SAFETY DATA SHEET: RHODES ALUMINA

SECTION 1: CHEMICAL PRODUCT & COMPANY INFORMATION

APPLICABLE PART #: AZ Series

IDENTITY: Rhodes Alumina

SUPPLIER: Universal Photonics, Inc.
85 Jetson Lane
Central Islip, NY 11722

FOR INFORMATION CALL CUSTOMER SERVICE (516) 935-4000

DATE PREPARED: November 25, 2015

EMERGENCY TELEPHONE NUMBER: 1.866.519.4752 3-E COMPANY - ACCT # 3665

SECTION 2: HAZARDS IDENTIFICATION

CLASSIFICATION OF SUBSTANCE:
EU CLP Classification (1272/2008): Not classified as hazardous
EU Classification (1999/45/EC): Not classified as dangerous
GHS Classification: Not classified as dangerous
US OSHA Classification (29CFR1910.1200): Not classified as dangerous
Refer to Section 16 for Full Text of EU Classes and R Phrases

LABEL ELEMENTS: Not Hazardous in accordance with the Globally Harmonized System for the Classification and Labeling of Chemicals (GHS)

SUPPLEMENTAL LABELING: Prolonged exposure to elevated noise levels during operations may affect hearing. A greater hazard, in most cases, is the exposure to the dust/fumes from the material or paint/coatings being processed. Most of the dust generated during abrasive processing is from the base material or coatings and the potential hazard from this exposure must be evaluated. This dust may present a fire or dust explosion hazard and may present a serious health hazard.

OTHER HAZARDS: None identified

SECTION 3: COMPOSITION INFORMATION

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>CAS#/EINECS#</th>
<th>REACH #</th>
<th>WEIGHT %</th>
<th>EU/GHS CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Oxide</td>
<td>1344-28-1/215-691-6</td>
<td>01-2119529248-35-0063</td>
<td>60-100%</td>
<td>Not dangerous/Not hazardous</td>
</tr>
</tbody>
</table>

SECTION 4: FIRST AID MEASURES

EYE CONTACT: Remove contact lenses if present and easy to do. Flush eyes thoroughly with large amounts of water, holding eyelids open. If irritation persists, seek medical attention.

SKIN CONTACT: Wash skin with soap and water. If irritation or other symptoms develop, seek medical attention.

INHALATION: Move person to fresh air. If breathing is difficult, have qualified personnel administer oxygen. Seek medical attention if irritation or other symptoms persist.
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INGESTION: Do not induce vomiting. Rinse mouth with water. Seek medical attention if large amount is swallowed or if you feel unwell.

MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED: Dust may cause eye and respiratory irritation. Prolonged inhalation of high concentration of dust may cause adverse effects on the lungs. Exposure to dust generated from processing the base material or coatings may present additional health hazards.

INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED: Immediate medical attention should not be required.

SECTION 5: FIRE FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA: Use an extinguishing agent suitable for the surrounding fire.

SPECIAL HAZARDS: This product is not flammable or combustible; however, consideration must be given to the potential fire/explosion hazards from the base material being processed. Many materials create flammable/explosive dusts or turnings when machined or ground.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE-FIGHTERS: Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires involving chemicals.

SECTION 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: Wear appropriate respirator and protective clothing as needed to avoid eye contact and inhalation of dust.

ENVIRONMENTAL PRECAUTIONS: Avoid contamination of water supplies and environmental releases. Report spills as required to authorities.

METHODS AND MATERIAL FOR CLEAN-UP: Carefully collect dry material, avoiding the creation of airborne dust. Place in a suitable container for disposal.

REFERENCE TO OTHER SECTIONS: Refer to Section 13 for disposal information and Section 8 for protective equipment.

SECTION 7: HANDLING & STORAGE

HANDLING: Avoid breathing dust. Use with adequate ventilation. Avoid contact with the eyes, skin and clothing. Wear suitable gloves, eye protection and appropriate protective clothing according to the operation. Wash thoroughly after handling. Consider potential exposure to components of the materials or coatings being processed. Refer to OSHA’s substance specific standards for additional work practice requirements where applicable.

STORAGE: No special storage required

SPECIFIC END USE(S):
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Industrial uses: Abrasive
Professional uses: None identified

SECTION 8: PERSONAL PROTECTION AND EXPOSURE CONTROLS

<table>
<thead>
<tr>
<th>CHEMICAL NAME</th>
<th>US OEL</th>
<th>EU OEL</th>
<th>UK OEL</th>
<th>GERMAN OEL</th>
<th>CHINA OEL</th>
<th>BIOLOGICAL LIMIT VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Oxide</td>
<td>5 mg/m3 TWA (respirable), 15 mg/m3 TWA (total dust) OSHA PEL None Established ACGIH TLV</td>
<td>None Established</td>
<td>4 mg/m3 TWA (respirable dust) 10 mg/m3 TWA (inhalable dust)</td>
<td>1.5 mg/m3 TWA (respirable), 4 mg/m3 TWA (inhalable)</td>
<td>4 mg/m3 TWA</td>
<td>None Established</td>
</tr>
</tbody>
</table>

Note: Consider also components of base materials and coatings being processed.

DNEL:
Aluminum oxide Long Term Oral Toxicity Long Term Inhalation Toxicity 6.2mg/kg 15.6mg/m3
PNEC: NONE ESTABLISHED

DNEL (DERIVED NO-EFFECT LEVEL): A DNEL is the level of exposure to the substance below which no adverse effects are expected to occur. It is therefore the level of exposure to the substance above which humans should not be exposed. DNEL is a derived level of exposure because it is normally calculated on the basis of available dose descriptors from animal studies such as No Observed Adverse Effect Levels (NOAELs) or benchmark doses (BMDs). This value is derived under EU REACH when a chemical safety assessment is performed as part of registration.

PNEC (PREDICTED NO-EFFECT CONCENTRATION): Concentration of the substance below which adverse effects in the environmental sphere of concern are not expected to occur. This value is derived under EU REACH when a chemical safety assessment is performed as part of registration.

EXPOSURE CONTROLS:
RECOMMENDED MONITORING PROCEDURES: None identified.

APPROPRIATE ENGINEERING CONTROLS: Use with adequate general or local exhaust ventilation to maintain exposure levels below the occupational exposure limits.

RESPIRATORY: Not necessary unless workplace concentrations of hazardous constituents exceed the exposure limits. If the exposure levels are excessive and irritation or other symptoms are experienced, an approved respirator should be worn. Respirator selection and use should be based on contaminant type, form and concentration. Follow OSHA 1910.134 and ANSI Z88.2 or other applicable regulations and standards and good Industrial Hygiene practice.

SKIN: Protective gloves recommended to avoid skin abrasion when handling. Wear protective clothing as required to avoid skin contact when handling.
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EYE: Use safety glasses with side shields or goggles.

OTHER PROTECTION: Hearing protection recommended if operation is noisy.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

**APPEARANCE AND ODOR:** White, solid (powder or crystal), odorless

<table>
<thead>
<tr>
<th>SOLUBILITY IN WATER:</th>
<th>Insoluble</th>
<th>BOILING POINT:</th>
<th>2977 C (5390.6 F)</th>
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</thead>
<tbody>
<tr>
<td>ODOR THRESHOLD:</td>
<td>N/A</td>
<td>PARTITION COEFFICIENT:</td>
<td>N/A</td>
</tr>
<tr>
<td>pH:</td>
<td>N/A</td>
<td>MELTING POINT:</td>
<td>2050 C (3722 F)</td>
</tr>
<tr>
<td>SPECIFIC GRAVITY:</td>
<td>4.0</td>
<td>VAPOR DENSITY:</td>
<td>N/A</td>
</tr>
<tr>
<td>EVAPORATION RATE:</td>
<td>N/A</td>
<td>VAPOR PRESSURE:</td>
<td>N/A</td>
</tr>
<tr>
<td>FLAMMABILITY (SOLID/GAS):</td>
<td>N/A</td>
<td>FLASH POINT:</td>
<td>N/A</td>
</tr>
<tr>
<td>EXPLOSIVE LIMITS:</td>
<td>N/A</td>
<td>AUTOIGNITION TEMPERATURE:</td>
<td>N/A</td>
</tr>
<tr>
<td>DECOMPOSITION TEMPERATURE:</td>
<td>N/A</td>
<td>VISCOSITY:</td>
<td>N/A</td>
</tr>
<tr>
<td>EXPLOSIVE PROPERTIES:</td>
<td>None</td>
<td>OXIDIZING PROPERTIES:</td>
<td>None</td>
</tr>
</tbody>
</table>

SECTION 10: STABILITY & REACTIVITY

**STABILITY AND REACTIVITY:** Stable, and not reactive under normal conditions of use and storage.

**POSSIBILITY OF HAZARDOUS REACTIONS:** A slight rise in temperature may result from contact with water.

**HAZARDOUS DECOMPOSITION PRODUCTS:** None known. Dust from abrasive processing could contain potentially hazardous components of the base material being processed or coatings applied to the base material.

**CONDITIONS TO AVOID:** None known.

**INCOMPATIBLE MATERIALS:** None known

SECTION 11: TOXICOLOGICAL INFORMATION

**SKIN:** May cause abrasive skin irritation.

**EYE:** May cause abrasive irritation and injury.

**INHALATION:** Breathing dust may cause irritation to the nose, throat and upper respiratory tract.

**INGESTION:** Not toxic. Swallowing may cause gastrointestinal disturbances.
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POTENTIAL CHRONIC HEALTH EFFECTS: Prolonged inhalation of respirable dust may cause adverse lung effects.

ACUTE TOXICITY VALUES: Aluminum Oxide: Oral rat LD50 >10000 mg/kg; LC50 Inhalation rat >2.3 mg/L/4 hr

SKIN CORROSION/IRRITATION: Aluminum oxide was not a skin irritant in animal studies. Skin contact may result in abrasive injury.

EYE DAMAGE/IRRITATION: Aluminum oxide was not an eye irritant in animal studies. Eye contact may result in abrasive irritation and injury.

RESPIRATORY IRRITATION: No chemical irritation expected.

SKIN SENSITIZATION: Not expected to cause skin sensitization based on human experience.

RESPIRATORY SENSITIZATION: Not expected to be a respiratory sensitizer based on human experience.

GERM CELL MUTAGENICITY: None of the components have been shown to cause mutagenic activity.

CARCINOGENICITY: Aluminum oxide is not listed as a carcinogen or potential carcinogen by ACGIH, IARC, NTP, OSHA or the EU CLP.

DEVELOPMENTAL/REPRODUCTIVE TOXICITY: No specific data is available; however, this product is not expected to present a risk of adverse reproductive or developmental toxicity.

SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE): No specific data is available.

SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE): Recent studies of alumina refinery employees indicate that current exposures to aluminum compounds are not associated with significant adverse respiratory effects. The small changes in pulmonary functions parameters and respiratory symptoms observed were likely due to exposure to irritants and were not considered clinically significant.

SECTION 12: ECOLOGICAL INFORMATION

TOXICITY: Aluminum oxide: NOEC 96 hr Salmo trutta >100 mg/L; NOEC 48 hr daphnia magna >100 mg/L; NOEC 72 hr Selenastrum capricornutum >100 mg/L

ENVIRONMENTAL PRECAUTIONS: No known significant effects or critical hazards.

PERSISTENCE AND DEGRADABILITY: Biodegradation is not applicable to inorganic substances.

BIO-ACCUMULATIVE POTENTIAL: N/A

MOBILITY IN SOIL: N/A

RESULTS OF PVT AND VPvB ASSESSMENT: None required
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OTHER ADVERSE EFFECTS: None known

SECTION 13: DISPOSAL INFORMATION

Waste Disposal: Dispose in accordance with all local, state and national regulations. Local regulations may be more stringent than regional and national requirements. It is the responsibility of the waste generator to determine the toxicity and physical characteristics of the material to determine the proper waste identification and disposal in compliance with applicable regulations.

SECTION 14: TRANSPORTATION INFORMATION

<table>
<thead>
<tr>
<th></th>
<th>UN Number</th>
<th>UN Proper Shipping Name</th>
<th>Hazard Class(s)</th>
<th>Packing Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>US DOT</td>
<td>None</td>
<td>Not Regulated</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>CANADIAN TDG</td>
<td>None</td>
<td>Not Regulated</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>EU ADR/RID</td>
<td>None</td>
<td>Not Regulated</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>IMDG</td>
<td>None</td>
<td>Not Regulated</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>IATA/ICAO</td>
<td>None</td>
<td>Not Regulated</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

SPECIAL PRECAUTION FOR USER: None Identified

TRANSPORT IN BULK ACCORDING TO ANNEX II MARPOL 73/78 AND THE IBC CODE: Not Determined

SECTION 15: REGULATORY INFORMATION

INTERNATIONAL INVENTORIES:

US EPA Toxic Substances Control Act (TSCA) STATUS:
All of the components of this product are listed on the TSCA inventory or exempt.

AUSTRALIA:
All of the components in this product are listed on the Australian Inventory of Chemical Substances (AICS) or exempt.

CANADIAN ENVIRONMENTAL PROTECTION ACT:
All of the components in this product are listed on the Domestic Substances List (DSL) or exempt.

CHINA:
All of the components in this product are listed on the Inventory of Existing Chemical Substances in China (IECSC) or exempt.

EUROPEAN UNION:
All the components in this product are listed on the EINECS inventory or exempt.

JAPAN:
All of the components in this product are listed on the Japanese Existing and New Chemical Substances (ENCS) inventory or exempt.

KOREA:
All of the components in this product are listed on the Korean Existing Chemicals List (KECL) or exempt.

NEW ZEALAND:
All of the components in this product are listed on the New Zealand Inventory of Chemicals (NZIoC) or exempt.
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PHILIPPINES: All of the components of this product are listed on the Philippines Inventory of Chemicals and Chemical Substances (PICCS) or exempt.

TAWAN: All of the components of this product are listed on the National Existing Chemical Inventory (NECI) in Taiwan or exempt.

UNITED STATES REGULATIONS:

EPA SARA REGULATIONS:
SARA 311/312 HAZARD CATEGORIES:
- N – Fire Hazard
- N – Sudden Release of Pressure
- N – Reactivity
- N – Acute Health
- N – Chronic Health

SARA 313: This contains the following chemicals above deminimus concentrations subject to the notification or reporting requirements of SARA 313: None

CERCLA SECTION 103: This product is not subject to CERCLA release reporting. Many states have more stringent spill reporting requirements. Report spills in accordance with all applicable regulations.

RCRA STATUS: This product, as sold, is not regulated under RCRA as a hazardous waste.

STATE REQUIREMENTS:

CALIFORNIA PROPOSITION 65: This product contains the following chemical known to the State of California to cause cancer: None

CONNECTICUT CARCINOGEN SUBSTANCES: None listed.

FLORIDA ESSENTIAL CHEMICAL LIST: None listed

MAINE CHEMICALS OF HIGH CONCERN: None listed

MASSACHUSETTS RIGHT TO KNOW LIST: Aluminum oxide

MICHIGAN CRITICAL MATERIALS LIST: None listed

MINNESOTA HAZARDOUS SUBSTANCES: None listed

NEW JERSEY RIGHT TO KNOW HAZARDOUS SUBSTANCES LIST: Aluminum oxide

NEW YORK LIST OF HAZARDOUS SUBSTANCES: None listed

OHIO EXTREMELY HAZARDOUS SUBSTANCES LIST: None listed

PENNSYLVANIA RTK HAZARDOUS SUBSTANCE: Aluminum oxide

RHODE ISLAND HAZARDOUS SUBSTANCES LIST: None listed

WASHINGTON PERSISTENT BIOACCUMULATIVE TOXINS: None listed

WYOMING PROCESS SAFETY MANAGEMENT – HIGHLY HAZARDOUS CHEMICALS: None listed

GERMAN REGULATIONS:
SUBSTANCES HAZARDOUS TO WATER (WGK): NWG

EUROPEAN UNION
REGULATION (EC) 1907/2006 REACH
ARTICLE 59(1), CANDIDATE LIST: None listed

SECTION 16: OTHER INFORMATION
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HMIS:
- Health 1
- Flammability 0
- Reactivity 0
- Personal Protection B

NFPA:
- Health 1
- Flammability 0
- Reactivity 0

DEFINITIONS:
- DOT – Department of Transportation
- GHS – The Globally Harmonized System of Classification and Labeling of Chemicals
- HMIS - Hazardous Materials Identification System
- NFPA - National Fire Protection Association
- NIOSH – National Institute for Occupational Safety and Health
- NORM – Natural Occurring Radioactive Materials
- IATA – International Air Transportation Association
- IMO – International Maritime Organization
- OSHA – Occupational Safety & Health Administration
- TSCA – Toxic Substance Control Act

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