

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) &amp; 2015/830

**SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING**
**1.1 Product identifier**

Product Name Tungsten diselenide few-layer film on sapphire  
 Synonyms Tungsten (IV) selenide, Tungsten selenide  
 Chemical Name Tungsten diselenide  
 Chemical Formula WSe<sub>2</sub>  
 CAS No. 12067-46-8  
 EC No. 235-078-7  
 Index No. 034-002-00-8  
 REACH Registration No. Not applicable.

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Identified Use(s) PC21 Laboratory chemicals, Research and development use *only*

**1.3 Details of the supplier of the safety data sheet**

Company Identification Ossila Limited  
 Address of Supplier Solpro Business Park  
 Windsor Street  
 Sheffield  
 Postal code S4 7WB, UK  
 Telephone: +441142999180  
 E-mail info@ossila.com  
 Office hours 08:00 - 17:00

**1.4 Emergency telephone number**

Emergency Phone # +44 (0) 20 3885 0382 (CHEMTREC)

Other Regions	Emergency Phone Number (CHEMTREC)
Europe, Middle East, Africa	+44 20 3885 0382
North America	+1 703 527 3887
Central America	+52 55 8526 4930
South America	+55 11 4349 1359
Asia, India, and Oceania	+65 3163 8374

**SECTION 2: HAZARDS IDENTIFICATION**
**2.1 Classification of the substance or mixture**

Regulation (EC) No. 1272/2008 (CLP) Acute Tox. 3: Toxic if swallowed.  
 Acute Tox. 3: Toxic if inhaled  
 STOT RE 2: May cause damage to organs through prolonged or repeated exposure  
 Aquatic Acute 1: Very toxic to aquatic life  
 Aquatic Chronic 1: Very toxic to aquatic life with long lasting effects

**2.2 Label elements**

According to Regulation (EC) No. 1272/2008 (CLP)  
 Product Name Tungsten diselenide few-layer film on sapphire

Hazard Pictogram(s)



GHS06

GHS08

GHS09

Signal Word(s)

Danger

Hazard Statement(s)

H301+H331: Toxic if swallowed or if inhaled  
 H373: May cause damage to organs through prolonged or repeated exposure  
 H400: Very toxic to aquatic life  
 H410: Very toxic to aquatic life with long lasting effects

Precautionary Statement(s)

P261: Avoid breathing dust/fume/gas/mist/vapours/spray.  
 P273: Avoid release to the environment.  
 P301 + P310 + P330: IF SWALLOWED: Immediately call a POISON CENTER/  
 doctor. Rinse mouth.  
 P304 + P340 + P311: IF INHALED: Remove person to fresh air and keep  
 comfortable for breathing. Call a POISON CENTER/ doctor.  
 P314: Get medical advice/attention if you feel unwell.

**2.3 Other hazards**

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

**2.4 Additional Information**

Not applicable.

**SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS**

**3.1 Substances**

Hazardous ingredient(s)	CAS No.	EC No.	%W/W	Hazard Statement(s)
Tungsten diselenide	12067-46-8	235-078-7	<0.1	Acute Tox. 3 H301 Acute Tox. 3 H331 STOT RE 2 H373 Aquatic Acute 1 H400 Aquatic Chronic 1 H410

**3.2 Mixtures**

Not applicable.

**SECTION 4: FIRST AID MEASURES**

**4.1 Description of first aid measures**

**General Advice** First aiders should ensure they have taken adequate steps to protect themselves from exposure (see Section 8 for recommended personal protection equipment) Show this safety data sheet to the doctor in attendance.

**Inhalation** Remove person to fresh air and keep comfortable for breathing. If not breathing give artificial respiration. Call a POISON CENTER or doctor/physician.

**Skin Contact** Rinse skin with water. If skin irritation occurs, get medical advice/attention.

**Eye Contact** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

**Ingestion** Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.

**4.2 Most important symptoms and effects, both acute and delayed**

Most important symptoms and effects, both acute and delayed, are included on labelling (Section 2.2) and in Section 11.

**4.3 Indication of any immediate medical attention and special treatment needed**

Treat symptomatically.

**SECTION 5: FIREFIGHTING MEASURES**

**5.1 Extinguishing media**

Suitable Extinguishing media As appropriate for surrounding fire.  
Unsuitable extinguishing media As appropriate for surrounding fire.

**5.2 Special hazards arising from the substance or mixture**

Tungsten oxides  
Selenium/selenium oxides

**5.3 Advice for firefighters**

Fire fighters should wear complete protective clothing including self-contained breathing apparatus.

**SECTION 6: ACCIDENTAL RELEASE MEASURES**

**6.1 Personal precautions, protective equipment and emergency procedures**

Follow safe handling advice and personal protective equipment recommendations (as per section 8). Provide adequate ventilation.

**6.2 Environmental precautions**

Avoid release to the environment.

**6.3 Methods and material for containment and cleaning up**

Sweep up spilled substance - avoid making dust. Use vacuum equipment for collecting spilt materials, where practicable. Dispose of contents in accordance with local, state or national legislation.

**6.4 Reference to other sections**

See Also Section 8, 13.

**SECTION 7: HANDLING AND STORAGE**

**7.1 Precautions for safe handling**

**Advice on safe handling** Avoid inhalation, ingestion, and contact with skin and eyes. Use only in a well-ventilated area. Wear protective clothing as per section 8.

**Hygiene measures** Keep away from food and drink. Wash hands after handling, before breaks, and at the end of workday.

**7.2 Conditions for safe storage, including any incompatibilities**

**Storage temperature** Store in a well-ventilated place. Keep container tightly closed. Store locked up. Ambient.

**Storage life** Stable under normal conditions.

Incompatible materials  
**7.3 Specific end use(s)**

None known.

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

**SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

**8.1 Control parameters**

8.1.1 Occupational Exposure Limits

UK – EH40 Workplace Exposure Limits (WEL).

Occupational Exposure Limits						
SUBSTANCE.	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m <sup>3</sup> )	STEL (ppm)	STEL (mg/m <sup>3</sup> )	Note
Selenium and compounds, except hydrogen selenide (as Se)	12067-46-8		0.1			

Region Source  
EU EU Occupational Exposure Limits  
United Kingdom UK Workplace Exposure Limits EH40/2005 (Third edition, published 2018)

**8.2 Exposure controls**

8.2.1. Appropriate engineering controls Ensure adequate ventilation and/or exhaust. A washing facility/water for eye and skin cleaning purposes should be present.

8.2.2. Personal protection equipment  
Eye Protection Wear eye protection with side protection tested and approved under appropriate government standards such as EN166 (EU).

Hand protection Handle with gloves. Gloves must be inspected prior to use and proper glove removal techniques should be used. The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.

Body protection Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.

Respiratory protection Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls.

Thermal hazards None known.

8.2.3. Environmental Exposure Controls Avoid release to the environment.

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

**9.1 Information on basic physical and chemical properties**

Physical State Film  
Colour Transparent.  
Odour Not known.  
Odour threshold Not known.  
Melting point/freezing point Not known.  
Initial boiling point and boiling range Not known.  
Flammability Not known.  
Lower and upper explosion limit Not known.  
Flash Point Not known.  
Auto-ignition temperature (°C) Not known.  
Decomposition temperature (°C) Not known.  
pH Not known.  
Kinematic viscosity Not known.  
Solubility(ies) Solubility (Water): Not known.  
Solubility (Other): Not known.  
Partition coefficient: n-octanol/water (log value) Not known.  
Vapour pressure Not known.  
Density Not known.  
Relative density Not known.  
Relative vapour density Not known.  
Particle characteristics Not known.

**9.2 Other information**

None.

**SECTION 10: STABILITY AND REACTIVITY**

**10.1 Reactivity**

None anticipated.

**10.2 Chemical Stability**

Stable under recommended storage conditions.

**10.3 Possibility of hazardous reactions**

Not known.

**10.4 Conditions to avoid**

Not known.

**10.5 Incompatible materials**

Not known.

**10.6 Hazardous decomposition products**

In the event of fire: see Section 5

**SECTION 11: TOXICOLOGICAL INFORMATION**

**11.1 Information on toxicological effects**

Acute toxicity - Ingestion	Toxic if swallowed. Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2).
Acute toxicity - Skin Contact	No data available.
Acute toxicity - Inhalation	Toxic if inhaled. Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2).
Skin corrosion/irritation	No data available.
Serious eye damage/irritation	No data available.
Skin sensitization data	No data available.
Respiratory sensitization data	No data available.
Germ cell mutagenicity	No data available.
Carcinogenicity	No data available.
Reproductive toxicity	No data available.
Lactation	No data available.
STOT - single exposure	No data available.
STOT - repeated exposure	Causes damage to organs through prolonged or repeated exposure. Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2).
Aspiration hazard	No data available.

**11.2 Information on other hazards**

**11.2.1 Endocrine disrupting properties**

None known.

**11.2.2. Information on other hazards**

None known.

**SECTION 12: ECOLOGICAL INFORMATION**

**12.1 Toxicity**

Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects. Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2).

Toxicity - Aquatic invertebrates	Not known.
Toxicity - Fish	Not known.
Toxicity - Algae	Not known.
Toxicity - Sediment Compartment	Not known.
Toxicity - Terrestrial Compartment	Not known.

**12.2 Persistence and Degradation**

Not known.

**12.3 Bioaccumulative potential**

Not known.

**12.4 Mobility in soil**

Not known.

**12.5 Results of PBT and vPvB assessment**

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

**12.6 Endocrine disrupting properties**

Not known.

**12.7 Other adverse effects**

Not known.

**SECTION 13: DISPOSAL CONSIDERATIONS**

**13.1 Waste treatment methods**

Dispose of contents in accordance with local, state or national legislation. Recycle only completely emptied packaging. Normal disposal is via incineration operated by an accredited disposal contractor. Send to a licensed recycler, reclaimer or incinerator.

**13.2 Additional Information**

Disposal should be in accordance with local, state or national legislation.

---

**SECTION 14: TRANSPORT INFORMATION**


---

<b>14.1 UN number</b>	
UN No.	3283
<b>14.2 UN proper shipping name</b>	
UN proper shipping name	Selenium compound, solid, n.o.s. (Molybdenum diselenide)
<b>14.3 Transport hazard class(es)</b>	
ADR/RID	6.1
IMDG	6.1
IATA	6.1
<b>14.4 Packing group</b>	
Packing group	III
<b>14.5 Environmental hazards</b>	
Environmental hazards	Not classified as a Marine Pollutant.
<b>14.6 Special precautions for user</b>	
Special precautions for user	Not known.
<b>14.7 Maritime transport in bulk according to IMO instruments</b>	
	Not known.

---

**SECTION 15: REGULATORY INFORMATION**


---

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

European Regulations - Authorisations and/or Restrictions On Use

Candidate List of Substances of Very High Concern for Authorisation Not listed

REACH: ANNEX XIV list of substances subject to authorisation Not listed

REACH: Annex XVII Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles Not listed

Community Rolling Action Plan (CoRAP) Regulation (EC) N° 850/2004 of the European Parliament and of the Council on persistent organic pollutants Not listed

Regulation (EC) N° 1005/2009 on substances that deplete the ozone layer Not listed

Regulation (EU) N° 649/2012 of the European Parliament and of the Council concerning the export and import of hazardous chemicals Not listed

**National regulations**

Other Not known.

**15.2 Chemical Safety Assessment**

A REACH chemical safety assessment has not been carried out.

---

**SECTION 16: OTHER INFORMATION**


---

The following sections contain revisions or new statements:

**LEGEND**

Acronyms	ADN : European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
	ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road
	CAS : Chemical Abstracts Service
	CLP : Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures
	DNEL : Derived No Effect Level
	EC : European Community
	EINECS : European Inventory of Existing Commercial Chemical Substances
	IATA : International Air Transport Association
	IBC : Intermediate Bulk Container
	ICAO : International Civil Aviation Organization
	IMDG : International Maritime Dangerous Goods
	LTEL : Long term exposure limit
	PBT : Persistent, Bioaccumulative and Toxic
	PNEC : Predicted No Effect Concentration
	REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals
	RID : Regulations concerning the International Carriage of Dangerous Goods by Rail
	STEL : Short term exposure limit
	STOT : Specific Target Organ Toxicity

UN : United Nations  
vPvB : very Persistent and very Bioaccumulative

**Disclaimers**

Information contained in this publication or as otherwise supplied to Users is believed to be accurate and is given in good faith, but it is for the Users to satisfy themselves of the suitability of the product for their own particular purpose. Ossila Limited gives no warranty as to the fitness of the product for any particular purpose and any implied warranty or condition (statutory or otherwise) is excluded except to the extent that exclusion is prevented by law. Ossila Limited accepts no liability for loss or damage (other than that arising from death or personal injury caused by defective product, if proved), resulting from reliance on this information. Freedom under Patents, Copyright and Designs cannot be assumed.