



# efcom

*We make more of monolithics  
House of complete refractory solutions*

**REFCOM INDIA PRIVATE LIMITED**  
AN ISO 9001 : 2015 CERTIFIED REFRACTORY COMPANY





**Refcom** is a family owned business of Singhania's which started as a small Refractory Sloution company in 1982 to provide Castables, Service & Systems for refractory application to customers across globe with the vision, expertise , continous R&D and desire to provide quality products to customers, we have evolved into a dynamic organisation. With the strategic multi located manufacturing facilities equipped with necessary manufacturing & complete testing facilities. We are able to cater to Iron & Steel, non-ferrous metals, cement, sponge Iron, Petrochemical, Power and Foundry Industries across the globe since last 35 years.



Our quality assurance and R & D team are working constantly on designing new products to suit customer needs in todays dynamic environment. Our R&D team is in collaboration with several reputed R&D labs including SAIL-RDCIS, Ranchi for development of several innovative products and has successfully supplied the same to Indian Iron & Steel industry since last 35 years. Refcom has pioneered the LC castables with RDCIS in the year 1985 and supplied the same to many steel plants successfully. To name a few Refcom has developed & has expertise in LC Castables, Self flow castables, Insitu Spinel forming castables & special application PCPF blocks like roof banner blocks etc.



### The Core Strength :

- Complete laboratory facility in line with BIS/ASTM standards and as per end application.
- Offer Turn key Refractory Engineering, design, Supply & installation services.
- Proven systems and mixers for process & installations.
- Strong team of service engineers for end users & supervision of our supplied products.
- Industry focussed product development approach.
- We deliver our customers the best value for money.
- One stop shop for all Refractories requirement





## Product Basket

### Castables

- Medium Purity Dense Conventional Castable
- High Purity Dense Conventional Castable
- Low Cement Castable
- New Generation Low Cement Castable
- Ultra Low Cement & No Cement Castable
- Customised Low Cement Castable for Sponge Iron Plant
- Self-Flow Castable
- Gel Bonded Castable
- Gunning Castable
- Alumina-SiC-C Castable for BF Cast House Trough
- Special Application Castable
- Insulating Castable
- In-Situ Spinel Castable
- Phosphate Bonded Castable
- Delta Castable



### Ramming Mass & Mortars

- MgO Ramming Mass
- MgO Spray Mass
- Vibro Mass
- Nozzle Filling Compound
- Casting Compound
- Plastic Mouldable Mass
- Silica Ramming Mass
- High Alumina Mortar
- Fire Clay Mortar
- Air Setting Mortar
- SiC & Silica Mortar
- Green Mortar



### Pre-Cast Pre-Fired (PCPF) Refractory Shapes

- Striking Pad & Turbo Inhibitors for Tundish
- Ceramic Baffles, Dams & Weirs for Tundish
- Well Blocks & Housing Blocks
- Burner Blocks & Tuyere Blocks
- Skimmer Blocks for BF Cast House, etc.
- LC-90 & ULCC-90 Hearth Blocks & Other Parts of Reheating Furnaces
- Burner Port Blocks of Pellet Plant
- Purging Plug and Assembly
- Ceramic Lances
- Coil Rings for Induction Furnace
- Customised Shapes as per Customer's Requirement; Weighing up to 5 MT single piece





# INDUSTRY WISE

## REFRACTORY INVOLVEMENT

### STEEL

#### BLAST FURNACE

**Product:** Insulating Gunning Castables, High Purity Dense Castables, PCPF Block, Self Flow Castables, 'CO' resistance gunning castables, High Purity Dense Gunning Castables, Alumina-SiC-C castables for Cast House Runner, Tuyere Blocks, Skimmer blocks.

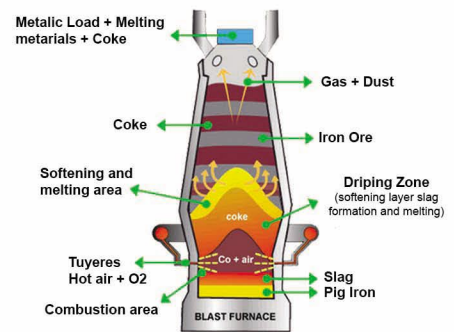


Figure 1 : Blast Furnace Operation

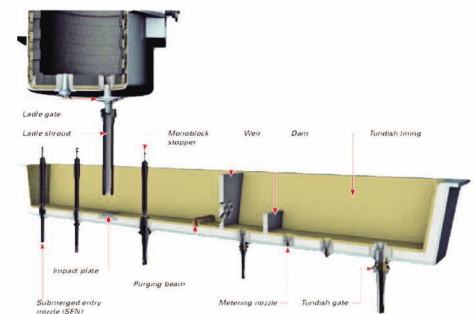
#### HOT METAL / STEEL LADLE

**Product:** High Alumina Patching Castables, Low Cement Castables, Well Blocks, Precast Lance HMDS/LF. Self Flow castable for back-up lining. Delta Castable for VAD/VOD



### TUNDISH

**Product:** Low Cement Castables for back-up, Striking Pad & Turbo Inhibitors, Ceramic Baffles, Dams & Weirs



#### REHEATING FURNACE

**Product:** ZCC/ULCC Hearth Blocks, Low Cement Castables, High Purity Dense Castables, Burner Blocks, Roof blocks and Insulating Castables.



### COKE OVENS

**Product:** Light weight Insulating Castables, High Purity Dense Castables, PCPF doors, Patching/ gunning Castables for hot repair, PCPF Dumpers and other shapes, LC Castables for doors







## SPONGE IRON

Product: Different Quality of Low Cement Castables, Mullite Castables, Insulating Castables, High Purity Dense Castables, Insulation blocks for double layer lining



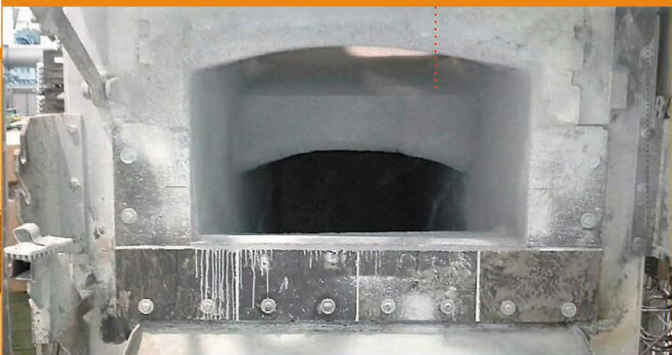
## POWER

Plastic Mouldable mass, Phosphate bonded castable, Zr Base High Abrasion Registration Castable, Insulating and Dense Castable.



## PETRO CHEMICAL

Product: Insulating Castables, Gunning Castables, Abrasion Resistant Castables, PCPF Burner Blocks, Low Cement Castables, High Purity Castables



## ALUMINIUM

Product: Non Wetting High Alumina Castables, High Alumina Bricks, Low Purity Bricks, PCPF Blocks, Insulating Bricks, Insulating Castables



## CEMENT

Low cement High Alumina Gunning Castable, High Strength Dense Castables, High Abrasion / Thermal Shock Resistance Low Cement high Performance Castables, Self Flow Castable, Litewater Insulating Gunning Castable, Low Cement Pre-Cast Blocks.







# Typical Specifications

## MEDIUM PURITY DENSE CASTABLES

| Brand Name   | RILCAST 160                  | RILCAST 200                  | RILCAST 250                  | RILCAST 450                  |
|--|------------------------------|------------------------------|------------------------------|------------------------------|
| <b>Chemical</b><br><br>Al <sub>2</sub> O <sub>3</sub> %<br>Fe <sub>2</sub> O <sub>3</sub> %  | 40.0<br>4.0                  | 45.0<br>4.0                  | 70.0<br>5.0                  | 45.0<br>2.5                  |
| <b>Physical</b><br>Bulk Density gm/cc<br>at 110°C Grading (mm)<br>CCS (kg/cm <sup>2</sup> ) min<br>110°C x 24 hrs.<br>1100°C x 3 hrs           | 2.0<br>0-6<br>300<br>250     | 2.1<br>0-6<br>350<br>250     | 2.4<br>0-6<br>350<br>300     | 2.0<br>0-6<br>300<br>250     |
| <b>Pyro - Physical</b><br>Permanent Linear Change(%)<br>(At service Temp for 3 hrs)<br>Service temp.(°C)                                       | ± 1.0<br><br>1300            | ± 1.0<br><br>1350            | ± 1.5<br><br>1450            | ± 1.0<br><br>1450            |
| <b>Application Guidelines</b><br>Water required for casting<br>% (Typical)<br><br>Water/Mix Temperature (°C)<br><br>Mixing Time (Min.):Dry/Wet | 10-15<br><br>20±5<br><br>2/5 | 10-13<br><br>20±5<br><br>2/5 | 10-13<br><br>20±5<br><br>2/5 | 10-14<br><br>20±5<br><br>2/5 |

Shelf-Life: 6 Months; Nature of Installation: Pouring / Casting / Troweling; Delivery State:Dry; Setting: Hydraulic

## HIGH PURITY DENSE CASTABLES

| Brand Name  | RILCAST 900A (S)                     | RILCAST 900A                         | RILCAST 800                         | RILCAST 600K (S)                  | RILCAST 600K                      | RILCAST 550C                      | RIL-C- 94                            | RIL-C- 97                            |
|---|--------------------------------------|--------------------------------------|-------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|--------------------------------------|--------------------------------------|
| <b>Chemical</b><br><br>Al <sub>2</sub> O <sub>3</sub> %<br>Fe <sub>2</sub> O <sub>3</sub> %   | 90.0<br>0.8                          | 86.0<br>1.5                          | 80.0<br>1.8                         | 60.0<br>1.0                       | 55<br>1.5                         | 50.0<br>1.7                       | 94.0<br>0.3                          | 96.0<br>0.2                          |
| <b>Physical</b><br>Bulk Density gm/cc<br>at 110°C<br><br>Grading (mm)<br>CCS (kg/cm <sup>2</sup> ) min<br>110°C x 24 hrs.<br>1100°C x 3 hrs.<br>1500°C x 3 hrs. | 2.75<br><br>0-6<br>650<br>600<br>750 | 2.70<br><br>0-6<br>600<br>550<br>700 | 2.5<br><br>0-6<br>550<br>500<br>650 | 2.2<br><br>0-6<br>350<br>500<br>- | 2.1<br><br>0-6<br>350<br>500<br>- | 2.0<br><br>0-6<br>300<br>450<br>- | 2.75<br><br>0-6<br>500<br>600<br>700 | 2.75<br><br>0-6<br>600<br>700<br>750 |
| <b>Pyro-Physical</b><br>Permanent Linear<br>Change (%)<br>(at service temp for 3 hrs)<br>Service temp.(°C)  | ±1.0<br><br>1750                     | ±1.0<br><br>1700                     | ±1.0<br><br>1650                    | ±1.0<br><br>1600                  | ±1.0<br><br>1550                  | ±1.0<br><br>1500                  | ±1.0<br><br>1800                     | ±1.0<br><br>1850                     |
| <b>Application Guidelines</b><br>Water required for casting<br>% (Typical)<br><br>Water/Mix Temperature<br>(°C)<br><br>Mixing Time (Min.):Dry/Wet               | 08 - 10<br><br>20+5<br><br>2/5       | 08 - 10<br><br>20+5<br><br>2/5       | 10 - 12<br><br>20+5<br><br>2/5      | 12 -14<br><br>20+5<br><br>2/5     | 12 - 14<br><br>20+5<br><br>2/5    | 10-15<br><br>20+5<br><br>2/5      | 07 - 10<br><br>20+5<br><br>2/5       | 07 - 10<br><br>20+5<br><br>2/5       |

Shelf-Life: 6 Months; Nature of Installation: Pouring / Casting / Troweling; Delivery State:Dry; Setting: Hydraulic





LOW CEMENT CASTABLES

| Brand Name   | RIL-LC 5                                       | RIL-LC 6  | RIL-LC 7   | RIL-LC 8B   | RIL-LC 8  | RIL-LC 9   | RIL-LC 95   |
|--|--|---|--|---|---|--|---|
| <b>Chemical</b><br><div>Al<sub>2</sub>O<sub>3</sub> %<br/>Fe<sub>2</sub>O<sub>3</sub> %</div>  | <div>45.00<br/>1.50</div>                      | <div>60.0<br/>1.50</div>                        | <div>70.00<br/>1.50</div>                        | <div>80.00<br/>1.80</div>                         | <div>80.00<br/>1.00</div>                         | <div>90.00<br/>1.00</div>                        | <div>92.0<br/>0.8</div>                           |
| <b>Physical</b><br>Bulk Density gm/cc at 110°C<br>Grading<br>CCS (kg/cm <sup>2</sup> ) min<br>110°C x 24 hrs.<br>900°C x 3 hrs.<br>1500°C x 3 hrs. | <div>2.3<br/>0-6<br/>650<br/>800<br/>900</div> | <div>2.5<br/>0-6<br/>700<br/>900<br/>1000</div> | <div>2.65<br/>0-6<br/>750<br/>950<br/>1100</div> | <div>2.75<br/>0-6<br/>900<br/>1000<br/>1100</div> | <div>2.8<br/>0-6<br/>1000<br/>1200<br/>1300</div> | <div>2.9<br/>0-6<br/>950<br/>1100<br/>1200</div> | <div>3.0<br/>0-6<br/>1000<br/>1200<br/>1350</div> |
| <b>Pyro - Physical</b><br>Permanent Linear Change (%)<br>900°C x 3 hrs<br>1500°C x 3 hrs<br>Service temp.(°C)                                      | <div><br/>±0.3<br/>±1.0<br/>1500</div>         | <div><br/>±0.3<br/>±1.0<br/>1600</div>          | <div><br/>±0.3<br/>±1.0<br/>1600</div>           | <div><br/>±0.3<br/>±0.8<br/>1700</div>            | <div><br/>±0.2<br/>±0.6<br/>1750</div>            | <div><br/>±0.3<br/>±0.8<br/>1700</div>           | <div><br/>±0.3<br/>±0.9<br/>1800</div>            |
| <b>Application Guidelines</b><br>Water required for casting % (Typical)<br>Water/Mix Temperature (°C)<br>Mixing Time (Min.):Dry/Wet                | <div>5.5-6.5<br/>20±5<br/>2/5</div>            | <div>5.0-6.0<br/>20±5<br/>2/5</div>             | <div>5.0-5.5<br/>20±5<br/>2/5</div>              | <div>5.0-5.5<br/>20±5<br/>2/5</div>               | <div>4.5-5.0<br/>20±5<br/>2/5</div>               | <div>4.0-4.5<br/>20±5<br/>2/5</div>              | <div>3.5-4.5<br/>20±5<br/>2/5</div>               |

Shelf-Life: 3-6 Months; Nature of Installation: Vibro -Casting; Delivery State: Dry;

ULTRA LOW CMENT CASTABLES

| Brand Name   | RIL-ULCC 70                                    | RIL-ULCC 90                                     | RIL-ULCC 95                                      |
|--|--|---|--|
| <b>Chemcal</b><br><div>Al<sub>2</sub>O<sub>3</sub> %<br/>Fe<sub>2</sub>O<sub>3</sub> %<br/>CaO %</div>                                     | <div>70.0<br/>1.0<br/>0.5</div>                | <div>90.0<br/>0.8<br/>0.5</div>                 | <div>94.0<br/>0.3<br/>0.4</div>                  |
| <b>Physical</b><br>Bulk Density gm/cc at 110°C<br>Grading (mm)<br>CCS (kg/cm2) min<br>110°C x 24 hrs.<br>900°C x 3 hrs.<br>1500°C x 3 hrs. | <div>2.8<br/>0-6<br/>400<br/>500<br/>900</div> | <div>2.9<br/>0-6<br/>500<br/>900<br/>1100</div> | <div>3.0<br/>0-6<br/>700<br/>1000<br/>1200</div> |
| <b>Pyro-Physical</b><br>Permanent Linear Change (%)<br>900°C x 3 hrs<br>1500°C x 3 hrs<br>Service temp.(0C)                                | <div><br/>±0.3<br/>±0.7<br/>1700</div>         | <div><br/>±0.2<br/>±0.6<br/>1750</div>          | <div><br/>±0.2<br/>±0.5<br/>1800</div>           |
| <b>Application Guidelines</b><br>Water required for casting % (Typical)<br>Water/Mix Temperature (0C)<br>Mixing Time (Min.):Dry/Wet        | <div>4.0-5.0<br/>20±5<br/>2/5</div>            | <div>3.5-4.0<br/>20±5<br/>2/5</div>             | <div>3.5-4.0<br/>20±5<br/>2/5</div>              |

Shelf-Life: 3-6 Months; Nature of Installation: Vibro -Casting; Delivery State: Dry;





## SELF FLOW CASTABLES

| Brand Name   | RILMON SF 60  | RILMON SF 70                        | RILMON SF 80                         | RILMON SF 90                         |
|--|---|-------------------------------------|--------------------------------------|--------------------------------------|
| <b>Chemical</b><br>$\text{Al}_2\text{O}_3\%$<br>$\text{Fe}_2\text{O}_3\%$  | 60.0<br>1.5   | 70.0<br>1.5                         | 80.0<br>1.5                          | 88.0<br>1.2                          |
| <b>Physical</b><br>Bulk Density gm/cc at 110°C<br>Grading (mm)<br>CCS (kg/cm <sup>2</sup> ) min<br>110°C x 24 hrs.<br>1000°C x 3 hrs.<br>1500°C x 3 hrs. | 2.4<br>0-6<br><br>350<br>500<br>800   | 2.6<br>0-6<br><br>400<br>600<br>900 | 2.7<br>0-6<br><br>400<br>700<br>1000 | 2.8<br>0-6<br><br>450<br>800<br>1100 |
| <b>Pyro-Physical</b><br>Permanent Linear Change (%)<br>1000°C x 3 hrs<br>1500°C x 3 hrs<br>Service temp.(°C)   | <br><br>±0.3<br>±0.8<br>1600  | <br><br>±0.3<br>±0.8<br>1650        | <br><br>±0.3<br>±0.8<br>1650         | <br><br>±0.3<br>±0.7<br>1700         |
| <b>Application Guidelines</b><br>Water required for casting % (Typical)<br>Water/Mix Temperature (°C)<br>Mixing Time (Min.):Dry/Wet                      | 7.0-10.0<br>20±5<br>2/5   | 7.0-10.0<br>20±5<br>2/5             | 6.0-8.0<br>20±5<br>2/5               | 6.0-8.0<br>20±5<br>2/5               |
| <b>Unique Properties</b>   | <ul style="list-style-type: none"> <li>● Self-flowing, requires no vibration</li> <li>● Can be used to install new monolithic linings, repair bricks/monolithic linings.</li> <li>● Strong bonding with old innings.</li> <li>● Supplied with the required setting property.</li> </ul> |                                     |                                      |                                      |

Shelf-Life: 3-6 Months ; Nature of Installation: Vibro - Casting; Delivery State: Dry

## SPECIAL PURPOSE CASTABLES

| Brand Name  | RILMON 75 PAR   | RILMON-SF 75Z   | RILMON-SC   | RILMON-DEL   |
|---|---|---|---|--|
| <b>Chemical</b><br>$\text{Al}_2\text{O}_3\%$<br>$\text{Fe}_2\text{O}_3\%$<br>$\text{CaO}\%$<br>$\text{ZrO}_2\%$   | 74<br>1.0<br>2.0<br>-                                       | 75<br>1.0<br>2.0<br>10                                | 65<br>1.0<br>2.0 (C)<br>20 (SiC)                  | 80<br>2.0<br>3 ( $\text{Cr}_2\text{O}_3$ )<br>-    |
| <b>Physical</b><br>Bulk Density gm/cc at 110°C<br>Grading (mm)<br>CCS (kg/cm <sup>2</sup> ) min<br>110°C x 24 hrs.<br>1000°C x 3 hrs.<br>1400°C x 3 hrs.<br>1450°C x 3 hrs.<br>1550°C x 3hrs.<br>Flow as per ASTM-C-860 free flow test, % | 2.75<br>0 - 6<br><br>1100<br>1300<br>-<br>1500<br>1800<br>- | 3.0<br>0 - 6<br><br>550<br>-<br>1500<br>-<br>-<br>100 | 2.95<br>0 - 8<br><br>350<br>-<br>-<br>-<br>-<br>- | 2.8<br>0 - 8<br><br>450<br>-<br>900<br>-<br>-<br>- |
| <b>HMOR (kg/cm<sup>2</sup>)</b><br>1200°C x 3hrs<br>1200°C x 30 min.<br>(on prefire sample at 1200°C x 3hrs)  | 120<br>-  | -<br>60   | -<br>-  | -<br>-   |
| <b>Pyro-Physical</b><br>Permanent Linear Change (%)<br>1000°C x 3 hrs<br>1400°C x 3 hrs.<br>1500°C x 3hrs<br>1550°C x 2 hrs<br>Service temp.(°C)  | <br>±0.2<br>-<br>-<br>±0.4<br>1750                          | <br>-<br>± 1.0<br>-<br>-<br>-                         | <br>-<br>± 0.5<br>-<br>-<br>-                     | <br>-<br>± 1.0<br>-<br>-<br>-                      |
| <b>Application Guidelines</b><br>Water required for casting % (Typical)   | 4-5.0   | 5-6   | -   | -  |
| <b>Application Area</b>   | DRI / Pelet Kilns   | BF Blow Pipe & Tuyere Stock                           | BF Cast House Runner/Skimmer                      | VAD / VOD Roof Delta                               |





GUNNING CASTABLES

| Brand Name  | RILGUN 35                             | RILGUN 40                             | RILGUN 60                             | RILGUN - INS                       |
|---|---------------------------------------|---------------------------------------|---------------------------------------|------------------------------------|
| <b>Chemical</b><br>Al <sub>2</sub> O <sub>3</sub> % (min)<br>Fe <sub>2</sub> O <sub>3</sub> % (max)   | 35.0<br>3.0                           | 40.0<br>2.5                           | 60.0<br>2.0                           | -<br>1.5                           |
| <b>Physical</b><br>Bulk Density gm/cc at 110°C/24 hrs (min)<br>Estimated Coverage (kg/cm <sup>2</sup> )<br>CCS (kg/cm2) min<br>110°C x 24 hrs.<br>800°C x 3 hrs.<br>1500°C x 3 hrs. | 1.90<br>1900<br><br>350<br>200<br>170 | 1.95<br>2000<br><br>350<br>250<br>200 | 2.15<br>2200<br><br>350<br>280<br>500 | 1.10<br>1150<br><br>60<br>40<br>35 |
| <b>Pyro-Physical</b><br>Permanent Linear Change (%)<br>800°C / 3 hrs<br>1200°C / 3 hrs<br>Service temp.(°C)<br>Thermal Conductivity at 500°C (Kcal/m-hr°C)                          | <br>±0.3<br>±0.5<br>1300<br>—         | <br>±0.3<br>±0.5<br>1400<br>—         | <br>±0.3<br>±0.5<br>1600<br>—         | <br>±0.5<br>±1.0<br>1250<br>0.18   |
| <b>Application Guidelines</b><br>Water required for casting %<br>Application Procedure  | 13 - 15<br>Gunning                    | 13 - 15<br>Gunning                    | 12 - 14<br>Gunning                    | 40 - 50<br>Gunning                 |

Shelf-Life: 6 - 9 Months; Nature of Installation: Gunning / Casting; Delivery State: Dry Powder

INSULATING CASTABLES

| Brand Name   | RIL-IN 4              | RIL-IN 7           | RIL-IN 9             | RIL-IN 11            | RIL-IN 13            | RIL-IN 15            | RIL-IN 11LI          | RIL-IN 13LI          | RIL-IN 15LI           |
|--|-----------------------|--------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|
| Hot Face Temp (°C)   | 1000                  | 1100               | 1100                 | 1350                 | 1350                 | 1350                 | 1350                 | 1350                 | 1350                  |
| Bulk Density gm/cc (Dried at 110°C)  | 0.5                   | 0.85               | 1.1                  | 1.25                 | 1.45                 | 1.6                  | 1.25                 | 1.45                 | 1.6                   |
| Permanant Liner Change (%)<br>(Temp X 3 hrs.)                                      | ± 0.8<br>1000°C       | ± 1.6<br>1100°C    | ± 1.2<br>1100°C      | ± 1.0<br>1300°C      | ± 0.7<br>1300°C      | ± 0.7<br>1300°C      | ± 1.0<br>1300°C      | ± 0.7<br>1300°C      | ± 0.9<br>1300°C       |
| Cold Crushing Strength (Kg/cm <sup>2</sup> )<br>110°C<br>800°C<br>1100°C<br>1300°C | 2.0<br>--<br>--<br>-- | 12<br>4<br>6<br>-- | 20<br>10<br>11<br>-- | 35<br>25<br>25<br>50 | 50<br>30<br>30<br>50 | 90<br>60<br>60<br>70 | 45<br>30<br>30<br>50 | 85<br>40<br>40<br>45 | 130<br>75<br>75<br>90 |
| Thermal Conductivity Kcal / m <sup>2</sup> / hr / °C                               | 0.09                  | 0.14               | 0.27                 | 0.31                 | 0.32                 | 0.42                 | 0.34                 | 0.40                 | 0.44                  |
| Chemical Analysis (%) Fe <sub>2</sub> O <sub>3</sub>                               | 11.0                  | 8.5                | 6.0                  | 3.5                  | 3.5                  | 3.5                  | 1.5                  | 1.5                  | 1.5                   |
| Grain Size (mm)Max   | 8.0                   | 8.0                | 8.0                  | 6.0                  | 6.0                  | 6.0                  | 6.0                  | 6.0                  | 6.0                   |
| Application Guidelines<br>Water/ Mix Temperature (°C)<br>Mixing Time (Min) Dry/Wet | 19 ± 5<br><br>3/5     | 19 ± 5<br><br>3/5  | 19 ± 5<br><br>3/5    | 19 ± 5<br><br>3/5    | 19 ± 5<br><br>3/5    | 19 ± 5<br><br>3/5    | 19 ± 5<br><br>3/5    | 19 ± 5<br><br>3/5    | 19 ± 5<br><br>3/5     |

Shelf-Life: 3-6 Months; Nature of Installation: Vibro -Casting; Delivery State: Dry







PRE-CAST PRE-FIRED BLOCK

| Brand Name   | PCPF-LC-50              | PCPF-LC-60           | PCPF-LC-70              | PCPF-LC-80             | PCPF-LC-90            | PCPF-ULCC-95          | PCPF-BB (Spalling Rasistance) |
|--|-------------------------|----------------------|-------------------------|------------------------|-----------------------|-----------------------|-------------------------------|
| Chemical<br>Al <sub>2</sub> O <sub>3</sub> %(min)<br>Fe <sub>2</sub> O <sub>3</sub> %(max)                           | 45-50<br>1.0-1.5        | 60-65<br>1.0-1.5     | 70-75<br>1.0-1.5        | 75-80<br>1.0-1.5       | 85-90<br>1.0-1.2      | 90-95<br>0.5-1.0      | 65-70<br>1.0                  |
| Physical<br>Bulk Desnsity gm/cc (110°C /24hrs) min<br>Apperent Porosity (%) max<br>Cold Curshing Strength (kg/sq.cm) | 2.4-2.5<br>10-15<br>800 | 2.5-2.6<br>15<br>900 | 2.65-2.75<br>13<br>1000 | 2.8-2.85<br>12<br>1000 | 2.9-3.0<br>11<br>1200 | 3.0-3.1<br>10<br>1500 | 2.6-2.7<br>12<br>1200         |
| Pyro - Physical<br>Permanent Linear Change (%) max 1450°C/ 3hrs<br>Max. Service Temperature (°C)                     | ±1.0<br>1500            | ±1.0<br>1600         | ±1.0<br>1600            | ±1.0<br>1700           | ±0.5<br>1750          | ±0.5<br>1800          | ±1.0<br>1800                  |

Delivery State: Pre-cast Pre-Fired Shapes as drawing of customer

FIRECLAY AND HIGH ALUMINA MORTARS

| Brand Name   | RILBOND 3                             | RILBOND 4                             | RILBOND 5  | RILBOND 6  | RILBOND 7  | RILBOND 8  | RILBOND 9  |
|--|---------------------------------------|---------------------------------------|--|--|--|--|--|
| Chemical<br>AL <sub>2</sub> O <sub>3</sub> %<br>Fe <sub>2</sub> O <sub>3</sub> % | 30<br>2.5                             | 38-40<br>3.5                          | 50<br>3.5  | 60<br>3.5  | 70<br>3.5  | 80<br>2.5  | 90<br>1.5  |
| Physical<br>PCE OC Grading (mm)  | 28<br>0 - 1.0                         | 30<br>0 - 1.0                         | 31<br>0 - 0.5  | 32<br>0 - 0.5  | 33<br>0 - 0.5  | 35<br>0 - 0.5  | 36<br>0 - 0.5  |
| Pyro-Physical<br>Service Temp (°C)   | 1350                                  | 1450                                  | 1500   | 1550   | 1600   | 1700   | 1750   |
| Application Guidelines<br>Types of Setting<br>Application Area                   | Ceramic<br><br>For Laying IS-6 bricks | Ceramic<br><br>For Laying IS-8 bricks | Ceramic<br><br>For Laying 50 % Al <sub>2</sub> O <sub>3</sub> bricks | Ceramic<br><br>For Laying 60 % Al <sub>2</sub> O <sub>3</sub> bricks | Ceramic<br><br>For Laying 70 % Al <sub>2</sub> O <sub>3</sub> bricks | Ceramic<br><br>For Laying 80 % Al <sub>2</sub> O <sub>3</sub> bricks | Ceramic<br><br>For Laying 90 % Al <sub>2</sub> O <sub>3</sub> bricks |







AIR SETTING AND GREEN MORTARS

| Brand Name                       | RILSET - 5D<br>(Normal) | RILSET - 5D<br>(Fine) | RILSET - 70K<br>(Green)        | RILSET - 90K<br>(Green) |
|----------------------------------|-------------------------|-----------------------|--------------------------------|-------------------------|
| <b>Chemical</b>                  |                         |                       |                                |                         |
| AL <sub>2</sub> O <sub>3</sub> % | 50                      | 50                    | 70                             | 90                      |
| Fe <sub>2</sub> O <sub>3</sub> % | 4.0                     | 3.5                   | -                              | -                       |
| <b>Physical</b>                  |                         |                       |                                |                         |
| PCE OC                           | 31                      | 31                    | 36                             | 37                      |
| Grading (mm)                     | 0 - 1.0                 | 0 - 0.5               | 0 - 0.5                        | 0 - 0.5                 |
| <b>Pyro-Physical</b>             |                         |                       |                                |                         |
| Service Temp (OC)                | 1500                    | 1550                  | 1600                           | 1800                    |
| Sintering Temperature            | 1100                    | 1100                  | 1200                           | 1200                    |
| <b>Application Guidelines</b>    |                         |                       |                                |                         |
| Type of Setting                  | Air                     | Air                   | Air /<br>Chemical /<br>Ceramic | Chemical /<br>Ceramic   |

PLASTIC MOULDABLE MASS

| Brand Name  | RIL PLAST - 45     | RIL PLAST - 60     |
|---|--------------------|--------------------|
| <b>Chemical</b>                                   |                    |                    |
| AL <sub>2</sub> O <sub>3</sub> %                  | 45.0               | 70.0               |
| Fe <sub>2</sub> O <sub>3</sub> %                  | 1.5                | 1.5                |
| <b>Physical</b>                                   |                    |                    |
| Bulk Density gm / cc at 110°C                     | 2.25               | 2.5                |
| Grading (mm)                                      | 0 - 6              | 0 - 6              |
| CCS (kg/cm <sup>2</sup> ) min                     |                    |                    |
| 300°C x 24 hrs.                                   | 80                 | 100                |
| 800°C x 3 hrs.                                    | 220                | 250                |
| 1450°C x 3 hrs.                                   | 350                | 400                |
| <b>Pyro-Physical</b>                              |                    |                    |
| Permanent Linear Change (%)                       |                    |                    |
| 1450°C x 3hrs.                                    | ± 0.5              | -                  |
| 1550°C x 3hrs.                                    | -                  | ± 0.5              |
| Service temp (°C)                                 | 1450               | 1650               |
| <b>Application Guidelines</b>                     |                    |                    |
| Liquid Binder required for casting %<br>(typical) | 8                  | 8                  |
| Water required for casting % (typical)            | 2 - 3              | 2 - 3              |
| Water / Mix Temperature (°C)                      | 20 ± 5             | 20 ± 5             |
| Type of Setting                                   | Chemical / Ceramic | Chemical / Ceramic |
| Mixing Time (min): Dry / Wet                      | 2/5                | 2/5                |

Shelf-Life: 6 Months; Nature of Installation: Pouring / Casting / Troweling; Delivery State:Dry;







## BASIC RAMMING MASSES

| Brand Name        | MgO (%)<br>min | SiO <sub>2</sub> (%)<br>max                  | Fe <sub>2</sub> O <sub>3</sub> (%)<br>max | Setitng  | Grading (mm) | Sintering Temp. (°C)<br>Min. | Application Temp. (°C)<br>Max. | Application Area  |
|-------------------|----------------|--|---|----------|--------------|------------------------------|--------------------------------|---|
| RIL-RAM M84       | 83             | 8.5  | -   | Chemical | 0-5          | 1550                         | 1750                           | Wet Raming Mass for EAF   |
| RIL-RAM M84 (SPL) | 83             | 7.5  | -   | -do-     | 0-5          | 1550                         | 1750                           | -do-  |
| RIL-RAM M90       | 90             | 5  | -   | Chemical | (0-5)        | 1550                         | 1700                           | Wet ramming mas for EAF & other application                           |
| RIL-RAM M95       | 94             | 1.5  | -   | Chemical | 0-5          | 1550                         | 1750                           | TAP hole BOF  |
| RIL-RAM H1        | 85             | 5.0  | 6   | Ceramic  | 0-6          | 1400                         | 1750                           | Dry Ramming Mass for FAF bottom                                       |
| RIL-RAM H2        | 80             | 1.5  | 6   | Ceramic  | (0-8)        | 1400                         | 1750                           | Dry Ramming mass for FAF bottom                                       |
| RI-RAM C(X)       | 70             | Cr <sub>2</sub> O <sub>3</sub> : 5<br>(Min.) | -   | Chemical | 0-5          | 800                          | 1750                           | Dry Ramming mas for induction fumace melting mild steel & alloy steel |
| RIL-COAT-M        | 88             | -  | -   | Chemical | 0-0.5        | -                            | -                              | Protective coating of coils of high frequency induction fumace        |

## NOZZLE FILLING COMPOUND

| Brand Name                            | SiO <sub>2</sub> (%) | Cr <sub>2</sub> O <sub>3</sub> (%)min | Cr <sub>2</sub> O <sub>3</sub> (%)min | Grain Size (mm) | Service Temp. °C Max. |
|---------------------------------------|----------------------|---------------------------------------|---------------------------------------|-----------------|-----------------------|
| RIL-NFC-L/T<br>Silica Based           | 94                   | -                                     | -                                     | 0-1.5           | 1650                  |
| RIL-NFC-XC1<br>Chrome Based, Type-1   | 54                   | 30                                    | -                                     | 0-1.5           | 1720                  |
| RIL-NFC-XC2<br>Chrome Based, Type-2   | 64                   | 15                                    | -                                     | 0-1             | 1720                  |
| RIL-NFC-XZ1<br>Zircon Based, Type-I   | -                    | -                                     | 60                                    | 0-0.8           | 1800                  |
| RIL-NFC-XZ2<br>Zircon Based, Type-II  | -                    | -                                     | 30                                    | 0-1             | 1780                  |
| RIL-NFC-XZ3<br>Zircon Based, Type-III | -                    | -                                     | 15                                    | 0-1             | 1750                  |







# CONTROLLED MONOLITHIC INSTALLATION TECHNIQUES

- Recommended Mixer capacity : 100 / 200 Kgs Minimum
- Mixer Blade / RPM -60 Min -Blade properly configured
- -Should ensure through mixing with % of water specified
- Material should be under the covered shed - 100% compliance required
- Ice water at (10°C-15°C) preferable
- Water PH: Must be 7
- Measurement of Water : Only in 5 Kg pre-calibrated plastic jar
- Well cleaned mixer and vibrator after every batch
- Dry mixing - 30 Sec to 1 Minute
- 100% specified water to be poured at one time in 30 seconds by well speared
- Wet Mixing minimum 3 to 4 minutes (Record the time)
- Mixture should have the cover to eliminate the dust loss
- Shuttering removal and kiln rotation only after 8 Hrs.
- Covering of the cast segment by wet Gunny bag for 24 Hrs
- Heat curing supervision as per our cycle is mandatory
- SCPL provides Quality assistant for each site and for all supplies.
- Shuttering -5mm thick . Inside machining with external vibrator clamping mechanism with minimum gaps.
- Vibrator - External with variable frequency drive essential or 60mm / Poker vibrations.
- No direct sunlight on mix at any time
- Avoid casting adjacent to the running kiln without protection. Introduce ceramic fibre curtain.
- Place the needle vibrator inside the shuttering and put the mix and vibrate it 2 minutes for 50 Kgs approximately
- Anchor Tip must be covered with tape / plastic cap

## DIMENSIONAL TOLERANCE AND VISUAL CHECKS FOR PRECAST SHAPES

| DIMENSION                        | FOR BELOW 200mm   | FROM 200mm TO 500mm               | ABOVE 500mm                        |
|----------------------------------|---|-----------------------------------|------------------------------------|
| LENGTH /<br>WIDTH /<br>THICKNESS | ± 1.5 % OR 2mm<br>WHICHEVER IS MORE   | ± 1 % OR 5mm<br>WHICHEVER IS LESS | ± 1 % OR 10mm<br>WHICHEVER IS LESS |
| BOW                              | 1% OR 2.5mm. WHICHEVER IS LESS  |                                   |                                    |
| VISUAL<br>DEFECTS                | THERE SHOULD BE NO CAST HOLES > 10mm. DIAMETER AND > 6mm DEEP ON ANY SURFACE                                      |                                   |                                    |
|                                  | THERE SHOULD BE NO VISIBLE CRACK ON ANY SURFACE BUT HAIR-LINE<br>CRACKS OF NOT MORE THAN 2mm DEPTH ARE ACCEPTED   |                                   |                                    |
|                                  | NO BLACK SPOT OR HOLE OF MORE THAN 6mm DIAMETER NO MORE<br>THAN 2 BLACK OR BROWN SPOTS PER FACE AND 6 PER PRODUCT |                                   |                                    |
|                                  | NO CORNER / EDGE CHIPPING OF MORE THAN 25mm OF TOTAL LENGTH   |                                   |                                    |
|                                  | NO CORNER / EDGE CHIPPING MORE THAN 8mm IN ONE SINGLE SURFACE   |                                   |                                    |
|                                  | NO CONTAMINATION  |                                   |                                    |
|                                  | NO BLOWN  |                                   |                                    |





# REFCOM - Associates for Total Turnkey Solution & Services

**GLOBAL REFRACTORY SOLUTIONS ----- One Window Shop** for all shaped & non-monolithic refractories.

**GLOBAL REFRACTORY SOLUTIONS** is a sister concern of **M/S Refcom (India) Pvt. Ltd.**, has been operating since 2007 with its prime objective to fulfil the requirements of shaped & non-monolithic refractories of process industries and supply complete package with all allied accessories & services other than monolithics.

Currently following products are being offered by **GLOBAL REFRACTORY SOLUTIONS** to its clients :

- Dense / High Alumina Bricks / Tiles & Other shapes
- Insulation Bricks
- Calcium Silicate Blocks
- Ceramic Paper / Fibre / Board / Blankets
- Acid Proof Bricks
- Silica Ramming Mass
- Ladle Covering Compounds
- Ladle Bricks & Tiles, Burner Block / Well Blocks
- Pulging Refractories like Nozzle , Slide plate, Porous Plugs etc.
- Tundish Boards both Silica & Magnesite
- All types of SS - Anchors (SS- 304/ 316 Gr.) as per standard design & as per clients design.



We also undertake complete Refractory installation jobs upto final heating up under supervision of qualified engineers & team equipped with all required machine / tools & tackles etc.

## GENERAL FIRE BRICKS

| Product | Al <sub>2</sub> O <sub>3</sub><br>% | Fe <sub>2</sub> O <sub>3</sub><br>% | P.C.E<br>OC | A.P.<br>% | B.D.<br>gm / cc | C.C.S.<br>Kg/cm <sup>2</sup> | RUL<br>°C | PLC at deg C/hrs<br>% |
|---------|-------------------------------------|-------------------------------------|-------------|-----------|-----------------|------------------------------|-----------|-----------------------|
| RIL 30  | 30                                  | 2.0                                 | 30          | 25        | 2.0             | 200                          | 1350      | ±0.5 at 1400 °C/2 hrs |
| RIL 38  | 38                                  | 2.0                                 | 31          | 25        | 2.05            | 250                          | 1380      | ±2.0 at 1400 °C/2 hrs |
| RIL 40  | 40                                  | 2.0                                 | 32          | 24        | 2.05            | 250                          | 1400      | ±1.0 at 1400 °C/2 hrs |
| RIL 42  | 42                                  | 2.0                                 | 32          | 23        | 2.10            | 300                          | 1410      | ±1.0 at 1450 °C/2 hrs |
| RIL 45  | 45                                  | 1.8                                 | 33          | 23        | 2.15            | 400                          | 1430      | ±0.5 at 1400 °C/2 hrs |
| RIL 50  | 50                                  | 2.5                                 | 34          | 23        | 2.30            | 400                          | 1420      | ±2.0 at 1450 °C/2 hrs |
| RIL 55  | 55                                  | 2.5                                 | 34          | 23        | 2.35            | 400                          | 1420      | ±2.0 at 1450 °C/2 hrs |
| RIL 60  | 60                                  | 2.5                                 | 35          | 23        | 2.40            | 400                          | 1430      | ±2.0 at 1450 °C/2 hrs |
| RIL 65  | 65                                  | 3.5                                 | 35          | 23        | 2.45            | 400                          | 1430      | ±2.0 at 1450 °C/2 hrs |
| RIL 70  | 70                                  | 3.5                                 | 36          | 22        | 2.50            | 500                          | 1500      | ±1.5 at 1450 °C/2 hrs |



## DENSE FIRE BRICKS

| Product  | Al <sub>2</sub> O <sub>3</sub><br>% | Fe <sub>2</sub> O <sub>3</sub><br>% | P.C.E<br>OC | A.P.<br>% | B.D.<br>gm / cc | C.C.S.<br>Kg/cm <sup>2</sup> | RUL<br>°C | PLC at deg C/hrs<br>% |
|----------|-------------------------------------|-------------------------------------|-------------|-----------|-----------------|------------------------------|-----------|-----------------------|
| RIL 30D  | 34                                  | 2.0                                 | 31          | 18        | 2.10            | 250                          | 1350      | ±0.5 at 1350 °C/2 hrs |
| RIL 40D  | 40                                  | 2.0                                 | 32          | 18        | 2.15            | 300                          | 1400      | ±0.4 at 1400 °C/2 hrs |
| RIL 42D  | 42                                  | 1.5                                 | 33          | 14        | 2.25            | 500                          | 1460      | ±0.3 at 1450 °C/2 hrs |
| RIL 45D  | 45                                  | 1.8                                 | 34          | 16        | 2.30            | 500                          | 1480      | ±0.5 at 1480 °C/2 hrs |
| RIL 55D  | 55                                  | 1.7                                 | 35          | 18        | 2.40            | 500                          | 1500      | ±0.5 at 1550 °C/2 hrs |
| RIL 60D  | 60                                  | 1.3                                 | 34          | 19        | 2.45            | 450                          | 1520      | ±0.5 at 1500 °C/2 hrs |
| RIL 62D  | 62                                  | 1.5                                 | 36          | 15        | 2.50            | 600                          | 1550      | ±0.5 at 1600 °C/2 hrs |
| RIL 80B  | 78                                  | 2.0                                 | 36          | 23        | 2.70            | 500                          | 1500      | ±1.5 at 1500 °C/2 hrs |
| RIL SIL  | 56                                  | 1.5                                 | 33          | 23        | 2.30            | 450                          | 1500      | ±0.8 at 1600 °C/2 hrs |
| RIL MULL | 70                                  | 0.5                                 | 38          | 18        | 2.55            | 600                          | 1650      | ±0.2 at 1650 °C/2 hrs |
| RIL 80A  | 80                                  | 1.5                                 | 38          | 20        | 2.85            | 500                          | 1550      | ±0.5 at 1450 °C/2 hrs |





## INSULATING BRICKS

| Product     | Al <sub>2</sub> O <sub>3</sub><br>(%) | SiO <sub>2</sub><br>(%) | Fe <sub>2</sub> O <sub>3</sub><br>(%) | Service<br>Temp~C | B.D.<br>(gm/cc) | Apparently<br>Porosity (%) | C.C.S.<br>(kg/cm <sup>2</sup> ) | Thermal<br>Conductivity<br>at 600~C HF | P.C.E.<br>(O/C) | PLC<br>(%) at<br>-50~C SWT |
|-------------|---------------------------------------|-------------------------|---------------------------------------|-------------------|-----------------|----------------------------|---------------------------------|--|-----------------|----------------------------|
| RIL-CF-1    | 28                                    | 60                      | 2                                     | 1100              | .75             | 70                         | 15                              | 0.190                                  | -               | 1.0                        |
| RIL-HF-2    | 30                                    | 62                      | 1.5                                   | 1200              | .90             | 65                         | 20                              | 0.230                                  | 28              | 1.5                        |
| RIL-HF- 1   | 32                                    | 60                      | 1.5                                   | 1350              | 1.00            | 60                         | 30                              | 0.280                                  | 30              | 1.6                        |
| RIL-INS-110 | 20                                    | 75                      | 2                                     | 1100              | 1.0             | 60                         | 25                              | 0.240                                  | 20              | 0.5                        |
| RIL-INS-125 | 28                                    | 65                      | 1.5                                   | 1250              | 0.90            | 65                         | 20                              | 0.370                                  | 26              | 1.35                       |
| RIL-INS-130 | 35                                    | 60                      | 1.5                                   | 1300              | 0.90            | 65                         | 20                              | 0.400                                  | 28              | 1.35                       |
| RIL-INS-140 | 42                                    | 52                      | 1.5                                   | 1400              | 1.10            | 58                         | 40                              | 0.500                                  | 32              | 1.50                       |
| RIL-INS-150 | 52                                    | 45                      | 1.0                                   | 1500              | 1.10            | 58                         | 40                              | 0.500                                  | 33              | 0.70                       |
| RIL-NV      | 15                                    | 80                      | 1.0                                   | 1200              | 0.90            | 57                         | 15                              | 0.450                                  | -               | 1.50                       |

## ACID PROF BRICKS

| Product   | Water absorption<br>(%) max | Flexual Strength<br>(kg/cm <sup>2</sup> ) min | C.C.S<br>(kg/cm <sup>2</sup> ) min | Resistance to acid<br>(loss in wt.%) Max | Remarks    |
|-----------|-----------------------------|---|------------------------------------|--|------------|
| RIL AP I  | 2                           | 100   | 700                                | 1.5                                      | outsourced |
| RIL AP II | 4                           | 70  | 500                                | 4  | outsourced |

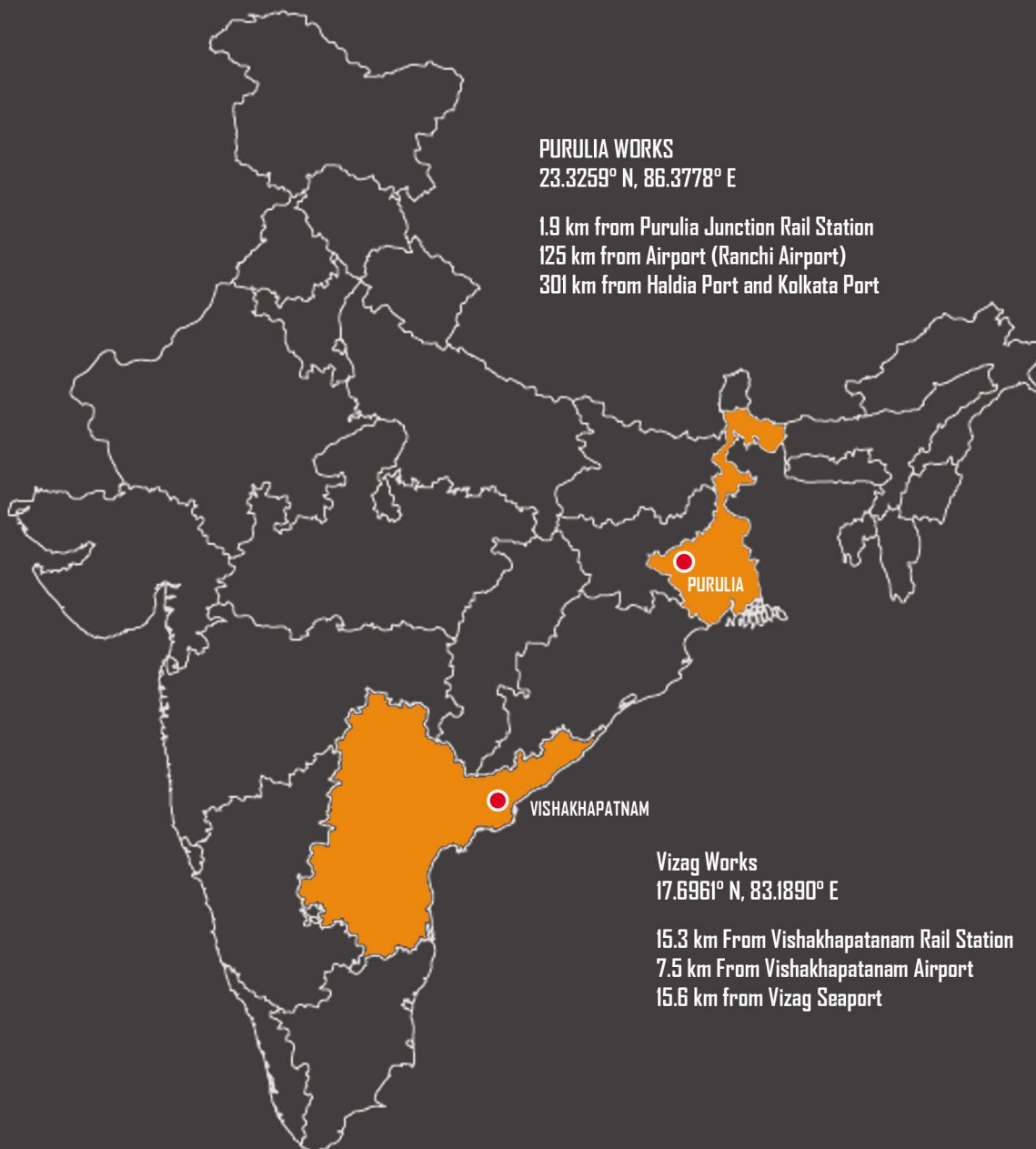
## SILICA RAMMING MASSES

| Brand Name | SiO <sub>2</sub><br>(%)<br>Min | Fe <sub>2</sub> O <sub>3</sub><br>(%)<br>Max. | Al <sub>2</sub> O <sub>3</sub><br>(%)<br>Max. | Setting | Grading<br>(mm) | PCE<br>(SK)<br>Min. | Sintering<br>Temp(°C)<br>Min. | Appli.<br>Temp(°C)<br>Max. | Application Area                     |
|------------|--------------------------------|---|---|---------|-----------------|---------------------|-------------------------------|----------------------------|--------------------------------------|
| RIL-RAM-SQ | 97                             | 0.2   | -   | Ceramic | 0-5             | 32                  | 1200                          | 1700                       | Lining coreless<br>induction furnace |
| RIL-RAM-Q  | 98                             | 0.3   | 0.3   | Ceramic | 0-5             | 32                  | 1200                          | 1700                       | -do-                                 |

## CERAMIC PRODUCTS

| Material                | Service<br>Temp-Deg C | Density<br>-Kg/m3 | T.C. w/m/k             | Thickness<br>Available (mm) |
|-------------------------|-----------------------|-------------------|------------------------|-----------------------------|
| Calcium Silicate Blocks | 800-1000              | 250               | 0.057 at 2000<br>Deg C | 25-100                      |
| Ceramic Fibre           | 1260                  | 64 / 96           | -                      | Loose                       |
| Blankets                | 1425                  | 64/96/128         | 0.126 at 600 Deg<br>C  | 6,12,25,38 and<br>50        |





**R**efcom India Private Limited

AN ISO 9001 : 2015 CERTIFIED REFRACTORY COMPANY

*We make more of monolithics / House of complete refractory solutions*

**Regd. Off.** : Barakar Road, Purulia- 723 101, West Bengal  
Ph: +91 3252 222224, +91 94753 31194, +91 94753 31235  
sales@refcom.in, refcom@rediffmail.com, ww.refcom.in

**Kolkata Off.** : 15 India Exchange Place, 1st Floor, Kolkata- 700 001  
Ph: (033) 2243-1661, (033) 2262-3032

**Vizag Works** : 103-104, D Block, I.D.A, Autonagar  
Vishakhapatnam- 530 012  
Ph: +91 98480 64033, (0891) 251-2619

**Purulia Works** : Vivekananda Nagar, Barakar Road, Purulia- 723 147  
Ph: +91 932081805