



SAFETY DATA SHEET

MATERION

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

1.1. Product identifier

Trade name or designation of the mixture	Ta-W-Si-Ce
Synonyms	None.
Document number	1QG
Materion Code	1QG
Issue date	14-July-2015
Version number	02
Revision date	11-January-2018
Supersedes date	14-July-2015

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

Identified uses	Not available.
Uses advised against	None known.

1.3. Details of the supplier of the safety data sheet

Supplier

Company name	Materion Advanced Chemicals Inc.
Address	407 N. 13th Street 1316 W. St. Paul Avenue Milwaukee, WI 53233 United States
Division	Milwaukee
Telephone	414.212.0257
e-mail	advancedmaterials@materion.com
Contact person	Noreen Atkinson

1.4. Emergency telephone number

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

The mixture has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

Classification according to Regulation (EC) No 1272/2008 as amended

This mixture does not meet the criteria for classification according to Regulation (EC) 1272/2008 as amended.

Hazard summary Not available.

2.2. Label elements

Label according to Regulation (EC) No. 1272/2008 as amended

Hazard pictograms	None.
Signal word	None.
Hazard statements	The mixture does not meet the criteria for classification.

Precautionary statements

Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.

Supplemental label information None.

2.3. Other hazards None known.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

The components are not hazardous or are below required disclosure limits.

List of abbreviations and symbols that may be used above

CLP: Regulation No. 1272/2008.

DSD: Directive 67/548/EEC.

M: M-factor

vPvB: very persistent and very bioaccumulative substance.

PBT: persistent, bioaccumulative and toxic substance.

#: This substance has been assigned Community workplace exposure limit(s).

Composition comments The full text for all R- and H-phrases is displayed in section 16.

SECTION 4: First aid measures

General information Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

4.1. Description of first aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Wash off with soap and water. Get medical attention if irritation develops and persists.

Eye contact Rinse with water. Get medical attention if irritation develops and persists.

Ingestion Rinse mouth. Get medical attention if symptoms occur.

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

Nausea. Coughing.

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

Treat symptomatically.

SECTION 5: Firefighting measures

General fire hazards No unusual fire or explosion hazards noted.

5.1. Extinguishing media

Suitable extinguishing media Dry powder. Dry sand.

Unsuitable extinguishing media Water. Do not use water jet as an extinguisher, as this will spread the fire. Carbon dioxide (CO₂).

5.2. Special hazards arising from the substance or mixture

During fire, gases hazardous to health may be formed.

5.3. Advice for firefighters

Special protective equipment for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Special firefighting procedures Move containers from fire area if you can do so without risk.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel Keep unnecessary personnel away. For personal protection, see section 8 of the SDS.

For emergency responders Keep unnecessary personnel away. Use personal protection recommended in Section 8 of the SDS.

6.2. Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

6.3. Methods and material for containment and cleaning up

Stop the flow of material, if this is without risk. Following product recovery, flush area with water.

6.4. Reference to other sections

For personal protection, see section 8 of the SDS. For waste disposal, see section 13 of the SDS.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Avoid prolonged exposure. Observe good industrial hygiene practices.

7.2. Conditions for safe storage, including any incompatibilities

Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

7.3. Specific end use(s)

Not available.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits

Austria. MAK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001

Components	Type	Value	Form
Tantalum (CAS 7440-25-7)	MAK	5 mg/m ³	Inhalable fraction.
Tungsten (CAS 7440-33-7)	MAK	5 mg/m ³	Inhalable fraction.
	STEL	10 mg/m ³	Inhalable fraction.

Belgium. Exposure Limit Values.

Components	Type	Value
Silicon (CAS 7440-21-3)	TWA	10 mg/m ³
Tantalum (CAS 7440-25-7)	TWA	5 mg/m ³
Tungsten (CAS 7440-33-7)	STEL	10 mg/m ³
	TWA	5 mg/m ³

Bulgaria. OELs. Regulation No 13 on protection of workers against risks of exposure to chemical agents at work

Components	Type	Value
Tantalum (CAS 7440-25-7)	TWA	5 mg/m ³
Tungsten (CAS 7440-33-7)	STEL	10 mg/m ³
	TWA	1 mg/m ³

Croatia. Dangerous Substance Exposure Limit Values in the Workplace (ELVs), Annexes 1 and 2, Narodne Novine, 13/09

Components	Type	Value	Form
Silicon (CAS 7440-21-3)	STEL	4 mg/m ³	Respirable dust.
		10 mg/m ³	Total dust.
Tantalum (CAS 7440-25-7)	MAC	5 mg/m ³	
	STEL	10 mg/m ³	
Tungsten (CAS 7440-33-7)	MAC	5 mg/m ³	
	STEL	3 mg/m ³	

Czech Republic. OELs. Government Decree 361

Components	Type	Value	Form
Tantalum (CAS 7440-25-7)	TWA	5 mg/m ³	Dust.

Denmark. Exposure Limit Values

Components	Type	Value	Form
Silicon (CAS 7440-21-3)	TLV	10 mg/m ³	
Tantalum (CAS 7440-25-7)	TLV	5 mg/m ³	Dust.
Tungsten (CAS 7440-33-7)	TLV	5 mg/m ³	Dust.

Estonia. OELs. Occupational Exposure Limits of Hazardous Substances. (Annex of Regulation No. 293 of 18 September 2001)

Components	Type	Value	Form
Silicon (CAS 7440-21-3)	TWA	5 mg/m ³	Respirable dust.
		10 mg/m ³	
Tantalum (CAS 7440-25-7)	TWA	5 mg/m ³	Respirable dust.
		10 mg/m ³	Total dust.
		1 mg/m ³	Dust.
Tungsten (CAS 7440-33-7)	TWA	5 mg/m ³	

Finland. Workplace Exposure Limits

Components	Type	Value
Tantalum (CAS 7440-25-7)	TWA	5 mg/m ³
Tungsten (CAS 7440-33-7)	TWA	5 mg/m ³

France. Threshold Limit Values (VLEP) for Occupational Exposure to Chemicals in France, INRS ED 984

Components	Type	Value
Silicon (CAS 7440-21-3)	VME	10 mg/m ³
Tantalum (CAS 7440-25-7)	VME	5 mg/m ³

Germany. DFG MAK List (advisory OELs). Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area (DFG)

Components	Type	Value	Form
Tantalum (CAS 7440-25-7)	TWA	4 mg/m ³	Inhalable fraction.

Germany. TRGS 900, Limit Values in the Ambient Air at the Workplace

Components	Type	Value	Form
Tantalum (CAS 7440-25-7)	AGW	10 mg/m ³ 1,25 mg/m ³	Inhalable fraction. Respirable fraction.

Greece. OELs (Decree No. 90/1999, as amended)

Components	Type	Value	Form
Silicon (CAS 7440-21-3)	TWA	5 mg/m ³ 10 mg/m ³	Respirable. Inhalable
Tantalum (CAS 7440-25-7)	STEL TWA	10 mg/m ³ 5 mg/m ³	

Hungary. OELs. Joint Decree on Chemical Safety of Workplaces

Components	Type	Value	Form
Tantalum (CAS 7440-25-7)	TWA	6 mg/m ³ 10 mg/m ³	Respirable dust. Total inhalable dust.

Iceland. OELs. Regulation 154/1999 on occupational exposure limits

Components	Type	Value	Form
Silicon (CAS 7440-21-3)	TWA	0,7 mg/m ³ 0,5 ppm	
Tantalum (CAS 7440-25-7)	TWA	5 mg/m ³	Dust.
Tungsten (CAS 7440-33-7)	TWA	5 mg/m ³	Dust.

Ireland. Occupational Exposure Limits

Components	Type	Value	Form
Silicon (CAS 7440-21-3)	TWA	4 mg/m ³ 10 mg/m ³	Respirable dust. Total inhalable dust.
Tantalum (CAS 7440-25-7)	STEL TWA	10 mg/m ³ 5 mg/m ³	
Tungsten (CAS 7440-33-7)	STEL TWA	10 mg/m ³ 5 mg/m ³	

Italy. Occupational Exposure Limits

Components	Type	Value	Form
Tungsten (CAS 7440-33-7)	TWA	3 mg/m ³	Respirable fraction.

Latvia. OELs. Occupational exposure limit values of chemical substances in work environment

Components	Type	Value	Form
Tantalum (CAS 7440-25-7)	TWA	2 mg/m ³ 2 mg/m ³	Dust.

Lithuania. OELs. Limit Values for Chemical Substances, General Requirements

Components	Type	Value	Form
Tantalum (CAS 7440-25-7)	TWA	10 mg/m ³	
Tungsten (CAS 7440-33-7)	TWA	5 mg/m ³	

Norway. Administrative Norms for Contaminants in the Workplace

Components	Type	Value	Form
Silicon (CAS 7440-21-3)	TLV	10 mg/m ³	
Tantalum (CAS 7440-25-7)	TLV	5 mg/m ³ 10 mg/m ³	Respirable dust. Total dust.
Tungsten (CAS 7440-33-7)	TLV	5 mg/m ³	

Poland. MACs. Regulation regarding maximum permissible concentrations and intensities of harmful factors in the work environment, Annex 1

Components	Type	Value	Form
Tantalum (CAS 7440-25-7)	TWA	5 mg/m ³	
Tungsten (CAS 7440-33-7)	TWA	5 mg/m ³	Inhalable fraction.

Portugal. VLEs. Norm on occupational exposure to chemical agents (NP 1796)

Components	Type	Value	Form
Tantalum (CAS 7440-25-7)	TWA	5 mg/m ³	Dust.
Tungsten (CAS 7440-33-7)	STEL TWA	10 mg/m ³ 5 mg/m ³	

Romania. OELs. Protection of workers from exposure to chemical agents at the workplace

Components	Type	Value
Tantalum (CAS 7440-25-7)	STEL	10 mg/m ³
	TWA	5 mg/m ³
Tungsten (CAS 7440-33-7)	STEL	6 mg/m ³
	TWA	2 mg/m ³

Slovakia. OELs. Regulation No. 300/2007 concerning protection of health in work with chemical agents

Components	Type	Value	Form
Silicon (CAS 7440-21-3)	TWA	4 mg/m ³	Respirable fraction.
		10 mg/m ³	Inhalable fraction.
Tantalum (CAS 7440-25-7)	TWA	4 mg/m ³	Inhalable fraction.
		1,5 mg/m ³	Respirable fraction.
Tungsten (CAS 7440-33-7)	TWA	5 mg/m ³	

Slovenia. OELs. Regulations concerning protection of workers against risks due to exposure to chemicals while working (Official Gazette of the Republic of Slovenia)

Components	Type	Value	Form
Tungsten (CAS 7440-33-7)	TWA	5 mg/m ³	Inhalable fraction.

Spain. Occupational Exposure Limits

Components	Type	Value	Form
Tantalum (CAS 7440-25-7)	TWA	3 mg/m ³	Respirable fraction.
		10 mg/m ³	Inhalable fraction.
Tungsten (CAS 7440-33-7)	STEL	10 mg/m ³	
	TWA	5 mg/m ³	

Sweden. OELs. Work Environment Authority (AV), Occupational Exposure Limit Values (AFS 2015:7)

Components	Type	Value	Form
Tantalum (CAS 7440-25-7)	TWA	5 mg/m ³	Respirable dust.
		10 mg/m ³	Inhalable dust.
Tungsten (CAS 7440-33-7)	TWA	5 mg/m ³	Total dust.

Switzerland. SUVA Grenzwerte am Arbeitsplatz

Components	Type	Value	Form
Silicon (CAS 7440-21-3)	TWA	3 mg/m ³	Respirable dust.
Tantalum (CAS 7440-25-7)	TWA	5 mg/m ³	Inhalable dust.

UK. EH40 Workplace Exposure Limits (WELs)

Components	Type	Value	Form
Silicon (CAS 7440-21-3)	TWA	4 mg/m ³	Respirable dust.
		10 mg/m ³	Inhalable dust.
Tantalum (CAS 7440-25-7)	STEL	10 mg/m ³	
	TWA	5 mg/m ³	
Tungsten (CAS 7440-33-7)	STEL	10 mg/m ³	
	TWA	5 mg/m ³	

Biological limit values No biological exposure limits noted for the ingredient(s).**Recommended monitoring procedures** Follow standard monitoring procedures.**Derived no effect levels (DNELs)** Not available.**Predicted no effect concentrations (PNECs)** Not available.**8.2. Exposure controls****Appropriate engineering controls** Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.**Individual protection measures, such as personal protective equipment****General information** Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.**Eye/face protection** Wear safety glasses with side shields (or goggles).**Skin protection**

- Hand protection	Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.
- Other	Wear suitable protective clothing.
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
Hygiene measures	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.
Environmental exposure controls	Environmental manager must be informed of all major releases.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Physical state	Solid.
Form	Solid.
Colour	Not available.
Odour	Not available.
Odour threshold	Not available.
pH	Not available.
Melting point/freezing point	1410 °C (2570 °F) estimated
Initial boiling point and boiling range	2355 °C (4271 °F) estimated
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Vapour pressure	0,00001 hPa estimated
Vapour density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Explosive properties	Not explosive.
Oxidising properties	Not oxidising.

9.2. Other information

Density	15,23 g/cm ³ estimated
Specific gravity	15,23 estimated

SECTION 10: Stability and reactivity

10.1. Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
10.2. Chemical stability	Material is stable under normal conditions.
10.3. Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
10.4. Conditions to avoid	Contact with incompatible materials.
10.5. Incompatible materials	Strong oxidising agents. Fluorine. Chlorine.
10.6. Hazardous decomposition products	No hazardous decomposition products are known.

SECTION 11: Toxicological information

General information	Occupational exposure to the substance or mixture may cause adverse effects.
Information on likely routes of exposure	
Inhalation	Prolonged inhalation may be harmful.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	May cause discomfort if swallowed. However, ingestion is not likely to be a primary route of occupational exposure.
Symptoms	Nausea. Coughing.
11.1. Information on toxicological effects	
Acute toxicity	No data available.
Skin corrosion/irritation	Based on available data, the classification criteria are not met.
Serious eye damage/eye irritation	Based on available data, the classification criteria are not met.
Respiratory sensitisation	Based on available data, the classification criteria are not met.
Skin sensitisation	Based on available data, the classification criteria are not met.
Germ cell mutagenicity	Based on available data, the classification criteria are not met.
Carcinogenicity	Based on available data, the classification criteria are not met.
Hungary. 26/2000 EüM Ordinance on protection against and preventing risk relating to exposure to carcinogens at work (as amended)	
Not listed.	
Reproductive toxicity	Based on available data, the classification criteria are not met.
Specific target organ toxicity - single exposure	Based on available data, the classification criteria are not met.
Specific target organ toxicity - repeated exposure	Based on available data, the classification criteria are not met.
Aspiration hazard	Due to partial or complete lack of data the classification is not possible.
Mixture versus substance information	No information available.
Other information	Not available.

SECTION 12: Ecological information

12.1. Toxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
12.2. Persistence and degradability	No data is available on the degradability of this product.
12.3. Bioaccumulative potential	No data available.
Partition coefficient n-octanol/water (log Kow)	Not available.
Bioconcentration factor (BCF)	Not available.
12.4. Mobility in soil	No data available.
12.5. Results of PBT and vPvB assessment	Not available.
12.6. Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Residual waste	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.
EU waste code	The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Disposal methods/information Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
Special precautions Dispose in accordance with all applicable regulations.

SECTION 14: Transport information

ADR

14.1. UN number UN3178
14.2. UN proper shipping name Flammable solid, inorganic, n.o.s. (Cerium, Silicon)
14.3. Transport hazard class(es)
Class 4.1
Subsidiary risk -
Label(s) 4.1
Hazard No. (ADR) 40
Tunnel restriction code E
14.4. Packing group III
14.5. Environmental hazards No.
14.6. Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

RID

14.1. UN number UN3178
14.2. UN proper shipping name Flammable solid, inorganic, n.o.s. (Cerium, Silicon)
14.3. Transport hazard class(es)
Class 4.1
Subsidiary risk -
Label(s) 4.1
14.4. Packing group III
14.5. Environmental hazards No.
14.6. Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

ADN

14.1. UN number UN3178
14.2. UN proper shipping name Flammable Solid, N.o.s. (Cerium, Silicon)
14.3. Transport hazard class(es)
Class 4.1
Subsidiary risk -
Label(s) 4.1
14.4. Packing group III
14.5. Environmental hazards No.
14.6. Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

IATA

14.1. UN number UN3178
14.2. UN proper shipping name Flammable solid, inorganic, n.o.s. (Cerium, Silicon)
14.3. Transport hazard class(es)
Class 4.1
Subsidiary risk -
14.4. Packing group III
14.5. Environmental hazards No.
ERG Code 3L
14.6. Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
Other information
Passenger and cargo aircraft Allowed with restrictions.
Cargo aircraft only Allowed with restrictions.

IMDG

14.1. UN number UN3178

14.2. UN proper shipping name FLAMMABLE SOLID, INORGANIC, N.O.S. (Cerium, Silicon)

14.3. Transport hazard class(es)

Class 4.1

Subsidiary risk -

14.4. Packing group III

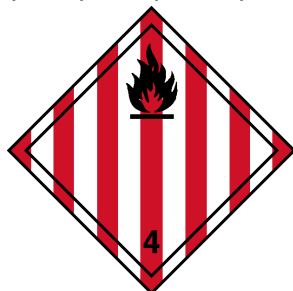
14.5. Environmental hazards

Marine pollutant No.

EmS F-A, S-G

14.6. Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

ADN; ADR; IATA; IMDG; RID



SECTION 15: Regulatory information

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

EU regulations

Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and II, as amended

Not listed.

Regulation (EC) No. 850/2004 On persistent organic pollutants, Annex I as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended

Not listed.

Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry, as amended

Not listed.

Regulation (EC) No. 1907/2006, REACH Article 59(10) Candidate List as currently published by ECHA

Not listed.

Authorisations

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended

Not listed.

Restrictions on use

Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended

Not listed.

Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work, as amended.

Not listed.

Other EU regulations

Directive 2012/18/EU on major accident hazards involving dangerous substances, as amended

Not listed.

Other regulations

The product is classified and labelled in accordance with EC directives or respective national laws. This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006.

National regulations Follow national regulation for work with chemical agents.

15.2. Chemical safety assessment No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

List of abbreviations Not available.

Information on evaluation method leading to the classification of mixture The classification for health and environmental hazards is derived by a combination of calculator methods and test data, if available.

Disclaimer Materion Advanced Chemicals Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. This document has been prepared using data from sources considered to be technically reliable and the information is believed to be correct. Materion makes no warranties, expressed or implied, as to the accuracy of the information contained herein. Materion cannot anticipate all conditions under which this information and its products may be used and the actual conditions of use are beyond its control. The user is responsible to evaluate all available information when using this product for any particular use and to comply with all Federal, State, Provincial and Local laws, statutes and regulations.