


US Patents 7,368,010;
7,824,464; 8,123,853;
8416,585 Pending 13/357,731
Mexico Patent 275142; 275142
Pending Mx/a/2012006542
Australian Patent 2004268991
Pending 2010246436;
2013200387
EU Pending 04782054.3
Brazil Pending PI0413999-2
Canada Patent 2,536,766 Pending
2,799,506



General Information

WAM[®] AL II



WAM[®] AL II is a truly unique product, designed to reduce the energy consumption associated with processing and handling of molten aluminum metal and to be non-reactive and non-wetted by the liquid metal. As a result this product has become the most demanded refractory material for molten aluminum applications by every company and individual desiring to reduce refractory wear, energy consumption and maintenance costs.

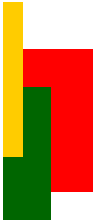
WAM[®] AL II technology can be deployed in every area of aluminum processing vessels whether in contact with molten metal or not, with some minor exceptions. It eliminates the need to zone between lower sidewalls, bellybands and upper sidewalls.

WAM[®] AL II is suitable in the belly band area because it does not promote the formation of corundum like other refractory linings nor is it penetrated by the metal or corundum which does form due to atmospheric oxygen. Any buildup is easily removed without any damaging physical effort. It is less dense than aluminum so any pieces that become dislodged float out and thus do not result in refractory inclusions.

WAM[®] AL II has been successfully used in all areas of reverberatory-type melting furnaces, troughs, heated launders, holding furnaces, stacks, transfer ladles, over-the-road crucibles, and a variety of lids and doors.

WAM[®] AL II has a demonstrated record of performance with continued operation in some vessels approaching 8 years and counting. Customers have measured energy savings compared to their old refractory linings of up to 50% and they have cut their maintenance efforts and costs in half or more.

Westmoreland Advanced Materials, Inc
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Typical Technical Data

WAM[®] AL II

Classification: Special Cement Castable
Placement Method: Vibration Casting
Available Application Packages: This product is specifically designed for aluminum contact application

Typical Water Requirement (% wt) 22
Material Required for Estimating (lb/ft³): 115
Maximum Recommended Service Temperature (°F) 2600

CHEMICAL ANALYSIS

Calculated wt.% Based on Common Oxides

Aluminum Oxide (Al ₂ O ₃)	64.8 %
Silicon Dioxide (SiO ₂)	0.3 %
Titanium Dioxide (TiO ₂)	0.1 %
Iron(III) Oxide (Fe ₂ O ₃)	0.1 %
Calcium Oxide (CaO)	24.3 %
Magnesium Oxide (MgO)	0.2 %
Combined Alkali Oxide (Na ₂ O + K ₂ O)	0.2 %
Other	10.0 %

THERMAL CONDUCTIVITY

(BTU-in/ft²-hr-°F)

750 °F	5.3
1470 °F	4.8
2200 °F	5.3

PHYSICAL PROPERTIES

Temperature (°F)	Density (lb/ft ³)	Modulus of Rupture (psi)	Cold Crushing Strength (psi)	Permanent Linear Change (%)
After 230	130	1520	9530	n/a
After 1500	115	740	4790	-0.1
After 2500	n/a	680	4610	-0.3

Additional technical data may be available. Please contact your sales representative for more information.

Data on this table represent typical properties and cannot be used for specification purposes

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MATERIAL SAFETY DATA SHEET

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Emergency Telephone: 724-684-5902
Prepared by: Technology Dept.
Telephone: 724-684-5912

SECTION I: Product Identification and Use

Product Name: **WAM[®] AL II**
NFPA/WHMIS Rating: 2-0-0
Product Use: Castable Refractory
Chemical Name/Synonym: Not Applicable

Product Identification No.: Not Applicable

Formula: Not Applicable
Chemical Family: Not Applicable

SECTION II: Hazardous Ingredients

<u>Hazardous Ingredients</u>	<u>%</u>	<u>CAS No.</u>	<u>TLV TWA (mg/m³)*</u>	<u>LD₅₀</u>	<u>LC₅₀</u>
Calcium Aluminate Cement	85 - 95	12042-68-1	10 total / 3 respirable	Not Applicable	Not Applicable
Barium Sulfate	0 - 15	7727-43-7	10 total	Not Applicable	Not Applicable

* Source: American Conference of Governmental Industrial Hygienists (ACGIH); TL V- TWA for Crystalline Silica are for the respirable fraction of particulate matter.

SARA Title III Section 313 Toxic Chemicals: None

Calcium Aluminate Cement is a low health risk by inhalation and should be treated as a nuisance dust.

SECTION III: Physical Data

Appearance and Odor: Granular Mixture, White to Gray Color, Earthy Odor
Physical State: Solid
Percent Volatile by Volume: 0
Odor Threshold: Not Available
Boiling Point (°C): Not Applicable
Specific Gravity (g/cc): 1.5

Freezing Point (°C): Not Applicable
pH (10% Solids): 8-10
Vapor Density (Air=1): Not Applicable
Solubility in Water: Slight
Vapor Pressure (mmHg): Not Applicable
Coefficient of Oil/Water Dist: Not Available
Evaporation Rate: Not Applicable

SECTION IV: Fire and Explosion Hazard Data

Flammability: Product is non-flammable and will not support combustion.
Means of Extinction: Not Applicable
Auto-Ignition Temperature (°C): Not Applicable
Flashpoint (°C) and Method: Not Applicable
Hazardous Combustion Products: Not Applicable

Upper Flammable Limit (o/v): Not Applicable
Explosion Sensitivity to Impact: Not Applicable
Lower Flammable Limit (o/v): Not Applicable
Explosion Sensitivity to Static Discharge: Not Applicable

SECTION V. Reactivity Data

Stability: Stable
Hazardous Decomposition Products: None
Incompatibility: Concentrated Acids

Hazardous Polymerization: Will Not Occur
Reactivity: Hydraulic Setting

SECTION VI: Health Hazard/Toxicological Data

Route of Entry:
Skin Contact: Yes
Skin Absorption: No
Eye Contact: Yes

Inhalation: Yes
Ingestion: Yes

Effects of Acute Exposure to Product:

Skin: May irritate skin.
Eye: May irritate and/or abrade eyes.
Inhalation: Congestion of the throat, nasal passages, and upper respiratory system.
Ingestion: Unknown.

Effects of Chronic Exposure to Product:

Skin: None Known
Eye: None Known
Inhalation: According to the International Agency for Research on Cancer (IARC), there is sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica in the form of quartz or cristobalite from occupational sources.
Ingestion: Unknown.

Exposure Limits: See Section II
Reproductive Toxicity: None Known
Irritancy of Product: Moderate irritation may occur.
Sensitization to the Product: None Known
Synergistic Materials: None Known

Teratogenicity: None Known
Mutagenicity: None Known

Carcinogenicity: Crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group IIARC).

California Proposition 65: This product contains crystalline silica, a chemical known to the state of California to cause cancer.

SECTION VII: Preventive Measures, and Spill or Leak Procedures

Personal Protective Equipment:

Gloves: Protective Gloves
Clothing: Long Sleeved and Legged
Footwear: Safety Shoes (Not Essential)

Eye: Goggles or Safety Glasses with Side Shields
Respirator: NIOSH Approved Respirator
Other: None Known

Engineering Controls: General mechanical ventilation is normally adequate.

Leak and Spill Procedure: Dry material may be swept, shoveled, or vacuumed up. Return clean, dry material to original container, or dispose. Place wet material in a container for disposal.

Waste Disposal: The tear out and disposal of this product may generate dust. During tear out, observe the exposure limits outlined in Section II, and the personal protection precautions in Section VII. Dispose in accordance with Federal, State and Local regulations.

Handling Procedures: Follow good housekeeping and hygienic practices.

Storage Requirements: Store in a dry place.

Special Shipping Information: Not regulated by USA DOT, Canadian TDB Class, and PIN.

SECTION VIII: First Aid Measures

Skin: Wash with soap and water. If irritation occurs, seek medical attention.

Eyes: Flush with clean water for 15 minutes. Seek medical attention.

Inhalation: Remove to dust free area and fresh air. If continuing respiratory distress, seek medical attention.

Ingestion: Seek medical attention immediately. Unless instructed by physician, do not induce vomiting. Product is non-toxic as supplied, but its abrasive nature may damage internal organs.

SECTION IX: Other Information

This information and recommendations set forth herein are taken from sources believed to be accurate as of the date herein; however, Westmoreland Advanced Materials, Inc. makes no warranty with respect to the accuracy of the information or the suitability of the recommendations, and assumes no liability to any user thereof.