

## SALPACK PRODUCTS

<b>SUMMARY OF THE PACKED REFRACTORY RANGE</b> For Full Specification see Technical Application Sheet		
<b>MORCOAT 70</b> REF:MCT70A	Flake graphite based general purpose dressing.	Can be applied either as a dry powder by dusting and sleeking, or mixed with water into a suitable consistency and swabbed or brushed onto moulds and cores for ferrous and non-ferrous use.
<b>MORCEM 2</b> REF:MCM2A MCM3A	Morcem 2 is a two part, thermally conductive, high performance cement, specially developed by MorganMMS for use in applications that have contact with liquid metals and slags. When mixed a chemical hardening takes place, which does not need any additional drying or heating.	It is suitable for use in applications where the temperature does not exceed 1650 °C. MORCEM 2 cement is supplied in two parts, MCM2A a dry powder and MCM3A a liquid component.
<b>MORCEM 900</b> REF:MCM900D	General purpose refractory cement.	Universal foundry use, providing a high resistance to metal penetration and slag attack.
<b>MORRAM 8301</b> REF:MCM8301A	Very high thermal conductivity rammable material.	A high quality graphite ramming material for use in furnaces where high thermal conductivity is required.

# Salamander Morcem 900 Cement

**MORCEM 900** is a high quality carbonaceous refractory cement which is supplied dry and merely requires mixing with water to be ready for use. It is extensively used in foundries and steelworks for many applications associated with jointing carbon or graphite based materials, and can also be used for providing a protective coating for refractories in contact with molten metal.

## WORKING INSTRUCTIONS FOR MORCEM 900

### MIXING

The material readily lends itself to mixing manually in any convenient container. Water should always be added to the powder, the amount being dependent upon the intended application. As a general guide when the material is to be used as cement, water should be added to the material in the ratio of 1:4 by volume. Where it is essential to obtain a strong air set joint prior to firing, the material must be mixed with boiling water but where green strength is not important cold water may be used.

### JOINTING

The surfaces to be joined should be brushed or blown free of dust and then 'wetted' but not soaked. This is particularly important where porous and unglazed surfaces are to be cemented.

A thin layer of cement is then applied to both surfaces and the pieces squeezed together. Excess material which has exuded from the joint should be removed and the cement allowed to set. Care should be exercised in preventing the jointed parts from moving during the air setting period. This will vary from ½ hour, for material mixed with hot water, to several hours for material mixed with cold water.

### DRYING

It is dangerous to permit molten metal to come into contact with any refractory material which has not been thoroughly dried, therefore cemented articles must be subject to a drying procedure. Ideally, where time and facilities are available, the cemented assemblies should be left to air dry overnight and then moderate heat applied in an oven or with a gas torch until quite dry. Less effective alternatives are to dry the joint with a gas torch immediately or stand the pieces in a warm place for a prolonged period. Whichever method is adopted, the first heating of the joint to 'red heat' should be done as slowly as possible.

### FIRING

The joint only attains its maximum strength after firing to temperatures of approximately 1200°C. Therefore, care should be taken not to stress the joint until this temperature has been reached.

### PROPERTIES

Morcem 900 is a plumbago based material with added silicon carbide, providing a high strength refractory cement with excellent resistance to oxidation, metal penetration and slag attack. To achieve optimum results the material must be mixed and applied according to the 'Working Instructions'. The following figures are based on average data obtained from current production quality control tests on the material.

### STORAGE

It is recommended that the material is stored in a cool, dry place and that part used sacks are resealed to prevent moisture pick up. Morcem 900 is a stock item and is supplied in 25kg paper sacks (Morcem 900D) and 7kg plastic buckets (Morcem 900E).



Nominal Chemical Analysis			
	%		%
SiO <sub>2</sub>	15	Fe <sub>2</sub> O <sub>3</sub>	6
SiC	30	B <sub>2</sub> O <sub>3</sub>	1.5
C	29	Na <sub>2</sub> O	0.4
Si	13	K <sub>2</sub> O	0.3
Al <sub>2</sub> O <sub>3</sub>	4	MgO	0.2
		CaO	0.6

Cold Crushing Strength Measured on 25mm Cube				
Dried to	100°C	600°C	1000°C	1200°C
kg/cm <sup>2</sup>	123	125	179	506
P.S.I	1750	1820	2540	7251

## Salamander Morcem 2 Cement

### INTRODUCTION

Morcem 2 is a two part, thermally conductive, high performance cement, specially developed by Morganite Crucible for use in applications that have contact with liquid metals and slags. When mixed a chemical hardening takes place, which does not need any additional drying or heating. There is a slight expansion and the hardened cement reaches a very high mechanical strength. It is suitable for use in applications where the temperature does not exceed 1650 °C. MORCEM 2 cement is supplied in two parts, MCM2 a dry powder and MCM3 a liquid component.



### THE ADVANTAGES OF MORCEM 2 CEMENT

- Quick preparation of only a few minutes.
- Cold setting without drying and heating.
- Slight expansion of 1 %.
- Very strong crushing strength.
- Very high refractory.
- Very high thermal conductivity.
- Is not wetted by molten metals.
- Is not wetted by liquid slags.
- Very high resistance to erosion by molten metals.
- Very high resistance to erosion by liquid slags.
- Very high resistance to corrosive atmospheres.
- Is compatible with all standard refractory coatings.

### THE PREPARATION OF MORCEM 2 CEMENT

1. Ensure that the surfaces where MORCEM 2 cement will be applied are dry and free from any dust or solid particles.
2. Place the MORCEM MCM3 in a suitable plastic container.
3. Brush a coating of MCM3 onto the surfaces to be joined. This will accelerate the chemical setting of MORCEM 2 cement.
4. Mix the MCM2 powder with the liquid MCM3 left. The use of an electric mixer fitted with a centrifugal turbine wheel is recommended. (Rotation speed of 1000 rev/minute, to obtain a good mixture of MCM2 and MCM3).
5. The MORCEM 2 cement is now ready to use. Use the cement immediately.
6. Cold setting of the MORCEM 2 cement begins as soon as the mixture is ready. Use within 10 minutes of mixing for best results.
7. Keep the cement dry and vibration free for 24 hours to ensure maximum strength and properties.
8. MORCEM 2 cement can be used without drying or preheating.

### USE OF MORCEM 2 CEMENT

MORCEM 2 cement can be used in many applications, especially in the iron and steel industry, non-ferrous, ceramic...

MORCEM 2 cement can be used in specific applications such as:

Jointing refractory / refractory.

Refractory / metal.

Metal / metal in some situations.

Coating for old refractories.

To protect refractory pieces against molten metals and fluxes attack.

To protect refractory pieces against oxidation (graphite pieces.)

Sticking of refractories to metal. (Sealing of thermocouple sheaths to steel tubes).

Refractories to refractories.

Refractories to ceramics.

Fibres to metal.

Coating by brushing or spraying on refractories, iron and steel.

MCM3 can be used alone, for this application; (gas firing is necessary to obtain a superficial hardening)

## TYPICAL APPLICATIONS

- Joints of sleeves in steel ladles
- Joints between well block and lining
- Joints between crucibles and refractory lining of non ferrous crucible furnaces.

## COMPOSITION OF MORCEM 2 CEMENT BEFORE COLD SETTING

Composition before cold setting.		
	Dry Powder	Wet Mix
SiC	43 – 45%	30%
Si	19 – 20%	13%
Al <sub>2</sub> O <sub>2</sub>	14 – 15%	10 – 15%
SiO <sub>2</sub>	11 – 12%	8%
Alkali	2%	1.5%
P <sub>2</sub> O <sub>5</sub>	-	20 – 30%
	+ ferrous and titanium oxides	+ ferrous and titanium oxides

Typical conductivity values: 0.020 – 0.023 cal/cm/co/sec

## PACKING

MORCEM MCM2 cement is supplied in watertight plastic bags and the MORCEM MCM3 liquid hardener in plastic drums.

PACKING		
	Packing No 1	Packing No2
MORCEM MCM2 Cement	15 Kgs	5 Kgs
MORCEM MCM3 Liquid	4.5 litre	1.5 litre



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# Salamander Plumbago Morram 8301

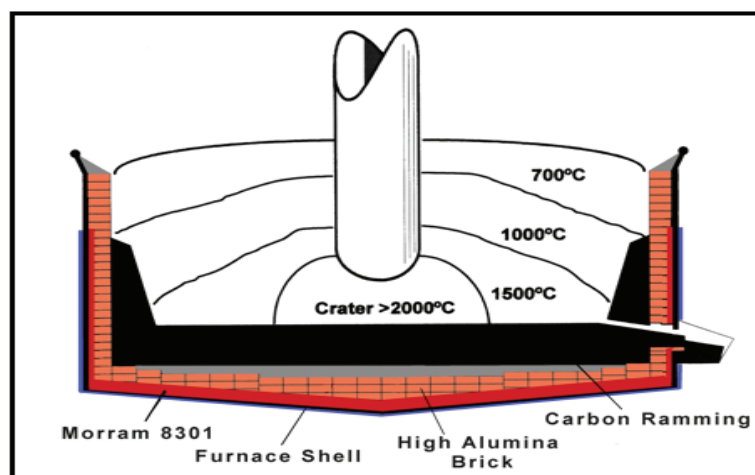
## High Thermal Conductivity Ramming for Electric Arc Furnace Applications




### INTRODUCTION

Morram 8301 (MRM8301A) is a high conductivity ramming material manufactured from carefully controlled blends of natural flake graphite (for thermal conductivity), and clays (for rammability and refractoriness). It has an excellent shelf life (18 months recommended) provided the bags remain sealed and protected from extremes of temperature. Morram 8301 must not be allowed to freeze and should be stored above 5° C.

### INSTALLATION

Morram 8301 is supplied ready for use with a moisture content of 12-14%, requires no mixing or heating prior to use and can be installed easily using hand or pneumatic rammers. As a guide, Morram 8301 should be rammed until thumb pressure produces no more than slight indentation. To ensure even compaction throughout, it is recommended that the depth of loose material to be rammed at any one time should not exceed 150mm. As far as possible, the ramming tool should move in a direction at right angles to the required direction of heat flow thus ensuring maximum cooling effect.



Key:  Brickwork  Water cooling.  Morram 8301.

### APPLICATIONS

The wear of refractory linings, in electric arc furnaces, increases as operating temperatures rise. In recognition of this, many furnaces are fitted with a cooling system, the efficiency of which is inhibited by the use of conventional low thermal conductivity refractories. Morram 8301 has been designed to improve the heat exchange between brickwork and the furnace cooling system and thereby extend the lining life and furnace campaign. Morram 8301 is recommended for use in the furnace bottom and the furnace side walls.

## ADVANTAGES

- The thermal conductivity of Morram 8301 is at least twice that of conventional high conductivity ramming material.
- The thermal conductivity is maintained even at low rammed densities.
- High thermal conductivity is maintained at working temperatures.
- Easy to install – Morram 8301 is poured straight from the bag and is easily consolidated by hand ramming.
- No heating or other preparation is needed prior to installation.
- Ramming produces marked directional heat flow properties.
- Heat flow may be directed to the cooling system.
- Morram 8301 may be used as a compressible ramming to take up brickwork expansion.

Good shelf life – (18 months providing the bags remain sealed and undamaged and protected from extremes of temperature). Morram 8301 must not be allowed to freeze and should be stored above 5° C.

## EFFECT OF TEMPERATURE

The thermal conductivity of Morram 8301 increases as the rammed density rises but for a given density, it is substantially constant.

Density (g/cc)	Thermal Conductivity (W/mK)		
	50°C	150°C	250°C
1.85	-	31.0	-
1.75	27	27.9	27
1.45	12.7	14.89	15.82

## PHYSICAL PROPERTIES

The thermal conductivity of Morram 8301 is higher than other conventional rammings over a wide range of rammed densities.

Chemical Analysis % by Weight			
Carbon	60 – 70	Al <sub>2</sub> O <sub>3</sub>	9 – 13
SiO <sub>2</sub>	15 – 20	Fe <sub>2</sub> O <sub>3</sub>	2 max.

**Warning:** This material must be completely dry before molten metal is allowed to contact. To do otherwise is dangerous.  
This material should only be used for the purposes described or recommended.



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