SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name
Tungsten hexafluoride

EC No (from EINECS): 232-029-1
CAS No: 7783-82-6
Index-Nr.
Chemical formula WF6
REACH Registration number
Not available.

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

Relevant identified uses
Industrial and professional. Perform risk assessment prior to use.

Uses advised against
Consumer use.

1.3. Details of the supplier of the safety data sheet

Company identification
BOC, Priestley Road, Worsley, Manchester M28 2UT
E-Mail Address ReachSDS@boc.com

1.4. Emergency telephone number

Emergency phone numbers (24h): 0800 111 333

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification acc. to Regulation (EC) No 1272/2008/EC (CLP/GHS)
Press. Gas (Liquefied gas) - Contains gas under pressure; may explode if heated.
Acute Tox. 1 - Fatal if inhaled.
Skin Corr. 1A - Causes severe skin burns and eye damage.
EUH071 - Corrosive to the respiratory tract.

T+; R26 | C; R35
Very toxic by inhalation. Causes severe burns (eyes, respiratory system and skin).
Risk advice to man and the environment
Liquefied gas.

2.2. Label elements

- Labelling Pictograms

- 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.
EUH071 Corrosive to the respiratory tract.

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

- Precautionary Statement Response
P303+P361+P353+P315 IF ON SKIN (or hair): Remove / Take off immediately all contaminated clothes. Rinse skin with water/shower. Get immediate medical advice/attention.
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.

- Precautionary Statement Storage
P403 Store in a well-ventilated place.
P405 Store locked up.

- Precautionary Statement Disposal
None.

2.3. Other hazards
Contact with liquid may cause cold burns/frostbite.

SECTION 3: Composition/information on ingredients

Substance / Mixture: Substance.

3.1. Substances
Tungsten hexafluoride
CAS No: 7783-82-6
Index-Nr.: Not available.

EC No (from EINECS): 232-029-1

REACH Registration number: Not available.
Contains no other components or impurities which will influence the classification of the product.

3.2. Mixtures
Not applicable.

SECTION 4: First aid measures

4.1. Description of first aid measures

First Aid General Information:
Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

First Aid 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.

First Aid Skin / Eye:
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. In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Immediately flush eyes thoroughly with water for at least 15 minutes. Alternatively irrigate eyes intermittently for 20 minutes.
with an aqueous Calcium gluconate 1% solution if available. Obtain medical assistance.

First Aid 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 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. The potential for Hydrogen fluoride formation exists with every exposure, therefore its toxicity must also be considered.

4.3. Indication of any immediate medical attention and special treatment needed
Treat with a corticosteroid spray as soon as possible after inhalation. Obtain medical assistance.

SECTION 5: Fire fighting measures

5.1. Extinguishing media
Suitable extinguishing media
Dry powder. Carbon dioxide. Foam. Use water spray or fog to control fire fumes.

5.2. Special hazards arising from the substance or mixture
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: Tungsten and its oxides.

5.3. Advice for fire-fighters
Specific methods
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. Move container away or cool with water from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.

Special protective equipment for fire-fighters
Gas tight chemically protective clothing (Type 1) in combination with self contained breathing apparatus.
Guideline:
EN 943-2:2002: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Performance requirements for gas-tight (Type 1) chemical protective suits for emergency teams (ET).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Evacuate area. Use self-contained breathing apparatus and chemically protective clothing. Ensure adequate air ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Monitor concentration of released product. EN 137 Respiratory protective devices — Self-contained open-circuit compressed air breathing apparatus with full face mask — Requirements, testing, marking.

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 up
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
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 has been (or is regularly) checked for leaks before use. Installation of a cross purge assembly between the container 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 suckback of water, acid and alkalis. Refer to supplier's handling instructions. Do not allow backfeed into the container. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Protect containers from physical damage; do not drag, roll, slide or drop. 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 container 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 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 container contents.

7.2. Conditions for safe storage, including any incompatibilities
Segregate from flammable gases and other flammable materials in store. Keep container below 50°C in a well ventilated place. Cylinders should be stored in the vertical position and properly secured to prevent falling over. Stored containers should be periodically checked for general conditions 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. Keep away from combustible materials. Observe all regulations and local requirements regarding storage of containers. Containers should not be stored in conditions likely to encourage corrosion.

7.3. Specific end use(s)
None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
Exposure limit value

<table>
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<tr>
<th>Value type</th>
<th>value</th>
<th>Note</th>
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<tr>
<td>Great Britain - LTEL</td>
<td>5 mg/m³</td>
<td>EH 40/07</td>
</tr>
<tr>
<td>Great Britain - STEL</td>
<td>10 mg/m³</td>
<td>EH 40/07</td>
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</table>
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DNEL not available  
PNEC not available.

8.2. Exposure controls  
Appropriate engineering controls  
A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Product to be handled in a closed system and under strictly controlled conditions. Keep concentrations well below occupational exposure limits. Use only permanent leak-tight installations (e.g. welded pipes). Systems under pressure should be regularly checked for leakages. Gas detectors should be used when toxic quantities may be released. Provide adequate general or local ventilation. Consider work permit system e.g. for maintenance activities.

Personal protective equipment  
Eye and face protection  
Protect eyes, face and skin from contact with product. Wear a face-shield when transferring and breaking transfer connections. Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Full-face mask recommended

Guideline:  
EN 136 Respiratory protective devices. Full face masks. Requirements, testing, marking

Skin protection  
Advice: Chemically resistant gloves complying with EN 374 should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Material: Neoprene

Guideline:  
EN 374-1/2/3 Protective gloves against chemicals and micro-organisms.

Advice: Wear working gloves and safety shoes while handling containers.

Body protection  
Protect eyes, face and skin from contact with product. Keep suitable chemically resistant protective clothing readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved.

Guideline:  
EN 943: Protective clothing against liquid and gaseous chemicals, including liquid aerosols and solid particles.

Other protection  
Wear working gloves and safety shoes while handling containers. EN ISO 20345 Personal protective equipment - Safety footwear.

Respiratory protection  
Keep self contained breathing apparatus readily available for emergency use.. Use SCBA in the event of high concentrations. The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD. When allowed by a risk assessment a supplied air respirator may be used.

Guideline:  
EN 136 Respiratory protective devices. Full face masks. Requirements, testing, marking

Guideline:  
EN 137 Respiratory protective devices — Self-contained open-circuit compressed air breathing apparatus with full face mask — Requirements, testing, marking.

Thermal hazards

If there is a risk of contact with the liquid, all protective equipment should be suitable for extremely low temperatures.

Environmental Exposure Controls  
Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

SECTION 9: Physical and chemical properties  
9.1. Information on basic physical and chemical properties  
General information  

Odour: Pungent

Odour threshold:  
Odour threshold is subjective and inadequate to warn for over exposure.

Melting point: 2,3 °C

Boiling point: 17,10 °C

Flash point: Not applicable for gases and gas mixtures.

Evaporation rate: Not applicable for gases and gas mixtures.

Flammability range: Non flammable.

Vapour Pressure 20 °C: 1,1 bar

Relative density, gas: 10,3

Solubility in water: No reliable data available.

Partition coefficient: n-octanol/water: Not applicable.

Autoignition temperature: Not applicable.

Molecular weight: 297,84 g/mol

Critical temperature: 170,00 °C

Relative density, liquid: 3,4

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

SECTION 10: Stability and reactivity  
10.1. Reactivity  
Unreactive under normal conditions.

10.2. Chemical stability  
Stable under normal conditions.

10.3. Possibility of hazardous reactions  
Violently oxidises organic material.

10.4. Conditions to avoid  
Avoid moisture in installation systems.

10.5. Incompatible materials  
May react violently with reducing agents. May react violently with combustible materials. For material compatibility see latest version of ISO-11114.

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

SECTION 11: Toxicological information  
11.1. Information on toxicological effects  
Acute oral toxicity
Acute inhalation toxicity

Value: LC50
Species: Rat
Exposure time: 1 h
Value in non-standard unit: 213 ppm

Value: LC50
Species: Rat
Exposure time: 4 h
Value in non-standard unit: 80 ppm
Delayed fatal pulmonary oedema possible. Absorption of excessive F- can result in acute systemic fluorosis with hypocalcaemia interference with various metabolic functions and organ damage (heart, liver, kidneys).

Acute dermal toxicity
No data available.

Skin irritation
Severe corrosion to the skin at high concentrations.

Eye irritation
Severe corrosion to the eyes at high concentrations., Risk of serious damage to eyes.

Sensitization
No known effects from this product.

Assessment mutagenicity
No known effects from this product.

Assessment carcinogenicity
No known effects from this product.

Assessment toxicity to reproduction
No known effects from this product.

Specific Target Organ Toxicity (STOT) - Single Exposure
Organ: Lungs

Organ: Kidneys

Organ: Heart

Specific Target Organ Toxicity (STOT) - Repeated Exposure
Organ: Kidneys

Organ: Lungs

Organ: Heart

Organ: Liver

Death from respiratory tract damage would likely occur before significant amounts of fluoride are absorbed., The potential for Hydrogen fluoride formation exists with every exposure, therefore its toxicity must also be considered.

Aspiration hazard
Not applicable to gases and gas mixtures

12.4. Mobility in soil
No data available.

12.5. Results of PBT and vPvB assessment
No data available.

12.6. Other adverse effects
May cause pH changes in aqueous ecological systems.

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Do not discharge into any place where its accumulation could be dangerous. Must not be discharged to atmosphere. Contact supplier if guidance is required. 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.
Gases in pressure containers (including halons) containing dangerous substances
EWC Nr. 16 05 04*

SECTION 14: Transport information

ADR/RID

14.1. UN number
2196

14.2. UN proper shipping name
Tungsten hexafluoride

14.3. Transport hazard class(es)
Class: 2
Classification Code: 2TC
Labels: 2.3, 8
Hazard number: 268
Tunnel restriction code: (D)
Emergency Action Code: 2WE

14.4. Packing group (Packing Instruction)
P200

14.5. Environmental hazards
None.

IMDG

14.1. UN number
2196

14.2. UN proper shipping name
Tungsten hexafluoride

14.3. Transport hazard class(es)
Class: 2.3
Labels: 2.3, 8
EmS: FC,SU,

14.4. Packing group (Packing Instruction)
P200

14.5. Environmental hazards

SECTION 12: Ecological information

12.1. Toxicity
Endangering to drinking water.

12.2. Persistence and degradability
No data available.

12.3. Bioaccumulative potential
No data available.
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None.

14.6. Special precautions for user
None.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Not applicable.

IATA

14.5. Environmental hazards
None.

14.6. Special precautions for user
None.

Other transport information
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 they are firmly secured. Ensure that the valve outlet cap nut or plug (where provided) is correctly fitted. Ensure that the valve protection device (where provided) is correctly fitted. Ensure adequate ventilation. Ensure compliance with applicable regulations. Ensure that the container valve is closed and not leaking.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
Seveso Directive 96/82/EC: Covered

Other regulations
Management of Health and Safety at Work Regulations (1999 No. 3242)
The Regulatory Reform (Fire Safety) Order 2005 (2005 No. 1541)
Control of Substances Hazardous to Health Regulations (COSHH, 2002 No. 2677)
Provision and Use of Work Equipment Regulations (PUWER, 1998 No. 2306)
Personal Protective Equipment Regulations (1992 No. 2966)
Control of Major Accident Hazards Regulations (COMAH, 1999 No. 743)
Chemical Hazards Information and Packaging for Supply (CHIP, 1994 No. 3247)
Pressure Systems Safety Regulations (PER, 2000 No. 128)

15.2. Chemical safety assessment
CSA has not been carried out.

SECTION 16: Other information

Ensure all national/local regulations are observed. Ensure operators understand the toxicity hazard. Users of breathing apparatus must be trained. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

Advice
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. Details given in this document are believed to be correct at the time of going to press.

Further information
Note:

When using this document care should be taken, as the decimal sign and its position complies with rules for the structure and drafting of international standards, and is a comma on the line.
As an example 2,000 is two (to three decimal places) and not two thousand, whilst 1,000 is one thousand and not one (to three decimal places).

References

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