

Tungsten hexafluoride**ALM/SDS/239**

2.3 : Toxic gases



8 : Corrosive substances

Danger**SECTION 1. Identification of the hazardous chemical and of the supplier****1.1. Product identifier**

Trade name : Tungsten hexafluoride
Chemical description : Tungsten hexafluoride
CAS No : 7783-82-6
EC No : 232-029-1
Index No : ---
Chemical formula : WF₆
Registration-No. : Registration deadline not expired.

1.2. Other means of identification

SDS Nr : ALM/SDS/239
Uses advised against : Consumer use.

1.3. Recommended use of the chemical and restrictions on use

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
Laboratory use.
Use for manufacture of electronic/photovoltaic components.
Test gas/Calibration gas.
Contact supplier for more information on uses.

1.4. Details of Principal Supplier

Company identification : AIR LIQUIDE MALAYSIA SDN. BHD.
Lot P.T. 2317, No 21, Jalan PTB 1,
Tangga Batu Industrial Estate,
76400 Melaka MALAYSIA

1.5. Emergency phone number**SECTION 2. Hazard identification****2.1. Classification of the substance or mixture and any nation or regional information****Hazard Class and Category Code Regulation EC 1272/2008 (CLP)**

- Health hazards : Acute toxicity, Inhalation - Category 1 - Danger - (CLP : Acute Tox. 1) - H330
Skin corrosion - Category 1A - Danger - (CLP : Skin Corr. 1A) - H314
- Physical hazards : Gases under pressure - Liquefied gas - Warning - (CLP : Press. Gas) - H280

Classification EC 67/548 or EC 1999/45

: T+; R26
C; R35

Not included in Annex VI.

Tungsten hexafluoride

ALM/SDS/239

SECTION 2. Hazard identification (continued)

2.2. Label elements

Labelling Regulation EC 1272/2008 (CLP)

- Hazard pictograms



- Hazard pictograms code

: GHS06 - GHS05 - GHS04

- Signal word

: Danger

- Hazard statements

: H280 - Contains gas under pressure; may explode if heated.
 H330 - Fatal if inhaled.
 H314 - Causes severe skin burns and eye damage.

- Supplemental hazard information

: EUH071 - Corrosive to respiratory tract.

- Precautionary statements

- Prevention

: P260 - Do not breathe gas, vapours.
 P280 - Wear protective gloves/protective clothing/eye protection/face protection.

- Response

: P304+P340+P315 - IF INHALED : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get immediate medical advice / attention.
 P305+P351+P338+P315 - IF IN EYES : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice / attention.
 P303+P361+P353+P315 - IF ON SKIN : (or hair) Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Get immediate medical advice / attention.

- Storage

: P403 - Store in a well-ventilated place.
 P405 - Store locked up.

2.3. Other hazards

: None.

SECTION 3. Composition and Information of the ingredients of the hazardous chemical

3.1. Substance / 3.2. Mixture

Substance.

Substance name	Contents	CAS No EC No Index No Registration No	Classification(DSD)	Classification(CLP)
Tungsten hexafluoride	: 100 %	7783-82-6 232-029-1 ----- * 2		Acute Tox. 1 (H330) Skin Corr. 1A (H314) Press. Gas Liquefied (H280)

Contains no other components or impurities which will influence the classification of the product.

* 1: Listed in Annex IV / V REACH, exempted from registration.

* 2: Registration deadline not expired.

* 3: Registration not required: Substance manufactured or imported < 1t/y.

Full text of R-phrases see section 16. Full text of H-statements see section 16.

Tungsten hexafluoride

ALM/SDS/239

SECTION 4. First-aid measures

4.1. Description of first aid measures

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
- Skin contact : Remove contaminated clothing. Drench affected area with water for at least 15 minutes. In case of skin contact, wearing rubber gloves rub 2.5% calcium gluconate gel continuously into the affected area for 1.5 hours or until further medical care is available.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- Ingestion : Ingestion is not considered a potential route of exposure.

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

- : May cause headache, nausea and irritation of respiratory tract. May cause severe chemical burns to skin and cornea. Suitable first-aid treatment should be immediately available. Seek medical advice before using product. Prolonged exposure to small concentrations may result in pulmonary oedema. Delayed adverse effects possible. Refer to section 11.

4.3. Indication of immediate medical attention and special treatment needed

- : Treat with corticosteroid spray as soon as possible after inhalation. Obtain medical assistance.

SECTION 5. Fire-fighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Water spray or fog.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the chemical

- Specific hazards** : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products** : If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition:
Hydrogen fluoride. Tungsten and its oxides.

5.3. Special protective equipment and precautions for fire-fighters

- Specific methods** : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
If possible, stop flow of product.
Specialist clean-up methods may be required.
Use of water may result in the formation of very toxic aqueous solutions.
Use water spray or fog to knock down fire fumes if possible.
- Special protective equipment for fire fighters** : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams.

Tungsten hexafluoride

ALM/SDS/239

SECTION 6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- : Try to stop release.
- Monitor concentration of released product.
- Evacuate area.
- Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.
- Ensure adequate air ventilation.
- Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.2. Environmental precautions

- : Try to stop release.
- Reduce vapour with fog or fine water spray.

6.3. Methods and material for containment and cleaning

- : Ventilate area.
- Hose down area with water.
- Wash contaminated equipment or sites of leaks with copious quantities of water.

6.4. Reference to other sections

- : See also sections 8 and 13.

SECTION 7. Handling and storage

7.1. Precautions for safe handling

Safe use of the product

- : Only experienced and properly instructed persons should handle gases under pressure. The substance must be handled in accordance with good industrial hygiene and safety procedures.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Avoid exposure, obtain special instructions before use.
- Use no oil or grease.
- Passivate all equipment and pipework before introducing gas. Contact supplier for passivation procedure.
- Do not smoke while handling product.
- Ensure the complete gas system was (or is regularly) checked for leaks before use.
- Installation of a cross purge assembly between the cylinder and the regulator is recommended.
- Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service.
- Avoid suck back of water, acid and alkalis.
- Consider pressure relief device(s) in gas installations.

Safe handling of the gas receptacle

- : Refer to supplier's container handling instructions.
- Do not allow backfeed into the container.
- Protect cylinders from physical damage; do not drag, roll, slide or drop.
- When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
- Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
- If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.
- Never attempt to repair or modify container valves or safety relief devices.
- Damaged valves should be reported immediately to the supplier.
- Keep container valve outlets clean and free from contaminants particularly oil and water.
- Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
- Close container valve after each use and when empty, even if still connected to equipment.
- Never attempt to transfer gases from one cylinder/container to another.
- Never use direct flame or electrical heating devices to raise the pressure of a container.
- Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.

Tungsten hexafluoride

ALM/SDS/239

SECTION 7. Handling and storage (continued)

7.2. Conditions for safe storage, including any incompatibilities

: Keep container below 50°C in a well ventilated place. Containers should be stored in the vertical position and properly secured to prevent toppling. Stored containers should be periodically checked for general condition and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition.
Observe all regulations and local requirements regarding storage of containers.
Containers should not be stored in conditions likely to encourage corrosion. Keep away from combustible materials.

7.3. Specific end use(s)

: None.

SECTION 8. Exposure controls and personal protection

8.1. Control parameters

8.2. Appropriate engineering controls

8.3. Individual protection measures

- **Eye/face protection** : Wear goggles and a face shield when transfilling or breaking transfer connections. Wear safety glasses with side shields.
Standard EN 166 - Personal eye-protection.
Provide readily accessible eye wash stations and safety showers.
- **Skin protection**
 - **Hand protection** : Wear working gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risk.
Wear chemically resistant protective gloves.
Standard EN 374 - Protective gloves against chemicals.
Consult glove manufacturer's product information on material suitability and material thickness.
The breakthrough time of the selected gloves must be greater than the intended use period.
 - **Other** : Wear safety shoes while handling containers.
Keep suitable chemically resistant protective clothing readily available for emergency use.
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
Standard EN943-1 - Full protective suits against liquid, solid and gaseous chemicals.
- **Respiratory protection** : Keep self contained breathing apparatus readily available for emergency use.
Gas filters may be used if all surrounding conditions e.g. type and concentration of the contaminant(s) and duration of use are known.
Use gas filters and full face mask, where exposure limits may be exceeded for a short-term period, e.g. connecting or disconnecting containers.
Recommended: Filter B (grey).
Consult respiratory device supplier's product information for the selection of the appropriate device.
Standard EN 14387 - Gas filter(s), combined filter(s) and full face mask - EN 136.
Gas filters do not protect against oxygen deficiency.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.
- **Thermal hazards** : None necessary.

Tungsten hexafluoride

ALM/SDS/239

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Physical state at 20°C / 101.3kPa : Gas.

Colour : Colourless.
Gives off white fumes in moist air.

Odour : Pungent.

Odour threshold : Odour threshold is subjective and inadequate to warn for overexposure.

pH value : Not applicable.

Molar mass [g/mol] : 298

Melting point [°C] : 2.3

Boiling point [°C] : 17

Critical temperature [°C] : 170

Flash point [°C] : Not applicable for gases and gas-mixtures.

Evaporation rate (ether=1) : Not applicable for gases and gas-mixtures.

Flammability range [vol% in air] : Non flammable.

Vapour pressure [20°C] : 1.1 bar

Relative density, gas (air=1) : 10.3

Relative density, liquid (water=1) : 3.4

Partition coefficient n-octanol/water [log Kow] : Not applicable for inorganic gases.

Auto-ignition temperature [°C] : Not applicable.

Viscosity at 20°C [mPa.s] : Not applicable.

Explosive Properties : Not applicable.

Oxidising Properties : None.

9.2. Other information

Other data : Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10. Stability and reactivity

10.1. Reactivity

: No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

: Stable under normal conditions.

10.3. Possibility of hazardous reactions

: None.

10.4. Conditions to avoid

: None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

: May react violently with reducing agents.
May react violently with combustible materials.
For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Tungsten hexafluoride

ALM/SDS/239

SECTION 11. Toxicological information

11.1. Information on toxicological effects

Acute toxicity	: Delayed fatal pulmonary oedema possible. Absorption of excessive F- can result in acute systemic fluorosis with hypocalcemia, interference with various metabolic functions and organ damage (heart, liver, kidneys).
Rat inhalation LC50 [ppm/4h]	: 80
Skin corrosion/irritation	: Severe corrosion to skin at high concentrations.
Serious eye damage/irritation	: Severe corrosion to the eyes at high concentrations.
Respiratory or skin sensitisation	: No known effects from this product.
Carcinogenicity	: No known effects from this product.
Germ cell mutagenicity	: No known effects from this product.
Reproductive toxicity	: No known effects from this product.
STOT-single exposure	: Severe corrosion to the respiratory tract at high concentrations.
STOT-repeated exposure	: No known effects from this product.
Aspiration hazard	: Not applicable for gases and gas-mixtures.

SECTION 12. Ecological information

12.1. Ecotoxicity

: No data available.

12.2. Persistence and degradability

: Not applicable for inorganic gases.

12.3. Bioaccumulative potential

: No data available.

12.4. Mobility in soil

: Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Results of PBT and vPvB assessment

: No data available.

12.6. Other adverse effects

	: May cause pH changes in aqueous ecological systems.
Effect on ozone layer	: None.
Effect on the global warming	: No known effects from this product.

SECTION 13. Disposal information

13.1 Waste treatment methods

: Must not be discharged to atmosphere.
Gas may be scrubbed in alkaline solution under controlled conditions to avoid violent reaction. Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org> for more guidance on suitable disposal methods.
Ensure that the emission levels from local regulations or operating permits are not exceeded.

List of hazardous wastes : 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

Additional information

: None.

Tungsten hexafluoride

ALM/SDS/239

SECTION 14. Transportation information

UN number : 2196

Labelling ADR, IMDG, IATA


 : 8 : Corrosive substances
 2.3 : Toxic gases

Land transport (ADR/RID)

H.I. nr : --
 UN proper shipping name : TUNGSTEN HEXAFLUORIDE
 Transport hazard class(es) : 2
 Classification code : 2 TC
 Packing Instruction(s) : P200
 Tunnel Restriction : D : Passage forbidden through tunnels of category D and E.
 Environmental hazards : None.

Sea transport (IMDG)

Proper shipping name : TUNGSTEN HEXAFLUORIDE
 Class : 2.3
 Emergency Schedule (EmS) - Fire : F-C
 Emergency Schedule (EmS) - Spillage : S-U
 Packing instruction : P200
 IMDG-Marine pollutant : No

Air transport (ICAO-TI / IATA-DGR)

Proper shipping name (IATA) : TUNGSTEN HEXAFLUORIDE
 Class : 2.3
 Passenger and Cargo Aircraft : FORBIDDEN.
 Cargo Aircraft only : FORBIDDEN.

Special precautions for user

: Avoid transport on vehicles where the load space is not separated from the driver's compartment.
 Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
 Before transporting product containers:
 - Ensure that containers are firmly secured.
 - Ensure cylinder valve is closed and not leaking.
 - Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
 - Ensure valve protection device (where provided) is correctly fitted.
 - Ensure there is adequate ventilation.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not applicable.

SECTION 15. Regulatory information

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

EU legislation

Restrictions on use : None.
 Seveso directive 96/82/EC : Covered.

National legislation

National legislation : Ensure all national/local regulations are observed.

Tungsten hexafluoride

ALM/SDS/239

SECTION 15. Regulatory information (continued)

15.2. Chemical safety assessment

: This product is either exempt from REACH, does not meet the minimum volume threshold for a CSR or the CSA has not yet been carried out.

SECTION 16. Other information

- Indication of changes** : Revised safety data sheet in accordance with commission OSHR 2013 (CLASS)
- Training advice** : Ensure operators understand the toxicity hazard.
Users of breathing apparatus must be trained.
- List of full text of R-phrases in section 3.** : R26 : Very toxic by inhalation.
R35 : Causes severe burns.
- List of full text of H-statements in section 3.** : H280 - Contains gas under pressure; may explode if heated.
H314 - Causes severe skin burns and eye damage.
H330 - Fatal if inhaled.
- Key literature references and sources for data used to compile the SDS** : This Safety Data Sheet has been established in accordance with the applicable European Directives and applies to all countries that have translated the Directives in their national law.
- DISCLAIMER OF LIABILITY** : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Details given in this document are believed to be correct at the time of going to press. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

End of document