Safety Data Sheet

According to Regulation (EC) No 1907/2006 (REACh)

Tungsten Electrode WTh10, WTh20, WTh30, WTh40 (EWTh-1, EWTh-2)

Version: 1.1/EN | Revision date: 2011-05-20 | Date of print: 2011-05-20

1. Identification of the substance/preparation and of the company

1.1. Identification of the substance or preparation

Tungsten with 0.8 to 4.2 weight-% thorium oxide

Identification on the label / trade name

TIG Electrodes WThX (X=10, 20, 30, 40)
according to ISO 6848:2004

TIG Electrodes EWTh-1/EWTh-2
according to ANSI/AWS A5.12M

1.2. Use of the product

1.2.1. Identified uses

Non melting electrode for TIG welding; electrodes for lightning; electrodes for plasma melting, plasma cutting, plasma spraying (thermal spraying); emission cathodes for electronic

1.2.2. Uses advised against

unknown

1.3. Company Identification

Gesellschaft fuer Wolfram Industrie mbH
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D 83278 Traunstein, Deutschland

phone +49 (861) 98 79-0
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E-mail (competent person)

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Information contact

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1.4. Emergency telephone

Wolfram Industrie (Only available during office hours.):
+49 (861) 98 79-0

Umweltbundesamt, Z. 2.4 (GSA), Bismarckplatz 1, D-14193 Berlin
+49 (30) 89 03-24 41
+49 (30) 89 03-20 20
+49 (30) 89 03-20 49

2. Hazards identification

2.1. Hazards description

The formulation is not rated as hazardous according to 1999/45/EG. According to the I.A.E.A.-criteria the product is rated as *LOW LEVEL RADIOACTIVITY.* The classification complies with the current EU lists although it has been amended by information from specialised literature and company data.

2.2. Information pertaining to special dangers for human and environment

Any precautions usually applied for the handling of chemicals must be complied with. Avoid the development of dust and smoke. Do not inhale dust and smoke.
Waste has to be disposed of in a safe and secure manner. The international regulations for the handling of radioactive apply. In Germany the StrlSchV (Regulations for Radiation Protection) apply.

Adverse physicochemical effects

unknown

Adverse human health effects and symptoms

May cause cancer.

Adverse environmental effects

unknown

Other hazards

unknown

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3. Composition/information on ingredients

3.1. Product related information

3.2. Hazardous ingredients

Substance name	CAS-No.	EG-No.	REACh-Reg.-No.	Concen-tration [%]	Classification		Remark
					Hazardous attribute	R-phrases	
Tungsten	7440-33-7	231-143-9	01-2119488910-30-0003	> 95,8		R11	R11 affects only powder/dust
Thorium oxide	1314-20-1	215-225-1	n. b.	0.8 – 4.2	radioactive	R45-23/24/25-33	Substance af-fected by 96/29/Euratom.

3.3. Additional information — The REACh registration number of the thorium oxide is unknown.

4. First aid measures

4.1. General information — For all cases – contact a medical specialist if you are experiencing strong symptoms.

4.2. In case of inhalation — Remove the affected person from the danger area and consult a doctor.

4.3. In case of skin contact — In general the product is not skin irritating. Remove dust thoroughly by washing with soap.

4.4. In case of eye contact — Rinse eyes for several minutes under running water, with the eye lid open. Consult a doctor if condition persists.

4.5. In case of ingestion — Thoroughly rinse mouth and consult a doctor.

4.6. Self-protection of the first aider — Pay attention to self-protection!

4.7. Information to physician

Symptoms — Pulmonary irritation

Hazards — Pulmonary irritation, contamination of pulmonary tissue

Treatment — In the case of lung irritation: Primary treatment by using Corticoide spray, e. g. Auxiloson spray, Pulmicort-dosage-spray (Auxiloson and Pulmicort are registered trademarks).

5. Fire-fighting measures

5.1. Suitable extinguishing media — Extinguishing powder for class D, sand, try salt, try cement

5.2. Extinguishing media which must not be used for safety reasons
water, ABC-powder, halon, carbon dioxide

5.3. Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases
low radioactive product

5.4. Special protective equipment for fire-fighters:
During the fire fighting self-contained breathing apparatus must be used which complies with the regulations for use under positive pressure, as well as complete personal protection equipment which applies for fires where radioactive material might be involved.

5.5. Additional Information — The metal in compact form is not flammable.

Fire class — D – fires of metals

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6. Accidental release measures

6.1.	Personal precautions	For releases of dust or smoke – extracting devices and breathing protection with particle filter P2 or P3, recommended P3 colour code white.
6.2.	Environmental precautions	Procure to avoid release into environment. Waste, dust filters and recipients are to be disposed of in a safe and secure way, according to respective national regulations in force. Grey washing or grinding water is to be captured and disposed of.
6.3.	Methods for cleaning up	Mechanical sweeping. Avoid generation of dust.
6.4.	Additional information	Don't use a brush or compressed air for cleaning surfaces or clothing.

7. Handling and storage

7.1. Handling

Advices on safe handling: It is recommended to design all work processes always so that the following is excluded: Inhalation of dust/particles/smoke.

Protective measures: Avoid incorporation of dust during processing by use of appropriate extraction devices and breathing protection with particle filter P2 or P3, recommended P3 colour code white.

Measures to prevent aerosol and dust generation:
see protective measures

7.2. storage

Technical measures and storage conditions
store in a dry place

Hints on joint storage: Keep away from: oxidising agent, food and feeding stuffs.

Storage class: Low radioactive substances

7.3. Specific uses

Recommendations: Non melting electrode for TIG welding; electrodes for lightning; electrodes for plasma melting, plasma cutting, plasma spraying (thermal spraying); emission cathodes for electronic.
To minimise the risk of radiation for welders we recommend using radiation free electrodes like WS2 WITSTAR® or WLa 20 WITSTAR®.

Industrial sector specific solutions: BGI 746:Handling of thoriated tungsten electrodes during tungsten inert gas welding (TIG) chapter 4 (Germany)

8. Exposure controls/Personal protection

8.1. Exposure limit values

Germany
Dust exposures TRGS 900

Substance identity		Peak limitation mg/m³	Remarks
Substance name	EG-Nr.		
Tungsten	231-143-9	5 E	DK, 25
Thorium oxide	215-225-1	n. a.	n. a.

Radiation exposure: Product is not listed in TRGS 905. The following dose limits apply for the effective dose in the calendar year:

no persons at "work", who are not exposed to radiation during work	6 mSv
for persons, who are exposed to radiation during work	20 mSv
for the complete dose as a consequence of the profession	400 mSv
for persons under 18 years of age	6 mSv

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Austria MAK	daily medium 5 mg/m³ short term value 10 mg/m³		
Denmark OEL	TWA: 5 mg (week)/m³		01/1999
Netherlands MAC	TWA (8 h) 5 mg/m³		2002
Poland OEL	MAC (TWA): 5 mg (week) /m³		01/1999
Russia OEL		STEL 2 mg/m³	01/1999
Norway OEL	TWA 5 mg (week) /m³		01/1999
Sweden OEL	NGV 5 mg (week) /m³		01/1999
United Kingdom OEL	TWA 5 mg (week) /m³	STEL 10 mg (week)/m³	09/2000
USA NIOSH REL	TWA 5 mg (week) /m³	STEL 10 mg/m³	DHHS, 1992
USA MSHA	TWA 5 mg (week) /m³		DTLVS, 1972
USA ACGIH REL	TWA 5 mg (week) /m³	STEL 10 mg/m³	RTK#1959

8.2. Exposure controls

8.2.1. Occupational exposure controls — Change of contaminated clothing. Washing hands after handling, possibly also showering. Keep away from food, drinks and feeding stuffs.

Personal protection equipment:

Respiratory protection — Extraction device, mask with particle filter (protection class P2) recommended for dust/aerosols. Protection class and type of mask must be adjusted according to the actual dust exposure, especially during cleaning and maintenance work.

Hand protection — UV protection welding gloves, general protection and hygiene measures.

Eye protection — Goggles, face protection shield recommended.

Body protection — Ban on food, drinks and smoking in the workplace in connection with hygienic measures, e. g. washing hands.

8.2.2. Environmental exposure controls — Remaining items, residues and contaminated filters have to be disposed of according to the respective national regulations in force (e. g. StrlSchV in Germany).

9. Physical and chemical Properties

9.1. Appearance

Physical state	solid
Colour	metallic grey
Odour	odourless

9.2. Important health, safety and environmental information

Safety relevant basis data

pH value (20 °C)	n. a.
Melting point [°C]	3382
Boiling point [°C]	5530
Ignition temperature [°C]	n. a.

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	Density at 20 °C[g/cm³]	WTh10	19.0
		WTh20	18.8
		WTh30	18.6
		WTh40	18.5
	Water solubility at 20 °C [g/l]	insoluble	
	Solubility at 20 °C [g/l]	insoluble in fat; very acid resistant; slowly soluble in HNO_3+HF (aqua regia); soluble in alkaline oxidation melts	
9.3.	Other information		
	Electrical conductivity [m/Ω mm²]	18.20	
	Specific activity [Bq/g]	WTh10	29 – 43 (Thorium 232) on average 35,7
		WTh20	61 – 78 (Thorium 232) on average 71,3
		WTh30	100 – 114 (Thorium 232) on average 107
		WTh40	136 – 150 (Thorium 232) on average 142.6

10. Stability and Reactivity

10.1.	Conditions to avoid	Presence of oxygen and high temperatures (> 600 °C) cause oxidation, from 977 °C sublimation of tungsten trioxide (WO_3, CAS 1314-35-8) and release of thorium oxide (ThO_2, CAS 1314-20-1).
10.2.	Materials to avoid	Contact with strong acids and/or bases; or with halogens (fluorine, chlorine, bromine, iodine and their compounds); or with oxidising agents (e. g. Perchlorate, peroxide, permanganate, chlorate, nitrates, nitrites, chromates); or with alkali/earth alkali metals (e. g. lithium, sodium, potassium, magnesium, calcium) can cause strong reactions (danger of strong exothermal reactions, danger of formation of flammable gases, danger of formation of insalubrious/poisonous substances/gases) must be avoided.
10.3.	Hazardous decomposition products	Emerge through oxidation oxides of the product which can evaporate (tungsten trioxide WO_3 CAS 1314-35-8) or be released (thorium oxide ThO_2 CAS 1314-20-1). R45 –May cause cancer.

11. Toxicological information

11.1.	Toxicokinetics, metabolism and distribution	n. a.	
11.2.	Acute effects (toxicological tests)	This product does not feature an acute oral, dermal toxicity or toxicity through inhalation.	
		W	LD_{50} oral, rat: >2000 mg/kg
			LD_{50} dermal, rat: >2000 mg/kg
			LC_{50} inhalative rat: >5.4 mg/l, 4 h Exposition
		ThO_2	LD_{50} parenteral mammal: 8 mg/kg
			LD_{50} intratracheal, rat: >1.140 mg/kg
		Further information from literature see chapter 16.5.	
	Chronic effects	Finding after intratracheal application of 50 mg tungsten dust per week during 3 weeks on guinea pigs lead to conclusion that the substance is relatively inert. Still an effect on the pulmonary tissue could be proved (interstitial cellular proliferation), which must not be neglected. Tungsten dust which was given to very young rats with their food over 70 days in concentrations of 2; 5 or 10 % caused a 15 % reduction of the development of the body weight in the female, but not in the male animals. Thorium oxide: no data available.	
	Sensitisation	No sensitising effects known.	
	In case of skin contact:	Due to its extent the irritation caused by the product does not need to be classified.	

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	In case of eye contact	Due to its extent the irritation caused by the product does not need to be classified.
11.3.	Experiences made in practice	
	Observations relevant to classification	n. a.
	Other observations	n. a.
11.4.	General remarks	The component thorium is a slightly radioactive element. A potential hazard consists mainly in alpha radiation emitted by thorium, especially during incorporation. A potentially carcinogenic risk cannot be excluded. If handled according to the provisions, no insalubrious effects are known.

12. Ecological information

12.1.	Ecotoxicity	Amphibians: LC_{50} 2,9 mg/l (toad, gastrophryne carolinensis, 7 d) Fish: LC_{50} 15,6 mg/l (rainbow trout, oncorhynchus mykiss, 28 d) Biodegradability: not applicable
12.2.	Mobility	
	Known or predicted distribution to environmental compartments	Tungsten compounds can be found in soils and water as tungstate (e. g. WO_4^{2-}) and other polyanions. There are no reports on organic tungsten compounds. The extraction coefficient for tungsten rises under the condition of decreasing ph-values (ph=5:100-50,000; ph=6.5:10-6,000; ph=8-9:5-90). These values prove slow or zero mobility of tungsten compounds in soils and water. In nature, tungsten compounds can be found as ions or insoluble solid matter. Therefore the volatilisation of surfaces of soils and water represents a less important environmental impact. Most tungsten compounds are characterised by low vapour pressures at 25 °C. For more literature references, see chapter 16.5.
12.3.	Persistence and degradability	
	Abiotic degradation	Tungsten features types of various oxidation values (0, 2+, 3+, 4+, 5+, 6+). The most stabile type is 6+, the other types are quite unstable. As ion, tungsten exists in combination with one or more elements, e.g. with oxygen. In water, tungsten compounds can be found as tungstate (e. g. WO_4^{2-}) and other polyanions. There are no reports on organic tungsten compounds. Bibasic tungsten only exists as a halogen compound. Tungsten strongly tends to form complexes (e. g. formation of heteropoly acids with oxides of phosphor, arsine, vanadium, silicon, and more). Tungsten forms a series of oxohalogenides (e. g. $WOCl_4$).
	Biodegradation	not applicable
	Bioaccumulative potential	no data available
12.4.	Results of PBT assessment	This substance does not meet the criteria for classification as PBT or vPvB.
12.5.	Other adverse effects	no data available
12.6.	Further ecological information	Water hazard class: not hazardous to water (German water Hazard Classes according to German Administrative Regulation for Substances Hazardous to Water from 1999-05-17)

13. Disposal considerations

13.1.	Appropriate disposal/product	This material and its container must be disposed of in a safe way. For information on recycling/reutilisation, please contact the manufacturer/distributor.
13.2.	EWC/AVV waste code	12 01 04 - non-ferrous metal dust and particles 12 01 13 – welding wastes
13.3.	Appropriate disposal / package	Unclean packaging can be handled as non-hazardous waste.

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13.4.	Additional information	Waste disposal according to international, national and regional provisions. Contact your local office responsible for this.

14. Transport information

14.1.	Land transport (ADR/RID/GGVSEB)	UN 2909: radioactive substances, released package, products made of natural thorium; class 7; LQ not possible
14.2.	Sea transport (IMDG-Code/GGVSee)	UN 2909: radioactive substances, released package, products made of natural thorium; class 7; LQ not possible; EmS: F-I, S-S; pack up category A
14.3.	Air transport (ICAO-TI/IATA-DGR)	UN 2909: radioactive substances, released package, products made of natural thorium; class 7

15. Regulatory information

15.1.	EU-Legislation	67/548/EWF idgF (Dangerous Substances) 99/45/EG idgF (Dangerous Preparations regulations) 96/29/Euratom (only affecting thorium oxide)
	Chemical Safety Assessment	no data available
	Labelling	215-225-1
	Hazard symbols and hazard statements	not available
	Hazardous components for labelling	not available
	R-phrases	R11 Easily flammable (only dusts) R45 May cause cancer.
	S-phrases	S13 Von Keep away from food, drink and animal feeding stuffs. S20/21 When using do not eat, drink or smoke. S22/23 Do not breathe dust and smoke. S53 Avoid exposure - obtain special instructions before use.
15.2.	National regulations	
	Germany	Employer's Liability Insurance Associations: BGI 746 Technical Regulation Air: TRGS 900
	Other countries	National provisions must be obeyed.

16. Other information

16.1.	Relevant R-phrases (Number and full text)	not available
16.2.	Training instructions	not available
16.3.	Recommended restrictions on use	not available
16.4.	Further Information	This safety data sheet has been prepared for the described product and must only be used for the described product. The data refers to the current state of research and knowledge. It is meant to describe the product specified in this safety data sheet with regards to the required safety precautions. The data provided does not guarantee any characteristics of the described product. If this product is used as a component of another product or if it is modified by processing, the information in this safety data sheet may not be applicable. The conditions and methods of handling, storage, usage and disposal are not within our control. Due to these and other reasons we do not take responsibility and refuse any liability for reasons, the cause of which can be seen in handling, storage, usage or disposal of the product. The user is responsible for forwarding the information in this data sheet to the employee in an appropriate manner.

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16.5. Data sources

- Auerdata Ausgabe 1998 und BG-Regel 190 (ZH 1/701) Einsatz von Atemschutzgeräten; issue 10/1996
- Ausgabe BArbBl Nr. 10/2000 last modified 2004-03-31, BArbBl Nr. 5/2004
- TRGS 905 Verzeichnis krebserzeugender, erbgutverändernder oder fortpflanzungsgefährdender Stoffe, last changed on BArbBl Nr. 3/2003
- Regulation on Radiation Protection (StrlSchV) from 20.07.2001
- Registry of toxic effects of chemical substances (RTECS) http://www.cdc.gov/niosh/rtecs/start.html Stand 01/2010
- Tungsten and tungsten compounds (CAS-No: 7440-33-7), Health-based Reassessment of Administrative Occupational Exposure Limits; Committee on Updating of Occupational Exposure Limits, a committee of the Health Council of the Netherlands, No. 2000/15OSH/058, The Hague, 2002-10-31
- New Jersey DHSS, Hazardous Substance Fact Sheet, Tungsten (CAS-No: 7440-33-7), Rev. 11/2000
- BGI 746: Umgang mit thoriumoxidhaltigen Wolframelektroden beim Wolfram-Inertgasschweißen (WIG), chapter 4
- Acute Toxicity Studies, Huntingdon Life Science, 1999
- BGIA GESTIS substance database http://biade.itrust.de/biade/lpext.dll?f=templates&fn=main-h.htm Stand 01/2010
- ECOTOX Ecotoxicology Database USEPA (http://www.epa.gov/ecotox) Stand 01/2010
- Hazardous Substances Database HSDB, National Library of Medicine (http://toxnet.nlm.nih.gov) Stand 01/2010
- Dermatas er al.: Solubility, Sorption and Soil Respiration Effects of Tungsten and Tungsten Alloys; Environmental Forensics, issue 5, S. 5-13, 2004