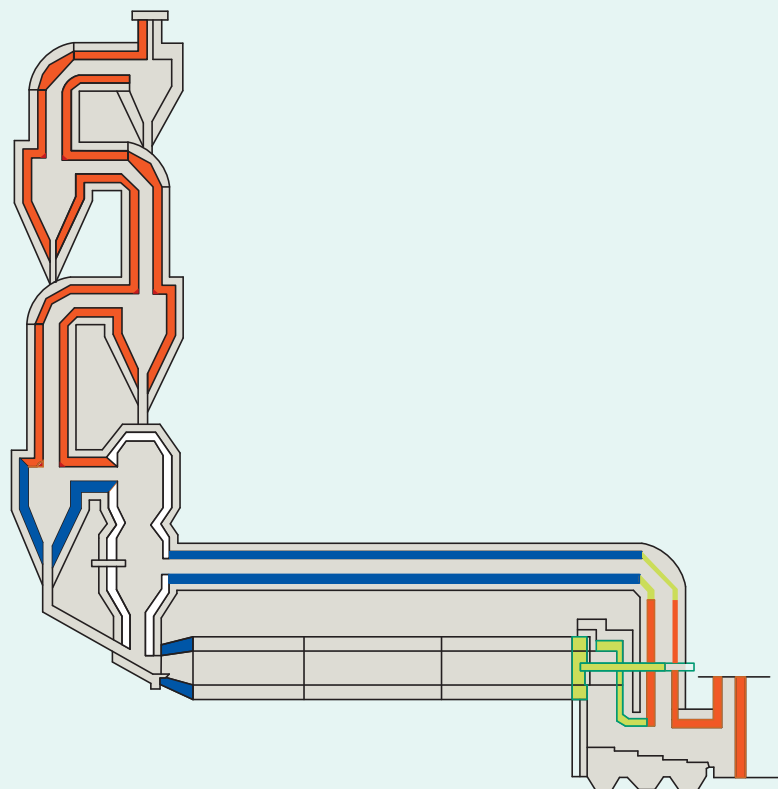


CEMENT INDUSTRY PRODUCT PORTFOLIO

Area of Application	Products Recommended	Installation by	Characteristics of the Products
Cyclone & Preheaters	Rotocrete / Rotocrete Excel	Vibration	High Strength @ 600-1100°C Region
Tip Casting Bullnose & Burner Pipe	Velcrete 002 / Velcrete 003 / Velcrete 007 / Velcrete 009	Vibration	<ul style="list-style-type: none"> • High Thermal Shock Resistance / • Abrasion Resistance • Alkali Resistance • Sulphur Attack Resistance
Smoke Chamber	Velcrete 003 SC	Vibration	Anti Coating
Maintenance & Repair	Super Patch 1400 / Rotoram 1300	Patching / Ramming	Excellent Adhesion
Coal Handling Ducts / VRM	Sharadaa HSD806	Trowelling	High Dense - Wear Resistant
Coating	AGNI - AZS	--	High Dense - Wear Resistant
Firing Hood	Velcrete 003 / VELGUN	Vibrocast Gunning	Thermal Shock Resistance

HIGH ALUMINA WEAR RESISTANCE LINERS

Attributes	Unit	Value
Alumina Content	%	92
Density	g/cc	3.65
Colour	-	White
Flexural Strength	MPa	320
Rock well Hardness	R45N	78
Vickers Hardness(HV10)	Kg/mm ²	1125
Vickers Hardness(HV5)	Kg/mm ²	1150
Vickers Hardness(HV1)	Kg/mm ²	1480
Vickers Hardness(HV0.5)	Kg/mm ²	1517
Fracture Toughness	MPa.m ^{0.5}	4-5
Thermal Expansion Coefficient (25 - 1000°C)	1X10-6/°C	8.1
Rubber Wheel Abrasion test		0.26



SHARADAA CLASSIC RANGE FOR
CEMENT PLANTS



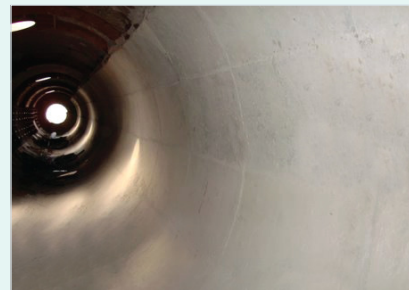
PROPERTIES	ROTOCRETE	ROTOCRETE XL	VELCRETE 003	VELCRETE 009	VELCRETE-007	VELCRETE-002	PLASCRETE 80D	PLASCRETE 90D
Service Temperature °C (Max)	1300	1400	1600	1700	1700	1400	1600	1600
Grain Size (MM) (Max)	6	6	10	6	10	6	3	3
Water Required to Mix	6	6	5	5	5	5	NA	NA
Liquid Binder Required to Mix	NA	NA	NA	NA	NA	NA	8	10
Method of Installation	Vibration	Vibration	Vibration	Vibration	Vibration	Vibration	Ramming	Ramming
Bulk Density (gm/cc) (Min) Dried at 110°C	2.3	2.3	2.6	3	3.1	2.7	2.7	2.9
Cold Crushing Strength (Kg/Cm ²) (Min)								
110°C	600	700	800	1000	1250	1000	600	900
1100°C	900	900	1000	1150	1500	1100	800	1200
1300°C	1000	1000				1200		
1500°C	NA	NA	1100	1300	2000		1000	1500
MOR (Kg/Cm ²) (Min)								
110°C	100	100	160	200	220	200	120	140
1100°C	130	140	200	210	300	220	160	180
1300°C	140	140				240	230	250
1500°C			220	230	400			
Apparent Porosity (%) at 1100°C	14 - 16	12 - 14	14 - 16	12 - 14	12 - 14	10 - 12	20 - 22	20 - 22
Permanent Linear Change (%) (Max)								
1100°C	± 0.30	± 0.30	± 0.30	± 0.30	± 0.30	± 0.30	± 0.30	± 0.30
1300°C	± 1	± 0.8			± 0.50	± 1	± 1	± 1
1500°C	± 1		± 0.8	± 1.0				
Thermal Conductivity (Kcal/m/hr/°C)								
600°C	0.9	1.02	1.1	2.3	2	2.9	1.8	2
800°C	1	1.05	1.25	2.4	2.6	3.2	2	2.2
Hot Abrasion at 900°C (CC) (Max)	10	6	4	5	5	4	5	3
Cold Abrasion (CC) (Max)	5	4	3	2	2	3	2	1.5
Alkali Resistance	Average	Good	Good	Good	Excellent	Excellent	Best	Best
Thermal Shock (Cycles) (Min)	20	30	40	30	45	45	30	30
Chemical Analysis (%)								
Mullite	40	60	60	90	60	60	80	80
Fe ₂ O ₃	2	1	1.2	0.8	0.5	1	1	1
SiC					10	7.5	7.5	
ZrO ₂						2.5	2.5	
Recommended Application areas	Preheater, Cyclone, Calcliner, TAD Bend	Cooler, TAD Damper, Bottom Cyclone, Inlet Cone	Nose Ring, Bull Nose, Cooler Side Wall, Inlet Cone, Damper	Very High Abrasion Resistance for Cooler, Bend Areas	Premium Product for Burner Pipe, Bull Noss, Nose Ring	Riser Duct, Smoke Chamber	Abrasion resistance for cold & hot application such as VRM Bend areas & Boiler Tubes	Abrasion resistance for cold & hot application such as VRM Bend areas & Boiler Tubes

SPONGE IRON | CASTABLE REFRACTORIES FOR SPONGE IRON DRI ROTARY KILNS

SPONGE IRON INDUSTRY

Standard Products for KILN	Velcrete 013A Velcrete 003	Duct Lining	Repair Castables
Low Cement Castables Sharadaa Refcast LC45 / LC DRI / LC 80	Velcrete for 3 Years Campaign Life	Sharadaa Refcast 45, Refinsul 11 By Hi Speed Gunning / Vibro Casting	Super Patch / ROTORAM / Supe FLO Series

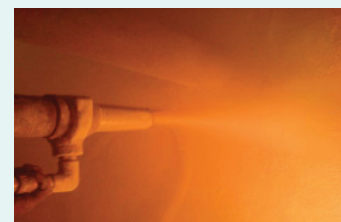
Velcrete 013A for Standard Requirement, Velcrete 003 for Premium Requirement



Sharadaa Strengths

- Proven Track Record Products in over 200 Kilns of 100 / 350 / 500 TPD
- Zero failures due to better product / installation design
- Minimal Erosion due to higher strength during accretion removal
- Lower quantity of materials consumed and hence lesser load on the kiln
- Established Patch / Ram / Flow repair Castables for repairing the holes and cavities created during accretion removal
- Carried out dual lining at 50 TPD Kilns, with Lower Skin Temperature / Fuel Cost
- Lower number of Cracks Due to Positive PLC
- Carried out supply & installation of insulation & dense castable layers by gunning in power plant duct, ABC, DSC in more than 200 installations.
- Offers Low Cement Gunning / Plastic Castables for kilns requiring hi speed installation
- Effective topping up old castable lining to reduce refractory cost and to reduce down time, extension of lining life
- Predictable life parameter with calibrated wear pattern

New Rotoram Repairs Extend old Refractory Life



DRI SPONGE IRON | SHARADAA CLASSIC RANGE

Properties	LC DRI 100 TPD	VELCRETE 013A	VELCRETE 003	NANO BOND 604
Grain Size (mm) (Max)	6 mm	10 mm	10 mm	10 mm
Water Required to Mix (Max)	5	4.8	4.5 - 5	4.5
Method of Installation	Vibration	Vibration	Vibration	Vibration
Bulk Density (gm/cc) (Min) Dried at 110°C	2.8	2.9	2.6	3
Cold Crushing Strength (Kg/cm ²)(Min)				
110°C	900	1000	1000	1100
1100°C	1000	1100	1100	1200
1300°C	1100	1200	1200	1400
MOR (Kg/cm ²) (Min)				
110°C	150	170	170	180
1100°C	180	200	200	220
1300°C	220	250	250	270
Permanent Linear Change (%) (Max)				
1100°C	± 0.30	± 0.30	± 0.30	± 0.30
1300°C	± 1	± 0.8	± 0.8	± 0.8
Thermal Conductivity (Kcal/hr/m/°C) (Max)				
600°C	1.6	1.8	1.6	2.2
800°C	1.7	1.9	1.7	2.3
Hot Abrasion at 900°C (CC) (Max)	6	5	4.5	4
Cold Abrasion (CC) (Max)	3	2.5	3.0	2
Accretion Resistance	Good	Best	Very Good	Excellent
Thermal Shock (Cycles) (Min)	35	40	40	45
Apparent Porosity (%) at 1100°C	14 - 16	12 - 14	12 - 14	12 - 14

Features - Velcrete 003

- Shell Temperature Guarantee max 290°C
- Wear Rate 25 mm per year, Cumulative 75 mm per year
- Suitable for Pellet Feeding

HIGH ALUMINA DENSE CASTABLES | SHARADAA - STANDARD REFCAST SERIES

PARTICULARS	REFCAST A	REFCAST 80	REFCAST K	REFCAST C	REFCAST A SUPER	REFCAST K SUPER	REFCAST C SUPER	REFCAST HA	REFCAST HA PLUS
GENERAL PROPERTIES									
Service Temp°C (Max)	1750	1700	1600	1500	1700	1600	1500	1800	1850
Grain Size (MM) (Max.)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Water Required to Mix (%)	8 - 10	9 - 11	9 - 11	10 - 12	8 - 10	9 - 11	10 - 12	8 - 10	8 - 10
Reversible Thermal Expansion	0.80	0.85	0.60	0.55	0.8	0.6	0.55	0.9	0.9
PHYSICAL PROPERTIES									
Bulk Density (gm/cc) (Dried at 110°C)(Min.)	2.75	2.65	2.20	2.1	2.85	2.1	2.1	2.8	2.75
Cold Crushing Strength (kgf/cm ²)									
1 Day	250	250	200	200	300	250	200	250	200
110°C	650	600	400	380	900	500	400	650	400
1100°C	400	375	300	250	450	350	275	450	300
1500°C	650	500	550	500	700	550	500	700	450
MOR, Kg/Cm ²									
110°C	95	80	65	65	105	65	65	100	75
1100°C	45	40	30	30	60	30	30	70	35
1500°C	110	100	90	85	115	90	85	100	90
THERMAL PROPERTIES									
Refractoriness°C (Min)	1800	1750	1680	1650	1750	1680	1650	+1900	+1900
Permanent Linear Change (%) (Max)									
800°C	-0.06	-0.08	-0.12	-0.06	-0.6	-0.12	-0.06	-0.05	-0.05
1100°C	-0.12	-0.15	-0.19	-0.12	-0.12	-0.19	-0.12	-0.08	-0.08
1500°C	-0.80	1.00	-1.20	-0.85	-0.7	-1.20	-0.85	-0.30	0.20
Thermal Conductivity (Kcal/hr/m/°C)									
400°C	1.10	1.05	0.80	0.75	1.15	0.80	0.70	1.35	1.40
600°C	1.18	1.10	0.85	0.85	1.20	0.85	0.75	1.37	1.42
800°C	1.25	1.15	0.95	0.85	1.30	0.95	0.80	1.40	1.46
CHEMICAL PROPERTIES(%)									
Al ₂ O ₃ (Min)	90	80	60	50	88	60	50	94	96
Fe ₂ O ₃ (Max)	0.8	1.5	1.0	1.5	0.70	1.0	1.4	0.3	0.3
Application Guidelines									
Mixer	P	P	P	P	P	P	P	P	P
Placement	V/T	V/T	V/T	V/T	V/T	V/T	V/T	V/T	V/T
Water/Mix Temperature °C	20 ± 5	20 ± 5	20 ± 5	20 ± 5	20 ± 5	20 ± 5	20 ± 5	20 ± 5	20 ± 5
Mixing Time (Min.): Dry/Wet	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5



Note :

1. Above are average typical test data subject to reasonable variations.
2. Tested as per BIS 10570: 1983.
3. Type of Mixer VAM with 33RPM
4. P: Preferred, V - Vibration , T - Tamping

LOW CEMENT CASTABLES | SHARADAA - STANDARD REFCAST SERIES

PARTICULARS	REFCAST LC45	REFCAST LC60	REFCAST LC60ABR	REFCAST LC70	REFCAST LC80	REFCAST LC90	REFCAST LC90ABR	REFCAST LC95	REFCAST ULCC90
GENERAL PROPERTIES									
Service Temp°C (Max)	1550	1600	1600	1600	1700	1700	1750	1800	1750
Grain Size (MM) (Max.)	6	6	10	6	6	6	10	6	6
Water Required to Mix (%)	5.0 - 5.5	4.8 - 5.3	4.0 - 5.0	4.8 - 5.3	4.5 - 5.0	4.5 - 5.0	4.0 - 4.5	4.5 - 5.0	4.5 - 5.0
Reversible Thermal Expansion @1000°C	0.50	0.60	0.30	0.70	0.75	0.85	0.9	0.9	0.9
PHYSICAL PROPERTIES									
Bulk Density (gm/cc) (Dried at 110°C)(Min.)	2.3	2.6	2.35	2.7	2.9	3.0	2.90	3.10	3.0
Cold Crushing Strength (kgf/cm ²)									
1 Day	200	200	250	250	250	250	300	200	200
110°C	750	800	900	800	870	1000	1100	1050	600
1100°C	950	950	1000	950	1100	1150	1300	1200	1100
1500°C	1100	1100	1100	1100	1300	1300	1500	1350	1300
MOR, Kg/cm ²									
110°C	100	120	120	130	130	140	140	160	100
1100°C	125	150	150	170	180	200	180	190	200
1500°C	165	170	180	230	250	270	220	270	260
THERMAL PROPERTIES									
Refractoriness°C (Min)	1717	1804	1804	1804	1820	1820	1820	1820	1820
Permanent Linear Change (%) (Max)									
800°C	±0.20	±0.20	±0.10	±0.20	±0.20	±0.20	±0.20	±0.20	±0.20
1100°C	±0.30	±0.30	±0.30	±0.30	±0.30	±0.30	±0.30	±0.30	±0.30
1500°C	±1.00	±1.00	±1.00	±1.00	±0.80	±0.80	±0.90	±0.70	±0.80
Thermal Conductivity (Kcal/hr/m/°C)									
400°C	0.84	0.95	0.90	1.15	1.65	2.20	2.20	2.25	2.20
600°C	1.05	1.10	1.00	1.25	1.75	2.30	2.30	2.30	2.30
800°C	1.16	1.20	1.10	1.30	1.80	2.35	2.35	2.35	2.35
CHEMICAL PROPERTIES									
Al ₂ O ₃ (Min)	45.0	60.0	60.0	70.0	80.0	90.0	90.0	94.0	90.0
Fe ₂ O ₃ (Max)	1.00	1.50	1.00	1.50	1.80	1.00	1.00	0.30	1.00
Application Guidelines									
Mixer	P	P	P	P	P	P	P	P	P
Placement	V/T	V/T	V/T	V/T	V/T	V/T	V/T	V/T	V/T
Water/Mix Temperature °C	20 ± 5	20 ± 5	20 ± 5	20 ± 5	20 ± 5	20 ± 5	20 ± 5	20 ± 5	20 ± 5
Mixing Time (Min.): Dry/Wet	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5



Application Guidelines : Mixer : P, Placement : V, Mixing Time : 2/5, Water/Temp°C : 20±5

Note :

- Above are average typical test data subject to reasonable variations
- Tested as per BIS 10570: 1983
- Essential: Strictly Measured Water%
- Application: Cold Water/Mix - 20 ± 5°C
- Requirement: 33 RPM Mixer - VAM Type, Needle/Shutter Vibrator
- Mixing Time: Dry - 2 minutes, Wet - 5 minutes

LOW CEMENT LOW POROUS RAMMING REPAIR CASTABLES

FOR CEMENT / DRI ROTARY KILNS

Properties	Rotoram Superior	Rotoram Premium	Rotoram Standard
Product Charecteristics			
Bond	Ultra fine	Ultra fine	Ultra fine
Aggregate	Bauxite	Bauxite+Cal.Pyro	Bauxite+Cal.Pyro
Type of Setting	Hydraulic	Hydraulic	Hydraulic
Service Temp °C (Max)	1400	1300	1300
Grain Size (mm)	6	6	6
Chemical Properties			
Al ₂ O ₃	75	65	57
Fe ₂ O ₃	2.0	1.8	1.4
Physical Properties			
Bulk Density after drying at 110°C (gm/cc)	2.75	2.60	2.45
Cold Crushing Strength (Kgs/cm ²)			
110°C	600	500	350
1100°C	800	700	500
1300°C	1000	900	800
Cold MOR (Kg/cm ²)			
110°C	100	80	60
1100°C	120	100	80
1300°C	140	120	100
Permanent Linear Change at 1300°C (%) (Max)	± 0.5	± 1	± 1
Installation Inputs			
Storage	Under Covered Shed	Under Covered Shed	Under Covered Shed
Shelf Life	9 Months	9 Months	9 Months
Installation Method	Ramming	Ramming	Ramming
Application Area	Recommended for top up of worn out lining with reinforcement	Recommended for top up of worn out lining with reinforcement	Recommended for top up of worn out lining with reinforcement
Water %	5 - 6	6 - 8	6 - 8
Setting Time	4 Hrs	4 Hrs	4 Hrs
Machinery Required	Paddle Mixer	Paddle Mixer	Paddle Mixer



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