

# MATERIAL SAFETY DATA SHEET

## SECTION I - PRODUCT IDENTIFICATION

**TRADE NAME:** Zinc Selenide (ZnSe)**CAS NO.:** 1315-09-9**SYNONYMS:** Raytran ZnSe, Kodak Irtran-4**EU NUMBER:** 034-002-00-8**FORM:** Solid Optical Element**CHEMICAL FAMILY:** Inorganic chemical belonging to the II-VI group of periodical systems of elements**MANUFACTURER / SUPPLIER:** II-VI Incorporated  
375 Saxonburg Boulevard  
Saxonburg, PA 16056  
Tel - 724-352-4455  
Fax - 724-352-4980

## SECTION II - COMPOSITION / INGREDIENTS

<u>MATERIAL COMPONENTS:</u>	<u>% ATOMIC:</u>	<u>CAS NUMBER</u>
Zinc	50%	7440-66-6
Selenium	50%	7782-49-2

### PHYSICAL PROPERTIES:

**FORM:** Solid**COLOR:** Yellow transparent**ODOR:** Odorless**MELTING POINT:** 1525 °C**BOILING POINT, 760 mm Hg:** Sublimes**SPECIFIC GRAVITY (H<sub>2</sub>O=1):** 5.27**VAPOR PRESSURE:** N/A**VAPOR DENSITY (Air=1):** N/A**SOLUBILITY IN H<sub>2</sub>O, % by WT:** Insoluble**% VOLATILES BY VOL.:** N/A**FLASH POINT (Test Method):** Not flammable and not explosive

**SECTION III – HAZARDS IDENTIFICATION**

**THRESHOLD LIMIT VALUE:**

<b>Material</b>	<b>OSHA 8-hr. TWA</b>	<b>ACGIH 8-hr. TWA</b>	<b>ACGIH STEL</b>
Zinc oxide fume .....	5 mg/m <sup>3</sup>	-----	-----
Zinc oxide total dust .....	15 mg/m <sup>3</sup>	-----	-----
Zinc oxide respirable fraction.....	5 mg/m <sup>3</sup>	2 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>
Selenium and compounds, as Se .....	0.2 mg/m <sup>3</sup>	0.2 mg/m <sup>3</sup>	-----

**EFFECTS OF OVEREXPOSURE:** **ZnSe** - Effects are not known, but some zinc and selenium compounds can be formed, such as: **Zinc Oxide** (fumes) - Sweet taste, throat dryness, cough, chills, weakness, general aching, fever, nausea and vomiting; **Zinc Oxide** (dust) – Virtually innocuous when freshly formed; **Selenium and Compounds** - Acute exposure might produce sternal pain, cough, nausea, pallor, coated tongue, gastro-intestinal disorders, nervousness and/or conjunctivitis. A garlic odor of the breath or sweat may occur.

**SECTION IV – FIRST-AID MEASURES**

**EMERGENCY AND FIRST AID PROCEDURES (Zinc Selenide in dust form):**

**EYES:** Flush eyes with water for 15 minutes. Consult physician if irritation develops or persists.

**SKIN:** Wash with soap and water. Consult physician if irritation develops or persists.

**INGESTION:** Seek medical attention. Do not induce vomiting.

**INHALATION:** Remove from exposure, treat symptomatically, consult physician

**RESPIRATORY PROTECTION:** NIOSH approved respirator with fume type cartridge

**VENTILATION:**      Local Exhaust  
                            Mechanical (General)  
                            Special (Specify)  
                            Other (Specify) See Below

**In case of vaporization:** Leave room and allow dust to settle. Clean all surfaces while wearing protective gloves. If room has ventilation, allow for several air changes. Locate exhaust near location of ZnSe processing or use if failure by melting is likely.

**SECTION V – FIRE-FIGHTING MEASURES**

Not flammable and not explosive.

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## SECTION VI – ACCIDENTAL RELEASE

**Solid Form:** If parts are dropped or otherwise broken, sweep up pieces as one would clean up broken glass (use caution with sharp edges) and safely transfer to disposal container. Cut resistant gloves are recommended.

**Dust Form** - Avoid getting ZnSe dust in eyes. If this happens, flush with water for 15 minutes. Consult physician. If ZnSe dust comes in contact with skin, wash with soap and water. If ZnSe dust is ingested, seek medical attention. If ZnSe dust is inhaled, remove from exposure, treat symptomatically, and consult physician.

RESPIRATORY PROTECTION: NIOSH approved respirator with fume type cartridge

VENTILATION:      Local Exhaust  
                           Mechanical (General)  
                           Special (Specify)  
                           Other (Specify) See Below

**In case of vaporization:** Leave room and allow dust to settle. Clean all surfaces while wearing protective gloves. If room has ventilation, allow for several air changes. Locate exhaust near location of ZnSe processing or use if failure by melting is likely.

## SECTION VII – HANDLING AND STORAGE

**HANDLING AND STORAGE:** If material is to be machined, ground or polished, processes should be done wet so as to minimize dust which could result in inhalation. Good work practices such as keeping hands clean and not letting slurry splash significantly should be followed so that transferal to mouth by contamination on the hands or clothing followed by ingestion will not occur. Wash hands and face thoroughly after handling material and before eating, drinking, smoking or using restroom facilities.

## SECTION VIII – EXPOSURE CONTROLS / PERSONAL PROTECTION

If material is to be machined, ground or polished, processes should be done wet so as to minimize dust which could result in inhalation. If ZnSe material is dropped or otherwise broken, carefully sweep up pieces which may have sharp edges as one would clean up broken glass and safely transfer to disposal container. Cut resistant gloves are recommended.

EYE PROTECTION: Safety glasses

SKIN PROTECTION: Impervious gloves, protective work clothing.

INGESTION: Good work practices such as keeping hands clean and not letting slurry splash significantly should be followed so that transferal to mouth by contamination on the hands or clothing followed by ingestion will not occur. Wash hands and face thoroughly after handling material and before eating, drinking, smoking or using restroom facilities.

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DUST INHALATION: NIOSH approved respirator with fume type cartridge.

**SECTION IX – PHYSICAL AND CHEMICAL CHARACTERISTICS**

<b>FORM:</b> Solid	<b>COLOR:</b> Yellow transparent
<b>ODOR:</b> Odorless	<b>MELTING POINT:</b> 1525 °C
<b>BOILING POINT, 760 mm Hg:</b> Sublimes	<b>SPECIFIC GRAVITY (H<sub>2</sub>O=1):</b> 5.27
<b>VAPOR PRESSURE:</b> N/A	<b>VAPOR DENSITY (Air=1):</b> N/A
<b>SOLUBILITY IN H<sub>2</sub>O, % by WT:</b> Insoluble	<b>% VOLATILES BY VOL.:</b> N/A
<b>FLASH POINT (Test Method):</b> Not flammable and not explosive	

**SECTION X –STABILITY AND REACTIVITY**

**STABILITY:** Stable; not reactive.

**CONDITIONS TO AVOID:** Extreme heat greater than 500 °C could result in decomposition.

**MATERIALS TO AVOID:** Strong acids, strong bases, oxidizing agents.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Selenium/Oxides of Selenium, Zinc Oxide

**HAZARDOUS POLYMERIZATION:**      Will not occur      Will occur

**SECTION XI – TOXICOLOGICAL INFORMATION**

**ZnSe:** Effects are not known, but some zinc and selenium compounds can be formed, such as:

**Zinc Oxide (fumes):** Sweet taste, throat dryness, cough, chills, weakness, general aching, fever, nausea and vomiting.

**Zinc Oxide (dust)** – Virtually innocuous when freshly formed.

**Selenium and Compounds** - Acute exposure might produce sternal pain, cough, nausea, pallor, coated tongue, gastro-intestinal disorders, nervousness and/or conjunctivitis. A garlic odor of the breath or sweat may occur.

Zinc Selenide as a compound was found to be non-toxic at 5g/1kg in an "Acute Oral Limit Toxicity Study" conducted by Toxikon. The test was initiated on January 7, 1993 by II-VI Inc. and it was performed according to Federal Hazardous Substances Act, 16CFR, Part 1500.3, January 1990.

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Additional toxicological information (selenium compounds, zinc oxide/zinc oxide fumes):

- EPA-D: Not classifiable as to human carcinogenicity: Inadequate human and animal evidence of carcinogenicity or no data are available.
- IARC-3: Unclassifiable as to carcinogenicity in humans.
- MAK-3B: In vitro tests or animal studies have yielded evidence of carcinogenic effects that is not sufficient for classification of the substance in one of the other categories. Further studies are required before a final classification can be made.

## SECTION XII – ECOLOGICAL INFORMATION

Ecotoxicity: No information was found in the references reviewed.

Environmental Fate: No information was found in the references reviewed.

Bioaccumulation: No information found in the references reviewed.

## SECTION XIII – DISPOSAL INFORMATION

Dispose of used laser optics in a licensed industrial waste facility in compliance with all local, state and federal regulations. If you do not have access to a licensed industrial waste facility, the used laser optics may be returned to II-VI Incorporated for proper disposal. Contact II-VI Incorporated before returning any used laser optics.

## SECTION XIV – TRANSPORT INFORMATION

ZnSe material should be wrapped in lens tissue or optical tissue and placed in individual plastic boxes to avoid possible breakage.

Not a hazardous material for transportation.

## SECTION XV - REGULATORY INFORMATION

Some zinc selenide lenses may be subject to U.S. export regulations.

## SECTION XVI - REFERENCES

1. "Dangerous Properties of Industrial Materials," Richard J. Lewis, Sr., 2000, 10th Edition.
2. "2003 Guide to Occupational Exposure Values" American Conference of Industrial Hygienists.
3. 2009 "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices," published by American Conference of Governmental Industrial Hygienists.
4. "Acute Oral Limit Toxicity Study" conducted by Toxikon and initiated on January 7, 1993 by II-VI Inc. This study was performed according to Federal Hazardous Substances Act, 16CFR, Part 1500.3, January 1990.

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*Robert J. Leonard*

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Environmental, Health and Safety Manager

*3/11/09*

Date

Material Safety Data Sheet: **Zinc Selenide**

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