

SAFETY DATA SHEETS (SDS)

1. PRODUCT IDENTIFICATION/DESCRIPTION

PRODUCT NAME:	<u>Dense Fused ZIRCONIA - YTTRIA STABILIZED</u>
SYNONYMS:	Yttria-Stabilized Zirconium Oxide
FORMULA:	ZrO ₂ (Zirconium Oxide)
RECOMENDED USES:	Yttria-stabilized Zirconia uses are based on its hardness, chemical inertness, ion-conducting properties, optical properties and high thermal properties. Applications include uses for: tooth crowns, refractory, thermal barrier coatings, jewelry and knife blade production.
COMPANY:	Graystar LLC
ADDRESS:	9 Simmonsville Road Bluffton, SC 29910
PHONE:	843-815-5600

2. HAZARDS IDENTIFICATION

HAZARD CLASSIFICATION:

- The product is not classified as hazardous according to the Global Harmonized System (GHS), CLP regulation, and under WHMIS.
- Abrasive particulate may cause minor Eye irritation and/or Skin irritation.
- May cause damage to lungs through prolonged/repeated exposure to dust concentrations in excess of PEL or TVL.

HAZARD PICTOGRAMS: Not Regulated

SIGNAL WORD: Not Regulated

HAZARD STATEMENTS:

- Harmful if swallowed.
- May cause minor skin or eye irritation. Particulate may scratch cornea or cause other mechanical eye injury.
- Inhaled; May cause respiratory irritation through single use, or cause damage to lungs through prolonged or repeated exposure to concentrations in excess of the PEL or TVL without respiratory protection. This may also decrease the ability of the lungs to clear particulate matter which may cause shortness of breath and increase susceptibility to respiratory disease.

PREVENTION:

- Wash hands thoroughly after use.
- Wear protective gloves and eye/face protection.
- Do not breathe dust. Do not use compressed air or dry sweeping to remove dust from work areas.
- Wear respiratory protection for concentrations in excess of the PEL or TVL.
- Store in dry area in closed containers.
- Dispose of according to applicable federal, state and local regulation.

FIRST AID:

- If Swallowed: Call doctor if you feel unwell.
- If on Skin: Wash with soap and water. Seek medical advice if symptoms persist.

- **If in Eyes:** Flush with warm water for 15 minutes (remove contacts if possible). Seek medical attention if symptoms persist.
- **If Inhaled:** If breathing is difficult - Remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms or feels unwell - Seek immediate medical attention.

3. COMPOSITION

Ingredient	CAS#	Weight(%)	PEL-OSHA (mg/m ³)	TLV-ACGIH (mg/m ³)	Carcinogen (Y/N)
*Zirconium Oxide (ZrO ₂)	1314-23-4	85- 99%	5	5	N
*Yttrium Oxide (Y ₂ O ₃)	1314-36-9	0 – 15%	Not Est.	2	N
*Hafnium Oxide (HfO ₂)	12055-23-1	1 – 2%	0.5	0.5	N
Amorphous Silica	112926-00-8	0 – 1%	80/%SiO ₂	10	N

This product also contains small amounts (<0.4% each) of alumina, iron oxide and titanium oxides.

- Materials are regulated under OSHA 29 CFR 1900.1200, Hazard Communication Standard.

- Source of exposure limit data; ACGIH Threshold Limit Values; (OSHA Tables Z-1-A, Z-2, Z-3)

* Ingredient is listed under TSCA.

4. FIRST AID MEASURES

EYES: Flush eyes with lukewarm water for 15 minutes, opening and closing eyelids to ensure adequate rinsing. If redness, irritation, pain, or tearing occurs, seek medical attention.

SKIN: Wash contaminated area with soap and water. Wash contaminated clothing. Seek medical attention if symptoms persist.

INHALATION: If inhalation of high concentrations occurs, move to fresh air. If breathing has stopped, a certified professional should give CPR. Seek immediate medical attention.

INGESTION: Do not induce vomiting unless suggested by a doctor. Seek medical attention.

5. FIRE FIGHTING MEASURES

FLASH POINT: Not Applicable

FLAMMABLE LIMITS: LEL: Not Applicable UEL: Not Applicable

AUTO IGNITION TEMPERATURES: No Data Available.

EXTINGUISHING MEDIA: Use media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARDS: Non-flammable, non-combustible. Product will not burn.

HAZARDOUS COMBUSTION PRODUCTS: None

FIRE FIGHTING INSTRUCTIONS: Firefighters should wear a NIOSH/MSHA approved full-faced self-contained breathing apparatus (SCBA) operated in positive pressure mode and full turnout or bunker gear.

NFPA CLASSIFICATION: HEALTH: 1 FLAMMABILITY: 0 REACTIVITY: 0

6. ACCIDENTAL RELEASE MEASURES

Isolate hazard area and deny entry to unauthorized and/or unprotected personnel. Avoid dust generation. Water mist may be added as necessary to control the level of airborne dusts. Respiratory protection for clean-up personnel depends on the level of exposure anticipated. (See Section 8. *EXPOSURE CONTROLS/PERSONAL PROTECTION*) Gently shovel or scoop into clean dry container for later recycle or disposal. Comply with Federal, State and Local regulations regarding reporting of spills and disposal.

7. HANDLING AND STORAGE

HANDLING: Prevent formation of dust, and avoid dust inhalation. Use only in well ventilated areas. Any deposit of dust that cannot be avoided must be regularly removed. DO NOT use compressed air or dry sweeping to remove dust from work area. Wash thoroughly with plenty of water.

STORAGE: Store in dry area in closed containers. Protect from high humidity and water.
Store receptacle in a well ventilated area.
Store away from oxidizing agents. Store away from foodstuffs.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION: Under normal working conditions, below acceptable exposure guidelines, none is required. For concentrations above the PEL but less than 10X the PEL, a NIOSH/MSHA approved dust mist respirator should be worn. Appropriate respirator selection will be dependent upon the magnitude of exposure and should be selected in accordance with 29 CFR 1910.134. (See Section 3. *COMPOSITION* for PEL's and TWA's).

SKIN PROTECTION: Protective gloves, as needed, to prevent skin contact.

EYE PROTECTION: Safety-glasses with side shields or goggles to prevent dust and particles from entering the eye. See OSHA 29 CFR 1910.133.

OTHER: Under dusty conditions, employees should wear coveralls or other suitable work clothing. Contaminated clothing must be vacuumed before removal. DO NOT REMOVE dust from clothing by blowing or shaking. Keep away from foodstuff, beverages and feed.

9. PHYSICAL PROPERTIES

Formula	ZrO ₂
Molecular Weight	123.2188
Flash Point	None
Boiling Point	Not Applicable
Melting Point	2500°C
Specific Gravity (H ₂ O = 1)	Nor available
Percent Volatile	0
Evaporation Rate	None
Solubility in Water	Insoluble
Appearance/Odor	Yellow grain or powder / odorless

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal ambient conditions of temperature and pressure.

THERMAL DECOMPOSITION: No decomposition if used and stored to specifications.

POSSIBLE HAZARDOUS REACTIONS: Reacts with strong acids, oxidizing agents, and with strong alkali.

CONDITIONS TO AVOID & INCOMPATIBLE MATERIALS: No further relevant information available.

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic metal oxide smoke.

11. TOXICOLOGICAL INFORMATION

EYE: Particulate matter may cause physical injury to the eye.
SKIN: May cause minor irritation.
INHALATION: May cause respiratory irritation through single use.
May cause damage to lungs or pulmonary disease through prolonged/repeated exposure to dust.
INGESTION: Ingestion of large quantities may result in gastrointestinal irritation and eventually interference with phosphate absorption which results in rickets.

12. ECOLOGICAL INFORMATION

Aquatic Toxicity: Generally not hazardous for water.
Persistence & Degradability: Inorganic, is not eliminable from water by means of biological cleaning processes.
Bioaccumulative Potential: Does not accumulate in organisms.
Mobility In Soil: No further relevant information available

13. DISPOSAL CONSIDERATIONS

Dispose of according to applicable federal, state, and local regulations. Dispose per 40 CFR 261 and 262.

14. TRANSPORT INFORMATION

U.S. Department of Transportation (D.O.T.): **Not Regulated as a Hazardous Material**
D.O.T. HAZARD CLASS (49 CFR 172.101): N/A
D.O.T. PROPER SHIPPING NAME (49 CFR 172.101): N/A
D.O.T. LABELS REQUIRED (49 CFR 172.101): N/A
D.O.T. PLACARDS REQUIRED: N/A
IMDG: **Not Regulated Under IMDG (is not hazardous cargo for sea transportation).**

15. REGULATORY INFORMATION

TSCA: Ingredients denoted in Section 3 are listed on the TSCA (Toxic Substance Control Act) inventory.

Canadian WHMIS: D2B



EPCRA Section 302 (EHSs): This product does not contain ingredients subject to reporting requirements of 40 CFR Part 355, Appendices A and B (Extremely Hazardous Substances).

CERCLA, Section 304: This product does not contain ingredients subject to state and local reporting under Section 304 of SARA Title III as listed in 40 CFR Part 302 Table 302.4.

SARA 313 REPORTING REQUIREMENTS: This product does not contain ingredients subject to the reporting requirements of Section 313 SARA, and Section 5607 of the Pollution Prevention Act.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and by definition meets the requirements of the following category: *Acute Health Hazard*

16. OTHER INFORMATION & LAST REVISION DATE

KEY:

ACGIH	American Conference of Governmental Industrial Hygienists
CAS	Chemical Abstracts Service
DOT	Department of Transportation
IARC	International Agency for Research on Cancer
IMDG	International Maritime Dangerous Goods
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
SARA	Superfund Amendment and Reauthorization Act
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act

DISCLAIMER:

Although reasonable care has been taken in the preparation of the information contained herein, the originator and **Graystar*LLC** extends no warranties, makes no representation and assumes no responsibility as to the accuracy of suitability of such information for application to the purchaser's intended purposes or for consequences of its use.

LAST REVISION DATE: 06-10-2015