Safety Data Sheet

47 mix metal standard solution

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Report No.：BWB2529-2016-MSDS-US
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*Prepared according to American OSHA HCS-2024 (29 CFR 1910.1200)

1 Identification

Product identifier

Product Name	47 mix metal standard solution
Cat No.	BWB2529-2016
CAS No.	Not applicable
EC No.	Not applicable
Molecular Formula	Not applicable

Recommended use of the product and restrictions on use

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

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

Emergency phone number

Emergency phone number	010-58103678

2 Hazard(s) identification

Hazard classification according to 29 CFR 1910.1200

Skin corrosion/irritation	Category 1A
Serious eye damage/irritation	Category 1
Acute Toxicity - Inhalation	Category 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

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 with adequate ventilation.
P280	Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.
P284	In case of inadequate ventilation wear respiratory protection.

◆ Response

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.

Other hazards

	Not applicable.

Hazard description

◆ Physical and chemical hazards

	No information available

◆ Health hazards

Inhaled	Inhalation of vapours or aerosols (mists, fumes), generated by the product during the course of normal handling, may produce severely toxic effects; these may be fatal. Corrosive product can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage.
Ingestion	Accidental ingestion of the product may be harmful to the health of the individual.
Skin Contact	The product can cause severe skin burns following direct contact with the skin.
Eye	The product can produce severe chemical burns to the eye following direct contact. If timely and appropriate treatment is not available may cause permanent blindness.

◆ Environmental hazards

	Please refer to 12th chapter of SDS.

3 Composition/information on ingredients

Substance/mixture

	Mixture

Component	CAS No.	EC No.	Concentration (wt, %)
Water	7732-18-5	231-791-2	94.53
Nitric acid	7697-37-2	231-714-2	5
Nickel	7440-02-0	231-111-4	0.01
Silver	7440-22-4	231-131-3	0.01
Aluminium	7429-90-5	231-072-3	0.01
Arsenic	7440-38-2	231-148-6	0.01
Boron	7440-42-8	231-151-2	0.01
Barium	7440-39-3	231-149-1	0.01
Beryllium	7440-41-7	231-150-7	0.01
Bismuth	7440-69-9	231-177-4	0.01
Calcium	7440-70-2	231-179-5	0.01
Cadmium	7440-43-9	231-152-8	0.01
Cobalt	7440-48-4	231-158-0	0.01
Chromium	7440-47-3	231-157-5	0.01
Copper	7440-50-8	231-159-6	0.01
Iron	7439-89-6	231-096-4	0.01
Potassium	7440-09-7	231-119-8	0.01
Lithium	7439-93-2	231-102-5	0.01
Magnesium	7439-95-4	231-104-6	0.01
Manganese	7439-96-5	231-105-1	0.01
Molybdenum	7439-98-7	231-107-2	0.01
Sodium	7440-23-5	231-132-9	0.01
Phosphorus	7723-14-0	231-768-7	0.01
Lead	7439-92-1	231-100-4	0.01
Antimony	7440-36-0	231-146-5	0.01
Selenium	7782-49-2	231-957-4	0.01
Silicon	7440-21-3	231-130-8	0.01
Tin	7440-31-5	231-141-8	0.01
Strontium	7440-24-6	231-133-4	0.01
Titanium	7440-32-6	231-142-3	0.01

Thallium	7440-28-0	231-138-1	0.01
Vanadium	7440-62-2	231-171-1	0.01
Zinc	7440-66-6	231-175-3	0.01
Zirconium	7440-67-7	231-176-9	0.01
Lanthanum	7439-91-0	231-099-0	0.01
Gold	7440-57-5	231-165-9	0.01
Palladium	7440-05-3	231-115-6	0.01
Indium	7440-74-6	231-180-0	0.01
Germanium	7440-56-4	231-164-3	0.01
Platinum	7440-06-4	231-116-1	0.01
Yttrium	7440-65-5	231-174-8	0.01
Mercury	7439-97-6	231-106-7	0.01
Lutetium	7439-94-3	231-103-0	0.01
Ytterbium	7440-64-4	231-173-2	0.01
Terbium	7440-27-9	231-137-6	0.01
Samarium	7440-19-9	231-128-7	0.01
Praseodymium	7440-10-0	231-120-3	0.01
Gallium	7440-55-3	231-163-8	0.01
Gadolinium	7440-54-2	231-162-2	0.01

4 First-aid measures

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.

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.

Indication of any immediate medical attention and special treatment needed

1	Treat symptomatically.
2	Symptoms may be delayed.

5 Fire-fighting measures

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.

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.

Special protective equipment and precautions for fire-fighters

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

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.

Environmental precautions

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

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.

7 Handling and storage

Precautions for safe handling

1	Handling is performed in a well ventilated place.
2	Wear suitable protective equipment.
3	Avoid contact with skin and eyes.
4	Keep away from heat/sparks/open flames/ hot surfaces.

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.

8 Exposure controls/personal protection

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
	Australia	2	5.2	4	10
	Canada - Ontario	2	-	4	-
	European Union	-	-	1	2.6
	New Zealand	2	5.2	4	10
Nickel	Japan - JSOH(2024–2025)	-	1	-	-
	Permissible exposure standards for workers in the workplace	-	1	-	2
	Australia	-	1	-	-
	Canada - Ontario	-	1	-	-
	New Zealand	-	0.005	-	-
	USA - ACGIH	-	1.5(inhalable fraction)	-	-
Silver	Japan - JSOH(2024–2025)	-	0.01	-	-

	Australia	-	0.1	-	-
	Canada - Ontario	-	0.1	-	-
	European Union	-	0.1	-	-
	New Zealand	-	0.1	-	-
	USA - ACGIH	-	0.1(dust and fume)	-	-
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)
	Australia	-	5(powder, pyrophoric)	-	-
	Canada - Ontario	1	-	-	-
	New Zealand	-	5(pyrophoric powder)	-	-
Arsenic	Japan - JSOH(2024–2025)	-	0.003(individual excess lifetime risk of cancer 10^-3)	-	-
	Permissible exposure standards for workers in the workplace	-	0.01(as As)	-	0.03(as As)
	Australia	-	0.05	-	-
	Canada - Ontario	-	0.01	-	0.05
	New Zealand	-	0.001	-	-
	USA - ACGIH	-	0.01	-	-
Boron	Germany (DFG)	-	0.75	-	0.75
Barium	Permissible exposure standards for workers in the workplace	-	0.5	-	1.5
	Australia	-	0.5	-	-
	Canada - Ontario	-	0.5	-	-
	European Union	-	0.5	-	-
	New Zealand	-	0.5	-	-
	USA - ACGIH	-	0.5	-	-
Beryllium	Japan - JSOH(2024–2025)	-	0.002	-	-
	Permissible exposure standards for	-	0.002(as Be)	-	0.006(as Be)

	workers in the workplace				
	Australia	-	0.002	-	-
	Canada - Ontario	-	0.002	-	0.01
	European Union	-	0.0002	-	-
	New Zealand	-	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)
	Australia	-	0.01	-	-
	Canada - Ontario	-	0.01(inhalable fraction)	-	-
	European Union	-	0.001	-	-
	New Zealand	-	0.004	-	-
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)
	Australia	-	0.05	-	-
	Canada - Ontario	-	0.02	-	-
	New Zealand	-	0.02	-	-
	USA - ACGIH	-	0.02(inhalable fraction)	-	-
Chromium	Japan - JSOH(2024–2025)	-	0.5	-	-
	Permissible exposure standards for workers in the workplace	-	1	-	2
	Australia	-	0.5	-	-
	Canada - Ontario	-	0.5	-	-
	European Union	-	2	-	-
	New Zealand	-	0.5	-	-
Copper	Permissible exposure standards for workers in the workplace	-	1(dust and mist)	-	2(dust and mist)
	Permissible exposure standards for workers in the	-	0.2(fume)	-	0.6(fume)

	workplace				
	Australia	-	0.2(fume, respirable fraction)	-	-
	Canada - Ontario	-	0.2(fume, respirable fraction)	-	-
	New Zealand	-	0.01	-	-
	USA - ACGIH	-	1(dust and mist)	-	-
Lithium	Germany (AGS)	-	0.2	-	0.2
	Germany (DFG)	-	0.2	-	0.2
	Sweden	-	-	-	0.02
	Switzerland	-	0.2	-	0.2
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)
	Australia	-	1	-	-
	Canada - Ontario	-	0.2	-	-
	European Union	-	0.2	-	-
Molybdenum	Australia	-	10	-	-
	Canada - Ontario	-	10	-	-
	New Zealand	-	10	-	-
	USA - ACGIH	-	3(respirable fraction)	-	-
	Austria	-	15(inhalable aerosol)	-	30(inhalable aerosol)
	Canada - Québec	-	10	-	-
Phosphorus	Japan - JSOH(2024–2025)	-	0.1	-	-
	Permissible exposure standards for workers in the workplace	-	0.1	-	0.3
	Australia	-	0.1	-	-
	New Zealand	-	0.1	-	-
	USA - NIOSH	-	0.1	-	-
	USA - OSHA	-	0.1	-	-
Lead	Japan - JSOH(2024–2025)	-	0.03(as Pb)	-	-

	Permissible exposure standards for workers in the workplace	-	0.05	-	0.15
	Australia	-	0.05	-	-
	Canada - Ontario	-	0.05	-	-
	European Union	-	0.15	-	-
	New Zealand	-	0.05	-	-
Antimony	Japan - JSOH(2024–2025)	-	0.1	-	-
	Permissible exposure standards for workers in the workplace	-	0.5	-	1.5
	Australia	-	0.5	-	-
	Canada - Ontario	-	0.5	-	-
	New Zealand	-	0.5	-	-
	USA - ACGIH	-	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)
	Australia	-	0.1	-	-
	Canada - Ontario	-	0.2	-	-
	New Zealand	-	0.1	-	-
	USA - ACGIH	-	0.2	-	-
Silicon	Australia	-	10	-	-
	Canada - Ontario	-	10	-	-
	New Zealand	-	10	-	-
	USA - NIOSH	-	10	-	-
	USA - OSHA	-	15	-	-
	Belgium	-	10	-	-
Tin	Permissible exposure standards for workers in the workplace	-	2	-	4
	Australia	-	2	-	-
	Canada - Ontario	-	2	-	-
	USA - ACGIH	-	2(inhalable fraction)	-	-

	USA - OSHA	-	0.1	-	-
	Austria	-	2(inhalable aerosol)	-	4(inhalable aerosol)
Titanium	Latvia	-	10	-	-
	Poland	-	10	-	15
	Romania	-	10	-	15
Thallium	Australia	-	0.1	-	-
	Canada - Ontario	-	0.02	-	-
	New Zealand	-	0.1	-	-
	USA - ACGIH	-	0.02(inhalable fraction)	-	-
	USA - NIOSH	-	0.1	-	-
	USA - OSHA	-	0.1	-	-
Vanadium	Australia	-	0.05	-	-
	New Zealand	-	0.05	-	-
	USA - OSHA	-	-	0.1	0.5
	Austria	-	0.5(inhalable aerosol)	-	1(inhalable aerosol)
	Germany (DFG)	-	0.005	-	0.01
	Latvia	-	1	-	-
Zinc	Germany (DFG)	-	2	-	4
	Switzerland	-	0.1(respirable aerosol)	-	0.4(respirable aerosol)
Zirconium	Australia	-	5	-	10
	Canada - Ontario	-	5	-	10
	New Zealand	-	5	-	10
	USA - ACGIH	-	5	-	10
	USA - NIOSH	-	5	-	10
	USA - OSHA	-	5	-	-
Indium	Permissible exposure standards for workers in the workplace	-	0.1	-	0.3
	Australia	-	0.1	-	-
	Canada - Ontario	-	0.1	-	-
	New Zealand	-	0.1	-	-
	USA - ACGIH	-	0.1	-	-
	USA - NIOSH	-	0.1	-	-
Germanium	Germany (AGS)	-	0.85	-	1.7
	Romania	-	2	-	5
Platinum	Japan - JSOH(2024–2025)	-	0.001	-	-

	Permissible exposure standards for workers in the workplace	-	1	-	2
	Australia	-	1	-	-
	Canada - Ontario	-	1	-	-
	New Zealand	-	1	-	-
	USA - ACGIH	-	1	-	-
Yttrium	Permissible exposure standards for workers in the workplace	-	1	-	2
	Australia	-	1	-	-
	Canada - Ontario	-	1	-	-
	New Zealand	-	1	-	-
	USA - ACGIH	-	1	-	-
	USA - NIOSH	-	1	-	-
Mercury	Japan - JSOH(2024–2025)	-	0.025(vapor)	-	-
	Permissible exposure standards for workers in the workplace	-	0.05	-	0.15
	Australia	0.003	0.025	-	-
	Canada - Ontario	-	0.025	-	-
	European Union	-	0.02	-	-
	New Zealand	-	0.025	-	-

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.

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.

9 Physical and chemical properties and safety characteristics

Physical and chemical properties

Appearance (physical state, color, etc.)	blue to blue-green transparent 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

10 Stability and reactivity

Stability and reactivity

Reactivity	Contact with incompatible substances can cause decomposition or other chemical reactions.
Chemical stability	Stable under proper operation and storage conditions.
Possibility of hazardous reactions	In contact with active metals (alkali metals, Na, Ca etc.) causes a reaction and release hydrogen. Reacts severely with halogens, interhalogens or other strong oxidants, or causes a fire. 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. May be oxidized quickly when exposed to air.
Conditions to avoid	Incompatible materials, heat, flame and spark.
Incompatible materials	Alkali, sodium, calcium, and other active metal, halogen, metal oxide, nonmetal oxide, acyl halide and metal phosphide. Halogen, interhalogen, strong oxidant, water and acids. 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. Water, carbon dioxide, halocarbon, halogen, interhalogen, metal halide, non-metal oxides, acids, mercury and hydrazine.
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11 Toxicological information

Acute toxicity

Component	LD_{50}(oral)	LD_{50}(dermal)	LC_{50}(inhalation,4h)
Arsenic	763mg/kg(Rat)	No information available	No information available
Bismuth	5000mg/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
Antimony	7000mg/kg(Rat)	No information available	No information available
Manganese	9000mg/kg(Rat)	No information available	No information available
Silicon	3160mg/kg(Rat)	No information available	No information available
Phosphorus	3.03mg/kg(Rat)	No information available	No information available
Selenium	6700mg/kg(Rat)	No information available	5.67mg/L(Rat)
Boron	650mg/kg(Rat)	No information available	No information available
Iron	30000mg/kg(Rat)	No information available	No information available

Carcinogenicity

Component	List of carcinogens by the IARC Monographs	Report on Carcinogens by NTP	OSHA Carcinogen List
Water	Not Listed	Not Listed	Not Listed
Nitric acid	Not Listed	Not Listed	Not Listed
Nickel	Category 2B	Category R	Not Listed
Silver	Not Listed	Not Listed	Not Listed
Aluminium	Not Listed	Not Listed	Not Listed
Arsenic	Category 1	Category K	Listed
Boron	Not Listed	Not Listed	Not Listed
Barium	Not Listed	Not Listed	Not Listed
Beryllium	Category 1	Category K	Not Listed
Bismuth	Not Listed	Not Listed	Not Listed
Calcium	Not Listed	Not Listed	Not Listed
Cadmium	Category 1	Category K	Listed
Cobalt	Category 2A	Category R	Not Listed
Chromium	Category 3	Not Listed	Not Listed
Copper	Not Listed	Not Listed	Not Listed
Iron	Not Listed	Not Listed	Not Listed
Potassium	Not Listed	Not Listed	Not Listed
Lithium	Not Listed	Not Listed	Not Listed
Magnesium	Not Listed	Not Listed	Not Listed

Manganese	Not Listed	Not Listed	Not Listed
Molybdenum	Not Listed	Not Listed	Not Listed
Sodium	Not Listed	Not Listed	Not Listed
Phosphorus	Not Listed	Not Listed	Not Listed
Lead	Category 2B	Category R	Not Listed
Antimony	Not Listed	Not Listed	Not Listed
Selenium	Category 3	Not Listed	Not Listed
Silicon	Not Listed	Not Listed	Not Listed
Tin	Not Listed	Not Listed	Not Listed
Strontium	Not Listed	Not Listed	Not Listed
Titanium	Not Listed	Not Listed	Not Listed
Thallium	Not Listed	Not Listed	Not Listed
Vanadium	Not Listed	Not Listed	Not Listed
Zinc	Not Listed	Not Listed	Not Listed
Zirconium	Not Listed	Not Listed	Not Listed
Lanthanum	Not Listed	Not Listed	Not Listed
Gold	Not Listed	Not Listed	Not Listed
Palladium	Not Listed	Not Listed	Not Listed
Indium	Not Listed	Not Listed	Not Listed
Germanium	Not Listed	Not Listed	Not Listed
Platinum	Not Listed	Not Listed	Not Listed
Yttrium	Not Listed	Not Listed	Not Listed
Mercury	Category 3	Not Listed	Not Listed
Lutetium	Not Listed	Not Listed	Not Listed
Ytterbium	Not Listed	Not Listed	Not Listed
Terbium	Not Listed	Not Listed	Not Listed
Samarium	Not Listed	Not Listed	Not Listed
Praseodymium	Not Listed	Not Listed	Not Listed
Gallium	Not Listed	Not Listed	Not Listed
Gadolinium	Not Listed	Not Listed	Not Listed

Others

47 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

12 Ecological information

Acute aquatic toxicity

Component	Fish	Crustaceans	Algae or other aquatic plants
Strontium	LC_{50} : > 40.3mg/L (96h)(Fish)	No information available	ErC_{50} : > 43.3mg/L (72h)(Algae)
Molybdenum	LC_{50} : 609.1mg/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)
Yttrium	LC_{50} : ≥100mg/L (96h)(Fish)	No information available	No information available
Selenium	LC_{50} : 2.06mg/L (96h)(Fish)	No information available	ErC_{50} : 96mg/L (96h)(Algae)
Nickel	LC_{50} : 40mg/L (96h)(Fish)	EC_{50} : 1mg/L (48h)(Crustaceans)	No information available
Silver	LC_{50} : 0.0012mg/L (96h)(Fish)	EC_{50} : 0.0092mg/L (48h)(Crustaceans)	ErC_{50} : 0.00198mg/L (96h)(Algae)
Manganese	LC_{50} : 1800mg/L (96h)(Fish)	EC_{50} : 40mg/L (48h)(Crustaceans)	No information available
Magnesium	LC_{50} :541mg/L (96h)(Fish)	No information available	No information available
Mercury	LC_{50} : 0.16mg/L (96h)(Fish)	No information available	No information available
Phosphorus	LC_{50} : 0.006mg/L (96h)(Fish)	EC_{50} : 0.14mg/L (48h)(Crustaceans)	No information available
Gadolinium	No information available	EC_{50} : > 0.43mg/L (48h)(Crustaceans)	No information available
Tin	LC_{50} : > 0.0124mg/L (96h)(Fish)	No information available	No information available
Calcium	No information available	EC_{50} : 49.1mg/L (48h)(Crustaceans)	No information available
Arsenic	LC_{50} : 12.6mg/L (96h)(Fish)	No information available	ErC_{50} : 25.2mg/L (72h)(Algae)
Samarium	No information available	EC_{50} : > 0.15mg/L (48h)(Crustaceans)	No information available
Lead	LC_{50} : 2.8mg/L (96h)(Fish)	No information available	No information available
Cobalt	LC_{50} : 1.5mg/L (96h)(Fish)	No information available	No information available
Cadmium	LC_{50} : 7.8mg/L (96h)(Fish)	EC_{50} : 0.58mg/L (48h)(Crustaceans)	No information available
Thallium	LC_{50} : 21mg/L (96h)(Fish)	No information available	ErC_{50} : 0.13mg/L (96h)(Algae)
Silicon	LC_{50} :100mg/L (96h)(Fish)	No information available	No information available
Zirconium	LC_{50} : 74mg/L (96h)(Fish)	No information available	No information available
Vanadium	LC_{50} : 0.693mg/L	No information available	No information available

	(96h)(Fish)		
Bismuth	LC_{50} :100mg/L (96h)(Fish)	EC_{50} : > 100mg/L (48h)(Crustaceans)	No information available
Indium	LC_{50} : 19.519mg/L (96h)(Fish)	No information available	No information available
Chromium	LC_{50} : 40.5mg/L (96h)(Fish)	EC_{50} : 0.07mg/L (48h)(Crustaceans)	No information available
Germanium	LC_{50} : 72mg/L (96h)(Fish)	No information available	No information available
Gallium	No information available	EC_{50} : 14.96mg/L (48h)(Crustaceans)	ErC_{50} : 14.65mg/L (72h)(Algae)
Zinc	LC_{50} : 2.01mg/L (96h)(Fish)	EC_{50} : 1.33mg/L (48h)(Crustaceans)	No information available
Aluminium	LC_{50} : 1.55mg/L (96h)(Fish)	No information available	No information available
Iron	LC_{50} : 1.29mg/L (96h)(Fish)	No information available	No information available
Lithium	LC_{50} : 18mg/L (96h)(Fish)	No information available	No information available

Chronic aquatic toxicity

Component	Fish	Crustaceans	Algae or other aquatic plants
Strontium	NOEC : ≥41.4mg/L(Fish)	No information available	No information available
Selenium	NOEC : 0.025mg/L(Fish)	No information available	No information available

Persistence and degradability

Component	Persistence (water/soil)	Persistence (air)
Nickel	Low	Low

Bioaccumulative potential

Component	Bioaccumulative potential	Comments
Nickel	Low	Log Kow=-1.38
Phosphorus	High	BCF=2310000

Mobility in soil

Component	log Koc	Remark
Nickel	1.155	
Magnesium	1.12	20 ℃
Silicon	1.00	20 ℃
Zirconium	4.61	20 ℃
Lanthanum	6.74	20 ℃

13 Disposal considerations

Disposal considerations

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

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

Others

Precautions for transport	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.

15 Regulatory information

International chemical inventory

Component	A	B	C	D	E	F	G	H	I	J	K	L	M
Water	√	√	√	√	√	√	√	√	√	√	√	√	√
Nitric acid	√	√	√	√	√	√	√	√	√	√	√	√	√
Nickel	√	√	√	√	√	√	√	√	√	√	√	√	√
Silver	√	√	√	√	√	√	√	√	×	√	√	√	√
Aluminium	√	√	√	√	√	√	√	√	√	√	√	√	√
Arsenic	√	√	√	√	√	√	√	√	√	√	√	√	√
Boron	√	√	√	√	√	√	√	√	√	√	√	√	√
Barium	√	√	√	√	√	√	√	√	√	√	√	√	√
Beryllium	√	√	√	√	√	√	√	√	√	√	√	√	√
Bismuth	√	√	√	√	√	√	√	√	√	√	√	√	√
Calcium	√	√	√	√	√	√	√	√	√	√	√	√	√
Cadmium	√	√	√	√	√	√	√	√	√	√	√	√	√
Cobalt	√	√	√	√	√	√	√	√	×	√	√	√	√
Chromium	√	√	√	√	√	√	√	√	√	√	√	√	√
Copper	√	√	√	√	√	√	√	√	√	√	√	√	√
Iron	√	√	√	√	√	√	√	√	√	√	√	√	√
Potassium	√	√	√	√	√	√	√	√	√	×	√	√	√
Lithium	√	√	√	√	√	√	√	√	√	√	√	√	√
Magnesium	√	√	√	√	√	√	√	√	√	√	√	√	√
Manganese	√	√	√	√	√	√	√	√	√	√	√	√	√
Molybdenum	√	√	√	√	√	√	√	√	√	√	√	√	√
Sodium	√	√	√	√	√	√	√	√	×	√	√	√	√
Phosphorus	√	√	√	√	√	√	√	√	√	√	√	√	√
Lead	√	√	√	√	√	√	√	√	×	√	√	√	√
Antimony	√	√	√	√	√	√	√	√	√	√	√	√	√
Selenium	√	√	√	√	√	√	√	√	×	√	√	√	√
Silicon	√	√	√	√	√	√	√	√	√	√	√	√	√
Tin	√	√	√	√	√	√	√	√	√	√	√	√	√
Strontium	√	√	√	√	√	√	√	√	√	√	√	√	√
Titanium	√	√	√	√	√	√	√	√	√	√	√	√	√

Thallium	√	√	√	√	√	√	√	√	√	×	√	√	√
Vanadium	√	√	√	√	√	√	√	√	√	√	√	√	√
Zinc	√	√	√	√	√	√	√	√	×	√	√	√	√
Zirconium	√	√	√	√	√	√	√	√	√	√	√	√	√
Lanthanum	√	√	√	√	√	√	√	√	×	×	×	√	√
Gold	√	√	√	√	√	√	√	√	√	×	√	√	√
Palladium	√	√	√	√	√	√	√	√	√	×	√	√	√
Indium	√	√	√	√	√	√	√	√	√	√	√	√	√
Germanium	√	√	√	×	√	×	√	√	√	×	×	√	√
Platinum	√	√	√	√	√	√	√	√	√	×	√	√	√
Yttrium	√	√	√	√	√	×	√	×	√	×	√	√	√
Mercury	√	√	√	√	√	√	√	√	√	√	√	√	√
Lutetium	×	√	√	√	×	×	×	×	×	×	×	√	√
Ytterbium	×	√	√	√	×	×	√	×	×	×	×	√	√
Terbium	×	√	√	×	×	×	√	×	×	×	×	√	√
Samarium	√	√	√	√	√	√	√	√	×	×	×	√	√
Praseodymium	√	√	√	√	√	×	×	√	×	×	×	√	√
Gallium	√	√	√	√	√	√	√	√	√	×	√	√	√
Gadolinium	×	√	√	×	×	×	√	×	×	×	×	√	√

【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	×	×	×
Nickel	×	×	×
Silver	×	×	×
Aluminium	×	×	×
Arsenic	×	×	×
Boron	×	×	×

Barium	×	×	×
Beryllium	×	×	×
Bismuth	×	×	×
Calcium	×	×	×
Cadmium	×	×	×
Cobalt	×	×	×
Chromium	×	×	×
Copper	×	×	×
Iron	×	×	×
Potassium	×	×	×
Lithium	×	×	×
Magnesium	×	×	×
Manganese	×	×	×
Molybdenum	×	×	×
Sodium	×	×	×
Phosphorus	×	×	×
Lead	×	×	×
Antimony	×	×	×
Selenium	×	×	×
Silicon	×	×	×
Tin	×	×	×
Strontium	×	×	×
Titanium	×	×	×
Thallium	×	×	×
Vanadium	×	×	×
Zinc	×	×	×
Zirconium	×	×	×
Lanthanum	×	×	×
Gold	×	×	×
Palladium	×	×	×
Indium	×	×	×
Germanium	×	×	×
Platinum	×	×	×
Yttrium	×	×	×
Mercury	×	×	√
Lutetium	×	×	×
Ytterbium	×	×	×

Terbium	×	×	×
Samarium	×	×	×
Praseodymium	×	×	×
Gallium	×	×	×
Gadolinium	×	×	×

【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

US chemical inventory

Component	A	B	C	D	E	F	G	H
Water	×	×	×	×	×	×	×	×
Nitric acid	×	√	√	√	√	√	√	×
Nickel	√	√	√	√	√	√	√	√
Silver	×	×	√	√	√	√	√	×
Aluminium	×	×	×	√	√	√	√	×
Arsenic	√	×	√	√	√	√	√	×
Boron	×	×	×	×	√	×	×	×
Barium	×	×	×	√	√	√	√	×
Beryllium	√	×	√	√	√	√	√	×
Bismuth	×	×	×	×	×	×	×	×
Calcium	×	×	×	√	√	√	√	×
Cadmium	√	×	√	√	√	√	√	×
Cobalt	√	√	×	√	√	√	√	√
Chromium	√	×	√	√	√	√	√	×
Copper	×	×	√	√	√	√	√	×
Iron	×	×	×	×	×	×	×	×
Potassium	×	×	×	√	√	√	√	×
Lithium	×	×	×	√	√	√	√	×
Magnesium	×	×	×	√	√	√	√	×
Manganese	√	×	×	√	√	√	√	×
Molybdenum	×	×	×	√	√	√	√	×
Sodium	×	×	√	√	√	√	√	×
Phosphorus	√	√	√	√	√	√	√	×
Lead	√	×	√	√	√	√	√	×
Antimony	√	×	√	√	√	√	√	×
Selenium	√	×	√	√	√	√	√	×
Silicon	×	×	×	√	√	√	×	×

Tin	×	×	×	√	√	√	√	×
Strontium	×	×	×	×	√	×	√	×
Titanium	×	×	×	×	√	×	√	×
Thallium	×	×	√	√	√	√	√	×
Vanadium	×	×	×	√	√	√	√	×
Zinc	×	×	√	√	√	√	√	×
Zirconium	×	×	×	√	√	√	√	×
Lanthanum	×	×	×	×	×	×	×	×
Gold	×	×	×	×	×	×	×	×
Palladium	×	×	×	×	×	×	×	×
Indium	×	×	×	√	√	√	√	×
Germanium	×	×	×	×	×	×	×	×
Platinum	×	×	×	√	√	√	√	×
Yttrium	×	×	×	√	√	√	√	×
Mercury	√	×	√	√	√	√	√	×
Lutetium	×	×	×	×	×	×	×	×
Ytterbium	×	×	×	×	×	×	×	×
Terbium	×	×	×	×	×	×	×	×
Samarium	×	×	×	×	×	×	×	×
Praseodymium	×	×	×	×	×	×	×	×
Gallium	×	×	×	×	√	×	√	×
Gadolinium	×	×	×	×	×	×	×	×

[A] US Clean Air Act (CAA)- Section 112, Hazardous Air Pollutants
[B] US SARA 302- Extremely Hazardous Substance List
[C] US CERCLA- Hazardous Substances List
[D] US Massachusetts Right-to-Know Substance List
[E] US New Jersey Right to Know Hazardous Substance List
[F] US Pennsylvania Right to Know Hazardous Substance List
[G] US New York City Right-to-Know Hazardous Substance List
[H] US California Proposition 65 List

Note:
"√" Indicates that the substance included in the regulations.
"×" No data or not included in the regulations.

16 Other information

Information on revision

Creation Date	2025/11/03
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	HCS	Hazard Communication Standard

Disclaimer

This Safety Data Sheet (SDS) was prepared according to OSHA HCS-2024. 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.