

# ***FIRECLAY AND HIGH ALUMINA RAMMING MASSES***

<b>BRAND</b>	<b>Al<sub>2</sub>O<sub>3</sub> %</b>	<b>Fe<sub>2</sub>O<sub>3</sub> %</b>	<b>P.C.E OC</b>	<b>Gradin g mm</b>	<b>Type of setting</b>	<b>Application temp °c</b>
<b>MACRAM MH</b>	30	2.0	30	0-4	Ceramic	1300
<b>MACRAM HH</b>	38	2.0	32	0-4	Ceramic	1400
<b>MACRAM SUPER</b>	42	18	33	0-4	Ceramic	1450
<b>MACRAM 50</b>	50	2.5	33-34	0-4	Chemical/Ceramic	1500
<b>MACRAM 60</b>	60	3.0	34-35	0-4	Chemical/Ceramic	1550
<b>MACRAM 70</b>	70	3.5	35-36	0-4	Chemical/Ceramic	1600
<b>MACRAM 80</b>	80	3.5	36	0-4	Chemical/Ceramic	1650
<b>MACRAM 85</b>	85	3.5	37-38	0-4	Chemical/Ceramic	1700
<b>MACRAM SILL</b>	56-58	1.5	35-36	0-4	Chemical/Ceramic	1550
<b>MACRAM MULL</b>	72	0.5	36-37	0-4	Chemical/Ceramic	1650
<b>MACRAM SUPER70</b>	70	0.8	36-37	0-4	Chemical/Ceramic	1650
<b>MACRAM SUPER80</b>	80	0.5	38	0-4	Chemical/Ceramic	1750
<b>MACRAM SUPER90</b>	90	0.5	38	0-4	Chemical/Ceramic	1800

Data represents typical average properties and do not constitute a specification.

# SPECIALITY INSULATING CASTABLE

	MACLITE 97L	MACLITE 11-L(Z)	MACLITE 11-SPL	MACLIT E 9HS	MACLITE LT	MACLITE 4	MACLITE POURABLE
<b>Physical Properties</b>							
Recommended Service temp.°c	1800	1300	1350	1100	500	1000	900
Dry Density (kg/m <sup>3</sup> ) at 110 °c	1450-1650	900-1000	1080-1100	900-1000	1300-1400	400-500	650-700
Thermal Conductivity (KCal/m/hr/°c)	0.9-1.1	0.22	0.30	0.28	-	0.06-0.10	0.20-0.22
Modulus of Rupture Kg/cm <sup>2</sup> at							
110°c	20-30	-	-	-	-	-	-
800°c	12-20	-	-	-	-	-	-
110°c	12-20	-	-	-	-	-	-
1550°c	15-25	-	-	-	-	-	-
CCS kg/cm <sup>2</sup>							
110°c	70-100	10-15	30-40	20-25	90-100	2-4	15-20
800°c	60-90	5-7	25-30	10-12	45-	1-2	12-14
1100°c	40-70	6-10	25-30	-	50(500°C)	-	-
1300°c	-	35-40	35-40	16-20	-	-	-
1550°c	60-90	-	-	-	-	-	-
Linear Change % at							
110°c	-	-	-	-	-	-	-
500°c	-	-	-	-	± 0.5	-	-
800°c	0.1	-	-	-	-	± 0.5	± 1.5
1100°c	0.2	± 1.0	± 0.2	± 1.5	-	-	-
1300°c	-	± 1.5	± 1.0	-	-	-	-
1550°c	1.2	-	-	-	-	-	-
<b>Chemical Analysis</b>							
Al <sub>2</sub> O <sub>3</sub> (%)	95	-	-	-	-	-	-
SiO <sub>2</sub> (%) max	0.3	-	-	-	-	-	-
Fe <sub>2</sub> O <sub>3</sub> (%) max	0.3	1.2	1.5	3	2.5	11.0	9.0
Na <sub>2</sub> O (%) max	0.4	-	-	-	-	-	-
CaO (%) max	5.0	-	-	-	-	-	-

CCS and PLC values are on 4x4x16cm prisms. Thermal Conductivity prefired hot face 500°C. Data represents typical average properties and do not constitute a specification. In addition, we can supply Tailor made variety to suit customer's requirement.

# ***FIRECLAY AND HIGH ALUMINA MORTARS***

<b>BRAND</b>	<b>Al<sub>2</sub>O<sub>3</sub> % min</b>	<b>Fe<sub>2</sub>O<sub>3</sub> % min</b>	<b>PCE OC min</b>	<b>Grain size mm</b>	<b>Service temp °c</b>	<b>Type of setting</b>
<b>MAC MH</b>	30	2.0	29	0-1.0	1300	ceramic
<b>MAC HH</b>	36	2.0	31	0-1.0	1400	ceramic
<b>MAC SH</b>	42	2.0	32	0-0.5	1450	ceramic
<b>MAC SILL</b>	50	1.5	34	0-0.5	1450	ceramic
<b>MAC SILL SPL</b>	54	1.5	35	0-0.5	1500	ceramic
<b>MAC 50</b>	50	2.5	33	0-0.5	1550	ceramic
<b>MAC 60</b>	60	2.5	34	0-0.5	1600	ceramic
<b>MAC 70</b>	70	3.0	35	0-0.5	1650	ceramic
<b>MAC 70S</b>	70	2.0	35	0-0.5	1700	ceramic
<b>MAC 70SPL</b>	70	1.0	36	0-0.5	1700	ceramic
<b>MAC MULL</b>	70	0.5	38	0-0.5	1700	ceramic
<b>MAC 80</b>	80	3.0	36	0-0.5	1700	ceramic
<b>MAC 80SPL</b>	80	0.5	38	0-0.5	1750	ceramic
<b>MAC 90SPL</b>	90	0.5	38	0-0.5	1800	Ceramic
<b>MAC SET70K</b>	69			0-0.5		ceramic
<b>MAC SET90K</b>	89			0-0.5		Chemical/ceramic

Data represents typical average properties and do not constitute a specification.

# MAC VIB

	MAC VIB45	MAC VIB60	MAC VIB70	MAC VIB80	MAC VIB90
<b>Physical properties</b>					
<b>Refractoriness</b> Orton / °c min	32 (1717)	36 (1804)	36 (1804)	37 (1820)	37 (1820)
<b>Maximum Service</b> Temperature °c	1550	1600	1600	1700	1700
<b>Dry Density (gm/cc)</b> min (110°C)	2.3	2.6	2.7	2.9	3.05
<b>Cold Crushing</b> Strength (Kg/cm <sup>2</sup> ) at					
110°C	700	750	750	800	950
800°C	800	800	800	900	1000
1100°C	900	900	900	1000	1150
1500°C	1000	1000	-	-	-
1550°C	-	-	1000	1200	1200
<b>P.L.C. % (max.) at</b>					
800°C	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
1100°C	± 0.3	± 0.3	± 0.3	± 0.3	± 0.3
1500°C	± 1.0	± 1.0	-	-	-
1550°C	-	-	± 1.0	± 0.8	± 0.6
<b>% Water Required</b> for Casting	4.5-5.0	4.0-4.6	4.0-4.5	4.0-4.5	3.5-4.0
<b>Maximum Grain Size</b> (mm)	6	6	6	6	6
<b>Chemical Analysis</b>					
<b>Al<sub>2</sub>O<sub>3</sub> (%) min</b>	45.0	60.0	70.0	80.0	90.0
<b>Fe<sub>2</sub>O<sub>3</sub> (%) max</b>	0.8-1.0	1.5	1.5	1.5	1.0

Data represents typical average properties and do not constitute a specification. We can also supply Tailor made variety to suit customer's requirement. Application / Installation instructions would be provided on request.

# ZIRCON / ZIRCON MULLITE MORTARS, RAMS AND PATCHES

BRAND	Al <sub>2</sub> O <sub>3</sub> % min	ZrO <sub>2</sub> % min	Fe <sub>2</sub> O <sub>3</sub> % max	Grain size	Setting	Sintering temp °c	Service temp. °c max
<b>MORTARS</b>							
MCL ZSM	-	58.0	0.5	0-0.5	chemical	1000-1100	1650
MCL ZMM	65.0	15.0	0.5	0-0.5	chemical	1000-1100	1650
<b>PATCH</b>							
MCL PATCH ZS	-	58.0	0.5	0-0.5	chemical	1000-1100	1650
MCL PATCH ZM	55.0	24.0	0.5	0-0.5	chemical	1000-1100	1650
<b>RAMS</b>							
MCL RAM ZS	-	58.0	0.5	0-5.0	chemical	1100-1150	1650
MCL RAM ZM	65	15.0	0.5	0-5.0	chemical	1000-1100	1650

## REFRACTORY PLASTICS

BRAND	Al <sub>2</sub> O <sub>3</sub> % min	Service temp °c	Nature of Bond	Installation	BD at 1000°c	Grain size mm	State of delivery
<b>Plastocast 30P</b>	30.0	1450	Ceramic	Ramming	1.90	0-7.0	Slices
<b>Plastocast 40P</b>	40.0	1540	Ceramic	Ramming	2.06	0-7.0	Slices
<b>Plastocast 45P</b>	45.0	1600	Ceramic	Ramming	2.10	0-7.0	Slices
<b>Plastocast 60P</b>	60.0	1650	Ceramic	Ramming	2.27	0-7.0	Slices
<b>Plastocast 80P</b>	80.0	1700	Ceramic	Ramming	2.55	0-7.0	Slices

Data represents typical average properties and do not constitute a specification.

## ***MACHEAT 'T' : TABULAR ALUMINA CASTABLES***

<b>Properties</b>	<b>MACHEAT - 94T</b>	<b>MACHEAT - 97T</b>
Max Service Temperature °c	1800	1850
Water required for casting (%) by weight of castable	10-11	9-10
Density gm/cc (min) (dried at 110°C/24 hrs)	2.5	2.6
Cold Crushing Strength kg/cm <sup>2</sup> (min)		
110°C/24 hrs	900	400
800°C/3 hrs	550	280
1100°C/3 hrs	450	280
1550°C/3 hrs	550	380
Modules of Rupture kg/cm <sup>2</sup> (min)		
110°C/24 hrs	100	80
800°C/3 hrs	65	45
1100°C/3 hrs	55	60
1550°C/3 hrs	110	130
PLC % (max)		
800°C/3 hrs	± 0.1	Nil
1100°C/3 hrs	± 0.2	± 0.25
1550°C/3 hrs	± 0.4	± 0.8
Thermal Conductivity k cal/m/hr/°C (max) (500°C hot face)	1.5	1.7
Chemical Analysis (%)		
Al <sub>2</sub> O <sub>3</sub> (min)	94.5	96.0
SiO <sub>2</sub> (max)	0.3	0.3
Fe <sub>2</sub> O <sub>3</sub> (max)	0.3	0.3
CaO (max)	5.0	2.8

Data represent typical average properties and do not constitute a specification. All castables generally have a maximum aggregate size of 5 mm. A finer grading is available on request.

# MAC CRETE

	MAC CRETE	MAC CRETE SUPER	MAC CRETE SPECIAL
<b>Physical Properties</b>			
<b>Recommended Service temp °c max</b>	1400	1450	1350
<b>Dry Density (kg/m<sup>3</sup>)</b>	2100	2500	2250
<b>Linear Change (%) max</b>	±1.0/1400°c/2 hrs	±1.0/1400°c/3 hrs	±0.8, 1350°C/2 hrs
<b>CCS kg/cm<sup>2</sup> (min)</b>			
<b>110°c</b>	250	350	400
<b>1350°c</b>	225	-	300
<b>1450°c</b>	-	450	-
<b>Grain Size mm</b>	0-5.0	0-5.0	0-5.0
<b>Chemical Analysis</b>			
<b>Al<sub>2</sub>O<sub>3</sub> (%) min</b>	45	70	45
<b>Fe<sub>2</sub>O<sub>3</sub> (%) max</b>	4.0	5.0	4.0

Data represents typical average properties and do not constitute a specification. Coarse grading can be supplied on request. We can also supply tailor made variety to suit customer's requirement.

# MAC HEAT

	MAC HEAT A	MAC HEAT K	MAC HEAT K SPECIAL	MAC HEAT C	MAC HEAT C SPECIAL	MAC HEAT M	MAC HEAT HIGH STRENGTH A
<b>Physical Properties</b>							
Recommended Service temp.°c max	1750	1600	1600	1500	1500	1700	1700
Refractoriness °C(min)	1820	1683	1670	1665	1650	1800	1750
Orton (min)	37	31	-	30	-	-	-
Dry Density kg/m <sup>3</sup> (min)	2800	2200	2000	2100	2000	2600	2750
Linear Change % (max)	± 1.0	± 1.5	± 1.5	± 1.0	± 1.0	± 1.0	± 1.0
	1500°c	1550°c	1550°c	1500°c	1500°c	1500°c	1550°c
	3hrs	3hrs	3hrs	3hrs	3hrs	3hrs	3hrs
CCS kg/cm <sup>2</sup> (min)110°c	600	350	450	350	400	550	650
Maximum Grain Size (mm)	5	5	5	5	5	5	5
<b>Chemical Analysis</b>							
Al <sub>2</sub> O <sub>3</sub> (%) min	90	60	61	50	50	80	88
Fe <sub>2</sub> O <sub>3</sub> (%) max	0.8	1.0	1.0	1.5	1.3	1.5	0.6

Data represents typical average properties and do not constitute a specification. Coarse grading can be supplied on request. We can also supply tailor made variety to suit customer's requirement.

# MACLITE

	MACLITE 7	MACLITE 9	MACLITE 11	MACLITE 13	MACLITE 15	MACLITE 11-LI	MACLITE 13-LI	MACLITE 15-LI
<b>Physical Properties</b>								
<b>Recommended Service temp.°c</b>	1100	1100	1350	1350	1350	1350	1350	1350
<b>Dry Density (kg/m<sup>3</sup>)</b>	750-850	900-1000	1100-1250	1300-1450	1500-1600	1100-1250	1300-1450	1500-1600
<b>CCS (kg/cm<sup>2</sup>)</b>	12-14	15-20	35-45	50-60	90-100	45-55	80-100	130-150
<b>110°c</b>								
<b>500°c</b>	4-6	6-8	25-30	30-40	60-70	30-35	40-50	75-80
<b>1100°c</b>	6-8	10-14	25-30	30-40	60-70	30-40	40-50	75-80
<b>1300°c</b>	-	-	40-45	50-70	70-90	50-60	40-50	90-100
<b>PLC (%) at 110°c</b>	-	-	-	-	-	-	-	-
<b>500°c</b>	-	± 0.2	-	-	-	-	-	-
<b>800°c</b>	± 1.0	± 0.6	-	-	-	-	-	± 0.2
<b>1100°c</b>	± 1.6	± 1.0	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2	± 0.5
<b>1300°c</b>	-	-	± 1.0	± 0.6	± 0.6	± 0.6	± 1.0	± 1.0
<b>Chemical Analysis</b>								
<b>Fe<sub>2</sub>O<sub>3</sub> (%) max.</b>	8.5	6	3.5	3.5	3.2	1.5	1.5	1.5

CCS and PLC values are on 4x4x16cm prisms. Thermal Conductivity preferred hot face 500°C. Data represents typical average properties and do not constitute a specification. In addition, we can supply Tailor made variety to suit customer's requirement.

# INSULATING MORTAR HEAT AIR SETTING MORTAR POT MIX

	MAC INS 30	MAC INS K	MAC SET INSUL K	MAC SET ASC	MAC SET SILL	MAC SET 50 SINGLE COMPONENT	MAC SET 60	MAC SET 70	MAC POTMIX 30	MAC POTMIX 36
<b>Physical Properties</b>										
<b>P.C.E. Orton.</b>	29-30	32-33	-	-	-	-	-	-	30	31 ½
<b>Grain Size</b>	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-1.0	0-3.0
<b>Service Temp °c</b>	-	-	1500	1600	1650	1550	1600	1650	1300	1350
<b>Type of Setting</b>	Ceramic	Ceramic	Air	Air	Air	Air	Air	Air	-	-
<b>Chemical Analysis</b>										
<b>Al<sub>2</sub>O<sub>3</sub> (%) min.</b>	-	-	-	42	52	50	60	70	30	36
<b>Fe<sub>2</sub>O<sub>3</sub> (%) max.</b>	2.0	1.8	-	1.5	1.5	2.5	2.5	3.0	1.5	2

Grading: 95% passing through the maximum indicated grain size. Service temperature : The temperature given above are indicative. Above are average test data subject to reasonable variations. We can also supply Tailor Made variety to suit customer's Requirement.

# BASIC MONOLITHICS

BRAND	MgO% min	Cr <sub>2</sub> O % min	SiO <sub>2</sub> % max	Setting	Grading mm	Sintering temp °c	Application temp °c max
<b>MORTARS</b>							
MCL MGI	90	-	-	Ceramic	0-0.5	1550	
MCL MGM	85	-	-	Ceramic	0-0.5	1600	
MCL MCM	60	15	-	Ceramic	0-1.0	1650	
MCL CMM	35	22	-	Ceramic	0-1.0	1650	
MCL CTM	-	40	-	Ceramic	0-1.0	1400	
<b>PATCH</b>							
MCL-PATCH MCX	75	8	-	Ceramic	0-2.0	800	
<b>RAMS</b>							
MCL RAM84	84	-	-	Ceramic	0-5.0	1550	1700
MCL RAM86	86	-	-	Ceramic	0-5.0	1550	1750
MCL RAM MCX	70	7	-	Ceramic	0-5.0	800	1750
MCL RAM90	90	-	5	Ceramic	0-5.0	1550	1750
MCL RAM95	95	-	2.5	Ceramic	0-5.0	1550	1750
<b>GUNNING MIXES</b>							
MCL PERIGUN88	88	-	6.5	Ceramic	0-5.0	1500	1700
MCL PERIGUN95	95	-	2.0	Ceramic	0-5.0	1500	1750
<b>FETTLING MASS</b>							
MCL FET84	84	-	-	Ceramic	0-5.0	1500	1750
<b>FILLING MASS</b>							
MCL PERIFILL	93	-	4.0	Ceramic	1.0-5.0	1500	1750
<b>TAPHOLE MASS</b>							
MCL PERITAP	96	-	1.0	ceramic	0-5.0	1550	1750