

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision Date 12.10.2018

Version 22.1

SECTION 1. Identification of the substance/mixture and of the company/undertaking**1.1 Product identifier**

Catalogue No.	111355
Product name	ICP multi-element standard solution IV (23 elements in diluted nitric acid) 1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn, Na, Ni, Pb, Sr, Tl, Zn Certipur®

REACH Registration Number This product is a mixture. REACH Registration Number see section 3.

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

Identified uses	Reagent for analysis For additional information on uses please refer to the Merck Chemicals portal (www.merckgroup.com).
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1.3 Details of the supplier of the safety data sheet

Company	Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0
Responsible Department	LS-QHC * e-mail: prodsafe@merckgroup.com

1.4 Emergency telephone number	Please contact the regional company representation in your country.
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SECTION 2. Hazards identification**2.1 Classification of the substance or mixture**

Classification (REGULATION (EC) No 1272/2008)

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1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn,
Na, Ni, Pb, Sr, Tl, Zn Certipur®

Corrosive to metals, Category 1, H290
Skin corrosion, Category 1B, H314
Skin sensitisation, Category 1, H317
Carcinogenicity, Category 1A, H350
Specific target organ toxicity - repeated exposure, Category 2, H373
Chronic aquatic toxicity, Category 2, H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms



Signal word

Danger

Hazard statements

H350 May cause cancer.
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H373 May cause damage to organs through prolonged or repeated exposure.
H411 Toxic to aquatic life with long lasting effects.
EUH071 Corrosive to the respiratory tract.

Precautionary statements

Prevention

P201 Obtain special instructions before use.
P273 Avoid release to the environment.

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Na, Ni, Pb, Sr, Tl, Zn Certipur®

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Restricted to professional users.

Reduced labelling (≤125 ml)

Hazard pictograms



Signal word

Danger

Hazard statements

H350 May cause cancer.

H314 Causes severe skin burns and eye damage.

H317 May cause an allergic skin reaction.

Precautionary statements

P201 Obtain special instructions before use.

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Contains: nitric acid, Chromium(III) nitrate, nickel(II) nitrate

2.3 Other hazards

None known.

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SECTION 3. Composition/information on ingredients

Chemical nature Nitric acid solution.

3.1 Substance

Not applicable

3.2 Mixture

Hazardous components (REGULATION (EC) No 1272/2008)

Chemical name (Concentration)

CAS-No. Registration number Classification

nitric acid ($\geq 5\%$ - $< 10\%$)

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

7697-37-2 01-2119487297-23-

XXXX

Oxidizing liquid, Category 2, H272

Corrosive to metals, Category 1, H290

Acute toxicity, Category 1, H330

Skin corrosion, Category 1A, H314

boric acid ($\geq 0,3\%$ - $< 1\%$)

PBT/vPvB: Not applicable for inorganic substances

10043-35-3 01-2119486683-25-

XXXX

Reproductive toxicity, Category 1B, H360FD

nickel(II) nitrate ($\geq 0,25\%$ - $< 0,3\%$)

13138-45-9 *)

Oxidizing solid, Category 2, H272

Acute toxicity, Category 4, H302

Acute toxicity, Category 4, H332

Skin irritation, Category 2, H315

Serious eye damage, Category 1, H318

Respiratory sensitisation, Category 1, H334

Skin sensitisation, Category 1, H317

Germ cell mutagenicity, Category 2, H341

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Carcinogenicity, Category 1A, H350i
Reproductive toxicity, Category 1B, H360D
Specific target organ toxicity - repeated exposure, Category 1,
H372
Acute aquatic toxicity, Category 1, H400
Chronic aquatic toxicity, Category 1, H410
M-Factor: 1

Cobalt(II) nitrate ($\geq 0,25\%$ - $< 0,3\%$)

The concentration stated or, in the absence of such concentrations, the generic concentrations set out in this Regulation are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture.

10141-05-6 *)

Germ cell mutagenicity, Category 2, H341
Reproductive toxicity, Category 1B, H360F
Carcinogenicity, Category 1B, H350i
Respiratory sensitisation, Category 1, H334
Skin sensitisation, Category 1, H317
Acute aquatic toxicity, Category 1, H400
Chronic aquatic toxicity, Category 1, H410
M-Factor: 10

Copper(II) nitrate ($\geq 0,25\%$ - $< 1\%$)

3251-23-8 *)

Oxidizing solid, Category 2, H272
Acute toxicity, Category 4, H302
Skin irritation, Category 2, H315
Eye irritation, Category 2, H319
Acute aquatic toxicity, Category 1, H400
Chronic aquatic toxicity, Category 1, H410

Zinc nitrate ($\geq 0,25\%$ - $< 1\%$)

7779-88-6 *)

Oxidizing solid, Category 2, H272
Acute toxicity, Category 4, H302
Skin irritation, Category 2, H315

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Na, Ni, Pb, Sr, Tl, Zn Certipur®

Eye irritation, Category 2, H319
Specific target organ toxicity - single exposure, Category 3, H335
Acute aquatic toxicity, Category 1, H400
Chronic aquatic toxicity, Category 1, H410

Cadmium nitrate ($\geq 0,01\%$ - $< 0,25\%$)

The concentration stated or, in the absence of such concentrations, the generic concentrations set out in this Regulation are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture.

10325-94-7 *)

Acute toxicity, Category 3, H301
Acute toxicity, Category 2, H330
Acute toxicity, Category 4, H312
Germ cell mutagenicity, Category 1B, H340
Carcinogenicity, Category 1B, H350
Specific target organ toxicity - repeated exposure, Category 1, H372
Acute aquatic toxicity, Category 1, H400
Chronic aquatic toxicity, Category 1, H410
M-Factor: 10

Lead(II) nitrate ($< 0,25\%$)

The concentration stated or, in the absence of such concentrations, the generic concentrations set out in this Regulation are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture.

10099-74-8 01-2119492475-28-

XXXX

Oxidizing solid, Category 2, H272
Acute toxicity, Category 4, H302
Acute toxicity, Category 4, H332
Serious eye damage, Category 1, H318
Reproductive toxicity, Category 1A, H360Df
Specific target organ toxicity - repeated exposure, Category 1, H372
Acute aquatic toxicity, Category 1, H400
Chronic aquatic toxicity, Category 1, H410
M-Factor: 10

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Silver nitrate (< 0,25 %)

7761-88-8 01-2119513705-43-
XXXX 05- Oxidizing solid, Category 2, H272
2114751442-53-0000 Skin corrosion, Category 1B, H314
Acute aquatic toxicity, Category 1, H400
Chronic aquatic toxicity, Category 1, H410
M-Factor: 100

Thallium(I) nitrate (< 0,25 %)

10102-45-1 *)
Acute toxicity, Category 2, H300
Acute toxicity, Category 2, H330
Specific target organ toxicity - repeated exposure, Category 2,
H373
Chronic aquatic toxicity, Category 2, H411

*) A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

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SECTION 4. First aid measures

4.1 Description of first aid measures

General advice

First aider needs to protect himself.

After inhalation: fresh air. Call in physician.

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician immediately.

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed

Risk of blindness!

The following applies to nitrites/nitrates in general: methaemoglobinaemia after the uptake of large quantities.

The following applies to boron compounds in general: resorption is followed by nausea and vomiting, agitation, spasms, CNS disorders, cardiovascular disorders.

The following applies to nickel compounds in general: astringent effect on mucous membranes. Sensitisation with allergic manifestations in predisposed persons. Occasional formation of nickel dermatitis.

The following applies to zinc compounds in general: only slightly absorbable via the gastrointestinal tract. Adstringent effect on mucous membranes. Metal-fume fever after inhalation of large quantities.

The following applies to soluble silver compounds: only slightly absorbed via the gastrointestinal tract. Strong irritations after contact with eyes and skin.

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The following applies to thallium compounds in general: latency period until onset of effect; constipation, peripheral nervous disorders (neuralgias, formication) with severe pain; tremor, spasms; sleeplessness, thirst, fever; CNS disorders/damage with psychic alterations; impaired speech and vision - grey cataract; rise in blood pressure, cyanosis, respiratory paralysis; changes in the blood picture. If the victim survives intoxication, lasting damage may remain.

The following applies to lead compounds in general: Due to the poor absorbability via the gastrointestinal tract, only very high doses lead to acute cases of intoxication. After a latency period of several hours, metallic taste, nausea, vomiting, and colics occur, in many instances followed by shock. Chronic uptake causes peripheral muscular weakness ("drop-wrist"), anaemia, and central-nervous disorders. Women of child-bearing age should not be exposed to the substance over longer periods of time (observe critical threshold).

The following applies to cadmium compounds in general: mucosal irritations, coughing, and dyspnoea after inhalation. Inhalation may lead to the formation of oedemas in the respiratory tract. Toxic effect on gastrointestinal tract. Long-term exposure to the chemical results in toxic effect on kidneys, lungs, bones.

Symptoms of an acute cobalt intoxication: diarrhoea, loss of appetite, drop in body temperature, drop in blood pressure. Toxic effect on kidneys (proteinuria, anuria), heart, and pancreas.

Irritation and corrosion, Cough, Nausea, Vomiting, Diarrhoea, Tiredness, Allergic reactions, drop in temperature, agitation, spasms, somnolence, ataxia (impaired locomotor coordination), Pain, Bloody vomiting, Shortness of breath

4.3 Indication of any immediate medical attention and special treatment needed

No information available.

SECTION 5. Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

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Not combustible.

Ambient fire may liberate hazardous vapours.

Fire may cause evolution of:

nitrous gases, nitrogen oxides

5.3 Advice for firefighters

Special protective equipment for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information

Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemisorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

Indications about waste treatment see section 13.

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SECTION 7. Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Observe label precautions.

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers

No metal containers.

Storage conditions

Protected from light.

Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorised persons.

Recommended storage temperature see product label.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

SECTION 8. Exposure controls/personal protection

8.1 Control parameters

Derived No Effect Level (DNEL)

nitric acid (7697-37-2)

Worker DNEL,	Local effects	inhalation	1,3 mg/m ³
longterm			

boric acid (10043-35-3)

Worker DNEL,	Systemic effects	inhalation	8,3 mg/m ³
longterm			

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Worker DNEL, longterm	Systemic effects	dermal	392 mg/kg Body weight
Consumer DNEL, longterm	Systemic effects	inhalation	4,15 mg/m ³
Consumer DNEL, longterm	Systemic effects	dermal	196 mg/kg Body weight
Consumer DNEL, longterm	Systemic effects	oral	0,98 mg/kg Body weight
Consumer DNEL, acute	Systemic effects	oral	0,98 mg/kg Body weight

Predicted No Effect Concentration (PNEC)

nitric acid (7697-37-2)

PNEC no data available

boric acid (10043-35-3)

PNEC Fresh water	2,02 mg/l
PNEC Marine water	2,02 mg/l
PNEC Aquatic intermittent release	13,7 mg/l
PNEC Sewage treatment plant	10 mg/l
PNEC Soil	5,4 mg/kg

8.2 Exposure controls

Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

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Individual protection measures

Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

Eye/face protection

Tightly fitting safety goggles

Hand protection

full contact:

Glove material:	natural latex
Glove thickness:	0,60 mm
Break through time:	> 480 min

splash contact:

Glove material:	Nitrile rubber
Glove thickness:	0,40 mm
Break through time:	> 240 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 706 Lapren® (full contact), KCL 730 Camatril® -Velours (splash contact).

The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.

This recommendation applies only to the product stated in the safety data sheet<(,>,<)> supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment

Acid-resistant protective clothing

Respiratory protection

required when vapours/aerosols are generated.

Recommended Filter type: filter E-(P2)

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective

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devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Environmental exposure controls

Do not let product enter drains.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form	liquid
Colour	blue
Odour	weak
Odour Threshold	No information available.
pH	ca. 1 at 20 °C
Melting point	No information available.
Boiling point	No information available.
Flash point	Not applicable
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	No information available.

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Upper explosion limit No information available.

Vapour pressure No information available.

Relative vapour density No information available.

Density 1,09 g/cm³
at 20 °C

Relative density No information available.

Water solubility at 20 °C
soluble

Partition coefficient: n-
octanol/water No information available.

Auto-ignition temperature No information available.

Decomposition temperature No information available.

Viscosity, dynamic No information available.

Explosive properties Not classified as explosive.

Oxidizing properties none

9.2 Other data

Corrosion May be corrosive to metals.

SECTION 10. Stability and reactivity

10.1 Reactivity

Oxidizing agents

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10.2 Chemical stability

Sensitivity to light

heat-sensitive

10.3 Possibility of hazardous reactions

Risk of explosion with:

Risk of ignition or formation of inflammable gases or vapours with:

Metals, Alkali metals, Alkaline earth metals, metal alloys, metallic oxides, Alcohols, Aldehydes, Amines, anhydrides, anilines, Ammonia, alkalines, hydrides, halogen compounds, nonmetallic oxides, nonmetallic halides, nonmetallic hydrogen compounds, nonmetals, phosphides, nitrides, lithium silicide, hydrogen peroxide, organic combustible substances, oxidisable substances, organic solvent, Ketones, Nitriles, organic nitro compounds, hydrazine and derivatives, acetylidene, acids, Fluorine

Generates dangerous gases or fumes in contact with:

Copper, Mercury

10.4 Conditions to avoid

Strong heating.

Moisture.

10.5 Incompatible materials

Cellulose, Metals, Aluminium, Mild steel

Contact with metals may lead to the formation of nitrous gases and hydrogen.

10.6 Hazardous decomposition products

in the event of fire: See section 5.

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SECTION 11. Toxicological information

11.1 Information on toxicological effects

Mixture

Acute oral toxicity

Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach., strong pain (risk of perforation!), Bloody vomiting, Nausea

Acute toxicity estimate: > 2.000 mg/kg

Calculation method

Acute inhalation toxicity

Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:., damage of respiratory tract, Inhalation may lead to the formation of oedemas in the respiratory tract.

Acute toxicity estimate: > 5 mg/l; 4 h ; dust/mist

Calculation method

Acute toxicity estimate: > 5 mg/l; 4 h ; dust/mist

Calculation method

Acute dermal toxicity

This information is not available.

Skin irritation

Mixture causes burns.

Eye irritation

Mixture causes serious eye damage. Risk of blindness!

Sensitisation

Mixture may cause an allergic skin reaction.

Germ cell mutagenicity

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This information is not available.

Carcinogenicity

This information is not available.

Reproductive toxicity

This information is not available.

Teratogenicity

This information is not available.

CMR effects

Carcinogenicity:

May cause cancer. Positive evidence from human epidemiological studies.

Specific target organ toxicity - single exposure

This information is not available.

Specific target organ toxicity - repeated exposure

Mixture may cause damage to organs through prolonged or repeated exposure.

Aspiration hazard

This information is not available.

11.2 Further information

Systemic effects:

If swallowed

Bloody vomiting, Nausea, Diarrhoea, agitation, spasms, Tiredness, ataxia (impaired locomotor coordination), drop in temperature, somnolence, pain, Fever, Shortness of breath, metallic taste, Salivation, drop in blood pressure, Unconsciousness, death

The following applies to nitrites/nitrates in general: methaemoglobinaemia after the uptake of large quantities.

The following applies to boron compounds in general: resorption is followed by nausea and vomiting, agitation, spasms, CNS disorders, cardiovascular disorders.

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The following applies to nickel compounds in general: astringent effect on mucous membranes. Sensitisation with allergic manifestations in predisposed persons. Occasional formation of nickel dermatitis.

The following applies to zinc compounds in general: only slightly absorbable via the gastrointestinal tract. Adstringent effect on mucous membranes. Metal-fume fever after inhalation of large quantities.

The following applies to soluble silver compounds: only slightly absorbed via the gastrointestinal tract. Strong irritations after contact with eyes and skin.

The following applies to thallium compounds in general: latency period until onset of effect; constipation, peripheral nervous disorders (neuralgias, formication) with severe pain; tremor, spasms; sleeplessness, thirst, fever; CNS disorders/damage with psychic alterations; impaired speech and vision - grey cataract; rise in blood pressure, cyanosis, respiratory paralysis; changes in the blood picture. If the victim survives intoxication, lasting damage may remain.

The following applies to lead compounds in general: Due to the poor absorbability via the gastrointestinal tract, only very high doses lead to acute cases of intoxication. After a latency period of several hours, metallic taste, nausea, vomiting, and colics occur, in many instances followed by shock. Chronic uptake causes peripheral muscular weakness ("drop-wrist"), anaemia, and central-nervous disorders. Women of child-bearing age should not be exposed to the substance over longer periods of time (observe critical threshold).

The following applies to cadmium compounds in general: mucosal irritations, coughing, and dyspnoea after inhalation. Inhalation may lead to the formation of oedemas in the respiratory tract. Toxic effect on gastrointestinal tract. Long-term exposure to the chemical results in toxic effect on kidneys, lungs, bones.

Symptoms of an acute cobalt intoxication: diarrhoea, loss of appetite, drop in body temperature, drop in blood pressure. Toxic effect on kidneys (proteinuria, anuria), heart, and pancreas.

Other dangerous properties can not be excluded.

This substance should be handled with particular care.

Components

nitric acid

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Na, Ni, Pb, Sr, Tl, Zn Certipur®

Acute inhalation toxicity

LC50 Rat: > 2,65 mg/l; 4 h ; vapour

OECD Test Guideline 403

Germ cell mutagenicity

Genotoxicity in vitro

Ames test

Salmonella typhimurium

Result: negative

Method: OECD Test Guideline 471

boric acid

Acute oral toxicity

LD50 Rat: 3.450 - 4.080 mg/kg

(ECHA)

Acute inhalation toxicity

LC50 Rat: > 2,03 mg/l; 4 h ; dust/mist

OECD Test Guideline 403

(highest concentration to be prepared)

Acute dermal toxicity

LD50 Rabbit: > 2.000 mg/kg

(ECHA)

Skin irritation

Rabbit

Result: No skin irritation

(ECHA)

Eye irritation

Rabbit

Result: slight irritation

OECD Test Guideline 405

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 111355
Product name ICP multi-element standard solution IV (23 elements in diluted nitric acid)
1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn,
Na, Ni, Pb, Sr, Tl, Zn Certipur®

Sensitisation

Buehler Test Guinea pig
Result: negative
Method: OECD Test Guideline 406

Germ cell mutagenicity

Genotoxicity in vivo

In vivo micronucleus test
Mouse
male and female
oral
Result: negative
Method: OECD Test Guideline 474

Genotoxicity in vitro

Ames test
Salmonella typhimurium
Result: negative
Method: OECD Test Guideline 471

Mutagenicity (mammal cell test):

Mouse lymphoma test
Result: negative
Method: OECD Test Guideline 476

Mutagenicity (mammal cell test):

Chinese hamster ovary cells
Result: negative
Method: OECD Test Guideline 482

Teratogenicity

Application Route: Oral
Rat
Number of exposures: daily
Method: OECD Test Guideline 414

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 111355
Product name ICP multi-element standard solution IV (23 elements in diluted nitric acid)
1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn,
Na, Ni, Pb, Sr, Tl, Zn Certipur®

nickel(II) nitrate

Acute oral toxicity

LD50 Rat: 1.620 mg/kg

(for the hexahydrate) (RTECS)

Acute inhalation toxicity

Acute toxicity estimate: 1,6 mg/l; dust/mist

Expert judgement

Germ cell mutagenicity

Genotoxicity in vitro

Ames test

Result: negative

(Lit.)

Cobalt(II) nitrate

Acute dermal toxicity

LD50 Rat: > 2.000 mg/kg

OECD Test Guideline 402

Skin irritation

Rabbit

Result: No irritation

OECD Test Guideline 404

Eye irritation

Rabbit

Result: Causes serious eye irritation.

OECD Test Guideline 405

Sensitisation

Guinea pig

Result: positive

Method: OECD Test Guideline 406

(in analogy to similar products)

Germ cell mutagenicity

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 111355
Product name ICP multi-element standard solution IV (23 elements in diluted nitric acid)
1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn,
Na, Ni, Pb, Sr, Tl, Zn Certipur®

Genotoxicity in vitro

Ames test

Salmonella typhimurium

Result: negative

Method: OECD Test Guideline 471

(in analogy to similar products)

Copper(II) nitrate

Acute oral toxicity

LD50 Rat: 940 mg/kg

Skin irritation

Rabbit

Result: Irritations

OECD Test Guideline 404

Eye irritation

Rabbit

Result: irritating

OECD Test Guideline 405

Sensitisation

Maximisation Test Guinea pig

Result: negative

Method: OECD Test Guideline 406

Zinc nitrate

Acute oral toxicity

LD50 Rat: 1.190 mg/kg

(for the hexahydrate) (RTECS)

Skin irritation

Rabbit

Result: Irritations

(for the hexahydrate) (RTECS)

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 111355
Product name ICP multi-element standard solution IV (23 elements in diluted nitric acid)
1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn,
Na, Ni, Pb, Sr, Tl, Zn Certipur®

Cadmium nitrate

Acute oral toxicity

Acute toxicity estimate: 100,1 mg/kg

Expert judgement

Acute inhalation toxicity

Acute toxicity estimate: 0,051 mg/l; dust/mist

Expert judgement

Acute dermal toxicity

Acute toxicity estimate : 1.100,1 mg/kg

Expert judgement

Lead(II) nitrate

Acute oral toxicity

Acute toxicity estimate: 500,1 mg/kg

Expert judgement

Acute inhalation toxicity

Acute toxicity estimate: 1,6 mg/l; dust/mist

Expert judgement

Skin irritation

In vitro study

Result: non-corrosive

OECD Test Guideline 431

In vitro study

Result: No skin irritation

OECD Test Guideline 439

Eye irritation

In vitro study

Result: Severe irritations

OECD Test Guideline 437

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 111355
Product name ICP multi-element standard solution IV (23 elements in diluted nitric acid)
1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn,
Na, Ni, Pb, Sr, Tl, Zn Certipur®

Sensitisation

Result: negative

Method: OECD Test Guideline 429

(in analogy to similar products)

Silver nitrate

Skin irritation

In vitro study

Result: Corrosive

OECD Test Guideline 431

Eye irritation

Rabbit

Result: Causes burns.

(External MSDS)

Germ cell mutagenicity

Genotoxicity in vitro

Ames test

Salmonella typhimurium

Result: negative

(External MSDS)

Thallium(I) nitrate

Acute oral toxicity

Acute toxicity estimate: 5,1 mg/kg

Expert judgement

Acute inhalation toxicity

Acute toxicity estimate: 0,051 mg/l; dust/mist

Expert judgement

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 111355
Product name ICP multi-element standard solution IV (23 elements in diluted nitric acid)
1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn,
Na, Ni, Pb, Sr, Tl, Zn Certipur®

SECTION 12. Ecological information

Mixture

12.1 Toxicity

No information available.

12.2 Persistence and degradability

No information available.

12.3 Bioaccumulative potential

No information available.

12.4 Mobility in soil

No information available.

12.5 Results of PBT and vPvB assessment

Substance(s) in the mixture do(es) not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII, or a PBT/vPvB assessment was not conducted.

12.6 Other adverse effects

Additional ecological information

Hazard for drinking water supplies.

Caustic even in diluted form.

Harmful effect due to pH shift.

Discharge into the environment must be avoided.

Components

nitric acid

Biodegradability

The methods for determining the biological degradability are not applicable to inorganic substances.

Partition coefficient: n-octanol/water

log Pow: -2,3

OECD Test Guideline 107

Bioaccumulation is not expected.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 111355
Product name ICP multi-element standard solution IV (23 elements in diluted nitric acid)
1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn,
Na, Ni, Pb, Sr, Tl, Zn Certipur®

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

Henry constant

2482 Pa*m³/mol

Method: (calculated)

(Lit.) Distribution preferentially in air.

boric acid

Toxicity to fish

flow-through test LC50 Oncorhynchus mykiss (rainbow trout): 79 mg/l; 96 h
(ECOTOX Database)

Toxicity to daphnia and other aquatic invertebrates

static test EC50 Daphnia magna (Water flea): 133 mg/l; 48 h
(ECOTOX Database)

Toxicity to algae

static test EC50 Pseudokirchneriella subcapitata (green algae): 52,4 mg/l; 74,5 h
Analytical monitoring: yes
OECD Test Guideline 201

Toxicity to fish (Chronic toxicity)

semi-static test NOEC Danio rerio (zebra fish): 6,4 mg/l; 34 d

OECD Test Guideline 210

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

semi-static test NOEC Daphnia magna (Water flea): 34,2 mg/l; 21 d

OECD Test Guideline 211

Biodegradability

The methods for determining the biological degradability are not applicable to inorganic substances.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 111355
Product name ICP multi-element standard solution IV (23 elements in diluted nitric acid)
1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn,
Na, Ni, Pb, Sr, Tl, Zn Certipur®

Partition coefficient: n-octanol/water

log Pow: -0,2 (25 °C)

EPI Suite™

Bioaccumulation is not expected. (Lit.)

PBT/vPvB: Not applicable for inorganic substances

nickel(II) nitrate

Toxicity to fish

LC50 Cyprinus carpio (Carp): 10,6 mg/l; 96 h

(ECOTOX Database)

Toxicity to daphnia and other aquatic invertebrates

EC50 Daphnia magna (Water flea): 0,9 mg/l; 48 h

(ECOTOX Database)

M-Factor

1

Cobalt(II) nitrate

Toxicity to fish

LC50 Carassius auratus (goldfish): 66,8 mg/l; 96 h

(ECOTOX Database) (Regulation (EC) No 1272/2008, Annex VI)

Toxicity to daphnia and other aquatic invertebrates

EC50 Daphnia magna (Water flea): 3,4 mg/l; 48 h

(ECOTOX Database) (Regulation (EC) No 1272/2008, Annex VI)

Biodegradability

The methods for determining the biological degradability are not applicable to inorganic substances.

M-Factor

10

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 111355
Product name ICP multi-element standard solution IV (23 elements in diluted nitric acid)
1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn,
Na, Ni, Pb, Sr, Tl, Zn Certipur®

Copper(II) nitrate

Toxicity to fish

LC50 fish: 0,29 mg/l; 96 h

(HSDB)

Biodegradability

The methods for determining the biological degradability are not applicable to inorganic substances.

Zinc nitrate

No information available.

Cadmium nitrate

Toxicity to fish

LC50 Pimephales promelas (fathead minnow): 0,0132 mg/l; 96 h

(ECOTOX Database) (referred to the cation)

Toxicity to daphnia and other aquatic invertebrates

LC50 Daphnia magna (Water flea): 0,023 mg/l; 48 h

(referred to the cation) (ECOTOX Database)

Toxicity to fish (Chronic toxicity)

NOEC Oncorhynchus mykiss (rainbow trout): 0,0013 mg/l; 28 d

(referred to the cation) (ECOTOX Database)

Biodegradability

The methods for determining the biological degradability are not applicable to inorganic substances.

Partition coefficient: n-octanol/water

Not applicable for inorganic substances

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 111355
Product name ICP multi-element standard solution IV (23 elements in diluted nitric acid)
1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn,
Na, Ni, Pb, Sr, Tl, Zn Certipur®

M-Factor

10

Lead(II) nitrate

Toxicity to daphnia and other aquatic invertebrates

EC50 Daphnia magna (Water flea): 1,8 mg/l; 48 h
(ECOTOX Database)

Toxicity to algae

EC50 algae: 0,024 - 0,029 mg/l; 28 h
(Lit.)

Partition coefficient: n-octanol/water

Not applicable

M-Factor

10

Silver nitrate

Toxicity to fish

NOEC Leuciscus idus (Golden orfe): 0,011 mg/l; 96 h
OECD Test Guideline 203

flow-through test LC50 Pimephales promelas (fathead minnow): 0,0067 mg/l; 96 h

Analytical monitoring: yes

US-EPA

Toxicity to daphnia and other aquatic invertebrates

semi-static test LC50 Daphnia magna (Water flea): 0,0069 - 0,0082 mg/l; 48 h

Analytical monitoring: yes

OECD Test Guideline 202

Toxicity to algae

IC50 Desmodesmus subspicatus (green algae): 0,008 mg/l; 8 d
(External MSDS)

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 111355
Product name ICP multi-element standard solution IV (23 elements in diluted nitric acid)
1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn,
Na, Ni, Pb, Sr, Tl, Zn Certipur®

semi-static test *Pseudokirchneriella subcapitata* (green algae): 0,19 mg/l; 96 h
US-EPA

Toxicity to bacteria

EC10 *Pseudomonas putida*: 0,006 mg/l; 16 h
(External MSDS)

Biodegradability

The methods for determining the biological degradability are not applicable to inorganic substances.

M-Factor

100

Thallium(I) nitrate

Partition coefficient: n-octanol/water

log Pow: 0,21

(calculated)

Bioaccumulation is not expected. (Lit.)

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	111355
Product name	ICP multi-element standard solution IV (23 elements in diluted nitric acid) 1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn, Na, Ni, Pb, Sr, Tl, Zn Certipur®

SECTION 13. Disposal considerations

Waste treatment methods

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14. Transport information

Land transport (ADR/RID)

14.1 UN number	UN 3264
14.2 Proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID, COBALT NITRATE)
14.3 Class	8
14.4 Packing group	II
14.5 Environmentally hazardous	yes
14.6 Special precautions for user	yes
Tunnel restriction code	E

Inland waterway transport (ADN)

Not relevant

Air transport (IATA)

14.1 UN number	UN 3264
14.2 Proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID, COBALT NITRATE)
14.3 Class	8
14.4 Packing group	II
14.5 Environmentally hazardous	yes

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 111355
Product name ICP multi-element standard solution IV (23 elements in diluted nitric acid)
1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn, Na, Ni, Pb, Sr, Tl, Zn Certipur®

14.6 Special precautions for user no

Sea transport (IMDG)

14.1 UN number UN 3264

14.2 Proper shipping name CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID MORE THAN 5% BUT NOT MORE THAN 50%, COBALT NITRATE)

14.3 Class 8

14.4 Packing group II

14.5 Environmentally hazardous yes

14.6 Special precautions for user yes

EmS F-A S-B

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not relevant

SECTION 15. Regulatory information

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

EU regulations

Major Accident Hazard SEVESO III
Legislation ENVIRONMENTAL HAZARDS
E2
Quantity 1: 200 t
Quantity 2: 500 t

Occupational restrictions Take note of Dir 94/33/EC on the protection of young people at work. Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 111355
Product name ICP multi-element standard solution IV (23 elements in diluted nitric acid)
1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn,
Na, Ni, Pb, Sr, Tl, Zn Certipur®

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer not regulated

Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC not regulated

Substances of very high concern (SVHC) This product does contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 59 above the respective regulatory concentration limit of > 0.1 % (w/w).

Contains: boric acid
Lead(II) nitrate
Cobalt(II) nitrate
Cadmium nitrate

National legislation

Storage class 6.1 D

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 111355
Product name ICP multi-element standard solution IV (23 elements in diluted nitric acid)
1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn,
Na, Ni, Pb, Sr, Tl, Zn Certipur®

SECTION 16. Other information

Full text of H-Statements referred to under sections 2 and 3.

H272	May intensify fire; oxidizer.
H290	May be corrosive to metals.
H300	Fatal if swallowed.
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H340	May cause genetic defects.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H350i	May cause cancer by inhalation.
H360D	May damage the unborn child.
H360Df	May damage the unborn child. Suspected of damaging fertility.
H360F	May damage fertility.
H360FD	May damage fertility. May damage the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	111355
Product name	ICP multi-element standard solution IV (23 elements in diluted nitric acid) 1000 mg/l: Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn, Na, Ni, Pb, Sr, Tl, Zn Certipur®

H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.

Training advice

Provide adequate information, instruction and training for operators.

Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at www.wikipedia.org.

Regional representation

This information is given on the authorised Safety Data Sheet for your country.

The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.