

## Safety Data Sheet

# 19 Mix metal standard solution

Version : V2.0.0.1

Report No. : BWB2308-2016-MSDS-EP

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\*Prepared in accordance with EU REACH Regulation (REACH 1907/2006 with amendment 2020/878)

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

### 1.1 Product identifier

Product Name	19 Mix metal standard solution
Cat No.	BWB2308-2016
CAS No.	Not applicable
EC No.	Not applicable
Molecular Formula	Not applicable
REACH Registration Number	-
UFI	No information available

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

Relevant identified uses	Please consult manufacturer.
Uses advised against	Please consult manufacturer.

### 1.3 Details of the supplier of the Safety Data Sheet

Name of the company	Weiyel Inc
Address of the company	Hedian Light Industrial Park, Chengguan Town, Shangcheng County, Xinyang City, Henan Province, China
Post code	465350
Telephone number	010-58103678
Fax number	010-84840368
E-mail address	info@weiyel.com

### 1.4 Emergency telephone number

Emergency telephone number	010-58103678
Opening hours	24h

## 2 Hazards identification

### 2.1 CLP classification according to Regulation ( EC ) No. 1272/2008 with amendment 2023/707

Skin corrosion/irritation	Category 1
Serious eye damage/irritation	Category 1
Acute Toxicity - Inhalation	Category 2
Carcinogenicity	Category 1B
Reproductive toxicity	Category 1A
Hazardous to the aquatic	Category 2

environment - long-term (chronic) hazard	
<b>2.2 Label elements</b>	
Hazard pictograms	
Signal word	<b>Danger</b>
<b>Hazard statements</b>	
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H330	Fatal if inhaled
H350	May cause cancer
H360DF	May damage fertility, May damage the unborn child
H411	Toxic to aquatic life with long lasting effects
EUH014	Reacts violently with water
EUH071	Corrosive to the respiratory tract
EUH208	Contains sensitising substance. May produce an allergic reaction
<b>Precautionary statements</b>	
◆ Prevention	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe gas/mist/vapour/spray.
P264	Wash hands and other parts of the body (if related) thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P284	[In case of inadequate ventilation] wear respiratory protection.
◆ Response	
P310	Immediately call a POISON CENTER/doctor.
P320	Specific treatment is urgent (see related instructions on the label).
P321	Specific treatment (see related instructions on the label).
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse affected areas with water [or shower].
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
◆ Storage	
P405	Store locked up.

P403+P233

Store in a well-ventilated place. Keep container tightly closed.

## ◆ Disposal

P501

Dispose of contents/container in accordance with local/regional/national/international regulations.

**2.3 Other hazards**

## ◆ Results of PBT and vPvB assessment

Component	Results of PBT and vPvB assessment [according to (EC) No 1907/2006]
Water	Insufficient information, temporarily unable to evaluate
Nitric acid	Not PBT/vPvB
Aluminium	Not applicable
Boron	Not applicable
Barium	Not applicable
Calcium	Not applicable
Cadmium	Not applicable
Cobalt	Not applicable
Copper	Not applicable
Iron	Not applicable
Lithium	Not applicable
Potassium	Insufficient information, temporarily unable to evaluate
Magnesium	Not PBT/vPvB
Manganese	Not applicable
Sodium	Not applicable
Nickel	Not applicable
Lead	Not applicable
Selenium	Not applicable
Zinc	Not applicable
Zirconium	Not applicable
Chromium	Not applicable

## ◆ Results of endocrine disrupting properties assessment

Component	Results of endocrine disrupting properties assessment [according to (EU) No 2017/2100 or (EU) No 2018/605]
Water	Insufficient information, temporarily unable to evaluate
Nitric acid	Insufficient information, temporarily unable to evaluate
Aluminium	Insufficient information, temporarily unable to evaluate
Boron	Insufficient information, temporarily unable to evaluate
Barium	Insufficient information, temporarily unable to evaluate
Calcium	Insufficient information, temporarily unable to evaluate

<b>Cadmium</b>	Insufficient information, temporarily unable to evaluate
<b>Cobalt</b>	Insufficient information, temporarily unable to evaluate
<b>Copper</b>	Insufficient information, temporarily unable to evaluate
<b>Iron</b>	Insufficient information, temporarily unable to evaluate
<b>Lithium</b>	Insufficient information, temporarily unable to evaluate
<b>Potassium</b>	Insufficient information, temporarily unable to evaluate
<b>Magnesium</b>	Insufficient information, temporarily unable to evaluate
<b>Manganese</b>	Insufficient information, temporarily unable to evaluate
<b>Sodium</b>	Insufficient information, temporarily unable to evaluate
<b>Nickel</b>	Insufficient information, temporarily unable to evaluate
<b>Lead</b>	Insufficient information, temporarily unable to evaluate
<b>Selenium</b>	Insufficient information, temporarily unable to evaluate
<b>Zinc</b>	Insufficient information, temporarily unable to evaluate
<b>Zirconium</b>	Insufficient information, temporarily unable to evaluate
<b>Chromium</b>	Insufficient information, temporarily unable to evaluate

◆ Other

Not applicable.

### 3 Composition/information on ingredients

#### 3.1 Substance

Not applicable

#### 3.2 Mixture

Component	Weight % content(or range)	Classification according to Regulation ( EC ) No. 1272/2008 with amendment 2023/707 [CLP]	Specific Conc. Limits, M-factors
<b>Water</b> CAS : 7732-18-5 EC : 231-791-2 Index No. : -	93.1	Not Classified	-
<b>Nitric acid</b> CAS : 7697-37-2 EC : 231-714-2 Index No. : 007-004-00-1	5	Oxidizing liquids, Category 2, H272; Skin corrosion/irritation, Category 1A, H314; Acute Toxicity - Inhalation, Category 1, H330; Corrosive to the respiratory tract, EUH071	H272Y2:C ≥ 99% H272Y3:70% ≤ C < 99%
<b>Aluminium</b> CAS : 7429-90-5 EC : 231-072-3 Index No. : 013-001-00-6	0.1	Pyrophoric solids, Category 1, H250; Substances and mixtures which, in contact with water, emit flammable gases, Category 2, H261	-
<b>Boron</b> CAS : 7440-42-8 EC : 231-151-2 Index No. : -	0.1	Not Classified	-
<b>Barium</b> CAS : 7440-39-3 EC : 231-149-1 Index No. : -	0.1	Flammable solids, Category 1, H228; Substances and mixtures which, in contact with water, emit flammable gases, Category 1, H260; Acute Toxicity - Oral, Category 3, H301; Skin corrosion/irritation, Category 1, H314; Serious eye	-

		damage/irritation, Category 1, H318	
<b>Calcium</b> CAS : 7440-70-2 EC : 231-179-5 Index No. : 020-001-00-X	0.1	Substances and mixtures which, in contact with water, emit flammable gases, Category 2, H261	-
<b>Cadmium</b> CAS : 7440-43-9 EC : 231-152-8 Index No. : 048-002-00-0	0.1	Acute Toxicity - Inhalation, Category 2, H330; Germ cell mutagenicity, Category 2, H341; Carcinogenicity, Category 1B, H350; Reproductive toxicity, Category 2, H361; Specific target organ toxicity - repeated exposure, Category 1, H372; Hazardous to the aquatic environment - short-term (acute) hazard, Category 1, H400; Hazardous to the aquatic environment - long-term (chronic) hazard, Category 1, H410	-
<b>Cobalt</b> CAS : 7440-48-4 EC : 231-158-0 Index No. : 027-001-00-9	0.1	Sensitization - skin, Category 1, H317; Sensitization - respiratory, Category 1, H334; Germ cell mutagenicity, Category 2, H341; Carcinogenicity, Category 1B, H350; Reproductive toxicity, Category 1B, H360; Hazardous to the aquatic environment - long-term (chronic) hazard, Category 4, H413	-
<b>Copper</b> CAS : 7440-50-8 EC : 231-159-6 Index No. : 029-026-00-0	0.1	Hazardous to the aquatic environment - short-term (acute) hazard, Category 1, H400; Hazardous to the aquatic environment - long-term (chronic) hazard, Category 1, H410	M=10;M(Chronic)=1
<b>Iron</b> CAS : 7439-89-6 EC : 231-096-4 Index No. : -	0.1	Not Classified	-
<b>Lithium</b> CAS : 7439-93-2 EC : 231-102-5 Index No. : 003-001-00-4	0.1	Substances and mixtures which, in contact with water, emit flammable gases, Category 1, H260; Skin corrosion/irritation, Category 1B, H314; Reacts violently with water, EUH014	-
<b>Potassium</b> CAS : 7440-09-7 EC : 231-119-8 Index No. : 019-001-00-2	0.1	Substances and mixtures which, in contact with water, emit flammable gases, Category 1, H260; Skin corrosion/irritation, Category 1B, H314; Reacts violently with water, EUH014	-
<b>Magnesium</b> CAS : 7439-95-4 EC : 231-104-6 Index No. : 012-001-00-3	0.1	Pyrophoric solids, Category 1, H250; Substances and mixtures which, in contact with water, emit flammable gases, Category 1, H260	-
<b>Manganese</b> CAS : 7439-96-5 EC : 231-105-1 Index No. : -	0.1	Not Classified	-
<b>Sodium</b> CAS : 7440-23-5 EC : 231-132-9 Index No. : 011-001-00-0	0.1	Substances and mixtures which, in contact with water, emit flammable gases, Category 1, H260; Skin corrosion/irritation, Category 1B, H314; Reacts violently with water, EUH014	-
<b>Nickel</b> CAS : 7440-02-0 EC : 231-111-4 Index No. : 028-002-00-7	0.1	Sensitization - skin, Category 1, H317; Carcinogenicity, Category 2, H351; Specific target organ toxicity - repeated exposure, Category 1, H372	-

<b>Lead</b> CAS : 7439-92-1 EC : 231-100-4 Index No. : 082-013-00-1	0.1	Reproductive toxicity, Category 1A, H360; Reproductive Toxicity - effects on or via lactation, Additional, H362; Hazardous to the aquatic environment - short-term (acute) hazard, Category 1, H400; Hazardous to the aquatic environment - long-term (chronic) hazard, Category 1, H410	H360A:C ≥ 0.03%;M=10;M(Chronic)=100
<b>Selenium</b> CAS : 7782-49-2 EC : 231-957-4 Index No. : 034-001-00-2	0.1	Acute Toxicity - Oral, Category 3, H301; Acute Toxicity - Inhalation, Category 3, H331; Specific target organ toxicity - repeated exposure, Category 2, H373; Hazardous to the aquatic environment - long-term (chronic) hazard, Category 4, H413	-
<b>Zinc</b> CAS : 7440-66-6 EC : 231-175-3 Index No. : 030-001-00-1	0.1	Pyrophoric solids, Category 1, H250; Substances and mixtures which, in contact with water, emit flammable gases, Category 1, H260; Hazardous to the aquatic environment - short-term (acute) hazard, Category 1, H400; Hazardous to the aquatic environment - long-term (chronic) hazard, Category 1, H410	-
<b>Zirconium</b> CAS : 7440-67-7 EC : 231-176-9 Index No. : 040-001-00-3	0.1	Pyrophoric solids, Category 1, H250; Substances and mixtures which, in contact with water, emit flammable gases, Category 1, H260	-
<b>Chromium</b> CAS : 7440-47-3 EC : 231-157-5 Index No. : -	0.1	Not Classified	-

## 4 First-aid measures

### 4.1 Description of first aid measures

<b>General advice</b>	Immediate medical attention is required. Show this safety data sheet (SDS) to the doctor in attendance.
<b>Eye contact</b>	Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician if feel uncomfortable.
<b>Skin contact</b>	Take off contaminated clothing and shoes immediately. Wash off with plenty of soap and water for at least 15 minutes and consult a physician if feel uncomfortable.
<b>Ingestion</b>	Never give anything by mouth to an unconscious person. Call a physician or Poison Control Center immediately.
<b>Inhalation</b>	Move victim into fresh air. If breathing is difficult, give oxygen. Do not use mouth to mouth resuscitation if victim ingested or inhaled the substance. If not breathing, give artificial respiration and consult a physician immediately.
<b>Protecting of first-aiders</b>	Ensure that medical personnel are aware of the substance involved. Take precautions to protect themselves and prevent spread of contamination.

### 4.2 Most important symptoms/effects, acute and delayed

1	Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.
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### 4.3 Indication of any immediate medical attention and special treatment needed

1	Treat symptomatically.
2	Symptoms may be delayed.

## 5 Fire-fighting measures

### 5.1 Extinguishing media

<b>Suitable extinguishing media</b>	Use extinguishing media suitable for surrounding area.
<b>Unsuitable extinguishing media</b>	There is no restriction on the type of extinguisher which may be used.

### 5.2 Specific hazards arising from the substance or mixture

1	Development of hazardous combustion gases or vapor possible in the event of fire.
2	May expand or decompose explosively when heated or involved in fire.

### 5.3 Advice for firefighters

1	As in any fire, wear self-contained breathing apparatus (MSHA/NIOSH approved or equivalent) and full protective gear.
2	Fight fire from a safe distance, with adequate cover.
3	Prevent fire extinguishing water from contaminating surface water or the ground water system.

## 6 Accidental release measures

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

1	Use personal protective equipment, do not breathe gas/mist/vapour/spray.
2	Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.
3	Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

### 6.2 Environmental precautions

1	Prevent further leakage or spillage if safe to do so.
2	Discharge into the environment must be avoided.

### 6.3 Methods and materials for containment and cleaning up

1	Cut off the source of the leak as much as possible.
2	Keep leaks in a ventilated place.
3	Absorb spilled material in dry sand or inert absorbent. In case of large amount of spillage, contain a spill by bunding.
4	Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.
5	Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container.

### 6.4 Reference to other sections

1	Personal Protective Equipment advice is contained in Section 8 of the SDS.
2	Disposal considerations advice is contained in Section 13 of the SDS.

## 7 Handling and storage

### 7.1 Precautions for safe handling

#### ◆ Protective measures

1	Handling is performed in a well ventilated place.
2	Wear suitable protective equipment.
3	Avoid contact with skin and eyes.

◆ Measures to prevent fire

1 Keep away from heat/sparks/open flames/ hot surfaces.

◆ Measures to prevent aerosol and dust generation

1 Not applicable.

◆ Advice on general occupational hygiene

1 Wash hands and face after using the substances.

2 Replace the contaminated clothing immediately.

## 7.2 Conditions for safe storage, including any incompatibilities

1 Keep containers tightly closed.

2 Keep containers in a dry, cool and well-ventilated place.

3 Keep away from heat/sparks/open flames/hot surfaces.

4 Store away from incompatible materials and foodstuff containers.

## 7.3 Specific end use(s)

1 In addition to use mentioned in the Section 1.2, unforeseen other specific end uses.

# 8 Exposure controls/personal protection

## 8.1 Control parameters

◆ Occupational exposure limit values

Component	Country/Region	Limit value - Eight hours		Limit value - Short term	
		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Nitric acid	Japan - JSOH(2024-2025)	2	5.2	-	-
	Permissible exposure standards for workers in the workplace	2	5.2	4	10.4
	European Union	-	-	1	2.6
	France	-	-	1	2.6
	Germany (AGS)	-	-	1	2.6
	Italy	-	-	1	2.6
Aluminium	Japan - JSOH(2024-2025)	-	0.5(respirable dust)	-	-
	Japan - JSOH(2024-2025)	-	2(total dust)	-	-
	Permissible exposure standards for workers in the workplace	-	5(respirable dust)	-	10(respirable dust)
	France	-	10(inhalable aerosol)	-	-
	Germany (DFG)	-	4	-	-

	United Kingdom	-	10(inhalable fraction);4(respirable fraction)	-	-
<b>Boron</b>	Germany (DFG)	-	0.75	-	0.75
<b>Barium</b>	Permissible exposure standards for workers in the workplace	-	0.5	-	1.5
	European Union	-	0.5	-	-
	France	-	0.5	-	-
	Germany (AGS)	-	0.5(inhalable aerosol)	-	0.5(inhalable aerosol)
	Germany (DFG)	-	0.5	-	4
	Italy	-	0.5	-	-
<b>Cadmium</b>	Japan - JSOH(2024-2025)	-	0.05	-	-
	Permissible exposure standards for workers in the workplace	-	0.05(as Cd)	-	0.15(as Cd)
	European Union	-	0.001	-	-
	France	-	0.05	-	-
	Germany (AGS)	-	0.002	-	0.016
	Italy	-	0.001	-	-
<b>Cobalt</b>	Japan - JSOH(2024-2025)	-	0.05	-	-
	Permissible exposure standards for workers in the workplace	-	0.05(dust and fume)	-	0.15(dust and fume)
	Germany (AGS)	-	0.005	-	0.04
	United Kingdom	-	0.1	-	-
	Austria	-	0.1	-	0.4
	Belgium	-	0.02	-	-
<b>Copper</b>	Permissible exposure standards for workers in the workplace	-	1(dust and mist)	-	2(dust and mist)
	Permissible exposure standards for workers in the workplace	-	0.2(fume)	-	0.6(fume)
	France	-	0.2(fume, respirable fraction)	-	-

	Germany (DFG)	-	0.01	-	0.02
	United Kingdom	-	1(dusts and mists)	-	2
	Austria	-	1(inhalable aerosol)	-	-
<b>Lithium</b>	Germany (AGS)	-	0.2	-	0.2
	Germany (DFG)	-	0.2	-	0.2
	Sweden	-	-	-	0.02
	Switzerland	-	0.2	-	0.2
<b>Manganese</b>	Japan - JSOH(2024-2025)	-	0.02(respirable particles, as Mn)	-	-
	Japan - JSOH(2024-2025)	-	0.1(total particulate, as Mn)	-	-
	Permissible exposure standards for workers in the workplace	-	1(fume)	-	2(fume)
	European Union	-	0.2	-	-
	France	-	0.2	-	-
	Germany (AGS)	-	0.02	-	0.16
<b>Nickel</b>	Japan - JSOH(2024-2025)	-	1	-	-
	Permissible exposure standards for workers in the workplace	-	1	-	2
	France	-	1	-	-
	Germany (AGS)	-	0.006	-	0.048
	United Kingdom	-	-	-	3
	Austria	-	0.5	-	2
<b>Lead</b>	Japan - JSOH(2024-2025)	-	0.03(as Pb)	-	-
	Permissible exposure standards for workers in the workplace	-	0.05	-	0.15
	European Union	-	0.15	-	-
	France	-	0.1(inhalable aerosol)	-	-
	Germany (AGS)	-	0.15	-	-
	Germany (DFG)	-	0.004	-	0.032
<b>Selenium</b>	Japan - JSOH(2024-2025)	-	0.1	-	-

	Permissible exposure standards for workers in the workplace	-	0.2(as Se)	-	0.6(as Se)
	Germany (AGS)	-	0.05(inhalable aerosol)	-	0.05(inhalable aerosol)
	Germany (DFG)	-	0.02	-	0.16
	United Kingdom	-	0.1	-	-
	Austria	-	0.1(inhalable aerosol)	-	0.3(inhalable aerosol)
<b>Zinc</b>	Germany (DFG)	-	2	-	4
	Switzerland	-	0.1(respirable aerosol)	-	0.4(respirable aerosol)
<b>Zirconium</b>	Germany (DFG)	-	1(inhalable aerosol)	-	1(inhalable aerosol)
	United Kingdom	-	5	-	10
	Austria	-	5(inhalable aerosol)	-	-
	Belgium	-	5	-	10
	Denmark	-	5	-	10
	Finland	-	1	-	-
<b>Chromium</b>	Japan - JSOH(2024–2025)	-	0.5	-	-
	Permissible exposure standards for workers in the workplace	-	1	-	2
	European Union	-	2	-	-
	France	-	2	-	-
	Germany (AGS)	-	2	-	2
	Italy	-	0.5	-	-

◆ Biological limit values

Component	Standard	Biological monitoring index	Biological limits value	Sampling time	Remark
<b>Cadmium</b>	SCOEL(EU)	Cd	2 µg/g creatinine	Not strictly regulated	
		Cadmium(Creatinine in urine)	5µg/g	Not critical	
		Cadmium(Blood)	5µg/L	Not critical	
<b>Cobalt</b>	USA -ACGIH	Cobalt(Urine)	15µg/L	End of shift at end of work week	
<b>Nickel</b>	USA -ACGIH	Nickel(Urine)	5µg/L	End of shift at end of work week	
<b>Lead</b>	SCOEL(EU)	Not strictly regulated	0.3mg/L	Not strictly regulated	

		Lead(Blood)	200µg/L	Not critical	
<b>Chromium</b>	USA -ACGIH	Total chromium(Urine)	0.7µg/L	End of shift at end of work week	

◆ Monitoring methods

1	EN 14042 Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.
2	GBZ/T 300 and GBZ/T 160 series standard Determination of toxic substances in workplace air.

◆ Derived No effect level (DNEL)

Component	Route of exposure	DNEL for Workers			
		Acute effects (local)	Acute effects (systemic)	Chronic effects (local)	Chronic effects (systemic)
<b>Water</b>	Inhalation	No data available	No data available	No data available	No data available
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Nitric acid</b>	Inhalation	No data available	No data available	No data available	No data available
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Aluminium</b>	Inhalation	No data available	No data available	3.72 mg/m <sup>3</sup>	3.72 mg/m <sup>3</sup>
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Boron</b>	Inhalation	No data available	No data available	No data available	No data available
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Barium</b>	Inhalation	No data available	No data available	No data available	5.8 mg/m <sup>3</sup>
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Calcium</b>	Inhalation	No data available	No data available	1 mg/m <sup>3</sup>	No data available
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Cadmium</b>	Inhalation	No data available	No data available	0.004 mg/m <sup>3</sup>	No data available
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Cobalt</b>	Inhalation	No data available	No data available	0.04 mg/m <sup>3</sup>	0.0541 mg/m <sup>3</sup>
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Copper</b>	Inhalation	No data available	No data available	No data available	No data available
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Iron</b>	Inhalation	No data available	No data available	3 mg/m <sup>3</sup>	No data available

	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Lithium</b>	Inhalation	No data available	No data available	No data available	4.2 mg/m <sup>3</sup>
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Potassium</b>	Inhalation	No data available	No data available	No data available	No data available
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Magnesium</b>	Inhalation	No data available	No data available	10 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Manganese</b>	Inhalation	No data available	No data available	No data available	0.0101 mg/m <sup>3</sup>
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Sodium</b>	Inhalation	No data available	No data available	No data available	No data available
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Nickel</b>	Inhalation	No data available	No data available	No data available	No data available
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Lead</b>	Inhalation	No data available	No data available	No data available	No data available
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Selenium</b>	Inhalation	No data available	No data available	No data available	0.05 mg/m <sup>3</sup>
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Zinc</b>	Inhalation	No data available	No data available	No data available	No data available
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Zirconium</b>	Inhalation	No data available	No data available	No data available	5 mg/m <sup>3</sup>
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available
<b>Chromium</b>	Inhalation	No data available	No data available	0.5 mg/m <sup>3</sup>	No data available
	Oral	No data available	No data available	No data available	No data available
	Dermal	No data available	No data available	No data available	No data available

◆ Predicted No Effect Concentration (PNEC)

Component	A	B	C	D	E	F	G	H
<b>Nitric acid</b>	No hazard identified	No hazard identified	No hazard identified	No hazard identified	No hazard identified	No hazard identified	No hazard identified	No potential for bioaccumulation
<b>Aluminium</b>	No data available	No data available	20 mg/L	No data available	No data available	No hazard identified	No data available	No data available
<b>Boron</b>	2.9 mg/L	2.9 mg/L	10 mg/L	No data available	No data available	No hazard identified	5.7 mg/kg soil dw	No potential for bioaccumulation
<b>Barium</b>	114.7 µg/L	No data available	62.2 mg/L	598.9 mg/kg sediment dw	No hazard identified	No hazard identified	207.7 mg/kg soil dw	No potential for bioaccumulation
<b>Calcium</b>	No data available	No data available	No data available	No data available	No data available	No hazard identified	No data available	No potential for bioaccumulation
<b>Cadmium</b>	190 ng/L	1.14 µg/L	20 µg/L	1.8 mg/kg sediment dw	640 µg/kg sediment dw	No hazard identified	900 µg/kg soil dw	160 µg/kg food
<b>Cobalt</b>	1.06 µg/L	2.36 µg/L	370 µg/L	53.8 mg/kg sediment dw	69.8 mg/kg sediment dw	No hazard identified	10.9 mg/kg soil dw	No potential for bioaccumulation
<b>Copper</b>	6.3 µg/L	5.2 µg/L	230 µg/L	87 mg/kg sediment dw	676 mg/kg sediment dw	No hazard identified	65 mg/kg soil dw	No potential for bioaccumulation
<b>Iron</b>	No data available	No data available	No data available	No data available	No data available	No hazard identified	No data available	No data available
<b>Lithium</b>	1.65 mg/L	165 µg/L	22.94 mg/L	6.6 - 44.2 mg/kg sediment dw	660 - 4420 µg/kg sediment dw	No hazard identified	260 - 6290 µg/kg soil dw	No potential for bioaccumulation
<b>Magnesium</b>	410 - 2000 µg/L	410 - 26500 µg/L	10.8 mg/L	87.8 - 268 mg/kg sediment dw	8.78 - 268 mg/kg sediment dw	10 mg/m <sup>3</sup>	28.7 - 268 mg/kg soil dw	212 mg/kg food
<b>Manganese</b>	22 - 34 µg/L	2.2 - 3.4 µg/L	100 mg/L	108 - 3300 µg/kg sediment dw	10.8 - 340 µg/kg sediment dw	No hazard identified	8.74 - 3400 µg/kg soil dw	No potential for bioaccumulation
<b>Sodium</b>	No data available	No data available	No data available	No data available	No data available	No hazard identified	No data available	No data available
<b>Lead</b>	2.4 µg/L	3.3 µg/L	100 µg/L	186 mg/kg	168 mg/kg	No hazard	212 mg/kg	10.9 mg/kg

				sediment dw	sediment dw	identified	soil dw	food
<b>Selenium</b>	2.67 µg/L	2 µg/L	1.5 mg/L	8.2 mg/kg sediment dw	6.2 mg/kg sediment dw	No hazard identified	44 - 100 µg/kg soil dw	1 mg/kg food
<b>Zinc</b>	14.4 µg/L	7.2 µg/L	100 µg/L	146.9 mg/kg sediment dw	162.2 mg/kg sediment dw	No hazard identified	83.1 mg/kg soil dw	No potential for bioaccumulation
<b>Zirconium</b>	74 µg/L	7.4 µg/L	No data available	74.6 mg/kg sediment dw	7.5 mg/kg sediment dw	No data available	7 mg/kg soil dw	No potential for bioaccumulation
<b>Chromium</b>	6.5 µg/L	No data available	No data available	205.7 mg/kg sediment dw	No data available	No hazard identified	21.1 mg/kg soil dw	No potential for bioaccumulation

**Note 1:**

A: Freshwater; B: Seawater; C: Sewage treatment plant; D: Sediment (freshwater); E: Sediment (seawater); F: Air; G: Soil; H: Secondary poisoning(Hazard for Predators).

**Note 2:**

The PNEC values of the remaining components not shown in the product are not available yet.

## 8.2 Exposure controls

### 8.2.1 Engineering controls

1	Ensure adequate ventilation, especially in confined areas.
2	Ensure that eyewash stations and safety showers are close to the workstation location.
3	Use explosion-proof electrical/ventilating/lighting/equipment.
4	Set up emergency exit and necessary risk-elimination area.

### 8.2.2 Personal protection equipment

<b>General requirement</b>	
<b>Eye protection</b>	Must wear appropriate anti-corrosion goggles.
<b>Hand protection</b>	Must wear acid and alkali resistant chemical protective gloves.
<b>Respiratory protection</b>	Must wear appropriate personal dust proof gas mask.
<b>Skin and body protection</b>	Must wear acid and alkali resistant chemical protective clothing.

### 8.2.3 Environmental exposure controls

<b>Environmental exposure controls</b>	No information available
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## 9 Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

<b>Physical state</b>	Brown liquid
<b>Colour</b>	Brown liquid

Odor	No information available
Odor threshold	No information available
pH	No information available
Melting point/freezing point(°C)	No information available
Initial boiling point and boiling range(°C)	>35
Flash point(Closed cup, °C)	No information available
Evaporation rate	No information available
Flammability	No information available
Upper/lower explosive limits[%(v/v)]	Upper limit : No information available ; Lower limit : No information available
Vapor pressure	No information available
Vapor density(Air = 1)	No information available
Relative density(Water=1)	No information available
Solubility	No information available
n-octanol/water partition coefficient	No information available
Auto-ignition temperature(°C)	No information available
Decomposition temperature(°C)	No information available
Kinematic viscosity	No information available
Explosive properties	No information available
Oxidizing properties	No information available
Particle characteristics	Not applicable

## 9.2 Other information

### 9.2.1 Information with regard to physical hazard classes

Information with regard to physical hazard classes	No information available
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### 9.2.2 Other safety characteristics

Other safety characteristics	No information available
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## 10 Stability and reactivity

### Stability and reactivity

10.1 Reactivity	Contact with incompatible substances can cause decomposition or other chemical reactions.
10.2 Chemical stability	Stable under proper operation and storage conditions.
10.3 Possibility of hazardous reactions	In contact with active metals (alkali metals, Na, Ca etc.) causes a reaction and release hydrogen. Ultrafine powder will self-ignite in the air at room temperature. Mixtures with metallic acetylene, when heated, cause a fire or incandescence. May burn continuously in carbon dioxide. Reacts severely with halogens, interhalogens or other strong oxidants, or causes a fire. May be oxidized quickly when exposed to air.
10.4 Conditions to avoid	Incompatible materials, heat, flame and spark.
10.5 Incompatible materials	Alkali, sodium, calcium, and other active metal, halogen, metal oxide, nonmetal oxide, acyl halide and metal phosphide. Oxidants, halogen, interhalogen and mercury. Metal acetylide, halogen, interhalogen, halogen oxides, nitric acid, nitrous oxide, nitrates, nitrites, halogen oxyacid salts, chromates,

	permanganates, inorganic peroxides, metal oxides and peroxyformic acid. Water, carbon dioxide, oxidants, halogen, interhalogen and mercury. Halogen, interhalogen, strong oxidant, water and acids. Water, carbon dioxide, halocarbon, halogen, interhalogen, metal halide, non-metal oxides, acids, mercury and hydrazine.
<b>10.6 Hazardous decomposition products</b>	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## 11 Toxicological information

### 11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008 with amendment 2023/707

19 Mix metal standard solution	
<b>Skin corrosion/irritation</b>	Causes severe skin burns and eye damage(Category 1)
<b>Serious eye damage/irritation</b>	Causes serious eye damage(Category 1)
<b>Skin sensitization</b>	Based on available data, the classification criteria are not met
<b>Respiratory sensitization</b>	Based on available data, the classification criteria are not met
<b>Reproductive toxicity</b>	May damage fertility, May damage the unborn child(Category 1A)
<b>STOT-single exposure</b>	Based on available data, the classification criteria are not met
<b>STOT-repeated exposure</b>	Based on available data, the classification criteria are not met
<b>Aspiration hazard</b>	Based on available data, the classification criteria are not met
<b>Germ cell mutagenicity</b>	Based on available data, the classification criteria are not met

### Acute toxicity

Component	LD <sub>50</sub> (oral)	LD <sub>50</sub> (dermal)	LC <sub>50</sub> (inhalation,4h)
<b>Cadmium</b>	2330mg/kg(Rat)	No information available	No information available
<b>Selenium</b>	6700mg/kg(Rat)	No information available	5.67mg/L(Rat)
<b>Iron</b>	30000mg/kg(Rat)	No information available	No information available
<b>Boron</b>	650mg/kg(Rat)	No information available	No information available
<b>Cobalt</b>	6171mg/kg(Rat)	No information available	No information available
<b>Manganese</b>	9000mg/kg(Rat)	No information available	No information available

### Carcinogenicity

Component	List of carcinogens by the IARC Monographs	Report on Carcinogens by NTP
<b>Water</b>	Not Listed	Not Listed
<b>Nitric acid</b>	Not Listed	Not Listed
<b>Aluminium</b>	Not Listed	Not Listed
<b>Boron</b>	Not Listed	Not Listed
<b>Barium</b>	Not Listed	Not Listed
<b>Calcium</b>	Not Listed	Not Listed
<b>Cadmium</b>	Category 1	Category K
<b>Cobalt</b>	Category 2A	Category R
<b>Copper</b>	Not Listed	Not Listed

<b>Iron</b>	Not Listed	Not Listed
<b>Lithium</b>	Not Listed	Not Listed
<b>Potassium</b>	Not Listed	Not Listed
<b>Magnesium</b>	Not Listed	Not Listed
<b>Manganese</b>	Not Listed	Not Listed
<b>Sodium</b>	Not Listed	Not Listed
<b>Nickel</b>	Category 2B	Category R
<b>Lead</b>	Category 2B	Category R
<b>Selenium</b>	Category 3	Not Listed
<b>Zinc</b>	Not Listed	Not Listed
<b>Zirconium</b>	Not Listed	Not Listed
<b>Chromium</b>	Category 3	Not Listed

## 11.2 Information on other hazards

### 11.2.1 Endocrine disrupting properties

<b>Component</b>	<b>Endocrine disrupting properties</b>
<b>Water</b>	No information available
<b>Nitric acid</b>	No information available
<b>Aluminium</b>	No information available
<b>Boron</b>	No information available
<b>Barium</b>	No information available
<b>Calcium</b>	No information available
<b>Cadmium</b>	No information available
<b>Cobalt</b>	No information available
<b>Copper</b>	No information available
<b>Iron</b>	No information available
<b>Lithium</b>	No information available
<b>Potassium</b>	No information available
<b>Magnesium</b>	No information available
<b>Manganese</b>	No information available
<b>Sodium</b>	No information available
<b>Nickel</b>	No information available
<b>Lead</b>	No information available
<b>Selenium</b>	No information available
<b>Zinc</b>	No information available
<b>Zirconium</b>	No information available
<b>Chromium</b>	No information available

## 11.2.2 Other Information

Other Information	See Section 11.1
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## 12 Ecological information

### 12.1 Toxicity

#### Acute aquatic toxicity

Component	Fish	Crustaceans	Algae or other aquatic plants
<b>Cadmium</b>	LC <sub>50</sub> : 7.8mg/L (96h)(Fish)	EC <sub>50</sub> : 0.58mg/L (48h)(Crustaceans)	No information available
<b>Iron</b>	LC <sub>50</sub> : 1.29mg/L (96h)(Fish)	No information available	No information available
<b>Lithium</b>	LC <sub>50</sub> : 18mg/L (96h)(Fish)	No information available	No information available
<b>Copper</b>	LC <sub>50</sub> : 0.665mg/L (96h)(Fish)	EC <sub>50</sub> : 0.02mg/L (48h)(Crustaceans)	ErC <sub>50</sub> : 7.9mg/L (96h)(Algae)
<b>Lead</b>	LC <sub>50</sub> : 2.8mg/L (96h)(Fish)	No information available	No information available
<b>Selenium</b>	LC <sub>50</sub> : 2.06mg/L (96h)(Fish)	No information available	ErC <sub>50</sub> : 96mg/L (96h)(Algae)
<b>Magnesium</b>	LC <sub>50</sub> : 541mg/L (96h)(Fish)	No information available	No information available
<b>Zirconium</b>	LC <sub>50</sub> : 74mg/L (96h)(Fish)	No information available	No information available
<b>Nickel</b>	LC <sub>50</sub> : 40mg/L (96h)(Fish)	EC <sub>50</sub> : 1mg/L (48h)(Crustaceans)	No information available
<b>Chromium</b>	LC <sub>50</sub> : 40.5mg/L (96h)(Fish)	EC <sub>50</sub> : 0.07mg/L (48h)(Crustaceans)	No information available
<b>Zinc</b>	LC <sub>50</sub> : 2.01mg/L (96h)(Fish)	EC <sub>50</sub> : 1.33mg/L (48h)(Crustaceans)	No information available
<b>Cobalt</b>	LC <sub>50</sub> : 1.5mg/L (96h)(Fish)	No information available	No information available
<b>Aluminium</b>	LC <sub>50</sub> : 1.55mg/L (96h)(Fish)	No information available	No information available
<b>Manganese</b>	LC <sub>50</sub> : 1800mg/L (96h)(Fish)	EC <sub>50</sub> : 40mg/L (48h)(Crustaceans)	No information available
<b>Calcium</b>	No information available	EC <sub>50</sub> : 49.1mg/L (48h)(Crustaceans)	No information available

#### Chronic aquatic toxicity

Component	Fish	Crustaceans	Algae or other aquatic plants
<b>Selenium</b>	NOEC : 0.025mg/L(Fish)	No information available	No information available

### 12.2 Persistence and degradability

Component	Persistence (water/soil)	Persistence (air)
<b>Nickel</b>	Low	Low

### 12.3 Bioaccumulative potential

Component	Bioaccumulative potential	Comments
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<b>Nickel</b>	Low	Log Kow=-1.38
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#### 12.4 Mobility in soil

Component	log Koc	Remark
Magnesium	1.12	20 °C
Nickel	1.155	
Zirconium	4.61	20 °C

#### 12.5 Results of PBT and vPvB assessment

Component	Results of PBT and vPvB assessment [according to (EC) No 1907/2006]
Water	Insufficient information, temporarily unable to evaluate
Nitric acid	Not PBT/vPvB
Aluminium	Not applicable
Boron	Not applicable
Barium	Not applicable
Calcium	Not applicable
Cadmium	Not applicable
Cobalt	Not applicable
Copper	Not applicable
Iron	Not applicable
Lithium	Not applicable
Potassium	Insufficient information, temporarily unable to evaluate
Magnesium	Not PBT/vPvB
Manganese	Not applicable
Sodium	Not applicable
Nickel	Not applicable
Lead	Not applicable
Selenium	Not applicable
Zinc	Not applicable
Zirconium	Not applicable
Chromium	Not applicable

#### 12.6 Endocrine disrupting properties

Component	Endocrine disrupting properties
Water	No information available
Nitric acid	No information available
Aluminium	No information available
Boron	No information available

<b>Barium</b>	No information available
<b>Calcium</b>	No information available
<b>Cadmium</b>	No information available
<b>Cobalt</b>	No information available
<b>Copper</b>	No information available
<b>Iron</b>	No information available
<b>Lithium</b>	No information available
<b>Potassium</b>	No information available
<b>Magnesium</b>	No information available
<b>Manganese</b>	No information available
<b>Sodium</b>	No information available
<b>Nickel</b>	No information available
<b>Lead</b>	No information available
<b>Selenium</b>	No information available
<b>Zinc</b>	No information available
<b>Zirconium</b>	No information available
<b>Chromium</b>	No information available

### 12.7 Other adverse effects

	No information available
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## 13 Disposal considerations

### 13.1 Waste treatment methods

<b>Waste chemicals</b>	Before disposal should refer to the relevant national and local laws and regulation. Recommend the use of incineration disposal.
<b>Contaminated packaging</b>	Containers may still present chemical hazard when empty. Keep away from hot and ignition source of fire. Return to supplier for recycling if possible.
<b>Disposal recommendations</b>	Refer to section waste chemicals and contaminated packaging.

## 14 Transport information

### Label and Mark

<b>Transporting Label</b>	Not applicable
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### IMDG-CODE

<b>IMDG-CODE</b>	NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS
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### IATA-DGR

<b>IATA-DGR</b>	NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS
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### UN-ADR

<b>UN-ADR</b>	NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS
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### Special precautions for user

Transport vehicles should be equipped with the appropriate variety and quantity of fire equipment and emergency equipment leakage during transport. Before transport, should be preceded by checking whether container integrity, sealing. The transport unit must be placarded and marked in accordance with relevant transporting requirements.

### Maritime transport in bulk according to IMO instruments

- ◆ Transport in bulk according to Annex II of MARPOL and the IBC code

Not Available

- ◆ Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Not Available

- ◆ Transport in bulk in accordance with the IGC Code

Not Available

## 15 Regulatory information

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

#### International chemical inventory

Component	A	B	C	D	E	F	G	H	I	J	K	L	M
Water	√	√	√	√	√	√	√	√	√	√	√	√	√
Nitric acid	√	√	√	√	√	√	√	√	√	√	√	√	√
Aluminium	√	√	√	√	√	√	√	√	×	√	√	√	√
Boron	√	√	√	√	√	√	√	√	×	√	√	√	√
Barium	√	√	√	√	√	√	√	√	×	√	√	√	√
Calcium	√	√	√	√	√	√	√	√	×	√	√	√	√
Cadmium	√	√	√	√	√	√	√	√	×	√	√	√	√
Cobalt	√	√	√	√	√	√	√	√	×	√	√	√	√
Copper	√	√	√	√	√	√	√	√	×	√	√	√	√
Iron	√	√	√	√	√	√	√	√	×	√	√	√	√
Lithium	√	√	√	√	√	√	√	√	×	√	√	√	√
Potassium	√	√	√	√	√	√	√	√	×	×	√	√	√
Magnesium	√	√	√	√	√	√	√	√	×	√	√	√	√
Manganese	√	√	√	√	√	√	√	√	×	√	√	√	√
Sodium	√	√	√	√	√	√	√	√	×	√	√	√	√
Nickel	√	√	√	√	√	√	√	√	×	√	√	√	√
Lead	√	√	√	√	√	√	√	√	×	√	√	√	√
Selenium	√	√	√	√	√	√	√	√	×	√	√	√	√
Zinc	√	√	√	√	√	√	√	√	×	√	√	√	√
Zirconium	√	√	√	√	√	√	√	√	×	√	√	√	√
Chromium	√	√	√	√	√	√	√	√	×	√	√	√	√

【A】 China Inventory of Existing Chemical Substances(IECSC)

【B】 European Inventory of Existing Commercial Chemical Substances(EC inventory)

- [C] United States Toxic Substances Control Act Inventory(TSCA)  
 [D] Canadian Domestic Substances List(DSL)  
 [E] New Zealand Inventory of Chemicals(NZIoC)  
 [F] Philippines Inventory of Chemicals and Chemical Substances(PICCS)  
 [G] Korea Existing Chemicals Inventory(KECL)  
 [H] Australian. Inventory of Industrial Chemical (AIICS)  
 [I] Japan Inventory of Existing & New Chemical Substances(ENCS)  
 [J] Thailand Existing Chemicals Inventory(TECI)  
 [K] Mexico National Inventory of Chemical Substances (INSQ)  
 [L] Russia Inventory of Existing Substances(DRAFT)  
 [M] Inventory of Existing Chemical Substances in Taiwan, China (TCSI)

### List of Chemical Substances under International Conventions

Component	A	B	C
Water	x	x	x
Nitric acid	x	x	x
Aluminium	x	x	x
Boron	x	x	x
Barium	x	x	x
Calcium	x	x	x
Cadmium	x	x	x
Cobalt	x	x	x
Copper	x	x	x
Iron	x	x	x
Lithium	x	x	x
Potassium	x	x	x
Magnesium	x	x	x
Manganese	x	x	x
Sodium	x	x	x
Nickel	x	x	x
Lead	x	x	x
Selenium	x	x	x
Zinc	x	x	x
Zirconium	x	x	x
Chromium	x	x	x

- [A] The Montreal Protocol on Substances that Deplete the Ozone Layer  
 [B] Stockholm Convention on Persistent Organic Pollutants (POPs)  
 [C] Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade

### European chemical inventory

Component	A	B	C	D	E	F	G	H	I
Water	x	x	x	√	x	x	x	x	x
Nitric acid	x	x	x	√	√	x	x	x	x

<b>Aluminium</b>	x	x	x	√	√	x	x	x	x
<b>Boron</b>	x	x	x	√	√	x	x	x	x
<b>Barium</b>	x	x	x	√	√	x	x	x	x
<b>Calcium</b>	x	x	x	√	√	x	x	x	x
<b>Cadmium</b>	√	x	√	√	√	x	√	x	x
<b>Cobalt</b>	x	x	√	√	√	x	x	x	x
<b>Copper</b>	x	x	x	√	√	x	x	x	x
<b>Iron</b>	x	x	x	√	√	x	x	x	x
<b>Lithium</b>	x	x	x	√	√	x	x	x	x
<b>Potassium</b>	x	x	x	√	√	x	x	x	x
<b>Magnesium</b>	x	x	x	√	√	x	x	x	x
<b>Manganese</b>	x	x	x	√	√	x	x	x	x
<b>Sodium</b>	x	x	x	√	√	x	x	x	x
<b>Nickel</b>	x	x	√	√	√	x	√	x	x
<b>Lead</b>	√	x	√	√	√	x	√	x	x
<b>Selenium</b>	x	x	x	√	√	x	x	x	x
<b>Zinc</b>	x	x	x	√	√	x	x	x	x
<b>Zirconium</b>	x	x	x	√	√	x	x	x	x
<b>Chromium</b>	x	x	x	√	√	x	x	x	x

- [A] Candidate list of Substances of Very High Concern for authorization under EU REACH regulation  
 [B] Substances requiring authorisation under EU REACH regulation  
 [C] Substances restricted under EU REACH  
 [D] Pre-registered substances under EU REACH  
 [E] Registered substances under EU REACH  
 [F] Substance Evaluation – CoRAP under EU REACH  
 [G] List of priority substances under EU water policy ( Directive 2455/2001/EC )  
 [H] Substances subject to POPs Regulation  
 [I] Substances proposed as POPs

Note:

“√” Indicates that the substance included in the regulations.

“x” No data or not included in the regulations.

### German water hazard class(WGK)

Component	WGK	Remark
<b>Nitric acid</b>	WGK 1	
<b>Aluminium</b>	nwg	
<b>Boron</b>	nwg	
<b>Barium</b>	WGK 1	
<b>Calcium</b>	WGK 1	
<b>Cadmium</b>	WGK 3	
<b>Cobalt</b>	WGK 1	
<b>Copper</b>	WGK 2	

<b>Iron</b>	nwg	
<b>Lithium</b>	WGK 1	
<b>Magnesium</b>	nwg	
<b>Manganese</b>	WGK 2	
<b>Sodium</b>	WGK 1	
<b>Nickel</b>	WGK 1	
<b>Selenium</b>	WGK 2	
<b>Zinc</b>	nwg	
<b>Zirconium</b>	WGK 1	
<b>Chromium</b>	nwg	

- 【WGK 1】 slightly hazardous to water  
 【WGK 2】 obviously hazardous to water  
 【WGK 3】 highly hazardous to water  
 【nwg】 non-hazardous to water  
 【awg】 hazardous to water in general

### German technical instructions on air quality control(TA LUFT)

Component	TA LUFT	Remark
<b>Aluminium</b>	Chapter 5.2.1 Overall Dust, including fine dust. The emissions of dust in the exhaust gas are not allowed to exceed the following values: Mass flow: 0.20 kg/hr or Mass conc.: 20 mg/m <sup>3</sup> The mass per unit volume of 0.15 g/m <sup>3</sup> in exhaust gas is not allowed to be exceeded also on observance or lower deviation of a mass flow of 0.20 kg/h. For emission sources that exceed the mass flow rate of 0.40 kg/h, the mass concentration in waste gas the mass concentration must not exceed 10 mg/m <sup>3</sup> .	
<b>Boron</b>	Chapter 5.2.1 Overall Dust, including fine dust. The emissions of dust in the exhaust gas are not allowed to exceed the following values: Mass flow: 0,20 kg/hr or Mass conc.: 20 mg/m <sup>3</sup> The mass per unit volume of 0,15 g/m <sup>3</sup> in exhaust gas is not allowed to be exceeded also on observance or lower deviation of a mass flow of 0,20 kg/h. For emission sources that exceed the mass flow rate of 0.40 kg/h, the mass concentration in waste gas the mass concentration must not exceed 10 mg/m <sup>3</sup> .	
<b>Barium</b>	Chapter 5.2.1 Overall Dust, including fine dust. The emissions of dust in the exhaust gas are not allowed to exceed the following values: Mass flow: 0,20 kg/hr or Mass conc.: 20 mg/m <sup>3</sup> The mass per	

	unit volume of 0,15 g/m <sup>3</sup> in exhaust gas is not allowed to be exceeded also on observance or lower deviation of a mass flow of 0,20 kg/h. For emission sources that exceed the mass flow rate of 0.40 kg/h, the mass concentration in waste gas the mass concentration must not exceed 10 mg/m <sup>3</sup> .	
<b>Calcium</b>	Chapter 5.2.1 Overall Dust, including fine dust. The emissions of dust in the exhaust gas are not allowed to exceed the following values: Mass flow: 0,20 kg/hr or Mass conc.: 20 mg/m <sup>3</sup> The mass per unit volume of 0,15 g/m <sup>3</sup> in exhaust gas is not allowed to be exceeded also on observance or lower deviation of a mass flow of 0,20 kg/h. For emission sources that exceed the mass flow rate of 0.40 kg/h, the mass concentration in waste gas the mass concentration must not exceed 10 mg/m <sup>3</sup> .	
<b>Cadmium</b>	Chapter 5.2.7.1.1 Carcinogenic substances. Class I. As minimum requirement, the following values are in all not allowed to be exceeded in the exhaust gas: Mass flow: 0.15 g/hr or Mass conc.: 0.05 mg/m <sup>3</sup> . Specified as Cd.	
<b>Cobalt</b>	Chapter 5.2.2 Inorganic dusts. Class II. Also with the presence of several substances of the same class, the following values are in all not allowed to be exceeded in the exhaust gas: Mass flow: 2,5 g/hr or Mass conc.: 0,5 mg/m <sup>3</sup> . Specified as Co.	
<b>Copper</b>	Chapter 5.2.2 Inorganic dusts. Class III. Also with the presence of several substances of the same class, the following values are in all not allowed to be exceeded in the exhaust gas: Mass flow: 5 g/hr or Mass conc.: 1 mg/m <sup>3</sup> . Specified as Cu.	
<b>Iron</b>	Chapter 5.2.1 Overall Dust, including fine dust. The emissions of dust in the exhaust gas are not allowed to exceed the following values: Mass flow: 0,20 kg/hr or Mass conc.: 20 mg/m <sup>3</sup> The mass per unit volume of 0,15 g/m <sup>3</sup> in exhaust gas is not allowed to be exceeded also on observance or lower deviation of a mass flow of 0,20 kg/h. For emission sources that exceed the mass flow rate of 0.40 kg/h, the mass concentration in waste gas the mass concentration must not exceed 10 mg/m <sup>3</sup> .	

<b>Lithium</b>	Chapter 5.2.1 Overall Dust, including fine dust. The emissions of dust in the exhaust gas are not allowed to exceed the following values: Mass flow: 0,20 kg/hr or Mass conc.: 20 mg/m <sup>3</sup> The mass per unit volume of 0,15 g/m <sup>3</sup> in exhaust gas is not allowed to be exceeded also on observance or lower deviation of a mass flow of 0,20 kg/h. For emission sources that exceed the mass flow rate of 0.40 kg/h, the mass concentration in waste gas the mass concentration must not exceed 10 mg/m <sup>3</sup> .	
<b>Potassium</b>	Chapter 5.2.1 Overall Dust, including fine dust. The emissions of dust in the exhaust gas are not allowed to exceed the following values: Mass flow: 0,20 kg/hr or Mass conc.: 20 mg/m <sup>3</sup> The mass per unit volume of 0,15 g/m <sup>3</sup> in exhaust gas is not allowed to be exceeded also on observance or lower deviation of a mass flow of 0,20 kg/h. For emission sources that exceed the mass flow rate of 0.40 kg/h, the mass concentration in waste gas the mass concentration must not exceed 10 mg/m <sup>3</sup> .	
<b>Magnesium</b>	Chapter 5.2.1 Overall Dust, including fine dust. The emissions of dust in the exhaust gas are not allowed to exceed the following values: Mass flow: 0.20 kg/hr or Mass conc.: 20 mg/m <sup>3</sup> The mass per unit volume of 0.15 g/m <sup>3</sup> in exhaust gas is not allowed to be exceeded also on observance or lower deviation of a mass flow of 0.20 kg/h. For emission sources that exceed the mass flow rate of 0.40 kg/h, the mass concentration in waste gas the mass concentration must not exceed 10 mg/m <sup>3</sup> .	
<b>Manganese</b>	Chapter 5.2.2 Inorganic dusts. Class III. Also with the presence of several substances of the same class, the following values are in all not allowed to be exceeded in the exhaust gas: Mass flow: 5 g/hr or Mass conc.: 1 mg/m <sup>3</sup> . Specified as Mn.	
<b>Sodium</b>	Chapter 5.2.1 Overall Dust, including fine dust. The emissions of dust in the exhaust gas are not allowed to exceed the following values: Mass flow: 0,20 kg/hr or Mass conc.: 20 mg/m <sup>3</sup> The mass per unit volume of 0,15 g/m <sup>3</sup> in exhaust gas is not allowed to be exceeded also on observance or lower	

	deviation of a mass flow of 0,20 kg/h. For emission sources that exceed the mass flow rate of 0.40 kg/h, the mass concentration in waste gas the mass concentration must not exceed 10 mg/m <sup>3</sup> .	
<b>Nickel</b>	Chapter 5.2.2 Inorganic dusts. Class II. Also with the presence of several substances of the same class, the following values are in all not allowed to be exceeded in the exhaust gas: Mass flow: 2,5 g/hr or Mass conc.: 0,5 mg/m <sup>3</sup> . Specified as Ni.	
<b>Lead</b>	Chapter 5.2.2 Inorganic dusts. Class II. Also with the presence of several substances of the same class, the following values are in all not allowed to be exceeded in the exhaust gas: Mass flow: 2,5 g/hr or Mass conc.: 0,5 mg/m <sup>3</sup> . Specified as Pb.	
<b>Selenium</b>	Chapter 5.2.2 Inorganic dusts. Class II. Also with the presence of several substances of the same class, the following values are in all not allowed to be exceeded in the exhaust gas: Mass flow: 2,5 g/hr or Mass conc.: 0,5 mg/m <sup>3</sup> . Specified as Se.	
<b>Zinc</b>	Chapter 5.2.1 Overall Dust, including fine dust. The emissions of dust in the exhaust gas are not allowed to exceed the following values: Mass flow: 0.20 kg/hr or Mass conc.: 20 mg/m <sup>3</sup> The mass per unit volume of 0.15 g/m <sup>3</sup> in exhaust gas is not allowed to be exceeded also on observance or lower deviation of a mass flow of 0.20 kg/h. For emission sources that exceed the mass flow rate of 0.40 kg/h, the mass concentration in waste gas the mass concentration must not exceed 10 mg/m <sup>3</sup> .	
<b>Zirconium</b>	Chapter 5.2.1 Overall Dust, including fine dust. The emissions of dust in the exhaust gas are not allowed to exceed the following values: Mass flow: 0.20 kg/hr or Mass conc.: 20 mg/m <sup>3</sup> The mass per unit volume of 0.15 g/m <sup>3</sup> in exhaust gas is not allowed to be exceeded also on observance or lower deviation of a mass flow of 0.20 kg/h. For emission sources that exceed the mass flow rate of 0.40 kg/h, the mass concentration in waste gas the mass concentration must not exceed 10 mg/m <sup>3</sup> .	
<b>Chromium</b>	Chapter 5.2.2 Inorganic dusts. Class III. Also with the presence of several	

	substances of the same class, the following values are in all not allowed to be exceeded in the exhaust gas: Mass flow: 5 g/hr or Mass conc.: 1 mg/m <sup>3</sup> . Specified as Cr.	
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### German technical rules for hazardous substances (TRGS)

Component	TRGS	Remark
Water	TRGS 500 TRGS 509 TRGS 510	
Nitric acid	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 401 TRGS 500 TRGS 509 TRGS 510 TRGS 800	
Aluminium	TRGS 500 TRGS 509 TRGS 510 TRGS 800	
Boron	TRGS 500 TRGS 509 TRGS 510 TRGS 800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724	
Barium	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 401 TRGS 500 TRGS 509 TRGS 510 TRGS 800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724	
Calcium	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 500 TRGS 509 TRGS 510 TRGS 800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724	
Cadmium	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 402 TRGS 401 TRGS 410 TRGS 500 TRGS 509 TRGS 510 TRGS 800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724 TRGS 560	pyrophoric
Cobalt	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 401 TRGS 406 TRGS 410 TRGS 500 TRGS 509 TRGS 510 TRGS 800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724 TRGS 560	
Copper	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 500 TRGS 509 TRGS 510 TRGS 800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724	
Iron	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 500 TRGS 509 TRGS 510 TRGS 800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724	
Lithium	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 401 TRGS 500 TRGS 509 TRGS 510 TRGS 800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724	
Potassium	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 401 TRGS 500 TRGS 509 TRGS 510 TRGS	

	800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724	
<b>Magnesium</b>	TRGS 500 TRGS 509 TRGS 510 TRGS 800	
<b>Manganese</b>	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 402 TRGS 500 TRGS 509 TRGS 510 TRGS 800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724	
<b>Sodium</b>	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 401 TRGS 500 TRGS 509 TRGS 510 TRGS 800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724	
<b>Nickel</b>	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 402 TRGS 401 TRGS 500 TRGS 509 TRGS 510 TRGS 800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724	
<b>Lead</b>	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 402 TRGS 401 TRGS 500 TRGS 509 TRGS 510 TRGS 560 TRGS 505	
<b>Selenium</b>	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 402 TRGS 401 TRGS 500 TRGS 509 TRGS 510 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724	
<b>Zinc</b>	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 500 TRGS 509 TRGS 510 TRGS 800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724	
<b>Zirconium</b>	TRGS 201 TRGS 400 TRGS 555 TRGS 600 TRGS 500 TRGS 509 TRGS 510 TRGS 800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724	
<b>Chromium</b>	TRGS 402 TRGS 500 TRGS 509 TRGS 510 TRGS 800 TRGS 720 TRGS 721 TRGS 722 TRGS 723 TRGS 724	

## 15.2 Chemical safety assessment

	No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.
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## 16 Other information

### Information on revision

<b>Creation Date</b>	2026/01/31
<b>Revision Date</b>	-
<b>Reason for revision</b>	-

### Reference

- [1] IPCS: The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>.
- [2] IARC, website: <http://www.iarc.fr/>.
- [3] OECD: The Global Portal to Information on Chemical Substances, website: <https://www.echemportal.org/echemportal/>.

- [4] CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>.  
 [5] NLM: ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>.  
 [6] EPA: Integrated Risk Information System, website: <http://cfpub.epa.gov/iris/>.  
 [7] U.S. Department of Transportation: ERG, website: <http://www.phmsa.dot.gov/hazmat/library/erg>.  
 [8] Germany GESTIS-database on hazard substance, website: <http://gestis-en.itrust.de/>.

## Abbreviations and acronyms

CAS	Chemical Abstracts Service	UN	The United Nations
PC-STEL	Short term exposure limit	OECD	Organization for Economic Co-operation and Development
PC-TWA	Time Weighted Average	IMDG-CODE	International Maritime Dangerous Goods CODE
MAC	Maximum Allowable Concentration	IARC	International Agency for Research on Cancer
DNEL	Derived No Effect Level	ICAO	International Civil Aviation Organization
PNEC	Predicted No Effect Concentration	IATA	International Air Transportation Association
NOEC	No Observed Effect Concentration	ACGIH	American Conference of Governmental Industrial Hygienists
LC <sub>50</sub>	Lethal Concentration 50%	NFPA	National Fire Protection Association
LD <sub>50</sub>	Lethal Dose 50%	NTP	National Toxicology Program
EC <sub>50</sub>	Effective Concentration 50%	PBT	Persistent, Bioaccumulative, Toxic
EC <sub>x</sub>	Effective Concentration X%	vPvB	very Persistent, very Bioaccumulative
P <sub>OW</sub>	Partition coefficient Octanol: Water	CMR	Carcinogens, mutagens or substances toxic to reproduction
BCF	Bioconcentration factor	RPE	Respiratory Protective Equipment
ED	Endocrine disruptor		

## Disclaimer

This Safety Data Sheet (SDS) was prepared according to REACH Regulation. The data included was derived from international authoritative database and provided by the enterprise. Other information was based on the present state of our knowledge. We try to ensure the correctness of all information. However, due to the diversity of information sources and the limitations of our knowledge, this document is only for user's reference. Users should make their independent judgment of suitability of this information for their particular purposes. We do not assume responsibility for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.