

# MATERIAL SAFETY DATA SHEET

## ZIRCON SAND / ZIRCON FLOUR / SPECTRALUX



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### SECTION 1: PRODUCT INFORMATION

**PRODUCT NAME:** Zircon Sand / Zircon Flour

HMIS (NPCA)	
HEALTH	1
FLAMMABILITY	0
REACTIVITY	0
PERSONAL PROTECTION	E

See Section 16 for explanation of codes

**SYNONYMS:** Zirconium Silicate; 200, 325, 400, 600 Zircon Flour; Z-Std.; Z-Course; Zircon Sand; Premium Zircon Sand; Spectralux 1500,3500, 4500, 5500, 6000, 7000

**MSDS NUMBER:** CMP01  
**PREPARATION DATE:** February 2001  
**LAST REVIEW DATE:** 02/2010

**DESCRIPTION:** ZIRCON SAND and ZIRCON FLOUR are specially sized grades of the mineral zircon - a naturally occurring zirconium silicate. Uses include: source of zirconium oxide, metallic zirconium and hafnium, abrasives, refractories, enamels, refractory porcelain, catalyst, silicon rubbers, foundry cores.

### SECTION 2: COMPOSITION / INFORMATION ON INGREDIENTS

#### HAZARDOUS COMPONENTS PLUS OTHER SIGNIFICANT COMPONENTS:

COMPONENT	SYNONYMS AND TRADE NAMES	CAS #	% BY WT.
ZrO <sub>2</sub> ·SiO <sub>2</sub>	Zirconium silicate; Zircon flour; Zircon sand	14940-68-2	97 - 99
SiO <sub>2</sub>	Quartz; crystalline silica; silica sand	14808-60-7	Trace <sup>1</sup>
TiO <sub>2</sub>	Titanium dioxide	13463-67-7	Trace <sup>1</sup>
Al <sub>2</sub> O <sub>3</sub>	Aluminum oxide; alumina	1344-28-1	Trace <sup>1</sup>
Al <sub>2</sub> SiO <sub>5</sub>	Kyanite; Aluminum Silicate	1302-76-7	0.1 – 2
U (natural)	Uranium (natural)	7440-29-1	Trace <sup>2,4</sup>
Th (natural)	Thorium (natural)	7440-61-1	Trace <sup>3,4</sup>

#### NOTES:

- The product contains trace amounts (<0.3 %) crystalline silica and traces of other identified compounds as impurities, which exist in complex mineralogical phases within the zircon.
- The product contains 0.0028% - 0.030% Uranium, which exists in complex mineralogical phase within the zircon.
- The product contains 0.0085% - 0.016% Thorium, which exists in complex mineralogical phase within the zircon.
- Daughter products are present typically at equilibrium concentrations.

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<b>SECTION 3: HAZARDS IDENTIFICATION</b>									
COMPONENT	CAS #	% BY WT.	OSHA PEL [mg/m <sup>3</sup> ]	OSHA CEILING [mg/m <sup>3</sup> ]	ACGIH TLV [mg/m <sup>3</sup> ]	ACGIH STEL [mg/m <sup>3</sup> ]	LISTED CARCINOGEN (YES/NO)		
							NTP	IARC	OSHA
Zircon (ZrO <sub>2</sub> :SiO <sub>2</sub> )	14940-68-2	97 - 99	5 (as Zr)	N/A	5 (as Zr)	10 (as Zr)	NO	NO	NO
Crystalline Silica (SiO <sub>2</sub> )	14808-60-7	<0.3	See Footnote 3		0.025 as respirable dust		YES	Yes; Group I	YES
Titanium Dioxide (TiO <sub>2</sub> )	13463-67-7	<0.3	5 (resp.) 15 (total)		10		NO	Not Classified; Group 3	
Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> ) (See Footnote 2)	1344-28-1	<0.8	5 (respirable) 15 total		10		NO	NO	NO
Aluminum Silicate (Al <sub>2</sub> SiO <sub>5</sub> ) (See Footnote 2)	1302-76-7	0.1 - 2	5 (resp.); 15 (total)		2 (as Al)		NO	NO	NO
U (natural)	7440-61-1	28 - 300 ppm	0.05 (insoluble) as U		0.2 as U	0.6 (insoluble) as U		Inadequate	
Th (natural)	7440-29-1	85 - 160 ppm	Not Estab.		--	--		Inadequate	

**NOTES:**

1. Exposure limits listed for each ingredient is for exposure to dust that may be generated during product transfer and handling.
2. OSHA standards are for particulate not otherwise regulated (PNOR) ("Nuisance Dust").
3. OSHA Table Z-3 establishes the following limits for quartz:

OSHA Table Z-3	Mmpcf(a)	Mg/m <sup>3</sup>
Quartz (respirable)	250(b) %SiO <sub>2</sub> +5	10 mg/m <sup>3</sup> %SiO <sub>2</sub> +2
Quartz (total)	-----	30 mg/m <sup>3</sup> %SiO <sub>2</sub> +2

Notes to Table Z-3:

- (a) mmpcf = millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques.
- (b) Percent quartz is the amount determined from airborne samples. Both concentration and percent quartz determined from fraction passing size-selector impactor having characteristics set forth in 29 C.F.R. 1910.1000 Table Z-3 footnote (e).

**EMERGENCY OVERVIEW:** Not a fire or spill hazard. Not acutely toxic. Avoid breathing dust. Take appropriate steps to minimize dusty conditions while handling or cleaning up spills.

**HEALTH EFFECTS:**

**Primary Route of Exposure:** Inhalation.

**Relevant Route(s) of Exposure:**

**Eye Contact:** Contact with particulate may cause slight to moderate eye irritation due to abrasive action.

**Skin Contact:** Prolonged contact may cause skin irritation due to abrasive action.

**Inhalation:** Inhalation of high concentrations of airborne particulate is irritating to the nose, throat, and respiratory tract.

**Ingestion:** Not toxic by ingestion. Swallowing large amounts may cause gastrointestinal disturbances due to abrasive action or mechanical blockage.

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**Target Organs:** Respiratory system, eyes.

**Acute Effects of Exposure:** Excessive, short-term exposure to airborne mineral dusts and particulate may cause upper respiratory and eye irritation.

**Signs and Symptoms of Acute Dust Exposure:** tearing of eyes, burning sensation in the throat, cough, chest discomfort.

**Chronic Effects of Exposure:**

**Silica:** Crystalline silica (quartz) is a known cause of lung disease (silicosis). Respirable size quartz has been classified as a human carcinogen (lung cancer). Zircon contains trace amounts of quartz. Take precautions to avoid inhaling zircon dust or creating dusty conditions.

Several recent epidemiology studies have shown that in addition to silicosis, there is limited evidence of an excess of lung cancer in occupations involving exposures mainly to Crystalline Silica, such as stone cutters and granite industry workers.

**Uranium and Thorium:** Zircon contains naturally occurring radioactive materials ("NORM") in the uranium and thorium series, in equilibrium, at typical specific activities of 0.3 to 0.7 Bq/g thorium (85 - 165 ppm) and 0.3 to 3.7 Bq/g uranium (28 - 300 ppm).

Zircon is exempt from Nuclear Regulatory Commission ("NRC") regulations for source material per 10 CFR 40, since it falls under the definition of "unimportant quantity source material" containing less than 0.05% uranium or thorium. Some states may apply NRC type radiation protection standards for NORM above background levels, or may have NORM specific regulations. It is recommended that you consult and comply with current regulations.

The main radiological hazard from the product is internal exposure from small amounts of alpha particles given off by inhaled dust. Industrial hygiene practices aimed at control of airborne dust can lessen the potential for exposure and suitable dust control measures shall be employed to ensure occupational exposure to generated dust and alpha particles are kept as low as reasonably achievable. Overexposure by inhalation to inhaled dusts containing radioactive uranium, thorium, and radium may cause lung cancer. External exposure is from gamma radiation. Low level gamma radiation in proximity to bulk or bagged stockpiles of zircon may present a lesser, external exposure that can be managed by limiting close proximity for long time periods to large volumes of material.

With respect to dust exposure from sand (8 hr/day TWA basis, 10 µm aerodynamic, or about 5 µm physical diameter particle size used for calculation purposes), evaluation and calculation of OSHA PEL's (29 CFR 1910), ACGIH TLV's, and NRC standards (10 CFR 20) for zircon, trace crystalline silica, and trace radionuclides indicate that a level of approximately 5 mg/m<sup>3</sup> of total dust (or 4.0 mg/m<sup>3</sup> respirable dust) will ensure that intake is less than the NRC public dose limit for radionuclides, less than OSHA and ACGIH limits for respirable and total quartz, and less than OSHA and ACGIH limits for zircon.

With respect to dust exposure from flour (8 hr/day TWA basis, 1 µm aerodynamic, or about 0.5 µm physical diameter particle size used for calculation purposes), evaluation and calculation of OSHA PEL's (29 CFR 1910), ACGIH TLV's, and NRC standards (10 CFR 20) for zircon, trace crystalline silica, and trace radionuclides indicate that a level of approximately 2.3 mg/m<sup>3</sup> of total dust will ensure that intake is less than the NRC public dose limit for radionuclides, less than OSHA and ACGIH limits for respirable and total quartz, and less than OSHA and ACGIH limits for zircon.

Quartz and radionuclides are listed by the IARC and NTP as known to be carcinogenic to humans. Classified 1 – Proven for humans (IARC).

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**Medical Conditions Generally Known to be Aggravated by Exposure:** The excessive inhalation of mineral dust may aggravate pre-existing chronic lung conditions including, but not limited to, bronchitis, emphysema, and asthma.

**Reproductive Hazards:** No reproductive hazards known.

**ENVIRONMENTAL:** No adverse environmental effects known. This product is insoluble in water. Prevent waste product from entering streams, water bodies, and wastewater systems and dispose of properly.

### SECTION 4: FIRST AID MEASURES

#### **FIRST AID PROCEDURES:**

**Eye Contact:** Flush eyes with clean, flowing (low pressure) water for at least 15 minutes. Get medical attention if pain or irritation persists.

**Skin Contact:** The compound is not hazardous by skin contact, however removal of particles and cleansing of the skin after use is advisable. Get medical attention if irritation develops or persists.

**Inhalation:** Move to fresh air and get medical attention if cough or other symptoms develop. If not breathing, give artificial respiration or give oxygen by trained personnel, and get immediate medical attention.

**Ingestion:** Rinse mouth with clean water and do not swallow. Give 1-2 glasses of water or milk. Never give anything by mouth to an unconscious person. Leave decision to induce vomiting to qualified medical personnel, since particles may be aspirated into the lungs. Seek immediate medical attention.

**NOTE TO PHYSICIANS:** Treat symptomatically.

### SECTION 5: FIRE FIGHTING MEASURES

**FLAMMABLE PROPERTIES:** Material will not burn. No unusual fire or explosion hazards.

**EXTINGUISHING MEDIA:** Use extinguishing media appropriate to combustibles in the surrounding area.

**PROTECTION FOR FIREFIGHTERS:** Wet material should be kept out of eyes and off skin. As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

### SECTION 6: ACCIDENTAL RELEASE MEASURES

**CONTAINMENT:** Product is dry solid (granular or powder) and not water soluble. Prevent spilled product from entering streams, water bodies, and wastewater systems.

**CLEANUP:** Vacuum or sweep up dry material and place in a container for reuse. Avoid creating airborne dust. Wear NIOSH/MSHA-approved respiratory protection (air-purifying or air-supply), gloves, long sleeved clothing and eye protection to prevent irritation from contact and inhalation.

**COLLECTION:** Collect spilled product in appropriate container. Re-use if possible.

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**REPORTING:** SEE SECTION 15: REGULATORY INFORMATION

**EVACUATION:** Isolate hazard area. Keep unnecessary and unprotected personnel from entering.

### SECTION 7: HANDLING AND STORAGE

**HANDLING:** Minimize dust generation and accumulation. Avoid breathing dust. Avoid contact with skin and eyes. Handle to minimize generation of airborne dust. Use engineering controls to maintain dust levels below exposure limits

**STORAGE:** Store in a cool, dry area. Keep container closed when not in use.

**WARN YOUR EMPLOYEES (AND YOUR CUSTOMERS - USERS IN CASE OF RESALE) BY POSTING AND OTHER MEANS OF THE HAZARDS AND OSHA PRECAUTIONS TO BE USED. PROVIDE TRAINING FOR YOUR EMPLOYEES ABOUT OSHA PRECAUTIONS.**

### SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

**ENGINEERING CONTROLS:** Use ventilation to keep exposure to airborne contaminants below the exposure limits listed in **SECTION 3**. Identify points of dust generation such as conveyor and hopper discharges and equip with effective dust extraction system to control dust at its source. Maintain good housekeeping procedures.

Radiation Occupational exposure should be as low as reasonably achievable (ALARA principle), but should not exceed a total of 100 mSv over five consecutive years (ICRP).

**PERSONAL PROTECTIVE EQUIPMENT:**

**Eye & Face Protection:** Mechanical (abrasive) eye irritant. Wear protective safety goggles.

**Skin Protection:** Wear clothing sufficient to cover the skin, safety shoes, and gloves for hand protection against dry material. Launder clothing after use.

**Respiratory Protection:** Use NIOSH/MSHA approved respiratory protection (air purifying or air supplying) with a type 100 (high efficiency) particulate cartridge or canister when concentrations are above exposure limit value. A respiratory protection program that meets OSHA 29 CFR part 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant the use of a respirator.

Protection provided by air-purifying respirators is limited. Use a positive pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection.

**General Hygiene Considerations:** Wash thoroughly after using product. Wash contaminated clothing. Wash hands before eating or drinking.

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### SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

**APPEARANCE:** Sand-like or fine powder that can vary in color from the typical gray/white to red to brown to colorless.

**ODOR:** Odorless.

**PHYSICAL/CHEMICAL PROPERTIES:**

<b>Bulk density:</b>	100 - 175 lbs/ft <sup>3</sup>	<b>Freeze Point:</b>	Solid at STP	<b>% volatile by vol:</b>	0% H <sub>2</sub> O
<b>Water solubility:</b>	Insoluble	<b>Melting Point:</b>	>2100 °C	<b>Vapor Density:</b>	N/A
<b>pH: (10% aqueous slurry)</b>	6 - 7.5	<b>Boiling Point:</b>	6500 °C	<b>Vapor Pressure:</b>	N/A

### SECTION 10: STABILITY AND REACTIVITY

**STABILITY:** Stable under normal conditions of storage. Material is non-reactive.

**CONDITIONS TO AVOID:** None under normal conditions.

**MATERIALS TO AVOID:** Hydrofluoric Acid, Strong Oxidizers.

**HAZARDOUS DECOMPOSITION PRODUCTS:** None under normal conditions.

**HAZARDOUS POLYMERIZATION:** Will not occur.

### SECTION 11: TOXICOLOGICAL PROPERTIES

**RTECS TOXICITY DATA FOR PRODUCT COMPONENTS:**

COMPONENT	CAS #	NIOSH (RTECS) #
Zircon (ZrO <sub>2</sub> ·SiO <sub>2</sub> )	14940-68-2	ZH9000000
Crystalline Silica (SiO <sub>2</sub> )	14808-60-7	VV7330000
Titanium Dioxide (TiO <sub>2</sub> )	13463-67-7	XR2275000
Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> )	1344-28-1	BD1200000
Aluminum Silicate (Al <sub>2</sub> SiO <sub>5</sub> )	1302-76-7	BD1450000
U (natural)	7440-61-1	YR3490000
Th (natural)	7440-29-1	XO6400000

### SECTION 12: ECOLOGICAL INFORMATION

Constituents identified in **Section 2** are contained within the zircon crystal structure and will not leach under Toxicity Characteristic Leaching Procedure (TCLP) testing conditions of EPA SW-846 Test Method 1311. No data available on any adverse effects of this material on the environment.

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### SECTION 13: DISPOSAL CONSIDERATIONS

**RCRA:** This product, as manufactured, is not a RCRA listed hazardous waste and does not exhibit any characteristics of a hazardous waste, including toxicity (by EPA TCLP method.)

**DISPOSAL METHOD:** This product is generally suitable for landfill disposal. Follow all applicable Federal, State, and local laws, rules, and regulations regarding the proper disposal of this material. If this product has been altered or contaminated with other hazardous materials, appropriate waste analysis may be necessary to determine proper method for disposal. A qualified environmental professional should determine waste characterization, disposal, and treatment methods for this material in accordance with applicable Federal, State and local requirements.

**“NORM” Disposal:** The presence of naturally occurring radioactivity from U (natural) and Th (natural) may require evaluation for disposal as NORM (See Section 15). Because NORM disposal regulations vary from state to state, please check with the relevant NORM disposal rules in your jurisdiction.

### SECTION 14: TRANSPORTATION INFORMATION

**USDOT INFORMATION:** This product is not regulated by USDOT as a hazardous material (49 CFR part 172.101). No UN code assigned. No placard required for transportation.

#### LABEL:

#### **CAUTION!**

Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling and use. Keep in a closed container in a well-ventilated area.

#### **WARNING:**

**Silica:** Crystalline silica (quartz) is a known cause of lung disease (silicosis). Respirable size quartz has been classified as a human carcinogen (lung cancer). Zircon contains trace amounts of quartz. Take precautions to avoid inhaling zircon dust or creating dusty conditions.

**Uranium and Thorium:** Zircon contains naturally occurring radioactive materials (“NORM”) in the uranium and thorium series, in equilibrium, at typical specific activities of 0.4 to 0.7 Bq/g thorium (85 – 165 ppm) and 0.4 to 3.7 Bq/g uranium (28 – 300 ppm). The main radiological hazard from the product is internal exposure from small amounts of alpha particles given off by inhaled dust. Low level gamma radiation in proximity to bulk or bagged stockpiles of zircon may present a lesser, external exposure that can be managed by limiting close proximity for long time periods to large volumes of material.

#### **FIRST AID MEASURES:**

**Eye Contact:** Remove material by immediately flushing eyes with clean, flowing, water (low pressure) for at least 15 minutes. Get medical attention if pain or irritation persists.

**Skin Contact:** Wash affected area with mild soap and water to remove any dust adhering to the skin. Get medical attention if irritation develops or persists.

**Inhalation:** If exposed to excessive levels of dusts, remove to fresh air and get medical attention if cough or other symptoms develop. If not breathing, give artificial respiration or give oxygen by trained personnel, and get medical attention.

**Ingestion:** If ingested and victim is conscious, give 1-2 glasses of water or milk. Never give anything by mouth to an unconscious person. Leave decision to induce vomiting to qualified medical personnel, since particles may be aspirated into the lungs. Seek immediate medical attention.

Zircon CAS# : 14940-68-2

Silica (Quartz) CAS# : 14808-60-7

**CALIFORNIA PROPOSITION 65 WARNING: THIS PRODUCT CONTAINS SUBSTANCES (Quartz and Radionuclides) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.**

See MSDS for additional information

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**FURTHER EU DIRECTIVE INFORMATION:** Not classified as dangerous in the meaning of transport regulations

### SECTION 15: OTHER REGULATORY INFORMATION

#### COMPONENTS LISTED IN FEDERAL REGULATIONS AND STATE "RIGHT-TO-KNOW" LAWS:

COMPONENT	CAS #	FEDERAL					STATE (Right-to-Know)			
		RCRA	CERCLA RQ?	SARA 313	SARA EHS	TSCA Listed	PA	NJ	MA	CA
Zircon (ZrO <sub>2</sub> ·SiO <sub>2</sub> ) (14940-68-2)	14940-68-2	NO	NO	NO	NO	YES	NO	NO	NO	NO
Crystalline Silica (SiO <sub>2</sub> )	14808-60-7	NO	NO	NO	NO	YES	YES	YES	YES	YES
Titanium Dioxide (TiO <sub>2</sub> )	13463-67-7	NO	NO	NO	NO	YES	YES	YES	YES	NO
Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> )	1344-28-1	NO	NO	NO	NO	YES	YES	YES	YES	NO
Aluminum Silicate (Al <sub>2</sub> SiO <sub>5</sub> )	1302-76-7	NO	NO	NO	NO	YES	YES	NO	NO	NO
U (natural)	7440-61-1	NO	YES(a)	NO	NO	YES	YES	YES	YES	YES
Th (natural)	7440-29-1	NO	YES(b)	NO	NO	YES	YES	YES	YES	YES

**Notes:** (a) CERCLA Reportable Quantity (RQ) for radionuclides at 40 C.F.R. 302.4 Appendix B lists RQ for U (natural) at 1 E 11 pCi (3.7E9 Bq) and Th(natural) at 1 E 10 pCi (3.7 E7 Bq). At the low concentrations of natural U and Th in zircon, RQ reporting for these constituents would be triggered by the "release" of 18,000 pounds of zircon.

**NORM Regulations:** This product contains naturally occurring radioactive materials (NORM) at levels below U.S. Nuclear Regulatory Commission licensing requirements at 10 C.F.R 40. However, state NORM rules vary. The Conference of Radiation Control Program Directors (CRCPD) 2002 Part N Suggested State Regulations exempt zircon from state regulation. Ohio regulations exempt zircon from regulation at O.R.C. 3701-39-021(B)(2)(c).

**CALIFORNIA PROPOSITION 65 WARNING: THIS PRODUCT CONTAINS SUBSTANCES (QUARTZ AND RADIONUCLIDES) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.**

#### COMPONENTS LISTED IN GLOBAL INVENTORIES

COMPONENT	CAS #	AUSTRALIA	CANADA	CHINA	EU	JAPAN <sup>1</sup>	JAPAN <sup>2</sup>	KOREA	NEW ZEALAND	PHILIPPINES
Zircon (ZrO <sub>2</sub> ·SiO <sub>2</sub> ) (14940-68-2)	14940-68-2	YES	YES	YES	YES	YES	YES	YES	YES	YES
Crystalline Silica (SiO <sub>2</sub> )	14808-60-7	YES	YES	YES	YES	YES	YES	YES	YES	YES
Titanium Dioxide (TiO <sub>2</sub> )	13463-67-7	YES	YES	YES	YES	YES	YES	YES	YES	YES
Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> )	1344-28-1	YES	YES	YES	YES	YES	YES	YES	YES	YES
Aluminum Silicate (Al <sub>2</sub> SiO <sub>5</sub> )	1302-76-7	YES	YES	YES	YES	NO	NO	YES	YES	NO
U (natural)	7440-61-1	YES	YES	NO	YES	NO	NO	YES	YES	YES
Th (natural)	7440-29-1	YES	YES	NO	YES	NO	NO	NO	YES	YES

**AUSTRALIA** – Inventory of Chemical Substances (AICS) as amended through January 5, 2010

**CANADA** – Domestic Substances List (DSL) as amended through December 23, 2009

**CHINA** – Inventory of Existing Chemical Substances (IECSC) as amended through December 2008

**EU** – European Inventory of Existing Commercial Chemical Substances (EINECS)

**JAPAN<sup>1</sup>** – Inventory of Existing & New Chemical Substances (ENICS) as amended through November 10, 2006

**JAPAN<sup>2</sup>** – Industrial Safety & Health Law (ISHL) Inventory as amended through September 25, 2009

**KOREA** – Existing Chemicals Inventory (KECI) as amended through November 4, 2009

**NEW ZEALAND** – New Zealand Inventory of Chemicals (NZIoC) as published by ERMA New Zealand (November 2009)

**PHILIPPINES** – Inventory of Chemicals and Chemical Substances (PICCS) 2008

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**CANADIAN WHMIS CLASSIFICATION:** D-2A; D-2B

**LABELLING ACCORDING TO EC DIRECTIVES:**

Not a hazardous substance or preparation according to EC-directives 67/548/EEC or 1999/45/EC.  
The product does not need to be labeled in accordance with EC directives or respective national laws.

### SECTION 16: OTHER INFORMATION

**DO NOT USE IN MEDICAL APPLICATIONS INVOLVING PERMANENT IMPLANTATION IN THE HUMAN BODY.**

**THE REQUIRED TESTING HAS NOT BEEN DONE TO QUALIFY ANY OF OUR PRODUCTS FOR DIRECT INCLUSION IN FOOD, DRUGS, OR COSMETIC FORMULATIONS.**

**WARN YOUR EMPLOYEES (AND YOUR CUSTOMERS – USERS IN CASE OF RESALE) BY POSTING AND OTHER MEANS OF THE HAZARDS AND OSHA PRECAUTIONS TO BE USED. PROVIDE TRAINING FOR YOUR EMPLOYEES ABOUT OSHA PRECAUTIONS.**

#### **HAZARDOUS MATERIALS IDENTIFICATION SYSTEM of the National Paint & Coatings Association**

##### **HEALTH**

- 0 – Normal Material
- 1 – Slightly Hazard/Significant irritation
- 2 – Hazardous/Temporary incapacitation or residual injury
- 3 – Extreme Danger/Serious or permanent injury
- 4 – Deadly

##### **REACTIVITY**

- 0 – Stable
- 1 – Unstable under heat or pressure
- 2 – Violent chemical change under heat or pressure
- 3 – Shock and heat may detonate
- 4 – Capable of Detonation or Explosion

##### **FLAMMABILITY**

- 0 – Will not burn
- 1 – Must be preheated before ignition will occur (Flash point greater than 200°F)
- 2 – Must be moderately heated before ignition will occur (Flash point 100°F to 200°F)
- 3 – Can be ignited under almost all ambient temperatures (Flash point 73°F to 100°F)
- 4 – Will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature, or will burn readily when dispersed in air (Flash point below 73°F)

##### **PERSONAL PROTECTION**

- A – Safety Glasses
- B – Safety Glasses + Gloves
- C – Safety Glasses + Gloves + Apron
- D – Face Shield + Gloves + Apron
- E – Safety Glasses + Gloves+ Dust Respirator
- F – Safety Glasses + Gloves + Apron + Dust Respirator
- G – Safety Glasses + Gloves + Vapor Respirator
- H – Splash Goggles + Gloves + Apron + Vapor Respirator
- I – Safety Glasses + Gloves + Dust and Vapor Respirator
- J – Splash Goggles + Gloves + Apron + Dust and Vapor Respirator
- K – Air Line Hood or Mask + Gloves + Full Suit Boots
- X – Ask supervisor or safety specialist for handling instructions.

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### ACRONYMS AND ABBREVIATIONS USED IN THIS MSDS:

<b>ACGIH</b>	American Conference of Governmental Industrial Hygienists
<b>CA</b>	California Right-to-Know Law; "Proposition 65," <i>CCR TITLE 8 – Division 1 – Chapter 3.2 – Subchapter 1 – Article 5 - §339 The Hazardous Substances List</i>
<b>CAS#</b>	CAS Registration Number is an assigned number to identify a material
<b>CERCLA</b>	Comprehensive Environmental Response, Compensation, and Liability Act, <i>40 CFR part 302.4 – Designation, Reportable Quantities, and Notification (Table 302.4)</i>
<b>CRCPD</b>	Conference of Radiation Control Program Directors
<b>EPA</b>	United States Environmental Protection Agency
<b>HMIS</b>	Hazardous Materials Identification System of the National Paint & Coatings Association
<b>IARC</b>	International Agency for Research on Cancer
<b>ICRP</b>	International Commission on Radiological Protection
<b>MA</b>	Massachusetts Right-to-Know Law; <i>MGL PART I – TITLE XVI – CHAPTER 111F Hazardous Substances Disclosure By Employers</i>
<b>mg/m<sup>3</sup></b>	Milligrams per cubic meter
<b>mSv</b>	Milli-seiverts
<b>MSHA</b>	Mine Safety and Health Administration
<b>N/A</b>	Not applicable
<b>NFPA</b>	National Fire Protection Association
<b>NIOSH</b>	National Institute of Occupational Safety and Health
<b>NJ</b>	New Jersey Right-to-Know Law; <i>NJAC 8:59 - Worker and Community Right to Know Act</i>
<b>NORM</b>	Naturally Occurring Radioactive Material
<b>NTP</b>	U.S. National Toxicology Program
<b>OSHA</b>	Occupational Safety and Health Administration
<b>PA</b>	Pennsylvania Right-to-Know Law; <i>34 PA Code § 323. Hazardous Substance List (Appendix A)</i>
<b>PEL</b>	Permissible Exposure Limit (OSHA)
<b>RCRA</b>	Resource Conservation and Recovery Act (EPA), <i>40 CFR part 261 - Identification and Listing of Hazardous Waste</i>
<b>REL</b>	Recommended Exposure Limit (NIOSH)
<b>RQ</b>	Reportable Quantity
<b>RTECS</b>	<i>Registry of Toxic Effects of Chemical Substances</i> : This database contains toxic effects data on some 140,000 chemicals. It is built and maintained by NIOSH.
<b>SARA</b>	Superfund Amendments and Reauthorization Act, <i>40 CFR part 372.65 - Toxic Chemical Release Reporting: Community Right-to-Know</i>
<b>SARA EHS</b>	<i>(SARA Extremely Hazardous Substances) 40 CFR part 355 - Emergency Planning and Notification (Appendices A &amp; B)</i>
<b>STEL</b>	Short-term exposure limit (ACGIH)
<b>STP</b>	Standard temperature and pressure (T = ~70°F, P = 1 atm)
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure (EPA Method 1311)
<b>TLV</b>	Threshold Limit Value (ACGIH)
<b>TSCA</b>	Toxic Substances Control Act, <i>40 CFR 716.120 - Health and Safety Data Reporting</i>
<b>TWA</b>	Time Weighted Average
<b>USDOT</b>	United States Department of Transportation

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