

# UNIVERSAL MINERALS EXPORT COMPANY

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## TECHNICAL DATA SHEET

## Ramming Mass

Product Code: UME-RAM-03

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HS Code: 3816.00

### 1. PRODUCT DESCRIPTION

Ramming Mass is a dry, granular refractory material used for lining coreless induction furnaces in which steel, cast iron, ductile iron, and non-ferrous metals are melted. It is rammed (compacted) around a former to form the crucible lining of the furnace, and then sintered in-situ under heat. Universal Minerals Export Company supplies three grades: **Acidic Ramming Mass** (silica-based, for steel and cast iron melting), **Premixed Ramming Mass** (acidic grade with sintering additive, ready-to-use), and **Neutral Ramming Mass** (alumina/magnesia-based, for special alloys and non-ferrous metals). Proper selection ensures maximum campaign life, minimal metal contamination, and safe furnace operation.

### 2. GRADE SELECTION GUIDE

Grade	Base Material	Refractoriness	Best For	Key Advantage
Acidic Ramming Mass	High-Purity Silica (SiO <sub>2</sub> )	> 1700°C	Steel, Cast Iron, Ductile Iron	Low cost, long campaign life
Premixed Ramming Mass	Silica + Boric Acid	> 1680°C	Cast Iron, General Foundry Use	Ready-to-use, easy sintering
Neutral Ramming Mass	Alumina (Al <sub>2</sub> O <sub>3</sub> ) / Magnesia	1750–1800°C	Special Alloys, Non-Ferrous	Neutral chemistry, no silica contamination

### 3. CHEMICAL COMPOSITION

Parameter	Acidic Grade	Premixed Grade	Neutral (Alumina)	Test Method
SiO <sub>2</sub>	≥ 97.0 %	≥ 95.0 %	≤ 5.0 %	XRF
Al <sub>2</sub> O <sub>3</sub>	≤ 0.8 %	≤ 0.8 %	≥ 85.0 %	XRF
Fe <sub>2</sub> O <sub>3</sub>	≤ 0.5 %	≤ 0.5 %	≤ 0.5 %	XRF
MgO	≤ 0.3 %	≤ 0.3 %	≤ 3.0 %	XRF
CaO	≤ 0.3 %	≤ 0.3 %	≤ 0.5 %	XRF
B <sub>2</sub> O <sub>3</sub> (Boric Acid Additive)	Nil	1.5 – 3.0 %	Nil	Wet chemical
Loss on Ignition	≤ 0.5 %	≤ 1.0 %	≤ 0.8 %	Gravimetric @ 1000°C

### 4. PHYSICAL PROPERTIES

Appearance	<b>Grey to off-white granular powder</b>	Refractoriness (PCE)	<b>&gt; SK 32 (Acidic); &gt; SK 34 (Neutral)</b>
Odour	<b>Odourless</b>	Max Service Temp.	<b>1700°C (Acidic); 1800°C (Neutral)</b>
Grain Size Range	<b>0 – 3 mm (typical mixed gradation)</b>	Thermal Shock Resist.	<b>Good — optimised grain gradation</b>
Bulk Density (loose)	<b>1.55 – 1.75 g/cm<sup>3</sup></b>	Sintering Temp.	<b>900 – 1100°C (first heat sintering)</b>
True Density	<b>2.20 – 2.65 g/cm<sup>3</sup> (grade dependent)</b>	Cold Crushing Strength	<b>After sintering: 15 – 35 MPa</b>
Moisture Content	<b>≤ 0.3 % (dry packed)</b>	pH (slurry)	<b>6.5 – 8.0</b>

## 5. GRAIN SIZE DISTRIBUTION (TYPICAL)

Fraction	Size Range	Acidic / Premixed %	Neutral (Alumina) %	Function
Coarse	1.0 – 3.0 mm	30 – 40 %	25 – 35 %	Structural backbone, reduces shrinkage
Medium	0.3 – 1.0 mm	25 – 35 %	25 – 35 %	Gap filling, density improvement
Fine	0.1 – 0.3 mm	15 – 20 %	15 – 25 %	Workability and packing density
Ultra-Fine	< 0.1 mm	10 – 20 %	15 – 20 %	Sintering reactivity, hot strength

*Note: Grain size distribution is engineered to achieve maximum packing density, optimal sintering, and long campaign life. Custom gradations available on request.*

## 6. APPLICATIONS & METAL COMPATIBILITY

Application	Recommended Grade	Furnace Capacity	Notes
Carbon Steel & Low-Alloy Steel	Acidic	100 kg – 10 T	Excellent campaign life; avoid high Mn steels
Cast Iron (Grey & White)	Acidic / Premixed	100 kg – 5 T	Premixed for easier sintering in smaller furnaces
Ductile Iron (SG Iron)	Acidic	250 kg – 5 T	High silica resists Mg treatment slag
Stainless Steel & High-Alloy Steel	Neutral (Alumina)	250 kg – 5 T	Neutral chemistry prevents Cr/Ni contamination
Manganese Steel (Hadfield)	Neutral (Alumina)	250 kg – 3 T	Acidic silica reacts with high-Mn melts — use neutral
Copper & Copper Alloys	Neutral (Alumina)	50 kg – 2 T	Non-contaminating; resists copper oxide slag
Aluminium Alloys	Neutral (Alumina)	50 kg – 1 T	Low silica prevents Al <sub>2</sub> O <sub>3</sub> buildup
Ferroalloys (FeSi, FeMn, FeCr)	Neutral (Alumina)	250 kg – 5 T	High temp stability required; neutral grade only

## 7. SINTERING PROCEDURE (RECOMMENDED)

**Step 1 — Lining:** Ram the mass in 50–75 mm layers around the former using a pneumatic or manual rammer. Ensure uniform density throughout. Total lining thickness typically 75–150 mm.

**Step 2 — Drying:** Allow 2–4 hours of air drying after lining. For humid climates, use radiant heat at 100–150°C for 1–2 hours to remove free moisture.

**Step 3 — Pre-heat (First Heat):** Charge the furnace with 50% of normal capacity. Gradually ramp power: 20% for 30 min → 40% for 30 min → 60% for 20 min → 80% for 15 min → 100%.

**Step 4 — Sintering Heat:** At full power, raise metal temperature to 50–80°C above normal tapping temperature. Hold for 20–30 minutes to complete sintering of the hot face.

**Step 5 — First Tap:** Tap carefully. Inspect lining for cracks or soft spots. Apply patch material if needed before second heat.

**Step 6 — Ongoing Operation:** Maintain lining by topping-up worn areas with ramming mass after every 10–15 heats. Avoid thermal shock from rapid power changes.

## 8. PACKAGING & STORAGE

Standard Pack	25 kg double-layered HDPE woven bags with PE inner liner (moisture-proof)
Bulk Pack	50 kg HDPE bags; 500 kg & 1,000 kg PP jumbo bags (FIBC)
Container Load	~500 x 25 kg bags per 20' FCL (~12.5 MT); ~280 x 50 kg bags per 20' FCL (~14 MT)
Pallet	48 bags/pallet (25 kg), stretch-wrapped — 24 pallets per 20' FCL
Storage	Store in a dry, covered area. Keep away from moisture and water. Shelf life: 12 months.
Moisture Warning	Premixed grade especially sensitive to moisture — store with desiccant if humidity > 70%.
Transport	Non-hazardous cargo. Standard freight classification. Keep dry during transport.

## 9. SAFETY & HEALTH INFORMATION

GHS Classification	Contains crystalline silica (SiO <sub>2</sub> ) — Acidic/Premixed grade: IARC Group 1 carcinogen (inhaled as respirable dust)
Respirable Silica Dust	Use P2/FFP2 or higher respirator when handling, ramming, or breaking out lining
Eye Protection	Safety glasses with side shields during handling and installation
Skin Protection	Work gloves recommended — mild abrasive material
Ventilation	Ensure adequate ventilation at furnace area during rammer operation and breakout
Hot Material Warning	Used lining is extremely hot — allow full cooling before breakout. Use heat-resistant PPE.
REACH / RoHS	Silica (quartz) registered under REACH. Premixed boric acid additive declared as per REACH.
Disposal	Used lining (spent refractory) — dispose as industrial mineral waste per local regulations.

## 10. EXPORT & ORDERING INFORMATION

HS Code	<b>3816.00 (Refractory Cements, Mortars, Concretes and Similar Compositions)</b>
Country of Origin	<b>India</b>
Port of Loading	<b>Mundra Port / Kandla Port, Gujarat, India</b>
Lead Time	<b>7–15 working days from order confirmation to container loading</b>
MOQ	<b>1 FCL (~12.5 MT in 25 kg bags)</b>
Payment Terms	<b>30% advance, 70% against BL copy (T/T); LC at sight acceptable</b>
Price Basis	<b>FOB Mundra / CIF destination port (as negotiated)</b>
Technical Support	<b>Sintering guidance and application support provided — contact our technical team</b>
Documents Provided	<b>Commercial Invoice, Packing List, Bill of Lading, COA, Certificate of Origin, MSDS</b>

### Universal Minerals Export Company

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*This TDS is provided for informational purposes only. Typical values may vary by batch and grade. Universal Minerals Export Company reserves the right to modify specifications without prior notice. Customers are responsible for determining suitability for their specific furnace and application. IMPORTANT: Acidic and Premixed grades contain crystalline silica — follow all respiratory protection guidelines during handling.*