Safety Data Sheet

32 Mix metal standard solution

Version：V2.0.0.1
Report No.：BWB2456-2016-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	32 Mix metal standard solution
Cat No.	BWB2456-2016
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 1A
Serious eye damage/irritation	Category 1
Acute Toxicity - Inhalation	Category 1
Hazardous to the aquatic environment - long-term (chronic) hazard	Category 3

2.2 Label elements

Hazard pictograms	
Signal word	Danger

Hazard statements

H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H330	Fatal if inhaled
H412	Harmful to aquatic life with long lasting effects
EUH071	Corrosive to the respiratory tract
EUH208	Contains sensitising substance. May produce an allergic reaction

Precautionary statements

- Prevention

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.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
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
Aluminum nitrate nonahydrate	Insufficient information, temporarily unable to evaluate
Chromium trinitrate	Not applicable
Strontium carbonate	Not applicable
Boric acid	Not applicable
Lithium carbonate	Not applicable
ZIRCONIUM NITRATE (ZIRCONYL)	Insufficient information, temporarily unable to evaluate
Ammonium dihydrogen phosphate	Not applicable
Calcium carbonate	Not applicable
Potassium nitrate	Not applicable
Silver nitrate	Not applicable
Ammonium molybdate(VI)	Not applicable
Sodium carbonate	Not applicable
Ammonium trioxovanadate	Not applicable
Nickel	Not applicable
Diarsenic trioxide	Not applicable
Beryllium	Not applicable
Cadmium	Not applicable
Cobalt	Not applicable
Copper	Not applicable
Iron	Not applicable
Magnesium	Not PBT/vPvB
Manganese	Not applicable
Lead	Not applicable
Antimony	Not PBT/vPvB
Selenium	Not applicable
Silicon	Not applicable
Tin	Not applicable
Titanium	Not applicable
Thallium nitrate	Insufficient information, temporarily unable to evaluate
Zinc	Not applicable
Bismuth	Not applicable
Barium nitrate	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
Aluminum nitrate nonahydrate	Insufficient information, temporarily unable to evaluate
Chromium trinitrate	Insufficient information, temporarily unable to evaluate
Strontium carbonate	Insufficient information, temporarily unable to evaluate
Boric acid	Insufficient information, temporarily unable to evaluate
Lithium carbonate	Insufficient information, temporarily unable to evaluate
ZIRCONIUM NITRATE (ZIRCONYL)	Insufficient information, temporarily unable to evaluate
Ammonium dihydrogen phosphate	Insufficient information, temporarily unable to evaluate
Calcium carbonate	Insufficient information, temporarily unable to evaluate
Potassium nitrate	Insufficient information, temporarily unable to evaluate
Silver nitrate	Insufficient information, temporarily unable to evaluate
Ammonium molybdate(VI)	Insufficient information, temporarily unable to evaluate
Sodium carbonate	Insufficient information, temporarily unable to evaluate
Ammonium trioxovanadate	Insufficient information, temporarily unable to evaluate
Nickel	Insufficient information, temporarily unable to evaluate
Diarsenic trioxide	Insufficient information, temporarily unable to evaluate
Beryllium	Insufficient information, temporarily unable to evaluate
Cadmium	Insufficient information, temporarily unable to evaluate
Cobalt	Insufficient information, temporarily unable to evaluate
Copper	Insufficient information, temporarily unable to evaluate
Iron	Insufficient information, temporarily unable to evaluate
Magnesium	Insufficient information, temporarily unable to evaluate
Manganese	Insufficient information, temporarily unable to evaluate
Lead	Insufficient information, temporarily unable to evaluate
Antimony	Insufficient information, temporarily unable to evaluate
Selenium	Insufficient information, temporarily unable to evaluate
Silicon	Insufficient information, temporarily unable to evaluate
Tin	Insufficient information, temporarily unable to evaluate
Titanium	Insufficient information, temporarily unable to evaluate
Thallium nitrate	Insufficient information, temporarily unable to evaluate
Zinc	Insufficient information, temporarily unable to evaluate
Bismuth	Insufficient information, temporarily unable to evaluate
Barium nitrate	Insufficient information, temporarily unable to evaluate

◆ Other

	Not applicable.

3 Composition/information on ingredients

3.1 Substance/mixture

	Mixture

Component	Weight % content(or range)	Classification according to Regulation (EC) No. 1272/2008 with amendment 2023/707 [CLP]	Specific Conc. Limits, M-factors
Water CAS : 7732-18-5 EC : 231-791-2 Index No. : -	84.21	Not Classified	-
Nitric acid CAS : 7697-37-2 EC : 231-714-2 Index No. : 007-004-00-1	15	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%
Aluminum nitrate nonahydrate CAS : 7784-27-2 EC : 616-523-8 Index No. : -	0.14	Oxidizing solids, Category 3, H272; Serious eye damage/irritation, Category 1, H318	-
Chromium trinitrate CAS : 13548-38-4 EC : 236-921-1 Index No. : -	0.08	Oxidizing solids, Category 3, H272; Sensitization - skin, Category 1A, H317; Acute Toxicity - Inhalation, Category 4, H332; Hazardous to the aquatic environment - long-term (chronic) hazard, Category 2, H411	-
Strontium carbonate CAS : 1633-05-2 EC : 216-643-7 Index No. : -	0.07	Hazardous to the aquatic environment - long-term (chronic) hazard, Category 4, H413	-
Boric acid CAS : 10043-35-3 EC : 233-139-2 Index No. : 005-007-00-2	0.05	Reproductive toxicity, Category 1B, H360	-
Lithium carbonate CAS : 554-13-2 EC : 209-062-5 Index No. : -	0.05	Acute Toxicity - Oral, Category 4, H302; Serious eye damage/irritation, Category 2, H319	-
ZIRCONIUM NITRATE (ZIRCONYL) CAS : 12372-57-5 EC : - Index No. : -	0.04	Oxidizing liquids, Category 2, H272; Skin corrosion/irritation, Category 1B, H314	-
Ammonium dihydrogen phosphate CAS : 7722-76-1 EC : 231-764-5 Index No. : -	0.03	Not Classified	-
Calcium carbonate CAS : 471-34-1 EC : 207-439-9 Index No. : -	0.03	Not Classified	-
Potassium nitrate CAS : 7757-79-1	0.03	Oxidizing solids, Category 3, H272	-

EC : 231-818-8 Index No. : -			
Silver nitrate CAS : 7761-88-8 EC : 231-853-9 Index No. : 047-001-00-2	0.02	Oxidizing solids, Category 2, H272; Skin corrosion/irritation, Category 1B, H314; Hazardous to the aquatic environment - short-term (acute) hazard, Category 1, H400; Hazardous to the aquatic environment - long-term (chronic) hazard, Category 1, H410	-
Ammonium molybdate(VI) CAS : 13106-76-8 EC : 236-031-3 Index No. : -	0.02	Hazardous to the aquatic environment - long-term (chronic) hazard, Category 3, H412	-
Sodium carbonate CAS : 497-19-8 EC : 207-838-8 Index No. : 011-005-00-2	0.02	Serious eye damage/irritation, Category 2, H319	-
Ammonium trioxovanadate CAS : 7803-55-6 EC : 232-261-3 Index No. : -	0.02	Acute Toxicity - Oral, Category 3, H301; Serious eye damage/irritation, Category 2, H319; Acute Toxicity - Inhalation, Category 4, H332; Reproductive toxicity, Category 2, H361; Specific target organ toxicity - repeated exposure, Category 1, H372; Hazardous to the aquatic environment - long-term (chronic) hazard, Category 2, H411	-
Nickel CAS : 7440-02-0 EC : 231-111-4 Index No. : 028-002-00-7	0.01	Sensitization - skin, Category 1, H317; Carcinogenicity, Category 2, H351; Specific target organ toxicity - repeated exposure, Category 1, H372	-
Diarsenic trioxide CAS : 1327-53-3 EC : 215-481-4 Index No. : 033-003-00-0	0.01	Acute Toxicity - Oral, Category 2, H300; Skin corrosion/irritation, Category 1B, H314; Carcinogenicity, Category 1A, H350; Hazardous to the aquatic environment - short-term (acute) hazard, Category 1, H400; Hazardous to the aquatic environment - long-term (chronic) hazard, Category 1, H410	-
Beryllium CAS : 7440-41-7 EC : 231-150-7 Index No. : 004-001-00-7	0.01	Acute Toxicity - Oral, Category 3, H301; Skin Corrosion/Irritation, Category 2, H315; Sensitization - skin, Category 1, H317; Serious eye damage/irritation, Category 2, H319; Acute Toxicity - Inhalation, Category 2, H330; Specific target organ toxicity - single exposure; respiratory tract irritation, Category 3, H335; Carcinogenicity, Category 1B, H350; Specific target organ toxicity - repeated exposure, Category 1, H372	-
Cadmium CAS : 7440-43-9 EC : 231-152-8 Index No. : 048-002-00-0	0.01	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	-

Cobalt CAS : 7440-48-4 EC : 231-158-0 Index No. : 027-001-00-9	0.01	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	-
Copper CAS : 7440-50-8 EC : 231-159-6 Index No. : 029-026-00-0	0.01	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
Iron CAS : 7439-89-6 EC : 231-096-4 Index No. : -	0.01	Not Classified	-
Magnesium CAS : 7439-95-4 EC : 231-104-6 Index No. : 012-001-00-3	0.01	Pyrophoric solids, Category 1, H250; Substances and mixtures which, in contact with water, emit flammable gases, Category 1, H260	-
Manganese CAS : 7439-96-5 EC : 231-105-1 Index No. : -	0.01	Hazardous to the aquatic environment - long-term (chronic) hazard, Category 2, H411	-
Lead CAS : 7439-92-1 EC : 231-100-4 Index No. : 082-013-00-1	0.01	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
Antimony CAS : 7440-36-0 EC : 231-146-5 Index No. : -	0.01	Carcinogenicity, Category 2, H351; Reproductive toxicity, Category 1A, H360; Reproductive Toxicity - effects on or via lactation, Additional, H362; Specific target organ toxicity - repeated exposure, Category 2, H373; Hazardous to the aquatic environment - long-term (chronic) hazard, Category 3, H412	-
Selenium CAS : 7782-49-2 EC : 231-957-4 Index No. : 034-001-00-2	0.01	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	-
Silicon CAS : 7440-21-3 EC : 231-130-8 Index No. : -	0.01	Not Classified	-
Tin CAS : 7440-31-5 EC : 231-141-8 Index No. : -	0.01	Serious eye damage/irritation, Category 2, H319; Specific target organ toxicity - single exposure; respiratory tract irritation, Category 3, H335	-
Titanium CAS : 7440-32-6 EC : 231-142-3 Index No. : -	0.01	Not Classified	-
Thallium nitrate CAS : 10102-45-1	0.01	Acute Toxicity - Oral, Category 2, H300; Acute Toxicity - Inhalation, Category 2,	-

EC : 233-273-1 Index No. : 081-002-00-9		H330; Specific target organ toxicity - repeated exposure, Category 2, H373; Hazardous to the aquatic environment - long-term (chronic) hazard, Category 2, H411	
Zinc CAS : 7440-66-6 EC : 231-175-3 Index No. : 030-001-00-1	0.01	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	-
Bismuth CAS : 7440-69-9 EC : 231-177-4 Index No. : -	0.01	Not Classified	-
Barium nitrate CAS : 10022-31-8 EC : 233-020-5 Index No. : 056-002-00-7	0.01	Acute Toxicity - Oral, Category 4, H302; Acute Toxicity - Inhalation, Category 4, H332	-

4 First-aid measures

4.1 Description of first aid measures

General advice	Immediate medical attention is required. Show this safety data sheet (SDS) to the doctor in attendance.
Eye contact	Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician if feel uncomfortable.
Skin contact	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.
Ingestion	Never give anything by mouth to an unconscious person. Call a physician or Poison Control Center immediately.
Inhalation	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.
Protecting of first-aiders	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.

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

Suitable extinguishing media	Small fire: dry chemical, CO_2 or water spray; Large fire: dry chemical, CO_2 , alcohol-resistant foam or water spray; Fire involving tanks, rail tank cars or highway tanks: Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Do not get water inside containers.

Unsuitable extinguishing media	No information available.

5.2 Specific hazards arising from the substance or mixture

1	Fire may produce irritating, poisonous or corrosive gases.
2	Development of hazardous combustion gases or vapor possible in the event of fire.
3	May expansion 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	Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
2	Do not touch or walk through spilled material.
3	Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
4	Use personal protective equipment,do not breathe gas/mist/vapour/spray.
5	Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.
6	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	Do not touch or cross spills.
2	It is recommended that emergency personnel wear a self-contained breathing apparatus with positive pressure and wear anti-corrosion clothing.
3	Transfer to a tank truck or special collector with a corrosion-resistant pump.
4	Do not touch broken containers and spills before putting on appropriate protective clothing.
5	Cut off the source of the leak as much as possible.
6	Keep leaks in a ventilated place.
7	Absorb spilled material in dry sand or inert absorbent. In case of large amount of spillage, contain a spill by bunding.
8	Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.
9	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/m³	ppm	mg/m³
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
Chromium trinitrate	Japan - JSOH(2024–2025)	-	0.5(as Cr)	-	-
	Permissible exposure standards for workers in the workplace	-	0.5 (as Cr)	-	1.5 (as Cr)
	USA - ACGIH	-	0.003(as	-	-

			Cr(III), inhalable fraction)		
Boric acid	Germany (AGS)	-	0.5	-	1
	Germany (DFG)	-	10(inhalable aerosol)	-	10(inhalable aerosol)
	Belgium	-	2	-	6
	Ireland	-	2	-	-
	Latvia	-	10	-	-
	Spain	-	2	-	6
Calcium carbonate	France	-	10(inhalable aerosol)	-	-
	United Kingdom	-	10(inhalable fraction);4(respirable fraction)	-	-
	Ireland	-	10	-	-
	Latvia	-	6	-	-
	New Zealand	-	10	-	-
	Poland	-	10	-	-
Silver nitrate	Japan - JSOH(2024–2025)	-	0.01(as Ag)	-	-
	Permissible exposure standards for workers in the workplace	-	0.01(dust and fume, as Ag)	-	0.03(dust and fume, as Ag)
	Finland	-	0.01	-	0.03
	USA - ACGIH	-	0.01(as Ag)	-	-
Ammonium molybdate(VI)	USA - ACGIH	-	0.5(as Mo, respirable fraction)	-	-
Sodium carbonate	Romania	-	1	-	3
Nickel	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
Diarsenic trioxide	Japan - JSOH(2024–2025)	-	0.003(as As, individual excess lifetime risk of cancer 10^-3)	-	-

	Permissible exposure standards for workers in the workplace	-	0.01(as As)	-	0.03(as As)
	Austria	-	0.01	-	0.04
	Finland	-	0.01	-	-
	Hungary	-	-	-	0.1
	Netherlands	-	0.0028	-	-
Beryllium	Japan - JSOH(2024–2025)	-	0.002	-	-
	Permissible exposure standards for workers in the workplace	-	0.002(as Be)	-	0.006(as Be)
	European Union	-	0.0002	-	-
	France	-	0.0006	-	-
	Germany (AGS)	-	0.00006	-	0.00006
	Italy	-	0.0002	-	-
Cadmium	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	-	-
Cobalt	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	-	-
Copper	Permissible exposure standards for workers in the workplace	-	1(dust and mist)	-	2(dust and mist)
	Permissible	-	0.2(fume)	-	0.6(fume)

	exposure standards for workers in the workplace				
	France	-	0.2(fume, respirable fraction)	-	-
	Germany (DFG)	-	0.01	-	0.02
	United Kingdom	-	1(dusts and mists)	-	2
	Austria	-	1(inhalable aerosol)	-	-
Manganese	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
Lead	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
Antimony	Japan - JSOH(2024–2025)	-	0.1	-	-
	Permissible exposure standards for workers in the workplace	-	0.5	-	1.5
	France	-	0.5	-	-
	United Kingdom	-	0.5	-	-
	Austria	-	0.5	-	1.5
	Belgium	-	0.5	-	-
Selenium	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)
Silicon	France	-	10(inhalable aerosol)	-	-
	United Kingdom	-	10(inhalable fraction);4(respirable fraction)	-	-
	Belgium	-	10	-	-
	Denmark	-	10(inhalable aerosol)	-	20(inhalable aerosol)
	Ireland	-	10	-	-
	New Zealand	-	10	-	-
Tin	Permissible exposure standards for workers in the workplace	-	2	-	4
	Italy	-	2	-	-
	United Kingdom	-	2	-	4
	Austria	-	2(inhalable aerosol)	-	4(inhalable aerosol)
	Belgium	-	2	-	-
	Denmark	-	0.1	-	0.2
Titanium	Latvia	-	10	-	-
	Poland	-	10	-	15
	Romania	-	10	-	15
Thallium nitrate	USA - ACGIH	-	0.02(as Tl, inhalable fraction)	-	-
Zinc	Germany (DFG)	-	2	-	4
	Switzerland	-	0.1(respirable aerosol)	-	0.4(respirable aerosol)
Barium nitrate	Permissible exposure standards for workers in the workplace	-	0.5(as Ba)	-	1.5(as Ba)
	Finland	-	0.5	-	-
	USA - ACGIH	-	0.5(as Ba)	-	-
	USA - NIOSH	-	0.5	-	-
	USA - OSHA	-	0.5	-	-

◆ Biological limit values

Component	Standard	Biological monitoring index	Biological limits value	Sampling time	Remark
Nickel	USA -ACGIH	Nickel(Urine)	5μg/L	End of shift at end of work week	
Diarsenic trioxide	USA -ACGIH	Inorganic arsenic, plus methylated metabolites(Creatinine in urine)	15μg/g As	End of work week or end of shift	
Cadmium	SCOEL(EU)	Cd	2 μg/g creatinine	Not strictly regulated	
		Cadmium(Creatinine in urine)	5μg/g	Not critical	
		Cadmium(Blood)	5μg/L	Not critical	
Cobalt	USA -ACGIH	Cobalt(Urine)	15μg/L	End of shift at end of work week	
Lead	SCOEL(EU)	Not strictly regulated	0.3mg/L	Not strictly regulated	
		Lead(Blood)	200μg/L	Not critical	

◆ 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)
Water	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
Nitric acid	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
Aluminum nitrate nonahydrate	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
Chromium trinitrate	Inhalation	No data available	No data available	0.155 mg/m3	0.464 mg/m3
	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
Strontium carbonate	Inhalation	No data available	No data available	No data available	3.5 mg/m3
	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

Boric acid	Inhalation	No data available	No data available	No data available	8.3 mg/m3
	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
Lithium carbonate	Inhalation	No data available	No data available	No data available	10 mg/m3
	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
ZIRCONIUM NITRATE (ZIRCONYL)	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
Ammonium dihydrogen phosphate	Inhalation	No data available	No data available	No data available	5.9 mg/m3
	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
Calcium carbonate	Inhalation	No data available	No data available	6.36 mg/m3	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
Potassium nitrate	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
Silver nitrate	Inhalation	No data available	No data available	No data available	0.016 mg/m3
	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
Ammonium molybdate(VI)	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
Sodium carbonate	Inhalation	No data available	No data available	10 mg/m3	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
Ammonium trioxovanadate	Inhalation	No data available	No data available	0.18 mg/m3	0.64 mg/m3
	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
Nickel	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
Diarsenic trioxide	Inhalation	No data available	No data available	No data available	0.005 mg/m3
	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
Beryllium	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
Cadmium	Inhalation	No data available	No data available	0.004 mg/m3	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
Cobalt	Inhalation	No data available	No data available	0.04 mg/m3	0.0541 mg/m3
	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
Copper	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
Iron	Inhalation	No data available	No data available	3 mg/m3	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
Magnesium	Inhalation	No data available	No data available	10 mg/m3	10 mg/m3
	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
Manganese	Inhalation	No data available	No data available	No data available	0.0101 mg/m3
	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
Lead	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
Antimony	Inhalation	No data available	No data available	0.263 mg/m3	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
Selenium	Inhalation	No data available	No data available	No data available	0.05 mg/m3
	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
Silicon	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
Tin	Inhalation	No data available	No data available	No data available	71 mg/m3
	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
Titanium	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
Thallium nitrate	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
Zinc	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
Bismuth	Inhalation	No data available	No data available	No data available	13.1 mg/m3
	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
Barium nitrate	Inhalation	No data available	No data available	No data available	2.73 mg/m3
	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
Nitric acid	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
Chromium trinitrate	22 µg/L	4.4 µg/L	2.29 mg/L	320 µg/kg sediment dw	32 µg/kg sediment dw	No hazard identified	320 µg/kg soil dw	No potential for bioaccumulation
Boric acid	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
Lithium carbonate	9 mg/L	900 µg/L	122.2 mg/L	238.4 mg/kg sediment dw	23.84 mg/kg sediment dw	No hazard identified	44.11 mg/kg soil dw	No potential for bioaccumulation
Ammonium dihydrogen phosphate	No hazard identified	No hazard identified	10 mg/L	No hazard identified	No hazard identified	No hazard identified	No hazard identified	No potential for bioaccumulation
Calcium carbonate	No hazard identified	No hazard identified	100 mg/L	No hazard identified	No hazard identified	No hazard identified	No hazard identified	No potential for bioaccumulation
Potassium nitrate	No hazard identified	No hazard identified	18 mg/L	No hazard identified	No hazard identified	No hazard identified	No hazard identified	No potential for bioaccumulation
Silver nitrate	46 ng/L	860 ng/L	25 µg/L	438.13 mg/kg	438.13 mg/kg	No hazard	1.05 mg/kg	No potential

				sediment dw	sediment dw	identified	soil dw	for bioaccumulation
Sodium carbonate	No data available	No data available	No data available	No hazard identified	No hazard identified	No hazard identified	No data available	No potential for bioaccumulation
Ammonium trioxovanadate	7.6 µg/L	2.5 µg/L	450 µg/L	240 mg/kg sediment dw	79 mg/kg sediment dw	No data available	7.2 mg/kg soil dw	167 µg/kg food
Diarsenic trioxide	7.4 µg/L	6.2 µg/L	80.5 µg/L	93.1 mg/kg sediment dw	47.4 mg/kg sediment dw	No hazard identified	3.8 mg/kg soil dw	1.3 mg/kg food
Cadmium	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
Cobalt	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
Copper	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
Iron	No data available	No data available	No data available	No data available	No data available	No hazard identified	No data available	No data available
Magnesium	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/m³	28.7 - 268 mg/kg soil dw	212 mg/kg food
Manganese	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
Lead	2.4 µg/L	3.3 µg/L	100 µg/L	186 mg/kg sediment dw	168 mg/kg sediment dw	No hazard identified	212 mg/kg soil dw	10.9 mg/kg food
Antimony	113 µg/L	11.3 µg/L	2.55 mg/L	11.2 mg/kg sediment dw	2.24 mg/kg sediment dw	No hazard identified	37 mg/kg soil dw	No potential for bioaccumulation
Selenium	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
Silicon	No data available	No data available	No data available	No data available	No data available	No data available	No data available	No potential for bioaccumulation

Tin	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
Titanium	76 µg/L	600 µg/L	60 mg/L	600 mg/kg sediment dw	60 mg/kg sediment dw	No data available	60 mg/kg soil dw	No potential for bioaccumulation
Zinc	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
Bismuth	No data available	No data available	17.5 mg/L	No data available	No data available	No data available	No data available	No data available
Barium nitrate	115 µg/L	11.5 µg/L	62.2 mg/L	600 mg/kg sediment dw	No hazard identified	No hazard identified	207.7 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

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

8.2.3 Environmental exposure controls

Environmental exposure controls	No information available

9 Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state	Clear, colorless liquid

Colour	Clear, colorless liquid
Odor	No information available
Odor threshold	No information available
pH	< 1 (Nitric acid)
Melting point/freezing point(°C)	-41.6 (Nitric acid)
Initial boiling point and boiling range(°C)	121 (Nitric acid)
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	6.4kPa (20°C ,Nitric acid)
Vapor density(Air = 1)	2.2 (Nitric acid)
Relative density(Water=1)	1.4 (Nitric acid)
Solubility	500000mg/L (20 °C,Nitric acid)
n-octanol/water partition coefficient	-0.21 (Nitric acid)
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

9.2.2 Other safety characteristics

Other safety characteristics	No information available

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. Mixture with active metal powders may explode intensely if heated. May react with strong acids, strong alkalis, strong oxidants or strong reducing agents. Reacts severely with halogens, interhalogens or other strong oxidants, or causes a fire. Reacts with active metals and poses an explosive potential or fire. May burn continuously in carbon dioxide. Mixtures with metallic acetylene, when heated, cause a fire or incandescence.
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. Active metal powder, non-metal

	elemental powder, sulfide, metal amino compound, metal acetylene compound, phenols, metal sulfamate, metal cyanide, thiocyanate, phosphide, hypophosphite, carboxylic acid, carboxylic anhydride , Carboxylic acid esters, ethanol, reducing agents and performic acid. Strong acids, strong alkalis, strong oxidants and strong reducing agents. Halogen, interhalogen, strong oxidant, water and acids. Active metal, alcohols, aldehydes, carbon disulfide, carbon, sulfur, phosphorus, boron, reducing agents, metallic acetylenes and metallic carbonates. Water, carbon dioxide, 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.
10.6 Hazardous decomposition products	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

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

Acute toxicity

Component	LD_{50}(oral)	LD_{50}(dermal)	LC_{50}(inhalation,4h)
Chromium trinitrate	3250mg/kg(Rat)	No information available	No information available
Silver nitrate	1173mg/kg(Rat)	No information available	No information available
Aluminum nitrate nonahydrate	3671mg/kg(Rat)	No information available	No information available
Bismuth	5000mg/kg(Rat)	No information available	No information available
Boric acid	2660mg/kg(Rat)	No information available	No information available
Cobalt	6171mg/kg(Rat)	No information available	No information available
Cadmium	2330mg/kg(Rat)	No information available	No information available
Manganese	9000mg/kg(Rat)	No information available	No information available
Barium nitrate	355mg/kg(Rat)	No information available	No information available
Iron	30000mg/kg(Rat)	No information available	No information available
Potassium nitrate	3750mg/kg(Rat)	No information available	No information available
Ammonium trioxovanadate	58.1mg/kg(Rat)	2102mg/kg(Rat)	0.0078mg/L(Rat)
Silicon	3160mg/kg(Rat)	No information available	No information available

Antimony	7000mg/kg(Rat)	No information available	No information available
Thallium nitrate	15mg/kg(Mouse)	No information available	No information available
Lithium carbonate	525mg/kg(Rat)	No information available	No information available
Sodium carbonate	4090mg/kg(Rat)	No information available	No information available
Selenium	6700mg/kg(Rat)	No information available	5.67mg/L(Rat)
Diarsenic trioxide	14.6mg/kg(Rat)	No information available	No information available

Carcinogenicity

Component	List of carcinogens by the IARC Monographs	Report on Carcinogens by NTP
Water	Not Listed	Not Listed
Nitric acid	Not Listed	Not Listed
Aluminum nitrate nonahydrate	Not Listed	Not Listed
Chromium trinitrate	Category 3	Not Listed
Strontium carbonate	Not Listed	Not Listed
Boric acid	Not Listed	Not Listed
Lithium carbonate	Not Listed	Not Listed
ZIRCONIUM NITRATE (ZIRCONYL)	Not Listed	Not Listed
Ammonium dihydrogen phosphate	Not Listed	Not Listed
Calcium carbonate	Not Listed	Not Listed
Potassium nitrate	Not Listed	Not Listed
Silver nitrate	Not Listed	Category R
Ammonium molybdate(VI)	Not Listed	Not Listed
Sodium carbonate	Not Listed	Not Listed
Ammonium trioxovanadate	Not Listed	Not Listed
Nickel	Category 2B	Category R
Diarsenic trioxide	Category 1	Category K
Beryllium	Category 1	Category K
Cadmium	Category 1	Category K
Cobalt	Category 2A	Category R
Copper	Not Listed	Not Listed
Iron	Not Listed	Not Listed
Magnesium	Not Listed	Not Listed
Manganese	Not Listed	Not Listed
Lead	Category 2B	Category R
Antimony	Not Listed	Not Listed
Selenium	Category 3	Not Listed

Silicon	Not Listed	Not Listed
Tin	Not Listed	Not Listed
Titanium	Not Listed	Not Listed
Thallium nitrate	Not Listed	Not Listed
Zinc	Not Listed	Not Listed
Bismuth	Not Listed	Not Listed
Barium nitrate	Not Listed	Not Listed

11.2 Information on other hazards

11.2.1 Endocrine disrupting properties

Component	Endocrine disrupting properties
Water	No information available
Nitric acid	No information available
Aluminum nitrate nonahydrate	No information available
Chromium trinitrate	No information available
Strontium carbonate	No information available
Boric acid	No information available
Lithium carbonate	No information available
ZIRCONIUM NITRATE (ZIRCONYL)	No information available
Ammonium dihydrogen phosphate	No information available
Calcium carbonate	No information available
Potassium nitrate	No information available
Silver nitrate	No information available
Ammonium molybdate(VI)	No information available
Sodium carbonate	No information available
Ammonium trioxovanadate	No information available
Nickel	No information available
Diarsenic trioxide	No information available
Beryllium	No information available
Cadmium	No information available
Cobalt	No information available
Copper	No information available
Iron	No information available
Magnesium	No information available
Manganese	No information available
Lead	No information available

Antimony	No information available
Selenium	No information available
Silicon	No information available
Tin	No information available
Titanium	No information available
Thallium nitrate	No information available
Zinc	No information available
Bismuth	No information available
Barium nitrate	No information available

11.2.2 Other Information

Other Information	See Section 11.1

12 Ecological information

12.1 Toxicity

Acute aquatic toxicity

Component	Fish	Crustaceans	Algae or other aquatic plants
Chromium trinitrate	LC_{50} : 20.1mg/L (96h)(Fish)	No information available	ErC_{50} : 0.105mg/L (96h)(Algae)
Silver nitrate	LC_{50} : 0.0109mg/L (96h)(Fish)	EC_{50} : 0.0029mg/L (48h)(Crustaceans)	No information available
Barium nitrate	LC_{50} : > 6.65mg/L (96h)(Fish)	EC_{50} : 27.6mg/L (48h)(Crustaceans)	ErC_{50} : > 30.1mg/L (72h)(Algae)
Iron	LC_{50} : 1.29mg/L (96h)(Fish)	No information available	No information available
Copper	LC_{50} : 0.665mg/L (96h)(Fish)	EC_{50} : 0.02mg/L (48h)(Crustaceans)	ErC_{50} : 7.9mg/L (96h)(Algae)
Nickel	LC_{50} : 40mg/L (96h)(Fish)	EC_{50} : 1mg/L (48h)(Crustaceans)	No information available
Lithium carbonate	LC_{50} : 30.3mg/L (96h)(Fish)	EC_{50} : 33.2mg/L (48h)(Crustaceans)	ErC_{50} : > 400mg/L (72h)(Algae)
Sodium carbonate	LC_{50} :300mg/L (96h)(Fish)	EC_{50} : 200mg/L (48h)(Crustaceans)	No information available
Diarsenic trioxide	LC_{50} : 12.6mg/L (96h)(Fish)	No information available	ErC_{50} : 25.2mg/L (72h)(Algae)
Selenium	LC_{50} : 2.06mg/L (96h)(Fish)	No information available	ErC_{50} : 96mg/L (96h)(Algae)
Ammonium molybdate(VI)	LC_{50} :550mg/L (96h)(Fish)	No information available	No information available
Aluminum nitrate nonahydrate	LC_{50} : 4.25mg/L (96h)(Fish)	No information available	No information available
Magnesium	LC_{50} :541mg/L (96h)(Fish)	No information available	No information available
Bismuth	LC_{50} :100mg/L (96h)(Fish)	EC_{50} : > 100mg/L (48h)(Crustaceans)	No information available
Cobalt	LC_{50} : 1.5mg/L (96h)(Fish)	No information available	No information available

Ammonium dihydrogen phosphate	No information available	EC_{50} : > 100mg/L (48h)(Crustaceans)	ErC_{50} : > 100mg/L (72h)(Algae)
Boric acid	LC_{50} :487mg/L (96h)(Fish)	EC_{50} : 226mg/L (48h)(Crustaceans)	ErC_{50} : 290mg/L (72h)(Algae)
Strontium carbonate	LC_{50} : 40.3mg/L (96h)(Fish)	No information available	No information available
Manganese	LC_{50} : 1800mg/L (96h)(Fish)	EC_{50} : 40mg/L (48h)(Crustaceans)	No information available
Cadmium	LC_{50} : 7.8mg/L (96h)(Fish)	EC_{50} : 0.58mg/L (48h)(Crustaceans)	No information available
Zinc	LC_{50} : 2.01mg/L (96h)(Fish)	EC_{50} : 1.33mg/L (48h)(Crustaceans)	No information available
Ammonium trioxovanadate	LC_{50} : 0.693mg/L (96h)(Fish)	No information available	No information available
Potassium nitrate	LC_{50} : > 100mg/L (96h)(Fish)	EC_{50} : 490mg/L (48h)(Crustaceans)	No information available
Silicon	LC_{50} :100mg/L (96h)(Fish)	No information available	No information available
Lead	LC_{50} : 2.8mg/L (96h)(Fish)	No information available	No information available
Tin	LC_{50} : > 0.0124mg/L (96h)(Fish)	No information available	No information available

Chronic aquatic toxicity

Component	Fish	Crustaceans	Algae or other aquatic plants
Potassium nitrate	NOEC : 58mg/L(Fish)	No information available	No information available
Boric acid	No information available	No information available	NOEC : 82mg/L(Algae)
Lithium carbonate	NOEC : 17.35mg/L(Fish)	No information available	No information available
Barium nitrate	NOEC : > 2.39mg/L(Fish)	No information available	No information available
Selenium	NOEC : 0.025mg/L(Fish)	No information available	No information available

12.2 Persistence and degradability

Component	Persistence (water/soil)	Persistence (air)
Strontium carbonate	Low	Low
Boric acid	Low	Low
Lithium carbonate	Low	Low
Ammonium trioxovanadate	High	High
Nickel	Low	Low
Thallium nitrate	Low	Low

12.3 Bioaccumulative potential

Component	Bioaccumulative potential	Comments
Strontium carbonate	Low	Log Kow=-0.4605
Boric acid	Low	BCF=0

Lithium carbonate	Low	Log Kow=-0.4605
Ammonium molybdate(VI)	Low	BCF=5.7
Ammonium trioxovanadate	Low	Log Kow=2.229
Nickel	Low	Log Kow=-1.38
Thallium nitrate	Low	Log Kow=0.209

12.4 Mobility in soil

Component	log Koc	Remark
Chromium trinitrate	0.00	20 ℃
Strontium carbonate	0.000	
Boric acid	1.545	
Lithium carbonate	0.000	
Ammonium trioxovanadate	1.545	
Nickel	1.155	
Magnesium	1.12	20 ℃
Silicon	1.00	20 ℃
Thallium nitrate	1.155	

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
Aluminum nitrate nonahydrate	Insufficient information, temporarily unable to evaluate
Chromium trinitrate	Not applicable
Strontium carbonate	Not applicable
Boric acid	Not applicable
Lithium carbonate	Not applicable
ZIRCONIUM NITRATE (ZIRCONYL)	Insufficient information, temporarily unable to evaluate
Ammonium dihydrogen phosphate	Not applicable
Calcium carbonate	Not applicable
Potassium nitrate	Not applicable
Silver nitrate	Not applicable
Ammonium molybdate(VI)	Not applicable
Sodium carbonate	Not applicable
Ammonium trioxovanadate	Not applicable

Nickel	Not applicable
Diarsenic trioxide	Not applicable
Beryllium	Not applicable
Cadmium	Not applicable
Cobalt	Not applicable
Copper	Not applicable
Iron	Not applicable
Magnesium	Not PBT/vPvB
Manganese	Not applicable
Lead	Not applicable
Antimony	Not PBT/vPvB
Selenium	Not applicable
Silicon	Not applicable
Tin	Not applicable
Titanium	Not applicable
Thallium nitrate	Insufficient information, temporarily unable to evaluate
Zinc	Not applicable
Bismuth	Not applicable
Barium nitrate	Not applicable

12.6 Endocrine disrupting properties

Component	Endocrine disrupting properties
Water	No information available
Nitric acid	No information available
Aluminum nitrate nonahydrate	No information available
Chromium trinitrate	No information available
Strontium carbonate	No information available
Boric acid	No information available
Lithium carbonate	No information available
ZIRCONIUM NITRATE (ZIRCONYL)	No information available
Ammonium dihydrogen phosphate	No information available
Calcium carbonate	No information available
Potassium nitrate	No information available
Silver nitrate	No information available
Ammonium molybdate(VI)	No information available
Sodium carbonate	No information available

Ammonium trioxovanadate	No information available
Nickel	No information available
Diarsenic trioxide	No information available
Beryllium	No information available
Cadmium	No information available
Cobalt	No information available
Copper	No information available
Iron	No information available
Magnesium	No information available
Manganese	No information available
Lead	No information available
Antimony	No information available
Selenium	No information available
Silicon	No information available
Tin	No information available
Titanium	No information available
Thallium nitrate	No information available
Zinc	No information available
Bismuth	No information available
Barium nitrate	No information available

12.7 Other adverse effects

	No information available

13 Disposal considerations

13.1 Waste treatment methods

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

14 Transport information

Label and Mark

Transporting Label	

IMDG-CODE

UN number	3264

UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Transport hazard class	8
Transport subsidiary hazard class	None
Packing group	Ⅲ
Marine pollutant (Yes or no)	No

IATA-DGR

UN number	3264
UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Transport hazard class	8
Transport subsidiary hazard class	None
Packing group	Ⅲ

UN-ADR

UN number	3264
UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Transport hazard class	8
Transport subsidiary hazard class	None
Packing group	Ⅲ

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	√	√	√	√	√	√	√	√	√	√	√	√	√
Aluminum nitrate nonahydrate	√	×	×	×	√	√	×	√	×	√	×	√	√

Chromium trinitrate	√	√	√	√	√	√	√	√	√	√	√	√	√
Strontium carbonate	√	√	√	√	√	√	√	√	√	√	√	√	√
Boric acid	√	√	√	√	√	√	√	√	√	√	√	√	√
Lithium carbonate	√	√	√	√	√	√	√	√	√	√	√	√	√
ZIRCONIUM NITRATE (ZIRCONYL)	×	×	×	×	×	×	×	×	×	×	×	×	√
Ammonium dihydrogen phosphate	√	√	√	√	√	√	√	√	√	√	√	√	√
Calcium carbonate	√	√	√	√	√	√	√	√	√	√	√	√	√
Potassium nitrate	√	√	√	√	√	√	√	√	√	√	√	√	√
Silver nitrate	√	√	√	√	√	√	√	√	√	√	√	√	√
Ammonium molybdate(VI)	√	√	√	√	√	√	√	√	√	×	×	√	√
Sodium carbonate	√	√	√	√	√	√	√	√	√	√	√	√	√
Ammonium trioxovanadate	√	√	√	√	√	√	√	√	√	√	√	√	√
Nickel	√	√	√	√	√	√	√	√	√	√	√	√	√
Diarsenic trioxide	√	√	√	√	√	√	√	√	√	√	√	√	√
Beryllium	√	√	√	√	√	√	√	√	√	√	√	√	√
Cadmium	√	√	√	√	√	√	√	√	√	√	√	√	√
Cobalt	√	√	√	√	√	√	√	√	×	√	√	√	√
Copper	√	√	√	√	√	√	√	√	√	√	√	√	√
Iron	√	√	√	√	√	√	√	√	√	√	√	√	√
Magnesium	√	√	√	√	√	√	√	√	√	√	√	√	√
Manganese	√	√	√	√	√	√	√	√	√	√	√	√	√
Lead	√	√	√	√	√	√	√	√	×	√	√	√	√
Antimony	√	√	√	√	√	√	√	√	√	√	√	√	√
Selenium	√	√	√	√	√	√	√	√	×	√	√	√	√
Silicon	√	√	√	√	√	√	√	√	√	√	√	√	√
Tin	√	√	√	√	√	√	√	√	√	√	√	√	√
Titanium	√	√	√	√	√	√	√	√	√	√	√	√	√
Thallium nitrate	√	√	√	×	√	√	√	√	√	×	√	√	√
Zinc	√	√	√	√	√	√	√	√	×	√	√	√	√
Bismuth	√	√	√	√	√	√	√	√	√	√	√	√	√
Barium nitrate	√	√	√	√	√	√	√	√	√	√	√	√	√

【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	×	×	×
Nitric acid	×	×	×
Aluminum nitrate nonahydrate	×	×	×
Chromium trinitrate	×	×	×
Strontium carbonate	×	×	×
Boric acid	×	×	×
Lithium carbonate	×	×	×
ZIRCONIUM NITRATE (ZIRCONYL)	×	×	×
Ammonium dihydrogen phosphate	×	×	×
Calcium carbonate	×	×	×
Potassium nitrate	×	×	×
Silver nitrate	×	×	×
Ammonium molybdate(VI)	×	×	×
Sodium carbonate	×	×	×
Ammonium trioxovanadate	×	×	×
Nickel	×	×	×
Diarsenic trioxide	×	×	×
Beryllium	×	×	×
Cadmium	×	×	×
Cobalt	×	×	×
Copper	×	×	×
Iron	×	×	×
Magnesium	×	×	×
Manganese	×	×	×
Lead	×	×	×
Antimony	×	×	×
Selenium	×	×	×
Silicon	×	×	×
Tin	×	×	×
Titanium	×	×	×
Thallium nitrate	×	×	×

Zinc	×	×	×
Bismuth	×	×	×
Barium nitrate	×	×	×

【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	×	×	×	√	×	×	×	×	×
Nitric acid	×	×	×	√	√	×	×	×	×
Aluminum nitrate nonahydrate	×	×	×	√	×	×	×	×	×
Chromium trinitrate	×	×	×	√	√	×	×	×	×
Strontium carbonate	×	×	×	√	√	×	×	×	×
Boric acid	√	×	√	√	√	×	×	×	×
Lithium carbonate	×	×	×	√	√	×	×	×	×
ZIRCONIUM NITRATE (ZIRCONYL)	×	×	×	×	×	×	×	×	×
Ammonium dihydrogen phosphate	×	×	×	√	√	×	×	×	×
Calcium carbonate	×	×	×	√	√	×	×	×	×
Potassium nitrate	×	×	×	√	√	×	×	×	×
Silver nitrate	×	×	×	√	√	×	×	×	×
Ammonium molybdate(VI)	×	×	√	√	√	×	×	×	×
Sodium carbonate	×	×	×	√	√	×	×	×	×
Ammonium trioxovanadate	×	×	√	√	√	×	×	×	×
Nickel	×	×	√	√	√	×	√	×	×
Diarsenic trioxide	√	√	√	√	√	×	×	×	×
Beryllium	×	×	√	√	√	√	×	×	×
Cadmium	√	×	√	√	√	×	√	×	×
Cobalt	×	×	√	√	√	×	×	×	×
Copper	×	×	×	√	√	×	×	×	×
Iron	×	×	×	√	√	×	×	×	×
Magnesium	×	×	×	√	√	×	×	×	×
Manganese	×	×	×	√	√	×	×	×	×
Lead	√	×	√	√	√	×	√	×	×
Antimony	×	×	×	√	√	√	×	×	×

Selenium	×	×	×	√	√	×	×	×	×
Silicon	×	×	×	√	√	×	×	×	×
Tin	×	×	×	√	√	×	×	×	×
Titanium	×	×	×	√	√	×	×	×	×
Thallium nitrate	×	×	×	√	×	×	×	×	×
Zinc	×	×	×	√	√	×	×	×	×
Bismuth	×	×	×	√	√	×	×	×	×
Barium nitrate	×	×	×	√	√	×	×	×	×

[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.
"×" No data or not included in the regulations.

German water hazard class(WGK)

Component	WGK	Remark
Nitric acid	WGK 1	
Strontium carbonate	nwg	
Boric acid	WGK 1	
Lithium carbonate	WGK 1	
Ammonium dihydrogen phosphate	WGK 1	
Calcium carbonate	nwg	
Potassium nitrate	WGK 1	
Silver nitrate	WGK 3	The regular and professional use of this substance for drinking water treatment, surface water remediation or waste water treatment is not restricted by this classification.
Ammonium molybdate(VI)	WGK 1	
Sodium carbonate	WGK 1	The regular and professional use of this substance for drinking water treatment, surface water remediation or waste water treatment is not restricted by this classification.
Ammonium trioxovanadate	WGK 3	
Nickel	WGK 1	
Diarsenic trioxide	WGK 3	
Cadmium	WGK 3	
Cobalt	WGK 1	

Copper	WGK 2	
Iron	nwg	
Magnesium	nwg	
Manganese	WGK 2	
Selenium	WGK 2	
Silicon	nwg	
Tin	nwg	
Titanium	nwg	
Thallium nitrate	WGK 3	
Zinc	nwg	
Bismuth	nwg	
Barium nitrate	WGK 1	

【WGK 1】 slightlyhazardous to water
【WGK 2】 obviouslyhazardous 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
Chromium trinitrate	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/m³. Specified as Cr.	
Strontium carbonate	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/m³ The mass per unit volume of 0,15 g/m3 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/m³.	
Boric acid	Chapter 5.2.7.1.3 Substances toxic to reproductionMass flow: 2,5 g/hr or Mass conc.: 1 mg/m³	
Lithium carbonate	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/m³ The mass per unit volume of 0,15 g/m3 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/m³.	
Ammonium dihydrogen phosphate	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/m³ The mass per unit volume of 0,15 g/m3 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/m³.	
Calcium carbonate	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/m³ The mass per unit volume of 0,15 g/m3 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/m³.	
Potassium nitrate	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/m³ The mass per unit volume of 0,15 g/m3 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/m³.	
Silver nitrate	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/m³ The mass per unit volume of 0,15 g/m3 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/m³.	
Ammonium molybdate(VI)	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/m³ The mass per unit volume of 0,15 g/m3 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/m³.	
Sodium carbonate	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/m³ The mass per unit volume of 0,15 g/m3 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/m³.	
Ammonium trioxovanadate	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/m³. Specified as V.	
Nickel	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/m³. Specified as Ni.	
Diarsenic trioxide	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/m³. Specified as As.	
Beryllium	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/m³	
Cadmium	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/m³. Specified as Cd.	
Cobalt	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/m³. Specified as Co.	
Copper	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/m³. Specified as Cu.	
Iron	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/m³ The mass per unit volume of 0,15 g/m3 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/m³.	
Magnesium	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/m³ The mass per unit volume of 0.15 g/m3 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/m³.	
Manganese	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/m³. Specified as	

	Mn.	
Lead	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/m³. Specified as Pb.	
Antimony	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/m³. Specified as Sb.	
Selenium	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/m³. Specified as Se.	
Silicon	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/m³ The mass per unit volume of 0,15 g/m3 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/m³.	
Tin	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/m³. Specified as Sn.	
Titanium	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/m³ The mass per unit volume of 0,15 g/m3 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/m³.	
Thallium nitrate	Chapter 5.2.2 Inorganic dusts. Class I. 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: 0,05 g/hr or Mass conc.:0,01 mg/m³. Specified as Tl.	
Zinc	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/m³ The mass per unit volume of 0.15 g/m3 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/m³.	
Bismuth	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/m³ The mass per unit volume of 0,15 g/m3 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/m³.	
Barium nitrate	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/m³ The mass per unit volume of 0,15 g/m3 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/m³.	

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	
Chromium trinitrate	TRGS 201|TRGS 400|TRGS 555|TRGS 600|TRGS 402|TRGS 401|TRGS 500|TRGS 509|TRGS 510|TRGS 800	
Strontium carbonate	TRGS 500|TRGS 509|TRGS 510	
Boric acid	TRGS 201|TRGS 400|TRGS 555|TRGS 600|TRGS 402|TRGS 401|TRGS 500|TRGS 509|TRGS 510|TRGS 560	
Lithium carbonate	TRGS 201|TRGS 400|TRGS 555|TRGS 600|TRGS 402|TRGS 500|TRGS 509|TRGS 510	
Ammonium dihydrogen phosphate	TRGS 500|TRGS 509|TRGS 510	
Calcium carbonate	TRGS 500|TRGS 509|TRGS 510	
Potassium nitrate	TRGS 201|TRGS 400|TRGS 555|TRGS 600|TRGS 500|TRGS 509|TRGS 510|TRGS 800	
Silver nitrate	TRGS 201|TRGS 400|TRGS 555|TRGS 600|TRGS 402|TRGS 401|TRGS 500|TRGS 509|TRGS 510|TRGS 800	
Ammonium molybdate(VI)	TRGS 201|TRGS 400|TRGS 555|TRGS 600|TRGS 500|TRGS 509|TRGS 510	
Sodium carbonate	TRGS 201|TRGS 400|TRGS 555|TRGS 600|TRGS 500|TRGS 509|TRGS 510	
Ammonium trioxovanadate	TRGS 201|TRGS 400|TRGS 555|TRGS 600|TRGS 402|TRGS 401|TRGS 500|TRGS 509|TRGS 510	
Nickel	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	
Diarsenic trioxide	TRGS 201|TRGS 400|TRGS 555|TRGS 600|TRGS 401|TRGS 410|TRGS 500|TRGS 509|TRGS 510|TRGS 560	
Beryllium	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	
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	
Magnesium	TRGS 500|TRGS 509|TRGS 510|TRGS 800	
Manganese	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	
Lead	TRGS 201|TRGS 400|TRGS 555|TRGS 600|TRGS 402|TRGS 401|TRGS 500|TRGS 509|TRGS 510|TRGS 560|TRGS 505	
Antimony	TRGS 201|TRGS 400|TRGS 555|TRGS 600|TRGS 401|TRGS 500|TRGS 509|TRGS 510|TRGS 800	
Selenium	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	
Silicon	TRGS 500|TRGS 509|TRGS 510|TRGS 800|TRGS 720|TRGS 721|TRGS 722|TRGS 723|TRGS 724	
Tin	TRGS 500|TRGS 509|TRGS 510|TRGS 800	
Titanium	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	
Thallium nitrate	TRGS 201|TRGS 400|TRGS 555|TRGS 600|TRGS 500|TRGS 509|TRGS 510|TRGS 800	
Zinc	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	
Bismuth	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	
Barium nitrate	TRGS 201|TRGS 400|TRGS 555|TRGS 600|TRGS 402|TRGS 500|TRGS 509|TRGS 510|TRGS 800	

15.2 Chemical safety assessment

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

16 Other information

Information on revision

Creation Date	2025/12/14
Revision Date	-
Reason for revision	-

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_{50}	Lethal Concentration 50%	NFPA	National Fire Protection Association
LD_{50}	Lethal Dose 50%	NTP	National Toxicology Program
EC_{50}	Effective Concentration 50%	PBT	Persistent, Bioaccumulative, Toxic
EC_X	Effective Concentration X%	vPvB	very Persistent, very Bioaccumulative
P_{OW}	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.