

# REFRACTORIES



# DENSE CASTABLES

|                         |                                                                | MCSHEAT A                | MCSHEAT A (S)            | MCSHEAT A (N)            | MCSHEAT K                |
|-------------------------|----------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| GENERAL PROPERTIES      | TYPE                                                           | HIGH PURITY,<br>DENSE    | HIGH PURITY,<br>DENSE    | HIGH PURITY,<br>DENSE    | HIGH PURITY,<br>DENSE    |
|                         | INSTALLATION                                                   | TROWELLING,<br>VIBRATION | TROWELLING,<br>VIBRATION | TROWELLING,<br>VIBRATION | TROWELLING,<br>VIBRATION |
|                         | BOND                                                           | HYDRAULIC                | HYDRAULIC                | HYDRAULIC                | HYDRAULIC                |
|                         | PACKING                                                        | 25 Kg/ BIG BAGS          | 25 Kg/ BIG BAGS          | 25 Kg/ BIG BAGS          | 25 Kg/ BIG BAGS          |
|                         | STORAGE LIFE                                                   | 9 MONTHS                 | 9 MONTHS                 | 9 MONTHS                 | 9 MONTHS                 |
|                         | MAX. SERVICE TEMP                                              | 1700°C                   | 1650°C                   | 1650°C                   | 1600°C                   |
|                         | MAX. GRAIN SIZE                                                | 5 mm                     | 5 mm                     | 5 mm                     | 5 mm                     |
|                         | WATER FOR MIX (%)                                              | 8 - 10                   | 8.5 - 10.5               | 9.0 - 11                 | 10.5 - 12.5              |
|                         | DELIVERY STATE                                                 | POWDER                   | POWDER                   | POWDER                   | POWDER                   |
| CHEMICAL ANALYSIS (Wt%) | Al <sub>2</sub> O <sub>3</sub>                                 | 85 - 88                  | 80 - 83                  | 75 - 78                  | 56 - 58                  |
|                         | Fe <sub>2</sub> O <sub>3</sub>                                 | 1.25 - 1.50              | 1.90 - 2.15              | 1.75 - 2.00              | 1.2 - 1.2                |
| PHYSICAL PROPERTIES     | BULK DENSITY (g/cc)<br>AFTER DRYING AT<br>110°C/ 24 hrs        | 2.75                     | 2.65                     | 2.6                      | 2.2                      |
|                         | CCS AFTER FIRING AT<br>110°C/ 24 hrs - Kg/cm <sup>2</sup>      | 600                      | 650                      | 500                      | 380                      |
|                         | PARMANENT<br>LINEAR CHANCE (%) -<br>FIRING AT<br>1500°C/ 3 hrs | +/- 1.8                  | +/- 1.58                 | +/- 1.50                 | +/- 2.40                 |



| MCSHEAT                  | MCSHEAT LBF              | MCSHEAT 94               | MCSHEAT 97               | MCSCRETE S                   | MCSCRETE N                   |
|--------------------------|--------------------------|--------------------------|--------------------------|------------------------------|------------------------------|
| HIGH PURITY,<br>DENSE    | HIGH PURITY,<br>DENSE    | HIGH PURITY,<br>DENSE    | HIGH PURITY,<br>DENSE    | HIGH PURITY,<br>DENSE        | HIGH PURITY,<br>DENSE        |
| TROWELLING,<br>VIBRATION | TROWELLING,<br>VIBRATION | TROWELLING,<br>VIBRATION | TROWELLING,<br>VIBRATION | TROWELLING,<br>VIBRATION     | TROWELLING,<br>VIBRATION     |
| HYDRAULIC                | HYDRAULIC                | HYDRAULIC                | HYDRAULIC                | HYDRAULIC                    | HYDRAULIC                    |
| 25 Kg/ BIG BAGS          | 25 Kg/ BIG BAGS          | 25 Kg/ BIG BAGS          | 25 Kg/ BIG BAGS          | 25 Kg/ BIG BAGS              | 25 Kg/ BIG BAGS              |
| 9 MONTHS                 | 9 MONTHS                 | 9 MONTHS                 | 9 MONTHS                 | 9 MONTHS                     | 9 MONTHS                     |
| 1500°C                   | 1750°C                   | 1750°C                   | 1800°C                   | 1450°C                       | 1400°C                       |
| 5 mm                     | 5 mm                     | 5 mm                     | 5 mm                     | 5 mm                         | 5 mm                         |
| 10.5 - 11.5              | 8.5 - 10                 | 8.5 - 10                 | 8.0 - 10                 | 10 - 11                      | 10 - 11.5                    |
| POWDER                   | POWDER                   | POWDER                   | POWDER                   | POWDER                       | POWDER                       |
| 46 - 50                  | 90 - 91                  | 90 - 92                  | 94 - 96                  | 68 - 70                      | 42 - 45                      |
| 1.15 - 1.25              | 0.8 - 1.0                | 0.25 - 0.4               | 0.10 - 0.20              | 4.8 - 5.0                    | 5 - 6                        |
| 2.15                     | 2.8                      | 2.8                      | 2.85                     | 2.55                         | 2.2                          |
| 350                      | 400                      | 550                      | 600                      | 350                          | 300                          |
| +/- 1.50                 | +/- 1.00                 | +/- 1.00                 | +/- 1.00                 | +/- 0.70 at<br>1400°C/ 3 hrs | +/- 0.80 at<br>1350°C/ 3 hrs |

# INSULATING CASTABLES

|                         |                                                              | MCS INSUL 9           | MCS INSUL 11          | MCS INSUL 11 Li       | MCS INSUL 13          | MCS INSUL 13 Li       |
|-------------------------|--------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| GENERAL PROPERTIES      | TYPE                                                         | INSULATING CASTABLE   | INSULATING CASTABLE   | INSULATING CASTABLE   | INSULATING CASTABLE   | INSULATING CASTABLE   |
|                         | INSTALLATION                                                 | VIBRATION             | VIBRATION             | VIBRATION             | VIBRATION             | VIBRATION             |
|                         | BOND                                                         | HYDRAULIC             | HYDRAULIC             | HYDRAULIC             | HYDRAULIC             | HYDRAULIC             |
|                         | PACKING                                                      | 40 Kg BAGS            | 40 Kg BAGS            | 40 Kg BAGS            | 40 Kg BAGS            | 40 Kg BAGS            |
|                         | STORAGE LIFE                                                 | 9 MONTHS              | 9 MONTHS              | 9 MONTHS              | 9 MONTHS              | 9 MONTHS              |
|                         | MAX. SERVICE TEMP                                            | 1200°C                | 1300°C                | 1350°C                | 1350°C                | 1400°C                |
|                         | MAX. GRAIN SIZE                                              | 6 mm                  | 6 mm                  | 6 mm                  | 6 mm                  | 6 mm                  |
|                         | WATER FOR MIX (%)                                            | 35 - 45               | 30 - 35               | 30 - 35               | 25 - 30               | 25 - 30               |
|                         | DELIVERY STATE                                               | POWDER                | POWDER                | POWDER                | POWDER                | POWDER                |
| CHEMICAL ANALYSIS (Wt%) | Fe <sub>2</sub> O <sub>3</sub>                               | 6                     | 3.5                   | 1.7                   | 3.5                   | 1.7                   |
| PHYSICAL PROPERTIES     | BULK DENSITY (g/cc)<br>AFTER DRYING AT<br>110°C/ 24 hrs      | 1                     | 1.3                   | 1.3                   | 1.5                   | 1.6                   |
|                         | CCS AFTER FIRING AT<br>110°C/ 24 hrs - Kg/cm <sup>2</sup>    | 18                    | 30                    | 40                    | 35                    | 80                    |
|                         | THERMAL CONDUCTIVITY AT 500°C - WATER<br>CALORIMETRIC METHOD | 0.270<br>kcal/m/hr/°C | 0.325<br>kcal/m/hr/°C | 0.350<br>kcal/m/hr/°C | 0.335<br>kcal/m/hr/°C | 0.450<br>kcal/m/hr/°C |

# LOW CEMENT CASTABLES

|                         |                                                        | MCS LCC 45          | MCS LCC 60          | MCS LCC 70          | MCS LCC 80                                   | MCS LCC 90                                   |
|-------------------------|--------------------------------------------------------|---------------------|---------------------|---------------------|----------------------------------------------|----------------------------------------------|
| GENERAL PROPERTIES      | TYPE                                                   | LOW CEMENT-CASTABLE | LOW CEMENT-CASTABLE | LOW CEMENT-CASTABLE | LOW CEMENT-CASTABLE                          | LOW CEMENT-CASTABLE                          |
|                         | INSTALLATION                                           | VIBRATION           | VIBRATION           | VIBRATION           | VIBRATION                                    | VIBRATION                                    |
|                         | BOND                                                   | HYDRAULIC           | HYDRAULIC           | HYDRAULIC           | HYDRAULIC                                    | HYDRAULIC                                    |
|                         | PACKING                                                | 25 Kg / BAGS        | 25 Kg / BAGS        | 25 Kg / BAGS        | 25 Kg / BAGS                                 | 25 Kg / BAGS                                 |
|                         | STORAGE LIFE                                           | 6 MONTHS            | 6 MONTHS            | 6 MONTHS            | 6 MONTHS                                     | 6 MONTHS                                     |
|                         | MAX. SERVICE TEMP                                      | 1550°C              | 1600°C              | 1650°C              | 1700°C                                       | 1700°C                                       |
|                         | MAX. GRAIN SIZE                                        | 6 mm                | 6 mm                | 6 mm                | 6 mm                                         | 6 mm                                         |
|                         | WATER FOR MIX (%)                                      | 5 - 6               | 5 - 6               | 4 - 6               | 4 - 6                                        | 4 - 5                                        |
|                         | DELIVERY STATE                                         | POWDER              | POWDER              | POWDER              | POWDER                                       | POWDER                                       |
| CHEMICAL ANALYSIS (Wt%) | Al <sub>2</sub> O <sub>3</sub>                         | 45                  | 60                  | 70                  | 80                                           | 90                                           |
|                         | CaO                                                    | 1.8                 | 2                   | 2.25                | 2.5                                          | 2.1                                          |
|                         | Fe <sub>2</sub> O <sub>3</sub>                         | 1                   | 1.5                 | 2                   | 2                                            | 1.25                                         |
| PHYSICAL PROPERTIES     | BULK DENSITY (g/cc) AFTER DRYING AT 110°C/ 24 hrs      | 2.3                 | 2.5                 | 2.65                | 2.85                                         | 3                                            |
|                         | CCS AFTER FIRING AT 110°C/ 24 hrs - Kg/cm <sup>2</sup> | 650                 | 700                 | 650                 | 750                                          | 900                                          |
|                         | CCS AFTER FIRING AT 1100°C/ 3 hrs - Kg/cm <sup>2</sup> | 850                 | 800                 | 850                 | 950                                          | 1100                                         |
|                         | CCS AFTER FIRING AT 1500°C/ 3 hrs - Kg/cm <sup>2</sup> | 1000                | 1000                | 900                 | 1150 - AT 1550°C/ 3 hrs - Kg/cm <sup>2</sup> | 1200 - AT 1550°C/ 3 hrs - Kg/cm <sup>2</sup> |
|                         | PERMANENT LINEAR CHANGE (%) - FIRING AT 1100°C/ 3 hrs  | -0.2                | +/- 0.20            | +/- 0.20            | +/- 0.40                                     | +/- 0.20                                     |
|                         | PERMANENT LINEAR CHANGE (%) - FIRING AT 1500°C/ 3 hrs  | -1.5                | +/- 1.00            | +/- 1.00            | +/- 1.00                                     | +1.4                                         |

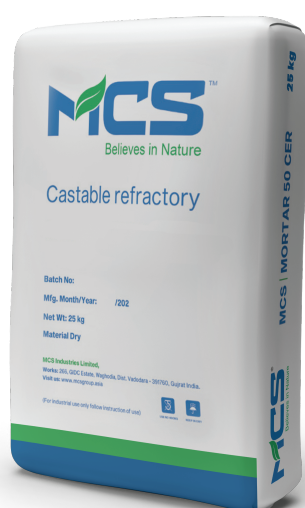


# NONWETTING CASTABLES - ALUMINIUM

|                         |                                                             | MCS FLOW 80 AI                         | MCS LCC 80 AI       |
|-------------------------|-------------------------------------------------------------|----------------------------------------|---------------------|
| GENERAL PROPERTIES      | TYPE                                                        | LOW CEMENT, SELF FLOW-<br>ING CASTABLE | LOW CEMENT CASTABLE |
|                         | INSTALLATION                                                | VIBRATION                              | VIBRATION           |
|                         | BOND                                                        | HYDRAULIC                              | HYDRAULIC           |
|                         | PACKING                                                     | 25 Kg/ BIG BAGS                        | 25 Kg/ BIG BAGS     |
|                         | STORAGE LIFE                                                | 6 MONTHS                               | 6 MONTHS            |
|                         | MAX. SERVICE TEMP                                           | 1350°C                                 | 1350°C              |
|                         | MAX. GRAIN SIZE                                             | 5 mm                                   | 5 mm                |
|                         | WATER FOR MIX (%)                                           | 6-8                                    | 4-5                 |
|                         | DELIVERY STATE                                              | POWDER                                 | POWDER              |
| CHEMICAL ANALYSIS (Wt%) | Al <sub>2</sub> O <sub>3</sub>                              | 78                                     | 78                  |
|                         | CaO                                                         | 2                                      | 1.5                 |
|                         | Fe <sub>2</sub> O <sub>3</sub>                              | 2                                      | 2.5                 |
| PHYSICAL PROPERTIES     | BULK DENSITY (g/cc)<br>AFTER DRYING AT<br>110°C/ 24 hrs     | 2.65                                   | 2.85                |
|                         | CCS AFTER FIRING AT<br>110°C/ 24 hrs - Kg/cm <sup>2</sup>   | 400                                    | 650                 |
|                         | CCS AFTER FIRING AT<br>800°C/ 3 hrs - Kg/cm <sup>2</sup>    | 550                                    | 950                 |
|                         | CCS AFTER FIRING AT<br>1200°C/ 3 hrs - Kg/cm <sup>2</sup>   | 800                                    | 1000                |
|                         | PARMANENT LINEAR<br>CHANGE (%) - FIRING AT<br>800°C/ 3 hrs  | +/-0.20                                | +/-0.20             |
|                         | PARMANENT LINEAR<br>CHANGE (%) - FIRING AT<br>1200°C/ 3 hrs | +/-1.00                                | +/-0.25             |

# MORTAR

|                         |                                                                                                                                                                                                                                                | MCSMORTAR 50 CER | MCS IFC COAT     | MCSMORTAR 90 CH   |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------|-------------------|
| GENERAL PROPERTIES      | TYPE                                                                                                                                                                                                                                           | MORTAR           | MORTAR           | MORTAR            |
|                         | INSTALLATION                                                                                                                                                                                                                                   | TROWELING        | TROWELING        | TROWELING         |
|                         | BOND                                                                                                                                                                                                                                           | HYDRAULIC        | HYDRAULIC        | HYDRAULIC         |
|                         | PACKING                                                                                                                                                                                                                                        | 25 Kg/50 Kg BAGS | 25 Kg/50 Kg BAGS | 25 Kg/ 50 Kg BAGS |
|                         | STORAGE LIFE                                                                                                                                                                                                                                   | 12 MONTHS        | 12 MONTHS        | 12 MONTHS         |
|                         | MAX. SERVICE TEMP                                                                                                                                                                                                                              | 1550°C           | 1650°C           | 1700 °C           |
|                         | MAX. GRAIN SIZE                                                                                                                                                                                                                                | 0.5 mm           | 0.5 mm           | 1 mm              |
|                         | WATER FOR MIX (%)                                                                                                                                                                                                                              | 20 - 30          | 14 - 20          | 20 - 30           |
|                         | DELIVERY STATE                                                                                                                                                                                                                                 | POWDER           | POWDER           | POWDER            |
| CHEMICAL ANALYSIS (Wt%) | Al <sub>2</sub> O <sub>3</sub>                                                                                                                                                                                                                 | 50               | 85               | 90                |
|                         | Cr <sub>2</sub> O <sub>3</sub>                                                                                                                                                                                                                 | 0                | 0                | 2.5               |
|                         | Fe <sub>2</sub> O <sub>3</sub>                                                                                                                                                                                                                 | 4.5              | 1.5              | 0.5               |
| Special Notes           | 1. MCS does not guarantee the accuracy & fitness of purpose or updates of any information disclosed above. Specifications of the products may change based on the availability of domestic raw materials and geographical area to be supplied. |                  |                  |                   |
|                         | 2. Data shown above are based on average results of production samples and are subject to normal variations during individual testing.                                                                                                         |                  |                  |                   |



# DENSE BRICKS

|                         |                                | TEST METHOD       | MCS 30               | MCS 35               | MCS 40               |
|-------------------------|--------------------------------|-------------------|----------------------|----------------------|----------------------|
| GENERAL PROPERTIES      | TYPE                           |                   | 30%<br>ALUMINA BRICK | 35%<br>ALUMINA BRICK | 40%<br>ALUMINA BRICK |
|                         | NATURE OF BOND                 |                   | CERAMIC              | CERAMIC              | CERAMIC              |
|                         | SHAPING                        |                   | DRY PRESSED          | DRY PRESSED          | DRY PRESSED          |
|                         | MAXIMUM SERVICE TEMPERATURE    |                   | 1350°C               | 1350°C               | 1400°C               |
|                         | REVERSIBLE THERMAL EXPANSION   |                   | 0.50% AT 1000°C      | 0.50% AT 1000°C      | 0.55% AT 1000°C      |
| CHEMICAL ANALYSIS (Wt%) | Al <sub>2</sub> O <sub>3</sub> | IS 12107 Part - 3 | 30 - 34              | 30 - 36              | 37 - 41              |
|                         | Fe <sub>2</sub> O <sub>3</sub> | IS 12107 Part - 6 | 2.0 - 3.0            | 2.0 - 3.0            | 2.0 - 3.0            |
| PHYSICAL PROPERTIES     | BULK DENSITY (g/cc)            | IS 1528 Part - 12 | 2.05 - 2.2           | 2.1 - 2.2            | 2.15 - 2.25          |
|                         | APPARENT POROSITY(%)           | IS 1528 Part - 8  | 18 - 23              | 17 - 22              | 17 - 22              |
|                         | COLD CRUSHING STRENGTH(Kg/cm2) | IS 1528 Part - 4  | 280 - 450            | 300 - 450            | 300 - 500            |
| THERMAL PROPERTIES      | REFRACTORINESS ORTON / °C      | IS 1528 Part - 1  | (+28) /(+ 1646)      | (+28) /(+ 1646)      | (+29) /(+ 1659)      |
|                         | RUL(Ta)°C                      | IS 1528 Part - 2  | 1300 - 1350          | 1310 - 1350          | 1340 - 1400          |
|                         | PLC(%) AT 1350° /3 hrs         | IS 1528 Part - 6  | (-1.0) to (+0.3)     | (-1.0) to (+0.3)     | (-0.8) to (+0.3)     |

| MCS 45               | MCS 50               | MCS 55               | MCS 60               | MCS 65               | MCS 70               |
|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 45%<br>ALUMINA BRICK | 50%<br>ALUMINA BRICK | 55%<br>ALUMINA BRICK | 60%<br>ALUMINA BRICK | 65%<br>ALUMINA BRICK | 70%<br>ALUMINA BRICK |
| CERAMIC              | CERAMIC              | CERAMIC              | CERAMIC              | CERAMIC              | CERAMIC              |
| DRY PRESSED          | DRY PRESSED          | DRY PRESSED          | DRY PRESSED          | DRY PRESSED          | DRY PRESSED          |
| 1400°C               | 1400°C               | 1420°C               | 1450°C               | 1470°C               | 1470°C               |
| 0.55% AT 1000°C      | 0.55% AT 1000°C      | 0.60% AT 1000°C      | 0.60% AT 1000°C      | 0.60% AT 1000°C      | 0.65% AT 1000°C      |
| 42 - 45              | 47 - 51              | 52 - 56              | 57 - 60              | 62 - 65              | 66 - 70              |
| 2.5 - 3.5            | 2.5 - 3.5            | 2.8 - 3.8            | 3.2 - 4.2            | 3.30 - 3.80          | 3.4 - 4.0            |
| 2.22 - 2.32          | 2.32 - 2.42          | 2.4 - 2.52           | 2.5 - 2.6            | 2.55 - 2.58          | 2.6 - 2.72           |
| 17 - 22              | 18 - 22              | 17 - 22              | 17 - 22              | 19 - 21              | 17 - 22              |
| 350 - 550            | 400 - 600            | 400 - 600            | 500 - 750            | 550 - 600            | 600 - 850            |
| (+30) / (+ 1665)     | (+31) / (+ 1683)     | (+33) / (+ 1743)     | (+35) / (+ 1785)     | (+35) / (+ 1785)     | (+36) / (+ 1804)     |
| 1350 - 1400          | 1380 - 1430          | 1380 - 1420          | 1400 - 1450          | 1450 - 1470          | 1430 - 1470          |
| (-1.0) to (+0.3)     | (-1.0) to (+0.3)     | (-0.3) to (+1.5)     | (+0.2) to (+2.0)     | (+0.2) to (+2.0)     | (+0.5) to (-2.5)     |

# DENSE BRICKS

|                         |                                | TEST METHOD       | MCS 75            | MCS 80            |
|-------------------------|--------------------------------|-------------------|-------------------|-------------------|
| GENERAL PROPERTIES      | TYPE                           |                   | 75% ALUMINA BRICK | 80% ALUMINA BRICK |
|                         | NATURE OF BOND                 |                   | CERAMIC           | CERAMIC           |
|                         | SHAPING                        |                   | DRY PRESSED       | DRY PRESSED       |
|                         | MAXIMUM SERVICE TEMPERATURE    |                   | 1500°C            | 1550°C            |
|                         | REVERSIBLE THERMAL EXPANSION   |                   | 0.65% AT 1000°C   | 0.75% AT 1000°C   |
| CHEMICAL ANALYSIS (Wt%) | Al <sub>2</sub> O <sub>3</sub> | IS 12107 Part - 3 | 72 - 75           | 77 - 80           |
|                         | Fe <sub>2</sub> O <sub>3</sub> | IS 12107 Part - 6 | 3.2 - 4.0         | 1.4 - 1.8         |
| PHYSICAL PROPERTIES     | BULK DENSITY (g/cc)            | IS 1528 Part - 12 | 2.6 - 2.75        | 2.75 - 2.85       |
|                         | APPARENT POROSITY(%)           | IS 1528 Part - 8  | 18 - 23           | 16 - 19           |
|                         | COLD CRUSHING STRENGTH(Kg/cm2) | IS 1528 Part - 4  | 600 - 900         | 750 - 950         |
| THERMAL PROPERTIES      | REFRACTORINESS ORTON / °C      | IS 1528 Part - 1  | (+36) /(+ 1804)   | (+37) / (+1820)   |
|                         | RUL(Ta)°C                      | IS 1528 Part - 2  | 1450 - 1500       | 1500 - 1540       |
|                         | PLC(%) AT 1350° /3 hrs         | IS 1528 Part - 6  | (-0.2) to (+3.0)  | (-0.2) to (+1.0)  |

# SPECIAL DENSE BRICKS

|                         |                                             | TEST METHOD       | MCS 40D              | MCS 42D              | MCS 45D              | MCS 62D              |
|-------------------------|---------------------------------------------|-------------------|----------------------|----------------------|----------------------|----------------------|
| GENERAL PROPERTIES      | TYPE                                        |                   | 40%<br>ALUMINA BRICK | 42%<br>ALUMINA BRICK | 45%<br>ALUMINA BRICK | 62%<br>ALUMINA BRICK |
|                         | NATURE OF BOND                              |                   | CERAMIC              | CERAMIC              | CERAMIC              | CERAMIC              |
|                         | SHAPING                                     |                   | DRY PRESSED          | DRY PRESSED          | DRY PRESSED          | DRY PRESSED          |
|                         | MAXIMUM SERVICE TEMPERATURE                 |                   | 1400°C               | 1460°C               | 1480°C               | 1550°C               |
|                         | REVERSIBLE THERMAL EXPANSION                |                   | 0.55% AT 1000°C      | 0.55% AT 1000°C      | 0.55% AT 1000°C      | 0.60% AT 1000°C      |
| CHEMICAL ANALYSIS (Wt%) | Al <sub>2</sub> O <sub>3</sub>              | IS 12107 Part - 3 | 38 - 42              | 41.5 - 45.5          | 44 - 46              | 61 - 64              |
|                         | Fe <sub>2</sub> O <sub>3</sub>              | IS 12107 Part - 6 | 1.6 - 2.2            | 1.2 - 1.6            | 1.2 - 1.6            | 1.0 - 1.6            |
| PHYSICAL PROPERTIES     | BULK DENSITY (g/cc)                         | IS 1528 Part - 12 | 2.20 - 2.30          | 2.27 - 2.37          | 2.28 - 2.38          | 2.42 - 2.52          |
|                         | APPARENT POROSITY(%)                        | IS 1528 Part - 8  | 14 - 19              | 14 - 18              | 14 - 18              | 14 - 17              |
|                         | COLD CRUSHING STRENGTH(Kg/cm <sup>2</sup> ) | IS 1528 Part - 4  | 450 - 650            | 550 - 750            | 500 - 700            | 580 - 800            |
| THERMAL PROPERTIES      | REFRACTORINESS ORTON / °C                   | IS 1528 Part - 1  | (+30) /(+ 1665)      | (+33) /(+ 1743)      | 33 / 1743            | (+36) /(+ 1804)      |
|                         | RUL(Ta)°C                                   | IS 1528 Part - 2  | 1360 - 1400          | 1440 - 1480          | 1450 - 1490          | 1480 - 1520          |
|                         | PLC(%) AT 1350° /3 hrs                      | IS 1528 Part - 6  | (-0.8) to (+0.3)     | (-0.5) to (+0.3)     | (-1.0) to (+1.0)     | (-0.5) to (+0.3)     |

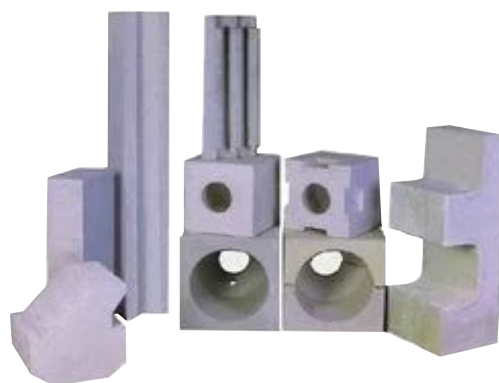
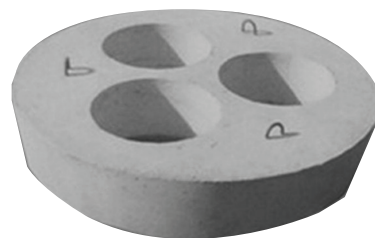


# INSULATING BRICKS

|                         |                                |           | TEST METHOD               | MCS HFK 135               | MCS HFK 140                | MCS HFK - 160             |
|-------------------------|--------------------------------|-----------|---------------------------|---------------------------|----------------------------|---------------------------|
| GENERAL PROPERTIES      | TYPE                           |           |                           | INSULATION BRICKS         | INSULATION BRICKS          | INSULATION BRICKS         |
|                         | NATURE OF BOND                 |           |                           | CERAMIC                   | CERAMIC                    | CERAMIC                   |
|                         | SHAPING                        |           |                           | PLASTICALLY MOULDED       | PLASTICALLY MOULDED        | PLASTICALLY MOULDED       |
|                         | MAXIMUM SERVICE TEMPERATURE    |           |                           | 1300°C                    | 1380°C                     | 1500°C                    |
|                         | REHEAT CHANGE(%)               |           |                           | (-0.3) at 1300°C IN 4 HRS | (-0.26) at 1450°C IN 5 HRS | (-0.3) at 1550°C IN 8 HRS |
| CHEMICAL ANALYSIS (Wt%) | Al <sub>2</sub> O <sub>3</sub> |           | IS 12107 Part - 3         | 35 - 37                   | 38 - 40                    | 58 - 60                   |
|                         | Fe <sub>2</sub> O <sub>3</sub> |           | IS 12107 Part - 6         | 1.30 - 1.50               | 1.10 - 1.30                | 0.90 - 1.0                |
| PHYSICAL PROPERTIES     | BULK DENSITY (g/cc)            |           | ASTM C - 134              | 0.95 - 1.10               | 1.10 - 1.20                | 1.20 - 1.30               |
|                         | APPARENT POROSITY(%)           |           | IS 1528 Part - 8          | 58 - 60                   | 55 - 68                    | 55 - 68                   |
|                         | COLD CRUSHING STRENGTH(Kg/cm2) |           | ASTM C - 133              | 25 - 30                   | 50 - 55                    | 60 - 65                   |
| THERMAL PROPERTIES      | THERMAL CONDUCTIVITY (W/mK)    | At 600°C  | WATER CALORIMETRIC METHOD | 0.35                      |                            |                           |
|                         |                                | At 800°C  |                           |                           | 0.36                       |                           |
|                         |                                | At 1000°C |                           |                           |                            | 0.46                      |

# POROSINT BRICKS

|                         |                                             | TEST METHOD               | MCS JM 23                                         | MCS JM 26                                         | MCS JM 28                                         |
|-------------------------|---------------------------------------------|---------------------------|---------------------------------------------------|---------------------------------------------------|---------------------------------------------------|
| GENERAL PROPERTIES      | TYPE                                        |                           | HOT FACE HIGH STRENGTH POROSINT INSULATION BRICKS | HOT FACE HIGH STRENGTH POROSINT INSULATION BRICKS | HOT FACE HIGH STRENGTH POROSINT INSULATION BRICKS |
|                         | NATURE OF BOND                              |                           | CERAMIC                                           | CERAMIC                                           | CERAMIC                                           |
|                         | SHAPING                                     |                           | PLASTICALLY MOULDED                               | PLASTICALLY MOULDED                               | PLASTICALLY MOULDED                               |
|                         | MAXIMUM SERVICE TEMPERATURE                 |                           | 1300°C                                            | 1450°C                                            | 1500°C                                            |
| CHEMICAL ANALYSIS (Wt%) | REHEAT CHANGE(%)                            |                           | (-0.25) AT 1350°C IN 8 HRS                        | (-0.3) AT 1450°C IN 8 HRS                         | (-0.15) AT 1500°C IN 8 HRS                        |
|                         | Al <sub>2</sub> O <sub>3</sub>              | IS 12107 Part - 3         | 35 - 40                                           | 55 - 60                                           | 65 - 70                                           |
|                         | Fe <sub>2</sub> O <sub>3</sub>              | IS 12107 Part - 6         | 0.65 - 0.75                                       | 0.80 - 0.90                                       | 0.70 - 0.80                                       |
| PHYSICAL PROPERTIES     | BULK DENSITY (g/cc)                         | ASTM C - 134              | 0.60 - 0.70                                       | 0.80 - 0.90                                       | 0.9 - 1.0                                         |
|                         | APPARENT POROSITY(%)                        | IS 1528 Part - 8          | 60 - 65                                           | 60 - 65                                           | 55 - 60                                           |
|                         | COLD CRUSHING STRENGTH(Kg/cm <sup>2</sup> ) | ASTM C - 133              | 10 - 15                                           | 20 - 25                                           | 30 - 35                                           |
| THERMAL PROPERTIES      | THERMAL CONDUCTIVITY (W/mK)                 | At 800°C                  | 0.43                                              |                                                   |                                                   |
|                         |                                             | At 1000°C                 |                                                   |                                                   |                                                   |
|                         |                                             | WATER CALORIMETRIC METHOD |                                                   | 0.45                                              | 0.55                                              |



**MCS** has been a regular supplier of PCPF blocks to various industries like steel, iron, copper, aluminium etc. with proven results.

MCS is capable of supplying as per clients' dimensions. We also provide technical assistance and expertise by designing the blocks as per the technical requirement of the application area.

PCPF are supplied with all ranges of LC & ULCC castables depending upon the service requirements.

### Technical Specifications - Ceramic Fiber Blanket

| Classification temperature (°C )            | 1260°C                | 1425°C                    |
|---------------------------------------------|-----------------------|---------------------------|
| Color                                       | White                 | White                     |
| Fiber Diameter (µm)                         | 3 ~4 Micron           | 3 ~4 Micron               |
| Linear Shrinkage (%)                        | At 1200°C x 24hrs < 3 | At 1400°C x 24 hrs < 3.30 |
| Thermal Conductivity (W/mk) (128 kg/m³)Mean | 0.15                  | 0.15                      |
| Temperature 500°C )                         |                       |                           |
| Tensile Strength (KPa) (25 mm thick, 128    | 60 min.               | 60 min.                   |
| Density (kg/m³)                             | 64,96,128,160         | 64,96,128,160             |
| Chemical Composition (%)                    |                       |                           |
| Al2O3                                       | 45-48                 | 35-37                     |
| SiO2                                        | 52-55                 | 47-49                     |
| ZrO2                                        | — — — —               | 14-18                     |
| Other                                       | Traces                | Traces                    |
| Available Size mm/roll                      | 25x610x7300 or 7620   | 13x610x7300 or 7620       |
|                                             |                       | 50x610x3650 or 3810       |

## Calcium Silicate Block

| 1100 Calcium Silicate Block                  |                   |                 |               |
|----------------------------------------------|-------------------|-----------------|---------------|
| Standard                                     | ASTM C 533-17     |                 |               |
| Particulars                                  | Unit              | Standard Values | Actual Values |
| Density                                      | Kg/M <sub>3</sub> | 280±10%         | 282           |
| Dimension tolerance                          | mm                | ±3              | -             |
| Service Temperature                          | °C                | 1100            | 1100          |
| Linear shrinkage after heating (1050°CX3hrs) | %                 | ≤2              | 1             |
| Bending Strength                             | MPa               | ≥0.36           | 0.43          |
| Tensile Strength                             | MPa               | ≥0.90           | 0.95          |
|                                              |                   |                 |               |
| Thermal Conductivity                         |                   |                 |               |
| Mean temp. @                                 | 38 °C             | W / (mxK)       | 0.053         |
|                                              | 93 °C             |                 | 0.059         |
|                                              | 149 °C            |                 | 0.063         |
|                                              | 204 °C            |                 | 0.070         |
|                                              | 260 °C            |                 | 0.082         |
|                                              | 316 °C            |                 | 0.085         |
|                                              | 371 °C            |                 | 0.092         |
| Chemical Analysis                            |                   |                 |               |
| SiO2                                         | %                 | 47.00           |               |
| CaO                                          | %                 | 45.00           |               |
| Al2O3                                        | %                 | 1.00            |               |
| Fe2O3                                        | %                 | 0.30            |               |
| LOI at 1050 °C                               | %                 | 5.7             |               |

## Technical Specifications - Insulation Millboard

| Particulars                                                                                 | Values  |
|---------------------------------------------------------------------------------------------|---------|
| Available Thickness (mm)                                                                    | 1.5-12  |
| Nominal Density (gm/cc)                                                                     | 1.2     |
| Tensile Strength (min)-Along Grain (kg/cm <sup>2</sup> )-Across Grain (kg/cm <sup>2</sup> ) | 32-25   |
| Loss on Ignition @ 800 °C (Max)                                                             | 11%     |
| Thermal Conductivity @ 150 °C mean Temperature (W/m °C)                                     | 0.118   |
| Moisture Content (Max)                                                                      | 2%      |
| Electrical Strength (Proof) in air @ 90 °C (kV/mm)                                          | 1.5     |
| Temperature Resistance                                                                      | 1150 °C |



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## *Go green live green*

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*Green signifies nature, Green is also a colour for freshness, Green also related to being Eco-friendly,*

*Thanks to each one of us in contributing towards improving our Carbon footprint and*

*making our environment Eco-friendly.*

*Each contribution Counts...!!!*

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