



# All M.A. Ford Cutting Tools

## Safety Data Sheet

According to Regulation (EC) No. 453/2010

Revision date: 28/04/2015 Date of issue: 28/04/2015

Version: 1.0

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

#### 1.1. Product identifier

Product Name : All M.A. Ford Cutting Tools

Product Form : Article

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

##### 1.2.1. Relevant identified uses

Industrial/Professional use spec : Industrial.  
For professional use only.

Use of the substance/mixture : Industrial drilling and milling

##### 1.2.2. Uses advised against

No additional information available

#### 1.3. Details of the supplier of the safety data sheet

##### Company

M.A. Ford Europe Limited

650 City Gate

London road

Derby

DE24 8WY

Phone number: +44 (0) 1332 267960

[www.mafordeurope.com](http://www.mafordeurope.com)

#### 1.4. Emergency telephone number

Emergency number : +44(0) 1332 267960  
Austria: +43 1 406 43 43  
Belgium: 070 245 245  
Bulgaria: +359 2 9154 233  
Croatia: (+385 1) 23-48-342  
Cyprus: +357 22 40 56 09; +357 22 40 56 08  
Czech Republic: +420 224 919 293, +420 224 915 402  
Denmark: 82 12 12 12  
Estonia: (+372) 626 93 90  
Finland: 09 471977  
France: + 33 (0) 1 45 42 59 59  
Germany: + 49 231 9071 2971  
Greece: +30 210 64 79 286  
Hungary: (06-1) 476-1120  
Iceland: 543 2222  
Ireland: 01 8092566  
Italy: +39 06 59 94 37 33  
Latvia: +371 67042473  
Liechtenstein: +423 236 61 95  
Lithuania: +370 5 236 20 52  
Luxembourg: +352 42 59 91 600  
Malta: 2545 0000  
Netherlands: 030-2748888  
Norway: 22 59 13 00  
Poland: +48 42 2538 424; +48 42 2538 427  
Portugal +351 218 430 500  
Romania: +40 21 207 11 06  
Slovakia: +421 2 4854 4511  
Slovenia: + 386 14 00 60 51  
Spain: + 34 91 562 04 20  
Sweden: 08-331231

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## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Not classified

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

Not classified

Adverse physicochemical, human health and environmental effects

No additional information available

### 2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

EUH phrases

: EUH208 - Contains Cobalt(7440-48-4), Nickel(7440-02-0). May produce an allergic reaction

EUH210 - Safety data sheet available on request

### 2.3. Other hazards

No additional information available

## SECTION 3: Composition/information on ingredients

### 3.1. Substance

Not applicable

### 3.2. Mixture

Name	Product identifier	%	Classification according to Directive 67/548/EEC
Tungsten carbide	(CAS No) 12070-12-1 (EC no) 235-123-0	0 - 100	Not classified
Iron	(CAS No) 7439-89-6 (EC no) 231-096-4	0 - 99	F; R11
Titanium boride (TiB <sub>2</sub> )	(CAS No) 12045-63-5 (EC no) 234-961-4	0 - 80	Not classified
Titanium carbide (TiC)	(CAS No) 12070-08-5 (EC no) 235-120-4	0 - 70	Not classified
Copper	(CAS No) 7440-50-8 (EC no) 231-159-6	0 - 70	N; R50/53
Silver	(CAS No) 7440-22-4 (EC no) 231-131-3	0 - 70	N; R50/53
Tantalum carbide (TaC)	(CAS No) 12070-06-3 (EC no) 235-118-3	0 - 52	Not classified
Nickel	(CAS No) 7440-02-0 (EC no) 231-111-4 (EC index no) 028-002-00-7	0 - 37	Carc.Cat.3; R40 R43 T; R48/23 R52/53 N; R50
Niobium carbide (NbC)	(CAS No) 12069-94-2 (EC no) 235-117-8	0 - 30	F; R11
Cobalt	(CAS No) 7440-48-4 (EC no) 231-158-0 (EC index no) 027-001-00-9	0 - 30	R42 R43 N; R50/53 Xi; R36 Repr.Cat.3; R62
Titanium nitride	(CAS No) 25583-20-4 (EC no) 247-117-5	0 - 30	Not classified
Zinc	(CAS No) 7440-66-6 (EC no) 231-175-3	0 - 30	N; R50
Chromium	(CAS No) 7440-47-3 (EC no) 231-157-5	0 - 27	Not classified

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Name	Product identifier	%	Classification according to Directive 67/548/EEC
Tungsten	(CAS No) 7440-33-7 (EC no) 231-143-9	0 - 19	F; R11
Vanadium	(CAS No) 7440-62-2 (EC no) 231-171-1	0 - 18	Not classified
Manganese	(CAS No) 7439-96-5 (EC no) 231-105-1	0 - 13	Not classified
Molybdenum	(CAS No) 7439-98-7 (EC no) 231-107-2	0 - 11	Not classified
Chromium carbide (Cr3C2)	(CAS No) 12012-35-0 (EC no) 234-576-1	0 - 10	Not classified
Hafnium carbide (HfC)	(CAS No) 12069-85-1 (EC no) 235-114-1	0 - 10	Not classified
Molybdenum carbide (Mo2C)	(CAS No) 12069-89-5 (EC no) 235-115-7	0 - 10	Not classified
Vanadium carbide (VC)	(CAS No) 12070-10-9 (EC no) 235-122-5	0 - 10	Not classified
Silicon	(CAS No) 7440-21-3 (EC no) 231-130-8	0 - 5	Not classified
Aluminum nitride (AlN)	(CAS No) 24304-00-5 (EC no) 246-140-8	0 - 5	Not classified
Carbon	(CAS No) 7440-44-0 (EC no) 231-153-3;931-328-0	0 - 3,5	Not classified
Aluminum	(CAS No) 7429-90-5 (EC no) 231-072-3 (EC index no) 013-002-00-1	0 - 3	F; R11 F; R15
Niobium	(CAS No) 7440-03-1 (EC no) 231-113-5	0 - 2,5	F; R11
Selenium	(CAS No) 7782-49-2 (EC no) 231-957-4 (EC index no) 034-001-00-2	0 - 2	T; R23/25 R33 R53
Titanium	(CAS No) 7440-32-6 (EC no) 231-142-3	0 - 1	F; R11
Lead	(CAS No) 7439-92-1 (EC no) 231-100-4	0 - 0,35	Xn; R20/22 Repr.Cat.1; R60 Repr.Cat.2; R61 T; R48/23/25 N; R50/53
Sulfur	(CAS No) 7704-34-9 (EC no) 231-722-6 (EC index no) 016-094-00-1	0 - 0,35	F; R11 Xi; R36/38
Phosphorus elemental	(CAS No) 7723-14-0 (EC no) 231-768-7;918-594-3 (EC index no) 015-002-00-7	0 - 0,15	Not classified
Zinc oxide	(CAS No) 1314-13-2 (EC no) 215-222-5 (EC index no) 030-013-00-7	0 - 0,1	N; R50/53

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Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Tungsten carbide	(CAS No) 12070-12-1 (EC no) 235-123-0	0 - 100	Not classified
Iron	(CAS No) 7439-89-6 (EC no) 231-096-4	0 - 99	Flam. Sol. 1, H228 Self-heat. 1, H251
Titanium boride (TiB <sub>2</sub> )	(CAS No) 12045-63-5 (EC no) 234-961-4	0 - 80	Not classified
Titanium carbide (TiC)	(CAS No) 12070-08-5 (EC no) 235-120-4	0 - 70	Not classified
Copper	(CAS No) 7440-50-8 (EC no) 231-159-6	0 - 70	Aquatic Acute 1, H400 (M=10) Aquatic Chronic 1, H410
Silver	(CAS No) 7440-22-4 (EC no) 231-131-3	0 - 70	Aquatic Acute 1, H400 (M=1000) Aquatic Chronic 1, H410
Tantalum carbide (TaC)	(CAS No) 12070-06-3 (EC no) 235-118-3	0 - 52	Not classified
Nickel	(CAS No) 7440-02-0 (EC no) 231-111-4 (EC index no) 028-002-00-7	0 - 37	Skin Sens. 1, H317 Carc. 2, H351 STOT RE 1, H372 Aquatic Acute 1, H400 (M=10) Aquatic Chronic 3, H412
Niobium carbide (NbC)	(CAS No) 12069-94-2 (EC no) 235-117-8	0 - 30	Flam. Sol. 1, H228
Cobalt	(CAS No) 7440-48-4 (EC no) 231-158-0 (EC index no) 027-001-00-9	0 - 30	Acute Tox. 4 (Oral), H302 Acute Tox. 1 (Inhalation:dust,mist), H330 Eye Irrit. 2, H319 Resp. Sens. 1B, H334 Skin Sens. 1A, H317 Repr. 2, H361 Aquatic Acute 1, H400 Aquatic Chronic 1, H410
Titanium nitride	(CAS No) 25583-20-4 (EC no) 247-117-5	0 - 30	Not classified
Zinc	(CAS No) 7440-66-6 (EC no) 231-175-3	0 - 30	Aquatic Acute 1, H400
Chromium	(CAS No) 7440-47-3 (EC no) 231-157-5	0 - 27	Not classified
Tungsten	(CAS No) 7440-33-7 (EC no) 231-143-9	0 - 19	Flam. Sol. 1, H228 Self-heat. 2, H252
Vanadium	(CAS No) 7440-62-2 (EC no) 231-171-1	0 - 18	Not classified
Manganese	(CAS No) 7439-96-5 (EC no) 231-105-1	0 - 13	Not classified
Molybdenum	(CAS No) 7439-98-7 (EC no) 231-107-2	0 - 11	Not classified
Chromium carbide (Cr <sub>3</sub> C <sub>2</sub> )	(CAS No) 12012-35-0 (EC no) 234-576-1	0 - 10	Not classified
Hafnium carbide (HfC)	(CAS No) 12069-85-1 (EC no) 235-114-1	0 - 10	Not classified
Molybdenum carbide (Mo <sub>2</sub> C)	(CAS No) 12069-89-5 (EC no) 235-115-7	0 - 10	Not classified
Vanadium carbide (VC)	(CAS No) 12070-10-9 (EC no) 235-122-5	0 - 10	Not classified

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Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Silicon	(CAS No) 7440-21-3 (EC no) 231-130-8	0 - 5	Not classified
Aluminum nitride (AlN)	(CAS No) 24304-00-5 (EC no) 246-140-8	0 - 5	Not classified
Carbon	(CAS No) 7440-44-0 (EC no) 231-153-3;931-328-0	0 - 3,5	Not classified
Aluminum	(CAS No) 7429-90-5 (EC no) 231-072-3 (EC index no) 013-002-00-1	0 - 3	Flam. Sol. 1, H228 Water-react. 2, H261
Niobium	(CAS No) 7440-03-1 (EC no) 231-113-5	0 - 2,5	Flam. Sol. 1, H228
Selenium	(CAS No) 7782-49-2 (EC no) 231-957-4 (EC index no) 034-001-00-2	0 - 2	Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Inhalation:dust,mist), H331 STOT RE 2, H373 Aquatic Chronic 4, H413
Titanium	(CAS No) 7440-32-6 (EC no) 231-142-3	0 - 1	Flam. Sol. 1, H228
Lead	(CAS No) 7439-92-1 (EC no) 231-100-4	0 - 0,35	Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Inhalation:dust,mist), H332 Repr. 1A, H360FD STOT RE 1, H372 Aquatic Acute 1, H400 Aquatic Chronic 1, H410
Sulfur	(CAS No) 7704-34-9 (EC no) 231-722-6 (EC index no) 016-094-00-1	0 - 0,35	Skin Irrit. 2, H315 Eye Irrit. 2, H319
Phosphorus elemental	(CAS No) 7723-14-0 (EC no) 231-768-7;918-594-3 (EC index no) 015-002-00-7	0 - 0,15	Not classified
Zinc oxide	(CAS No) 1314-13-2 (EC no) 215-222-5 (EC index no) 030-013-00-7	0 - 0,1	Aquatic Acute 1, H400 Aquatic Chronic 1, H410

Full text of R- and H-phrases: see section 16

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

- First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).
- First-aid measures after inhalation : Using proper respiratory protection, move the exposed person to fresh air at once. Encourage exposed person to cough, spit out, and blow nose to remove dust. Immediately call a poison center, physician, or emergency medical service.
- First-aid measures after skin contact : Remove contaminated clothing. Gently wash with plenty of soap and water. Obtain medical attention if irritation persists.
- First-aid measures after eye contact : Rinse cautiously with water for at least 5 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if redness, pain, or irritation occurs.
- First-aid measures after ingestion : Rinse mouth. Do not induce vomiting. Call a physician or poison control center immediately.

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

- Symptoms/injuries : Attention! - Contains lead. Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath.

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Symptoms/injuries after inhalation	: Not expected to present a significant inhalation hazard under anticipated conditions of normal use. Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath.
Symptoms/injuries after skin contact	: None expected under normal conditions of use.
Symptoms/injuries after eye contact	: None expected under normal conditions of use. Dusts caused from milling and physical alteration will likely cause eye irritation. Fumes from thermal decomposition or molten material will likely be irritating to the eyes.
Symptoms/injuries after ingestion	: Ingestion is likely to be harmful or have adverse effects.
Chronic symptoms	: Attention! - Contains lead. In massive form, no hazard exists. If physically altered to present slivers, ribbons, dusts or fumes from molten material: May cause cancer by inhalation. May damage fertility or the unborn child.

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

If exposed or concerned, get medical advice and attention.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media	: Use extinguishing media appropriate for surrounding fire.
Unsuitable extinguishing media	: Do not use a heavy water stream. Use of heavy stream of water may spread fire.

### 5.2. Special hazards arising from the substance or mixture

Fire hazard	: Not flammable. The following applies to the product if it is cut, sanded or altered in such a way that excessive and/or significant particulates and/or dusts may be generated: Metallic dusts may ignite or explode.
Explosion hazard	: Product itself is not explosive but if dust is generated, dust clouds suspended in air can be explosive.
Reactivity	: Product is stable. Contact with concentrated acid or alkali can result in evolution of hydrogen gas.

### 5.3. Advice for firefighters

Precautionary measures fire	: Exercise caution when fighting any chemical fire.
Firefighting instructions	: Use water spray or fog for cooling exposed containers.
Protection during firefighting	: Do not enter fire area without proper protective equipment, including respiratory protection.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

General measures	: The following applies to the product if it is cut, sanded or altered in such a way that excessive and/or significant particulates and/or dusts may be generated: Avoid dispersal of dust in the air (ie, clearing dust surfaces with compressed air). Do not breathe dust or fumes. Avoid all contact with skin, eyes, or clothing.
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#### 6.1.1. For non-emergency personnel

Protective equipment	: Use appropriate personal protection equipment (PPE).
Emergency procedures	: Do not touch or walk through spilled material. Evacuate unnecessary personnel.

#### 6.1.2. For emergency responders

Protective equipment	: Equip cleanup crew with proper protection.
Emergency procedures	: Upon arrival at the scene, a first responder is expected to recognize the presence of dangerous goods, protect oneself and the public, secure the area, and call for the assistance of trained personnel as soon as conditions permit.

### 6.2. Environmental precautions

Prevent entry to sewers and public waters. If spill could potentially enter any waterway, including intermittent dry creeks, contact the U.S. COAST GUARD NATIONAL RESPONSE CENTER at 800-424-8802. In case of accident or road spill notify CHEMTREC at 800-424-9300.

### 6.3. Methods and material for containment and cleaning up

For containment	: Contain and collect as any solid. Where possible allow molten material to solidify naturally. Avoid generation of dust during clean-up of spills.
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Methods for cleaning up : Clean up spills immediately and dispose of waste safely. Avoid actions that cause dust to become airborne during clean-up such as dry sweeping or using compressed air. Use HEPA vacuum or thoroughly wet with water to clean-up dust. Use PPE described in Section 8.

### 6.4. Reference to other sections

See Section 8, Exposure Controls and Personal Protection. See Section 13, Disposal Considerations.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Hygiene measures : Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work.

### 7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in a dry, cool and well-ventilated place. Keep container closed when not in use.

Incompatible products : Strong acids. Strong bases. Strong oxidizers.

### 7.3. Specific end use(s)

Industrial drilling and milling

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Tungsten carbide (12070-12-1)		
Latvia	OEL TWA (mg/m <sup>3</sup> )	6 mg/m <sup>3</sup>
Titanium carbide (TiC) (12070-08-5)		
Switzerland	VME (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (inhalable)
Niobium carbide (NbC) (12069-94-2)		
Switzerland	VME (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (inhalable)
Cobalt (7440-48-4)		
Belgium	Limit value (mg/m <sup>3</sup> )	0,02 mg/m <sup>3</sup> (dust and fume)
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Greece	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (dust and fume)
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0,02 mg/m <sup>3</sup>
Latvia	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Spain	VLA-ED (mg/m <sup>3</sup> )	0,02 mg/m <sup>3</sup>
Switzerland	VME (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> (aerosol and dust, inhalable)
Netherlands	Grenswaarde TGG 8H (mg/m <sup>3</sup> )	0,02 mg/m <sup>3</sup> (dust and smoke)
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup> (calculated)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	0,01 mg/m <sup>3</sup> (dust, fume and powder)
Estonia	OEL TWA (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	0,02 mg/m <sup>3</sup>
Hungary	AK-érték	0,1 mg/m <sup>3</sup>
Hungary	CK-érték	0,4 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup> (calculated)
Lithuania	IPRV (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	0,02 mg/m <sup>3</sup> (fume)
Norway	Gjennomsnittsverdier (Korttidsverdi) (mg/m <sup>3</sup> )	0,06 mg/m <sup>3</sup> (fume)

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<b>Cobalt (7440-48-4)</b>		
Poland	NDS (mg/m <sup>3</sup> )	0,02 mg/m <sup>3</sup>
Romania	OEL TWA (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Romania	OEL STEL (mg/m <sup>3</sup> )	0,10 mg/m <sup>3</sup>
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (metal)
Slovakia	NPHV (Hraničná) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (metal)
Slovenia	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (inhalable fraction) 0,1 mg/m <sup>3</sup> (other-inhalable fraction)
Slovenia	OEL STEL (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (inhalable fraction) 0,4 mg/m <sup>3</sup> (other-inhalable fraction)
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	0,02 mg/m <sup>3</sup> (total inhalable dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	0,02 mg/m <sup>3</sup>
Portugal	OEL chemical category (PT)	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
<b>Nickel (7440-02-0)</b>		
Belgium	Limit value (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
France	VME (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> 1 mg/m <sup>3</sup> (metal gratings)
Greece	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	1,5 mg/m <sup>3</sup> (inhalable fraction)
Latvia	OEL TWA (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Spain	VLA-ED (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (manufacturing, commercialization, and use restrictions under REACH)
Switzerland	VME (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (inhalable)
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	1,5 mg/m <sup>3</sup> (calculated)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> (dust and powder)
Estonia	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	0,01 mg/m <sup>3</sup>
Hungary	MK-érték	0,1 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	1,5 mg/m <sup>3</sup> (calculated)
Lithuania	IPRV (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (Korttidsverdi) (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
Poland	NDS (mg/m <sup>3</sup> )	0,25 mg/m <sup>3</sup>
Romania	OEL TWA (mg/m <sup>3</sup> )	0,10 mg/m <sup>3</sup>
Romania	OEL STEL (mg/m <sup>3</sup> )	0,50 mg/m <sup>3</sup>
Slovenia	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (inhalable fraction)
Slovenia	OEL STEL (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (inhalable fraction)
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (total dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	1,5 mg/m <sup>3</sup> (inhalable fraction)
Portugal	OEL chemical category (PT)	A5 - Not Suspected as a Human Carcinogen



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<b>Vanadium carbide (VC) (12070-10-9)</b>		
Austria	MAK (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (inhalable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (inhalable fraction)
Slovenia	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (inhalable fraction)
<b>Chromium (7440-47-3)</b>		
EU	IOELV TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Austria	MAK (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Belgium	Limit value (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	2,0 mg/m <sup>3</sup>
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Cyprus	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
France	VME (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (indicative limit)
Germany	TRGS 900 Occupational exposure limit value (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (inhalable fraction)
Gibraltar	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Greece	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Italy	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Latvia	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Spain	VLA-ED (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (indicative limit value)
Switzerland	VME (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (inhalable)
Netherlands	Grenswaarde TGG 8H (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	1,5 mg/m <sup>3</sup> (calculated)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (dust)
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (powder)
Estonia	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	0,005 mg/m <sup>3</sup>
Hungary	AK-érték	2 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	6 mg/m <sup>3</sup> (calculated)
Lithuania	IPRV (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Luxembourg	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Malta	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (Korttidsverdi) (mg/m <sup>3</sup> )	1,5 mg/m <sup>3</sup>
Poland	NDS (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Romania	OEL TWA (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> 2 mg/m <sup>3</sup>
Slovenia	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (total dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (indicative limit value)
Portugal	OEL chemical category (PT)	A4 - Not Classifiable as a Human Carcinogen
<b>Titanium nitride (25583-20-4)</b>		
Latvia	OEL TWA (mg/m <sup>3</sup> )	4 mg/m <sup>3</sup>

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<b>Aluminum (7429-90-5)</b>		
Austria	MAK (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	20 mg/m <sup>3</sup> (inhalable fraction)
Belgium	Limit value (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	10,0 mg/m <sup>3</sup> (metal dust) 1,5 mg/m <sup>3</sup> (respirable fraction)
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (total dust) 4 mg/m <sup>3</sup> (respirable dust)
France	VME (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (metal) 5 mg/m <sup>3</sup> (dust)
Greece	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction) 5 mg/m <sup>3</sup> (respirable fraction)
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (respirable fraction)
Latvia	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Spain	VLA-ED (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (dust)
Switzerland	VME (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup> (respirable)
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable dust) 4 mg/m <sup>3</sup> (respirable dust)
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	30 mg/m <sup>3</sup> (calculated-inhalable dust) 12 mg/m <sup>3</sup> (calculated-respirable dust)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	10,0 mg/m <sup>3</sup> (dust)
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (dust, fume and powder, total) 2 mg/m <sup>3</sup> (dust and powder, respirable)
Estonia	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (total dust) 4 mg/m <sup>3</sup> (respirable dust)
Hungary	AK-érték	6 mg/m <sup>3</sup> (respirable dust)
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (respirable dust)
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup> (calculated-respirable dust)
Lithuania	IPRV (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (inhalable fraction) 2 mg/m <sup>3</sup> (respirable fraction) 1 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (pyrotechnical-powder)
Norway	Gjennomsnittsverdier (Korttidsverdi) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (pyrotechnical-powder)
Poland	NDS (mg/m <sup>3</sup> )	2,5 mg/m <sup>3</sup> (inhalable fraction) 1,2 mg/m <sup>3</sup> (respirable fraction)
Romania	OEL TWA (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup> (dust) 1 mg/m <sup>3</sup> (fume)
Romania	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (powder) 3 mg/m <sup>3</sup> (fume)
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	1,5 mg/m <sup>3</sup> (metal) 6 mg/m <sup>3</sup> (total aerosol)
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (total dust) 2 mg/m <sup>3</sup> (respirable dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (metal dust)
<b>Carbon (7440-44-0)</b>		
Austria	MAK (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (alveolar dust with <1% Quartz, respirable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (alveolar dust with <1% quartz, respirable fraction)

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<b>Carbon (7440-44-0)</b>		
Poland	NDS (mg/m <sup>3</sup> )	4,0 mg/m <sup>3</sup> (natural-inhalable fraction) 1,0 mg/m <sup>3</sup> (natural-respirable fraction) 6,0 mg/m <sup>3</sup> (synthetic-inhalable fraction)
<b>Copper (7440-50-8)</b>		
Austria	MAK (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (inhalable fraction) 0,1 mg/m <sup>3</sup> (respirable fraction, smoke)
Austria	MAK Short time value (mg/m <sup>3</sup> )	4 mg/m <sup>3</sup> (inhalable fraction) 0,4 mg/m <sup>3</sup> (respirable fraction, smoke)
Belgium	Limit value (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (metal vapor)
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust)
Croatia	KGVI (kratkotrajna granična vrijednost izloženosti) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (dust and fumes)
France	VLE (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (dust)
France	VME (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust)
Greece	OEL TWA (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust)
Greece	OEL STEL (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (dust)
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume)
Latvia	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Spain	VLA-ED (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
Switzerland	VLE (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (inhalable)
Switzerland	VME (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable)
Netherlands	Grenswaarde TGG 8H (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction)
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (dust and mists) 0,2 mg/m <sup>3</sup> (fume)
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	0,6 mg/m <sup>3</sup> (calculated-fume) 2 mg/m <sup>3</sup> (dust and mist)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (dust) 0,1 mg/m <sup>3</sup> (fume)
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	1,0 mg/m <sup>3</sup> (dust and powder) 0,1 mg/m <sup>3</sup> (fume)
Estonia	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (total dust) 0,2 mg/m <sup>3</sup> (respirable dust)
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> 0,1 mg/m <sup>3</sup> (respirable dust and fume)
Hungary	AK-érték	1 mg/m <sup>3</sup> 0,1 mg/m <sup>3</sup> (fume)
Hungary	CK-érték	4 mg/m <sup>3</sup> 0,4 mg/m <sup>3</sup> (fume)
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	0,6 mg/m <sup>3</sup> (calculated-fume) 2 mg/m <sup>3</sup> (dust and mist)
Lithuania	IPRV (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (inhalable fraction) 0,2 mg/m <sup>3</sup> (respirable fraction)

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<b>Copper (7440-50-8)</b>		
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust)
Norway	Gjennomsnittsverdier (Korttidsverdi) (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup> (fume) 3 mg/m <sup>3</sup> (dust)
Poland	NDS (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup>
Romania	OEL TWA (mg/m <sup>3</sup> )	0,50 mg/m <sup>3</sup> (powder)
Romania	OEL STEL (mg/m <sup>3</sup> )	0,20 mg/m <sup>3</sup> (fume) 1,50 mg/m <sup>3</sup> (dust)
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (dust) 0,1 mg/m <sup>3</sup> (fume)
Slovakia	NPHV (Hraničná) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (dust) 0,2 mg/m <sup>3</sup> (fume)
Slovenia	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (inhalable fraction) 0,1 mg/m <sup>3</sup> (respirable fraction, fume)
Slovenia	OEL STEL (mg/m <sup>3</sup> )	4 mg/m <sup>3</sup> (inhalable fraction) 0,4 mg/m <sup>3</sup> (respirable fraction, fume)
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (total dust) 0,2 mg/m <sup>3</sup> (respirable dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
<b>Iron (7439-89-6)</b>		
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	6,0 mg/m <sup>3</sup> (containing <2% free Crystalline silicon dioxide in respirable fraction-dust, inhalable fraction)
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	6,0 mg/m <sup>3</sup> (total aerosol)
<b>Lead (7439-92-1)</b>		
Austria	MAK (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	0,4 mg/m <sup>3</sup> (inhalable fraction)
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
Cyprus	OEL TWA (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
France	VME (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (restrictive limit)
Germany	TRGS 903 (BGW)	300 µg/l (Medium: whole blood - Time: no restriction - Parameter: Lead (women age below 45 years) 400 µg/l (Medium: whole blood - Time: no restriction - Parameter: Lead (women 45 years and older)
Gibraltar	OEL TWA (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
Greece	OEL TWA (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Italy	OEL TWA (mg/m <sup>3</sup> )	0,075 mg/m <sup>3</sup>
Latvia	OEL TWA (mg/m <sup>3</sup> )	0,005 mg/m <sup>3</sup>
Spain	VLA-ED (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
Switzerland	VLE (mg/m <sup>3</sup> )	0,8 mg/m <sup>3</sup> (inhalable)
Switzerland	VME (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable)
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	0,45 mg/m <sup>3</sup> (calculated)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>

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<b>Lead (7439-92-1)</b>		
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> (dust, fume and powder)
Estonia	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (total dust) 0,05 mg/m <sup>3</sup> (respirable dust)
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (all works)
Hungary	AK-érték	0,15 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	0,45 mg/m <sup>3</sup> (calculated)
Lithuania	IPRV (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup> (inhalable fraction) 0,07 mg/m <sup>3</sup> (respirable fraction)
Luxembourg	OEL TWA (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> (dust and fume)
Norway	Gjennomsnittsverdier (Korttidsverdi) (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup> (dust and fume)
Poland	NDS (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Romania	OEL TWA (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Romania	OEL STEL (mg/m <sup>3</sup> )	0,10 mg/m <sup>3</sup>
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
Slovenia	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction)
Slovenia	OEL STEL (mg/m <sup>3</sup> )	0,4 mg/m <sup>3</sup> (inhalable fraction)
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (total inhalable dust) 0,05 mg/m <sup>3</sup> (total respirable dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup> (mandatory indicative limit value)
Portugal	OEL chemical category (PT)	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
<b>Manganese (7439-96-5)</b>		
Austria	MAK (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (inhalable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (inhalable fraction)
Belgium	Limit value (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup>
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
France	VME (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (fume)
Germany	TRGS 900 Occupational exposure limit value (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed-inhalable fraction)
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0,02 mg/m <sup>3</sup> (respirable fraction) 0,1 mg/m <sup>3</sup> (inhalable fraction)
Spain	VLA-ED (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup>
Switzerland	VME (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (inhalable)
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	1,5 mg/m <sup>3</sup> (calculated)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (dust, fume and powder) 0,1 mg/m <sup>3</sup> (respirable)
Estonia	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (total dust) 0,5 mg/m <sup>3</sup> (respirable dust)
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (inhalable dust) 0,02 mg/m <sup>3</sup> (respirable)
Hungary	AK-érték	5 mg/m <sup>3</sup>
Hungary	CK-érték	20 mg/m <sup>3</sup>

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<b>Manganese (7439-96-5)</b>		
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume)
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	0,6 mg/m <sup>3</sup> (calculated) 3 mg/m <sup>3</sup> (fume)
Lithuania	IPRV (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (inhalable fraction) 0,5 mg/m <sup>3</sup> (respirable fraction)
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (inhalable fraction) 0,1 mg/m <sup>3</sup> (respirable fraction)
Norway	Gjennomsnittsverdier (Korttidsverdi) (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup> (respirable fraction)
Norway	Gjennomsnittsverdier (Korttidsverdi) (ppm)	3 ppm (inhalable fraction)
Poland	NDS (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (inhalable fraction) 0,05 mg/m <sup>3</sup> (respirable fraction)
Romania	OEL TWA (mg/m <sup>3</sup> )	0,50 mg/m <sup>3</sup>
Romania	OEL STEL (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup>
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Slovenia	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (inhalable fraction)
Slovenia	OEL STEL (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (inhalable fraction)
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (total dust) 0,1 mg/m <sup>3</sup> (respirable dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup>
<b>Molybdenum (7439-98-7)</b>		
Austria	MAK (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	20 mg/m <sup>3</sup> (inhalable fraction)
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	10,0 mg/m <sup>3</sup>
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction) 3 mg/m <sup>3</sup> (respirable fraction)
Spain	VLA-ED (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction) 3 mg/m <sup>3</sup> (respirable fraction)
Switzerland	VME (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
Estonia	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable dust)
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Lithuania	IPRV (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction) 5 mg/m <sup>3</sup> (respirable fraction) 5 mg/m <sup>3</sup>
Poland	NDS (mg/m <sup>3</sup> )	4 mg/m <sup>3</sup>
Poland	NDSCh (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction) 3 mg/m <sup>3</sup> (respirable fraction)
<b>Niobium (7440-03-1)</b>		
Austria	MAK (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (inhalable fraction) 0,5 mg/m <sup>3</sup> (respirable fraction, smoke)
Austria	MAK Short time value (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction) 1 mg/m <sup>3</sup> (respirable fraction, smoke)
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (dust and powder) 0,5 mg/m <sup>3</sup> (fume)

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<b>Niobium (7440-03-1)</b>		
Slovenia	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (inhalable fraction)
<b>Selenium (7782-49-2)</b>		
Austria	MAK (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup> (inhalable fraction)
Belgium	Limit value (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup>
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup>
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Germany	TRGS 900 Occupational exposure limit value (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed-inhalable fraction)
Greece	OEL TWA (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup>
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup>
Spain	VLA-ED (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Switzerland	VLE (mg/m <sup>3</sup> )	0,16 mg/m <sup>3</sup> (inhalable)
Switzerland	VME (mg/m <sup>3</sup> )	0,02 mg/m <sup>3</sup> (inhalable)
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup> (calculated)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Estonia	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Finland	HTP-arvo (15 min)	0,3 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup> (calculated)
Lithuania	IPRV (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (Korttidsverdi) (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
Poland	NDS (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Poland	NDSCh (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup>
Romania	OEL TWA (mg/m <sup>3</sup> )	0,10 mg/m <sup>3</sup>
Romania	OEL STEL (mg/m <sup>3</sup> )	0,20 mg/m <sup>3</sup>
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Slovakia	NPHV (Hraničná) (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup>
Slovenia	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction)
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (total dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup>
<b>Silicon (7440-21-3)</b>		
Belgium	Limit value (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (total dust) 4 mg/m <sup>3</sup> (respirable dust)
France	VME (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Greece	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction) 5 mg/m <sup>3</sup> (respirable fraction)
Switzerland	VME (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup> (respirable)
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable dust) 4 mg/m <sup>3</sup> (respirable dust)

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<b>Silicon (7440-21-3)</b>		
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	12 mg/m <sup>3</sup> (calculated-respirable dust)
United Kingdom	WEL STEL (ppm)	30 ppm (calculated-inhalable dust)
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Estonia	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> 5 mg/m <sup>3</sup> (respirable dust)
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (total inhalable dust) 4 mg/m <sup>3</sup> (respirable dust)
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	30 mg/m <sup>3</sup> (calculated-total inhalable dust) 12 mg/m <sup>3</sup> (calculated-respirable dust)
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (equal to the standard for nuisance dust)
Norway	Gjennomsnittsverdier (Korttidsverdi) (mg/m <sup>3</sup> )	20 mg/m <sup>3</sup> (equal to the standard for nuisance dust)
<b>Titanium (7440-32-6)</b>		
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	1,0 mg/m <sup>3</sup>
Latvia	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Poland	NDS (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Poland	NDSCh (mg/m <sup>3</sup> )	30 mg/m <sup>3</sup>
Romania	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Romania	OEL STEL (mg/m <sup>3</sup> )	15 mg/m <sup>3</sup>
<b>Tungsten (7440-33-7)</b>		
Austria	MAK (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (inhalable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction)
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
Croatia	KGVI (kratkotrajna granična vrijednost izloženosti) (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup>
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
USA ACGIH	ACGIH STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Spain	VLA-ED (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
Spain	VLA-EC (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (dust and powder)
Estonia	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Lithuania	IPRV (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (Korttidsverdi) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Poland	NDS (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (inhalable fraction)
Romania	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Romania	OEL STEL (mg/m <sup>3</sup> )	6 mg/m <sup>3</sup>
Slovenia	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (inhalable fraction)
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (total dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
Portugal	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>



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<b>Vanadium (7440-62-2)</b>		
Austria	MAK (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (inhalable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (inhalable fraction)
Latvia	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> (dust)
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (dust)
Norway	Gjennomsnittsverdier (Korttidsverdi) (mg/m <sup>3</sup> )	0,6 mg/m <sup>3</sup> (dust)
Norway	Gjennomsnittsverdier (Takverdi) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> (fume)
Romania	OEL TWA (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> (fume) 0,10 mg/m <sup>3</sup> (dust)
Romania	OEL STEL (mg/m <sup>3</sup> )	0,10 mg/m <sup>3</sup> (V2O5 fume)
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> (total dust)
Slovenia	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (inhalable fraction)
<b>Phosphorus elemental (7723-14-0)</b>		
Austria	MAK (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (inhalable fraction)
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Croatia	KGVI (kratkotrajna granična vrijednost izloženosti) (ppm)	0,3 ppm
Germany	TRGS 900 Occupational exposure limit value (mg/m <sup>3</sup> )	0,01 mg/m <sup>3</sup> (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed-inhalable fraction)
Greece	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Greece	OEL STEL (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup>
Latvia	OEL TWA (mg/m <sup>3</sup> )	0,03 mg/m <sup>3</sup>
Switzerland	VLE (mg/m <sup>3</sup> )	0,02 mg/m <sup>3</sup> (inhalable)
Switzerland	VME (mg/m <sup>3</sup> )	0,02 mg/m <sup>3</sup> (inhalable)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Estonia	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Hungary	AK-érték	0,1 mg/m <sup>3</sup>
Hungary	CK-érték	0,1 mg/m <sup>3</sup>
Romania	OEL TWA (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> (white, yellow-dust)
Slovakia	NPHV (Hraničná) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (yellow, white)
Slovenia	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction)
Slovenia	OEL STEL (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction)
<b>Sulfur (7704-34-9)</b>		
Latvia	OEL TWA (mg/m <sup>3</sup> )	6 mg/m <sup>3</sup>
Lithuania	IPRV (mg/m <sup>3</sup> )	6 mg/m <sup>3</sup>
Romania	OEL STEL (mg/m <sup>3</sup> )	15 mg/m <sup>3</sup> (dust)
<b>Zinc oxide (1314-13-2)</b>		
Austria	MAK (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (respirable fraction, smoke)
Belgium	Limit value (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (dust) 5 mg/m <sup>3</sup> (fume) 5 mg/m <sup>3</sup> (aerosol and vapor)

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<b>Zinc oxide (1314-13-2)</b>		
Belgium	Short time value (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (fume) 10 mg/m <sup>3</sup> (aerosol and vapor)
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	5,0 mg/m <sup>3</sup>
Bulgaria	OEL STEL (mg/m <sup>3</sup> )	10,0 mg/m <sup>3</sup>
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
Croatia	KGVI (kratkotrajna granična vrijednost izloženosti) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
France	VME (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (fume) 10 mg/m <sup>3</sup> (dust)
Greece	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (fume)
Greece	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (fume)
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (respirable fraction)
USA ACGIH	ACGIH STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (respirable fraction)
Latvia	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Spain	VLA-ED (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (respirable fraction)
Spain	VLA-EC (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Switzerland	VLE (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup> (respirable, smoke)
Switzerland	VME (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup> (respirable, smoke)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	4 mg/m <sup>3</sup> 4 mg/m <sup>3</sup> (fume)
Estonia	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (fume)
Finland	HTP-arvo (15 min)	10 mg/m <sup>3</sup> (fume)
Hungary	AK-érték	5 mg/m <sup>3</sup> (respirable dust)
Hungary	CK-érték	20 mg/m <sup>3</sup> (respirable dust)
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (fume)
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (fume)
Lithuania	IPRV (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (Korttidsverdi) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Poland	NDS (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (inhalable fraction)
Poland	NDSCh (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (fume)
Romania	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (fume)
Romania	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (fume)
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (fume)
Slovakia	NPHV (Hraničná) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
Slovenia	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (respirable fraction, fume)
Slovenia	OEL STEL (mg/m <sup>3</sup> )	20 mg/m <sup>3</sup> (respirable fraction, fume)
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (total dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (respirable fraction)
Portugal	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (respirable fraction)
<b>Silver (7440-22-4)</b>		
EU	IOELV TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Austria	MAK (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction)

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<b>Silver (7440-22-4)</b>		
Belgium	Limit value (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Cyprus	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
France	VME (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (indicative limit)
Germany	TRGS 900 Occupational exposure limit value (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction)
Gibraltar	OEL TWA (mg/m <sup>3</sup> )	0,01 mg/m <sup>3</sup>
Greece	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (dust and fume)
Italy	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Latvia	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Spain	VLA-ED (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (indicative limit value)
Switzerland	VLE (mg/m <sup>3</sup> )	0,8 mg/m <sup>3</sup> (inhalable)
Switzerland	VME (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable)
Netherlands	Grenswaarde TGG 8H (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup> (calculated)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	0,01 mg/m <sup>3</sup> (dust and powder)
Estonia	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Hungary	AK-érték	0,1 mg/m <sup>3</sup>
Hungary	CK-érték	0,4 mg/m <sup>3</sup> (Substances with European indicative limits (96/94/EC, 2000/39/EC, 2006/15/EC, 2009/161/EU), which currently has no peak limit concentration. In these cases, Annex 3.1. should be used exercised)
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (metallic)
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup> (calculated-metallic)
Lithuania	IPRV (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Malta	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (metallic)
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (metal dust and fume)
Norway	Gjennomsnittsverdier (Korttidsverdi) (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup> (metal dust and fume)
Poland	NDS (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> (inhalable fraction)
Romania	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup>
Slovenia	OEL TWA (mg/m <sup>3</sup> )	0,01 mg/m <sup>3</sup>
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (total dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	0,01 mg/m <sup>3</sup> (indicative limit value)
<b>Zinc (7440-66-6)</b>		
Switzerland	VLE (mg/m <sup>3</sup> )	0,4 mg/m <sup>3</sup> (respirable)
Switzerland	VME (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (respirable) 2 mg/m <sup>3</sup> (inhalable)
<b>Aluminum nitride (AlN) (24304-00-5)</b>		
Latvia	OEL TWA (mg/m <sup>3</sup> )	6 mg/m <sup>3</sup>

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Aluminum nitride (AlN) (24304-00-5)		
Lithuania	IPRV (mg/m <sup>3</sup> )	6 mg/m <sup>3</sup>

### 8.2. Exposure controls

- Appropriate engineering controls : When cutting, grinding, crushing, or drilling, provide general or local ventilation systems, as needed, to maintain airborne dust concentrations below the regulatory limits. Local vacuum collection is preferred since it prevents release of contaminants into the work area by controlling it at the source. Other technologies that may aid in controlling airborne respirable dust include wet suppression, ventilation, process enclosure, and enclosed employee work stations. Ensure that all electrical components/systems are in compliance with the National Electrical Code.
- Personal protective equipment : The following applies to the product if it is cut, sanded or altered in such a way that excessive and/or significant particulates and/or dusts may be generated: Protective goggles. Dust/aerosol mask. Gloves. Dustproof clothing.
- 
- Materials for protective clothing : Flame retardant antistatic protective clothing.
- Hand protection : Impermeable protective gloves. If material is hot, wear thermally resistant protective gloves.
- Eye protection : In case of dust production: protective goggles.
- Skin and body protection : Wear suitable protective clothing.
- Respiratory protection : When effective engineering controls are not feasible, appropriate respirators shall be used. Personal Protective Equipment must be selected by trained personnel, taking into account the type of hazardous materials it should protect from, the nature of the work, the expected exposure, and the facial characteristics of the wearers; proper fit is of paramount importance. Ensure the respiratory protection program meets the requirements of OSHA 29 CFR 1910.134.
- Other information : When using, do not eat, drink or smoke.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

- Physical state : Solid
- Appearance : Grey.
- Colour : No data available
- Odour : No data available
- Odour threshold : No data available
- pH : No data available
- Evaporation rate : No data available
- Melting point : No data available
- Freezing point : No data available
- Boiling point : No data available
- Flash point : No data available
- Auto-ignition temperature : No data available
- Decomposition temperature : No data available
- Flammability (solid, gas) : No data available
- Vapour pressure : No data available
- Relative vapour density at 20 °C : No data available
- Solubility : Insoluble in water.
- Partition coefficient: n-octanol/water : No data available
- Viscosity : No data available
- Explosive properties : No data available
- Oxidising properties : No data available
- Explosive limits : Not applicable

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## 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

Product is stable. Contact with concentrated acid or alkali can result in evolution of hydrogen gas.

### 10.2. Chemical stability

Stable under normal conditions.

### 10.3. Possibility of hazardous reactions

Hazardous polymerization will not occur.

### 10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures. Use good housekeeping practices during storage, transfer, handling, to avoid excessive dust accumulation.

### 10.5. Incompatible materials

Strong acids. Strong bases. Strong oxidizers.

### 10.6. Hazardous decomposition products

Metal oxides.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity : Oral: Not classified. Inhalation:dust,mist: Not classified.

<b>Cobalt (7440-48-4)</b>	
LD50 oral rat	215,9 - 1140 mg/kg
LC50 inhalation rat (mg/l)	> 10 mg/l (Exposure time: 1 h)
ATE CLP (dust,mist)	0,01 mg/l/4h
<b>Nickel (7440-02-0)</b>	
LD50 oral rat	> 9000 mg/kg
<b>Chromium (7440-47-3)</b>	
LD50 oral rat	> 5000 mg/kg
<b>Carbon (7440-44-0)</b>	
LD50 oral rat	> 10000 mg/kg
<b>Iron (7439-89-6)</b>	
LD50 oral rat	98,6 g/kg
<b>Lead (7439-92-1)</b>	
ATE CLP (oral)	500,00 mg/kg bodyweight
ATE CLP (dust,mist)	1,50 mg/l/4h
<b>Manganese (7439-96-5)</b>	
LD50 oral rat	> 2000 mg/kg
<b>Molybdenum (7439-98-7)</b>	
LD50 oral rat	> 2000 mg/kg
LD50 dermal rat	> 2000 mg/kg
<b>Niobium (7440-03-1)</b>	
LD50 oral rat	> 10 g/kg
<b>Selenium (7782-49-2)</b>	
ATE CLP (oral)	100,00 mg/kg bodyweight
ATE CLP (dust,mist)	0,50 mg/l/4h
<b>Phosphorus elemental (7723-14-0)</b>	
LD50 oral rat	3,03 mg/kg
LD50 dermal rat	100 mg/kg
LC50 inhalation rat (mg/l)	4,3 mg/l (Exposure time: 1 h)

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<b>Sulfur (7704-34-9)</b>	
LD50 oral rat	> 3000 mg/kg
LD50 dermal rabbit	> 2000 mg/kg
LC50 inhalation rat (mg/l)	> 9,23 mg/l/4h
<b>Zinc oxide (1314-13-2)</b>	
LD50 oral rat	> 5000 mg/kg
LD50 dermal rat	> 2000 mg/kg
<b>Silver (7440-22-4)</b>	
LD50 oral rat	> 2000 mg/kg
Skin corrosion/irritation	: Not classified
Serious eye damage/irritation	: Not classified
Respiratory or skin sensitisation	: Not classified.
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified.
<b>Cobalt (7440-48-4)</b>	
IARC group	2B
<b>Nickel (7440-02-0)</b>	
IARC group	2B
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen.
<b>Chromium (7440-47-3)</b>	
IARC group	3
<b>Lead (7439-92-1)</b>	
IARC group	2A
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen.
<b>Selenium (7782-49-2)</b>	
IARC group	3
Reproductive toxicity	: Not classified.
Specific target organ toxicity (single exposure)	: Not classified
Specific target organ toxicity (repeated exposure)	: Not classified.
Aspiration hazard	: Not classified

## SECTION 12: Ecological information

### 12.1. Toxicity

Ecology - general : For particulates and dust: Very toxic to aquatic life with long lasting effects.

<b>Nickel (7440-02-0)</b>	
LC50 fishes 1	100 mg/l (Exposure time: 96 h - Species: Brachydanio rerio)
EC50 Daphnia 1	13 (13 - 200) µg/l (Exposure time: 48h - Species: Ceriodaphnia dubia [static])
LC50 fish 2	1,3 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [semi-static])
EC50 Daphnia 2	1 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
EC50 other aquatic organisms 2	0,174 (0,174 - 0,311) mg/l (Exposure time: 96 h - Species: Pseudokirchneriella subcapitata [static])
<b>Copper (7440-50-8)</b>	
LC50 fishes 1	<= 0,0068 (0,0068 - 0,0156) mg/l (Exposure time: 96 h - Species: Pimephales promelas)
EC50 Daphnia 1	0,03 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
EC50 other aquatic organisms 1	0,0426 (0,0426 - 0,0535) mg/l (Exposure time: 72 h - Species: Pseudokirchneriella subcapitata [static])
LC50 fish 2	0,3 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])

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<b>Copper (7440-50-8)</b>	
EC50 other aquatic organisms 2	0,031 (0,031 - 0,054) mg/l (Exposure time: 96 h - Species: Pseudokirchneriella subcapitata [static])
<b>Lead (7439-92-1)</b>	
LC50 fishes 1	0,44 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [semi-static])
EC50 Daphnia 1	600 µg/l (Exposure time: 48 h - Species: water flea)
LC50 fish 2	1,17 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])
<b>Manganese (7439-96-5)</b>	
NOEC chronic fish	3,6 mg/l (Exposure time: 96h; Species: Oncorhynchus mykiss)
<b>Sulfur (7704-34-9)</b>	
LC50 fishes 1	866 mg/l (Exposure time: 96 h - Species: Brachydanio rerio [static])
EC50 Daphnia 1	736 mg/l
LC50 fish 2	14 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])
<b>Zinc oxide (1314-13-2)</b>	
LC50 fishes 1	780 µg/l (Exposure time: 96 h - Species: Pimephales promelas)
EC50 Daphnia 1	0,122 mg/l
NOEC chronic fish	0,026 mg/l (Species: Jordanella floridae)
<b>Silver (7440-22-4)</b>	
LC50 fishes 1	0,00155 (0,00155 - 0,00293) mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])
EC50 Daphnia 1	0,00024 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
LC50 fish 2	0,0062 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])
<b>Zinc (7440-66-6)</b>	
LC50 fishes 1	2,16 - 3,05 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
EC50 Daphnia 1	0,139 - 0,908 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
LC50 fish 2	0,211 - 0,269 mg/l (Exposure time: 96 h - Species: Pimephales promelas [semi-static])

### 12.2. Persistence and degradability

<b>Copper (7440-50-8)</b>	
Persistence and degradability	Not readily biodegradable.

### 12.3. Bioaccumulative potential

<b>Cobalt (7440-48-4)</b>	
BCF fish 1	(no bioaccumulation)

### 12.4. Mobility in soil

No additional information available

### 12.5. Results of PBT and vPvB assessment

No additional information available

### 12.6. Other adverse effects

Other information : Avoid release to the environment.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Waste disposal recommendations : Dispose of waste material in accordance with all local, regional, national, and international regulations. Material should be recycled if possible.

Ecology - waste materials : The materials contained within this product are hazardous to the environment, do not release into the environment.

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## SECTION 14: Transport information

In accordance with ADR / RID / IMDG / IATA / ADN

### 14.1. UN number

Not regulated for transport

### 14.2. UN proper shipping name

Not regulated for transport

### 14.3. Transport hazard class(es)

Not applicable

### 14.4. Packing group

Not applicable

### 14.5. Environmental hazards

Other information : No supplementary information available.

### 14.6. Special precautions for user

#### 14.6.1. Overland transport

No additional information available

#### 14.6.2. Transport by sea

No additional information available

#### 14.6.3. Air transport

No additional information available

### 14.7. 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

#### 15.1.1. EU-Regulations

The following restrictions are applicable according to Annex XVII of the REACH Regulation (EC) No 1907/2006:

3.a. Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 2.1 to 2.4, 2.6 and 2.7, 2.8 types A and B, 2.9, 2.10, 2.12, 2.13 categories 1 and 2, 2.14 categories 1 and 2, 2.15 types A to F	Niobium carbide (NbC)
3.c. Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard class 4.1	Zinc
27. Nickel	Nickel
40. Substances classified as flammable gases category 1 or 2, flammable liquids categories 1, 2 or 3, flammable solids category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases, category 1, 2 or 3, pyrophoric liquids category 1 or pyrophoric solids category 1, regardless of whether they appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 or not.	Niobium carbide (NbC)
63. Lead and its compounds	Lead

Contains no substance on the REACH candidate list

Contains no REACH Annex XIV substances

Other information, restriction and : Exempted from REACH registration.  
prohibition regulations

#### 15.1.2. National regulations

No additional information available

### 15.2. Chemical safety assessment

No chemical safety assessment has been carried out

## SECTION 16: Other information

Revision date : 28/04/2015

Data sources : REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

Full text of R-, H- and EUH-phrases:

Acute Tox. 1 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 1
Acute Tox. 3 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 3



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Acute Tox. 3 (Oral)	Acute toxicity (oral), Category 3
Acute Tox. 4 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4
Aquatic Acute 1	Hazardous to the aquatic environment — Acute Hazard, Category 1
Aquatic Chronic 1	Hazardous to the aquatic environment — Chronic Hazard, Category 1
Aquatic Chronic 3	Hazardous to the aquatic environment — Chronic Hazard, Category 3
Aquatic Chronic 4	Hazardous to the aquatic environment — Chronic Hazard, Category 4
Carc. 2	Carcinogenicity, Category 2
Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
Flam. Sol. 1	Flammable solids, Category 1
Repr. 1A	Reproductive toxicity, Category 1A
Repr. 2	Reproductive toxicity, Category 2
Resp. Sens. 1B	Sensitisation — Respiratory, category 1B
Self-heat. 1	Self-Heating Substances and Mixtures, Category 1
Self-heat. 2	Self-Heating Substances and Mixtures, Category 2
Skin Irrit. 2	Skin corrosion/irritation, Category 2
Skin Sens. 1	Sensitisation — Skin, category 1
Skin Sens. 1A	Sensitisation — Skin, category 1A
STOT RE 1	Specific target organ toxicity — Repeated exposure, Category 1
STOT RE 2	Specific target organ toxicity — Repeated exposure, Category 2
Water-react. 2	Substances and Mixtures which, in contact with water, emit flammable gases, Category 2
H228	Flammable solid
H251	Self-heating: may catch fire
H252	Self-heating in large quantities; may catch fire
H261	In contact with water releases flammable gases
H301	Toxic if swallowed
H302	Harmful if swallowed
H315	Causes skin irritation
H317	May cause an allergic skin reaction
H319	Causes serious eye irritation
H330	Fatal if inhaled
H331	Toxic if inhaled
H332	Harmful if inhaled
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
H351	Suspected of causing cancer
H360FD	May damage fertility. May damage the unborn child
H361	Suspected of damaging fertility or the unborn child
H372	Causes damage to organs through prolonged or repeated exposure
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
H412	Harmful to aquatic life with long lasting effects
H413	May cause long lasting harmful effects to aquatic life
R11	Highly flammable
R15	Contact with water liberates extremely flammable gases
R20/22	Harmful by inhalation and if swallowed
R23/25	Toxic by inhalation and if swallowed
R33	Danger of cumulative effects
R36	Irritating to eyes
R36/38	Irritating to eyes and skin
R40	Limited evidence of a carcinogenic effect

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R42	May cause sensitization by inhalation
R43	May cause sensitisation by skin contact
R48/23	Toxic: danger of serious damage to health by prolonged exposure through inhalation
R48/23/25	Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed
R50	Very toxic to aquatic organisms
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment
R53	May cause long-term adverse effects in the aquatic environment
R60	May impair fertility
R61	May cause harm to the unborn child
R62	Possible risk of impaired fertility
F	Highly flammable
N	Dangerous for the environment
T	Toxic
Xi	Irritant
Xn	Harmful

SDS EU (REACH Annex II) 10pt

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*