

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

## SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

### 1.1 Product identifier

Product Name Perovskite Precursor Ink for Nitrogen Processing  
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) Flam. Liq. 3: Flammable liquid and vapour  
Acute Tox. 4: Harmful if swallowed.  
Acute Tox. 4: Harmful in contact with skin.  
Acute Tox. 4: Harmful if inhaled  
Eye Irrit. 2: Causes serious eye irritation  
Repr. 1A: May damage fertility or the unborn child  
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

Product Name According to Regulation (EC) No. 1272/2008 (CLP)  
Perovskite Precursor Ink for Nitrogen Processing

Hazard Pictogram(s)



GHS02

GHS07

GHS08

GHS09

Signal Word(s)

Danger

Hazard Statement(s)

H226: Flammable liquid and vapour  
H302+H312+H332: Harmful if swallowed, in contact with skin or if inhaled  
H319: Causes serious eye irritation  
H360Df: May damage the unborn child. Suspected of damaging fertility  
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)

P201: Obtain special instructions before use.  
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
P273: Avoid release to the environment.  
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P308 + P313: IF exposed or concerned: Get medical advice/attention.  
P501: Dispose of contents/container to an approved waste disposal plant.

### 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

This product is a mixture.

### 3.2 Mixtures

Hazardous ingredient(s)	CAS No.	EC No.	%W/W	Hazard Statement(s)
N,N-dimethylformamide Index No. 616-001-00-X  Component included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)	68-12-2	200-679-5	>= 60 - <65	Flam. Liq. 3 H226 Repr. 1B H360D Acute Tox. 4 H332 Acute Tox. 4 H312 Eye Irrit. 2 H319
Methylammonium iodide	14965-49-2	239-037-4	>= 15 - <20	Acute Tox. 4 H302 Eye Irrit. 2 H319 Skin Irrit. 2 H315 STOT SE 3 H335
Lead iodide Index No. 082-001-00-6	10101-63-0	233-256-9	>= 10 - <15	Repr. 1A H360Df Acute Tox. 4 H332 Acute Tox. 4 H302 Stot RE 2 H373 (C ≥ 0,5 %) Aquatic Acute 1 H400 Aquatic Chronic 1 H410
Lead dichloride Index No. 082-001-00-6	7758-95-4	231-845-5	>= 5 - <10	Repr. 1A H360Df Acute Tox. 4 H332 Acute Tox. 4 H302 Stot RE 2 H373 (C ≥ 0,5 %) Aquatic Acute 1 H400 Aquatic Chronic 1 H410

## 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

Wash with soap and flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a POISON CENTER or doctor/physician.

Eye Contact

Flush with copious amounts of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a POISON CENTER or doctor/physician.

Ingestion

Immediately call a POISON CENTER or doctor/ physician. Rinse mouth. Do NOT induce vomiting.

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

Lead salts have been reported to cross the placenta and to induce embryo- and fetotoxicity. They also have teratogenic effect in some animal species. No teratogenic effects have been reported with exposure to organometallic lead compounds. Adverse effects of lead on human reproduction, embryonic and fetal development, and postnatal (e.g., mental) development have been reported. Excessive exposure can affect blood, nervous, and digestive systems. The synthesis of hemoglobin is inhibited and results in anemia. If left untreated, neuromuscular dysfunction, possible paralysis, and encephalopathy can result. Additional symptoms of overexposure include: joint and muscle pain, weakness of the extensor muscles (frequently the hand and wrist), headache, dizziness, abdominal pain, diarrhea, constipation, nausea, vomiting, blue line on the gums, insomnia, and metallic taste. High body levels produce increased cerebrospinal pressure, brain damage, and stupor leading to coma and often death.

Warning: intolerance for alcohol can occur up to 4 days after dimethylformamide exposure. N,N-dimethylformamide is considered to be a potent liver toxin., Vomiting,

Diarrhoea, Abdominal pain, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

#### 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

Carbon oxides  
Nitrogen oxides (NOx)  
Hydrogen chloride gas  
Hydrogen iodide  
Lead 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

Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).

#### 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.  
Storage life Ambient.  
Incompatible materials Product is air and moisture sensitive. Handle and store under inert gas.  
None known.

#### 7.3 Specific end use(s)

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.	LTCL (8 hr TWA ppm)	LTCL (8 hr TWA mg/m <sup>3</sup> )	STCL (ppm)	STCL (mg/m <sup>3</sup> )	Note
N,N-Dimethylformamide	68-12-2	5	15	10	30	
Lead diiodide	10101-63-0		0.15			
Lead dichloride	7758-95-4		0.15			

Region EU  
United Kingdom

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

## Chemical Agents Directive - Annex II: Binding biological limit values

Biological Occupational Exposure Limits				
SUBSTANCE.	CAS No.	Parameters	Value	Biological specimen
Lead diiodide	10101-63-0	Lead	0.7 mg/l	Blood
Lead dichloride	7758-95-4			
	Remarks	Biological monitoring must include measuring the blood-lead level (PbB) using absorption spectrometry or a method giving equivalent results., Medical surveillance is carried out if: - exposure to a concentration of lead in air is greater than 0,075 mg/m3, calculated as a time-weighted average over 40 hours per week, or - a blood-lead level greater than 40 µg Pb/100 ml blood is measured in individual workers., Practical guidelines for biological monitoring and medical surveillance must be developed in accordance with article 12, paragraph 2. These include recommendations of biological indicators (e.g. ALAU, ZPP, ALAD) and biological monitoring strategies.		

**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 respirator with multi-purpose combination (US) or type ABEK (EN 14387) 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	Liquid.
Colour	Yellow.
Odour	Not known.
Odour threshold	Not known.
Melting point/freezing point	-61.4-61 °C (DMF)
Initial boiling point and boiling range	152-153 °C (DMF)
Flammability	Not known.
Lower and upper explosion limit	Not known.
Flash Point	57.5 °C – closed cup (DMF)
Auto-ignition temperature (°C)	Not known.
Decomposition temperature (°C)	Not known.
pH	Not known.
Kinematic viscosity	Not known.
Solubility(ies)	Solubility (Water): ca. 1 000 g/L (DMF) Solubility (Other): alcohol, ether, acetone (> 1 000 - <= 10 000 mg/L) (DMF)
Partition coefficient: n-octanol/water (log value)	logPow : -0.85 (DMF)
Vapour pressure	3.77 hPa (20 °C) (DMF)
Density	0.94 g/cm3 at 20 °C (DMF)
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

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**SECTION 11: TOXICOLOGICAL INFORMATION**

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**11.1 Information on toxicological effects**

Acute toxicity - Ingestion	No data available.
Acute toxicity - Skin Contact	No data available.
Acute toxicity - Inhalation	No data available.
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	No data available.
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.

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**SECTION 12: ECOLOGICAL INFORMATION**

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**12.1 Toxicity**

Toxicity - Aquatic invertebrates	No data available.
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.

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**SECTION 13: DISPOSAL CONSIDERATIONS**

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**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.

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**SECTION 14: TRANSPORT INFORMATION**

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**14.1 UN number**

UN No. 1992

**14.2 UN proper shipping name**

UN proper shipping name Flammable liquid, toxic, n.o.s. (N,N-dimethylformamide, lead dichloride, lead diiodide solution)

**14.3 Transport hazard class(es)**

ADR/RID	3 (6.1)
IMDG	3 (6.1)
IATA	3 (6.1)

**14.4 Packing group**

Packing group III

**14.5 Environmental hazards**

Environmental hazards Classified as a Marine Pollutant.

**14.6 Special precautions for user**

Special precautions for user Not known.

**14.7 Maritime transport in bulk according to IMO instruments**

Not known.

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**SECTION 15: REGULATORY INFORMATION**

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**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 Certain components listed (N,N-Dimethylformamide)

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 Certain components listed (N,N-Dimethylformamide, Lead diiodide, Lead dichloride)

Community Rolling Action Plan (CoRAP) Not listed

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

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A REACH chemical safety assessment has not been carried out.

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**SECTION 16: OTHER INFORMATION**

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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

SVHC : Substances of Very High Concern

UN : United Nations

vPvB : very Persistent and very Bioaccumulative

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