



SAFETY DATA SHEET

This safety data sheet was created pursuant to the requirements of:
OSHA HCS2012

Revision date 04-Nov-2021

Revision Number 1

1. Identification

Product identifier

Product Name Ce, Cr, Hf, Mn, Ni, Zr @1000µg/mL in 5% HCL/tr HNO3

Other means of identification

Product Code(s) VHG-Z21-W000962

Synonyms None

Recommended use of the chemical and restrictions on use

Recommended use Laboratory use

Restrictions on use No information available

Details of the supplier of the safety data sheet

Supplier Address

VHG
LGC Standards
276 Abby Road
Manchester, NH 03103
UNITED STATES OF AMERICA

Tel :+1 (603) 622-7660
Fax : +1 (603) 622-5180
Email : lgcusa@lgcgroup.com

Web : lgcstandards.com

E-mail sds-request@lgcgroup.com

Emergency telephone number

Emergency Telephone

For Hazardous Materials or Dangerous Goods Incident
Spill, Leak, Fire Exposure, or Accident
Call CHEMTREC:
USA & Canada 1-800-424-9300
Rest of the world +1 703-741-5970

2. Hazard(s) identification

Classification



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Classified according to OSHA.

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A
Respiratory sensitization	Category 1
Skin sensitization	Category 1
Carcinogenicity	Category 1B
Chronic aquatic toxicity	Category 3
Corrosive to metals	Category 1

Hazards not otherwise classified (HNOc)

Not applicable

Label elements

Danger

Hazard statements

Classified according to OSHA.
Causes skin irritation
Causes serious eye irritation
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause an allergic skin reaction
May cause cancer
Harmful to aquatic life with long lasting effects
May be corrosive to metals



Precautionary Statements - Prevention

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Wear protective gloves/protective clothing/eye protection/face protection
Wash face, hands and any exposed skin thoroughly after handling
Avoid breathing dust/fume/gas/mist/vapors/spray
In case of inadequate ventilation wear respiratory protection
Contaminated work clothing must not be allowed out of the workplace
Keep only in original container

Precautionary Statements - Response

IF exposed or concerned: Get medical advice/attention
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing



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If eye irritation persists: Get medical advice/attention
IF ON SKIN: Wash with plenty of water and soap
Take off contaminated clothing and wash it before reuse
If skin irritation or rash occurs: Get medical advice/attention
IF INHALED: If breathing is difficult, remove person to fresh air and keep comfortable for breathing
If experiencing respiratory symptoms: Call a POISON CENTER or doctor
Absorb spillage to prevent material damage

Precautionary Statements - Storage

Store locked up
Store in corrosive resistant/ .? container with a resistant inner liner

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant

Other information

No information available.

3. Composition/information on ingredients

Substance

Not applicable.

Mixture

Chemical name	CAS No	Weight-%	Trade secret
Hydrochloric acid	7647-01-0	1 - <3	*
Zirconium(IV) oxide chloride	7699-43-6	0.1 - 1	*
Nitric Acid	7697-37-2	0.1 - 1	*
nickel	7440-02-0	0.1 - 1	*
Manganese(II) nitrate hexahydrate	17141-63-8	0.1 - 1	*
Hafnium(IV) oxychloride hydrate	14456-34-9	0.1 - 1	*
Chromium	7440-47-3	0.1 - 1	*
Cerium(III) nitrate hexahydrate	10294-41-4	0.1 - 1	*

4. First-aid measures

Description of first aid measures

General advice

Show this safety data sheet to the doctor in attendance. IF exposed or concerned: Get medical advice/attention.

Inhalation

Remove to fresh air. May cause allergic respiratory reaction. If breathing has stopped, give artificial respiration. Get medical attention immediately. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Get immediate medical advice/attention.



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Eye contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Keep eye wide open while rinsing. Do not rub affected area. Get medical attention if irritation develops and persists.
Skin contact	Wash off immediately with soap and plenty of water for at least 15 minutes. May cause an allergic skin reaction. In the case of skin irritation or allergic reactions see a physician.
Ingestion	Rinse mouth. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. May produce an allergic reaction. Get immediate medical advice/attention.
Self-protection of the first aider	Avoid contact with skin, eyes or clothing. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Use personal protective equipment as required. See section 8 for more information.

Most important symptoms and effects, both acute and delayed

Symptoms	May cause allergy or asthma symptoms or breathing difficulties if inhaled. Coughing and/ or wheezing. Itching. Rashes. Hives. May cause redness and tearing of the eyes. Burning sensation.
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Indication of any immediate medical attention and special treatment needed

Note to physicians	May cause sensitization in susceptible persons. Treat symptomatically.
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5. Fire-fighting measures

Suitable Extinguishing Media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Large Fire	CAUTION: Use of water spray when fighting fire may be inefficient.
Unsuitable extinguishing media	Do not scatter spilled material with high pressure water streams.
Specific hazards arising from the chemical	Product is or contains a sensitizer. May cause sensitization by inhalation and skin contact. May cause sensitization by skin contact.
Explosion data	
Sensitivity to mechanical impact	None.
Sensitivity to static discharge	None.
Special protective equipment and precautions for fire-fighters	Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. Accidental release measures



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Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

Other information Refer to protective measures listed in Sections 7 and 8.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

7. Handling and storage

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Provide extract ventilation to points where emissions occur. In case of insufficient ventilation, wear suitable respiratory equipment. Do not eat, drink or smoke when using this product. Remove contaminated clothing and shoes. Take off contaminated clothing and wash before reuse.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from moisture. Store locked up. Keep out of the reach of children. Store away from other materials. Please refer to the manufacturer's certificate for specific storage and transport temperature conditions. Store only in the original receptacle unless other advice is given on the CoA.

8. Exposure controls/personal protection

Control parameters

Exposure Limits The following ingredients are the only ingredients of the product above the cut-off level (or level that contributes to the hazard classification of the mixture) which have an exposure limit applicable in the region for which this safety data sheet is intended or other recommended limit. At this time, the other relevant constituents have no known exposure limits from the sources listed here.

Chemical name	ACGIH TLV	OSHA PEL	NIOSH
Hydrochloric acid	Ceiling: 2 ppm	(vacated) Ceiling: 5 ppm	IDLH: 50 ppm



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7647-01-0		(vacated) Ceiling: 7 mg/m ³ Ceiling: 5 ppm Ceiling: 7 mg/m ³	Ceiling: 5 ppm Ceiling: 7 mg/m ³
Zirconium(IV) oxide chloride 7699-43-6	STEL: 10 mg/m ³ Zr TWA: 5 mg/m ³ Zr	TWA: 5 mg/m ³ Zr (vacated) TWA: 5 mg/m ³ Zr (vacated) STEL: 10 mg/m ³ Zr	IDLH: 25 mg/m ³ Zr TWA: 5 mg/m ³ except Zirconium tetrachloride Zr STEL: 10 mg/m ³ Zr
Nitric Acid 7697-37-2	STEL: 4 ppm TWA: 2 ppm	TWA: 2 ppm TWA: 5 mg/m ³ (vacated) TWA: 2 ppm (vacated) TWA: 5 mg/m ³ (vacated) STEL: 4 ppm (vacated) STEL: 10 mg/m ³	IDLH: 25 ppm TWA: 2 ppm TWA: 5 mg/m ³ STEL: 4 ppm STEL: 10 mg/m ³
nickel 7440-02-0	TWA: 1.5 mg/m ³ inhalable particulate matter	TWA: 1 mg/m ³ (vacated) TWA: 1 mg/m ³	IDLH: 10 mg/m ³ TWA: 0.015 mg/m ³
Manganese(II) nitrate hexahydrate 17141-63-8	TWA: 0.02 mg/m ³ Mn respirable particulate matter TWA: 0.1 mg/m ³ Mn inhalable particulate matter	(vacated) Ceiling: 5 mg/m ³ Ceiling: 5 mg/m ³ Mn	IDLH: 500 mg/m ³ Mn TWA: 1 mg/m ³ Mn STEL: 3 mg/m ³ Mn
Hafnium(IV) oxychloride hydrate 14456-34-9	TWA: 0.5 mg/m ³ Hf	-	IDLH: 50 mg/m ³ Hf TWA: 0.5 mg/m ³ Hf
Chromium 7440-47-3	TWA: 0.5 mg/m ³ inhalable particulate matter	TWA: 1 mg/m ³ (vacated) TWA: 1 mg/m ³	IDLH: 250 mg/m ³ TWA: 0.5 mg/m ³

Biological occupational exposure limits

Chemical name	ACGIH
nickel 7440-02-0	5 µg/L - urine (Nickel) - post-shift at end of workweek
Chromium 7440-47-3	0.7 µg/L - urine (Total chromium) - end of shift at end of workweek

Appropriate engineering controls

Engineering controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face protection Avoid contact with eyes. Wear safety glasses with side shields (or goggles).

Hand protection Wear suitable gloves. Impervious gloves. Wear protective nitrile rubber gloves. The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374.

Skin and body protection Long sleeved clothing. Wear suitable protective clothing.



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Respiratory protection	No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.
Environmental exposure controls	Do not allow into any sewer, on the ground or into any body of water.
General hygiene considerations	Regular cleaning of equipment, work area and clothing is recommended. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and immediately after handling the product. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Wash hands before breaks and after work. Wear suitable gloves and eye/face protection.

9. Physical and chemical properties

Information on basic physical and chemical properties

Physical state	Liquid
Appearance	Liquid
Color	colorless
Odor	Odorless
Odor threshold	No information available

Property	Values	Remarks • Method
pH	No data available	None known
Melting point / freezing point	No data available	None known
Boiling point / boiling range	No data available	None known
Flash point	No data available	None known
Evaporation rate	No data available	None known
Flammability (solid, gas)	No data available	None known
Flammability Limit in Air		None known
Upper flammability or explosive limits	No data available	
Lower flammability or explosive limits	No data available	
Vapor pressure	No data available	None known
Relative vapor density	No data available	None known
Relative density	No data available	None known
Water solubility	No data available	None known
Solubility(ies)	No data available	None known
Partition coefficient	No data available	None known
Autoignition temperature	No data available	None known
Decomposition temperature		None known
Kinematic viscosity	No data available	None known
Dynamic viscosity	No data available	None known

Other information

Explosive properties	No information available
Oxidizing properties	No information available
Softening point	No information available
Molecular weight	No information available
VOC Content (%)	No information available



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Liquid Density	No information available
Bulk density	No information available

10. Stability and reactivity

Reactivity	No information available.
Chemical stability	Stable under normal conditions.
Possibility of hazardous reactions	None under normal processing.
Conditions to avoid	Exposure to air or moisture over prolonged periods.
Incompatible materials	Oxidizing agent. Strong acids. Strong bases.
Hazardous decomposition products	None known based on information supplied.

11. Toxicological information

Information on likely routes of exposure

Product Information

Inhalation	Specific test data for the substance or mixture is not available. May cause sensitization in susceptible persons. (based on components). May cause irritation of respiratory tract.
Eye contact	Specific test data for the substance or mixture is not available. Causes serious eye irritation. (based on components). May cause redness, itching, and pain.
Skin contact	Specific test data for the substance or mixture is not available. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons. (based on components). May cause sensitization by skin contact. Causes skin irritation.
Ingestion	Specific test data for the substance or mixture is not available. May cause additional affects as listed under "Inhalation". Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms	Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain, or flushing. Coughing and/ or wheezing. Itching. Rashes. Hives. Redness. May cause redness and tearing of the eyes.
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Acute toxicity

Numerical measures of toxicity



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The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (inhalation-dust/mist) 27.10 mg/l
ATEmix (inhalation-vapor) 2,650.00 mg/l

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Hydrochloric acid 7647-01-0	238 - 277 mg/kg (Rat)	> 5010 mg/kg (Rabbit)	= 1.68 mg/L (Rat) 1 h
Zirconium(IV) oxide chloride 7699-43-6	= 3500 mg/kg (Rat)	-	-
Nitric Acid 7697-37-2	-	-	= 2500 ppm (Rat) 1 h ATE (vapours) = 2.65 mg/L
nickel 7440-02-0	> 9000 mg/kg (Rat)	-	> 10.2 mg/L (Rat) 1 h
Cerium(III) nitrate hexahydrate 10294-41-4	= 4200 mg/kg (Rat)	-	-

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation	Classification based on data available for ingredients. Irritating to skin.
Serious eye damage/eye irritation	Classification based on data available for ingredients. Causes serious eye irritation.
Respiratory or skin sensitization	May cause sensitization by inhalation. May cause sensitization by skin contact.
Germ cell mutagenicity	No information available.

Carcinogenicity Contains a known or suspected carcinogen. Classification based on data available for ingredients. May cause cancer.

The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical name	ACGIH	IARC	NTP	OSHA
nickel 7440-02-0	-	Group 2B	Reasonably Anticipated	X
Manganese(II) nitrate hexahydrate 17141-63-8	-	-	-	X
Chromium 7440-47-3	-	Group 3	-	-
Cerium(III) nitrate hexahydrate 10294-41-4	-	-	-	X

Legend

IARC (International Agency for Research on Cancer)
Group 2B - Possibly Carcinogenic to Humans



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Group 3 - Not Classifiable as to Carcinogenicity in Humans
NTP (National Toxicology Program)
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen
OSHA (Occupational Safety and Health Administration of the US Department of Labor)
X - Present

Reproductive toxicity No information available.

STOT - single exposure No information available.

STOT - repeated exposure No information available.

Target organ effects Respiratory system, Eyes, Skin.

Aspiration hazard No information available.

Other adverse effects No information available.

Interactive effects No information available.

12. Ecological information

Ecotoxicity Harmful to aquatic life with long lasting effects.

Chemical name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Zirconium(IV) oxide chloride 7699-43-6	-	LC50: =15mg/L (96h, Lepomis macrochirus) LC50: =18mg/L (96h, Pimephales promelas)	-	-
nickel 7440-02-0	EC50: 0.174 - 0.311mg/L (96h, Pseudokirchneriella subcapitata) EC50: =0.18mg/L (72h, Pseudokirchneriella subcapitata)	LC50: =1.3mg/L (96h, Cyprinus carpio) LC50: =10.4mg/L (96h, Cyprinus carpio) LC50: >100mg/L (96h, Brachydanio rerio)	-	EC50: =1mg/L (48h, Daphnia magna) EC50: >100mg/L (48h, Daphnia magna)
Cerium(III) nitrate hexahydrate 10294-41-4	-	LC50: =0.3mg/L (96h, Oncorhynchus mykiss)	-	EC50: 6.9 mg/L (48h, Daphnia magna)

Persistence and degradability No information available.



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Bioaccumulation There is no data for this product.

Component Information

Chemical name	Partition coefficient
Nitric Acid 7697-37-2	-2.3

Other adverse effects No information available.

13. Disposal considerations

Waste treatment methods

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging Do not reuse empty containers.

California Hazardous Waste Status This product contains one or more substances that are listed with the State of California as a hazardous waste.

14. Transport information

DOT

UN number or ID number UN3264
UN proper shipping name Corrosive liquid, acidic, inorganic, n.o.s. (Hydrochloric acid, Nitric Acid)
Transport hazard class(es) 8
Packing group III
Special Provisions IB3, T7, TP1, TP28
DOT Marine Pollutant NP
Description UN3264, Corrosive liquid, acidic, inorganic, n.o.s. (Hydrochloric acid, Nitric Acid), 8, III
Emergency Response Guide Number 154

TDG

UN number or ID number UN3264
UN proper shipping name Corrosive liquid, acidic, inorganic, n.o.s. (Hydrochloric acid, Nitric Acid)
Transport hazard class(es) 8
Packing group III
Special Provisions 16
Marine pollutant NP.
Description UN3264, Corrosive liquid, acidic, inorganic, n.o.s. (Hydrochloric acid, Nitric Acid), 8, III



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MEX

UN number or ID number UN3264
UN proper shipping name Corrosive liquid, acidic, inorganic, n.o.s. (Hydrochloric acid, Nitric Acid)
Transport hazard class(es) 8
Packing group III
Technical Name Hydrochloric acid, Nitric Acid
Description UN3264, Corrosive liquid, acidic, inorganic, n.o.s. (Hydrochloric acid, Nitric Acid), 8, III
Special Provisions 223, 274

IATA

UN number or ID number UN3264
UN proper shipping name Corrosive liquid, acidic, inorganic, n.o.s. (Hydrochloric acid, Nitric Acid)
Transport hazard class(es) 8
Packing group III
Technical Name Hydrochloric acid, Nitric Acid
Description UN3264, Corrosive liquid, acidic, inorganic, n.o.s. (Hydrochloric acid, Nitric Acid), 8, III
Special Provisions A3, A803
ERG Code 8L

IMDG

UN number or ID number UN3264
UN proper shipping name Corrosive liquid, acidic, inorganic, n.o.s. (Hydrochloric acid, Nitric Acid)
Transport hazard class(es) 8
Packing group III
EmS-No F-A, S-B
Special Provisions 223, 274
Marine pollutant NP
Description UN3264, Corrosive liquid, acidic, inorganic, n.o.s. (Hydrochloric acid, Nitric Acid), 8, III

15. Regulatory information

International Inventories

TSCA

Contact supplier for inventory compliance status.

Chemical name	CAS No	US TSCA Inventory listing	US TSCA inactive/active designation
Water	7732-18-5	Present	Active
Hydrochloric acid	7647-01-0	Present	Active
Nitric Acid	7697-37-2	Present	Active
Zirconium(IV) oxide chloride	7699-43-6	Present	Active
Cerium(III) nitrate hexahydrate	10294-41-4	Present	Active
Hafnium(IV) oxychloride hydrate	14456-34-9	-	Unknown *
Manganese(II) nitrate hexahydrate	17141-63-8	Present	Active
nickel	7440-02-0	Present	Active
Chromium	7440-47-3	Present	Active



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*Contact supplier for details. One or more substances in this product are either not listed on the US TSCA inventory, listed on the confidential US TSCA inventory or are otherwise exempted from inventory listing requirements

DSL/NDL	Contact supplier for inventory compliance status.
EINECS/ELINCS	Contact supplier for inventory compliance status.
ENCS	Contact supplier for inventory compliance status.
IECSC	Contact supplier for inventory compliance status.
KECL	Contact supplier for inventory compliance status.
PICCS	Contact supplier for inventory compliance status.
AICS	Contact supplier for inventory compliance status.

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

ENCS - Japan Existing and New Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

Chemical name	SARA 313 - Threshold Values %
Hydrochloric acid - 7647-01-0	1.0
Nitric Acid - 7697-37-2	1.0
nickel - 7440-02-0	0.1
Manganese(II) nitrate hexahydrate - 17141-63-8	1.0
Chromium - 7440-47-3	1.0
Cerium(III) nitrate hexahydrate - 10294-41-4	1.0

SARA 311/312 Hazard Categories

Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Hydrochloric acid 7647-01-0	5000 lb	-	-	X



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Nitric Acid 7697-37-2	1000 lb	-	-	X
nickel 7440-02-0	-	X	X	-
Chromium 7440-47-3	-	X	X	-

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302).

Chemical name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	Reportable Quantity (RQ)
Hydrochloric acid 7647-01-0	5000 lb	5000 lb	RQ 5000 lb final RQ RQ 2270 kg final RQ
Nitric Acid 7697-37-2	1000 lb	1000 lb	RQ 1000 lb final RQ RQ 454 kg final RQ
nickel 7440-02-0	100 lb	-	RQ 100 lb final RQ RQ 45.4 kg final RQ
Chromium 7440-47-3	5000 lb	-	RQ 5000 lb final RQ RQ 2270 kg final RQ

US State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals:.

Chemical name	California Proposition 65
nickel - 7440-02-0	Carcinogen

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Water 7732-18-5	-	-	X
Hydrochloric acid 7647-01-0	X	X	X
Nitric Acid 7697-37-2	X	X	X
Zirconium(IV) oxide chloride 7699-43-6	-	X	-
Cerium(III) nitrate hexahydrate 10294-41-4	X	-	-
Manganese(II) nitrate hexahydrate 17141-63-8	X	-	X
nickel 7440-02-0	X	X	X



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Chromium 7440-47-3	X	X	X
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U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

16. Other information

NFPA	Health hazards 3	Flammability 0	Instability 0	Special hazards -
HMIS	Health hazards 2 *	Flammability 0	Physical hazards 0	Personal protection X
<i>Chronic Hazard Star Legend</i>		<i>* = Chronic Health Hazard</i>		

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

Legend Section 8: Exposure controls/personal protection

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	*	Skin designation

Key literature references and sources for data used to compile the SDS

Agency for Toxic Substances and Disease Registry (ATSDR)
U.S. Environmental Protection Agency ChemView Database
European Food Safety Authority (EFSA)
EPA (Environmental Protection Agency)
Acute Exposure Guideline Level(s) (AELG(s))
U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act
U.S. Environmental Protection Agency High Production Volume Chemicals
Food Research Journal
Hazardous Substance Database
International Uniform Chemical Information Database (IUCLID)
Japan GHS Classification
Australia National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
NIOSH (National Institute for Occupational Safety and Health)
National Library of Medicine's ChemID Plus (NLM CIP)
National Library of Medicine's PubMed database (NLM PUBMED)
National Toxicology Program (NTP)
New Zealand's Chemical Classification and Information Database (CCID)
Organization for Economic Co-operation and Development Environment, Health, and Safety Publications
Organization for Economic Co-operation and Development High Production Volume Chemicals Program
Organization for Economic Co-operation and Development Screening Information Data Set
World Health Organization

Revision date 04-Nov-2021

Revision Note No information available.

Disclaimer

The information in this Safety Data Sheet meets the requirements of the United States OCCUPATIONAL SAFETY AND HEALTH ACT and regulations promulgated thereunder (29 CFR 1910.1200 et. seq.) This document is intended only as a guide to the appropriate precautionary handling of the material by a person trained in, or supervised by a person trained in, chemical handling. The user is responsible for determining the application. Depending on usage, protective clothing



SAFETY DATA SHEET

This safety data sheet was created pursuant to the requirements of:

**VHG-Z21-W000962 - Ce, Cr, Hf, Mn, Ni, Zr
@1000µg/mL in 5% HCL/tr HNO3**

Revision date 04-Nov-2021

including eye and face guards and respirators must be used to avoid contact with material or breathing chemical vapors/fumes. Exposure to this product may have serious adverse health effects. This chemical may interact with other substances. Since the potential uses are so varied, we cannot warn of all of the potential dangers of use or interaction with other chemicals or materials. We warrant that the chemical meets the specifications set forth on the label. We (LGC/VHG/ARMI) disclaim any other warranties, expressed or implied with regard to the product supplied hereunder, its merchantability or its fitness for a particular purpose. The user should recognize that this product can cause severe injury and even death, especially if improperly handled or the known dangers of use are not heeded. Read all precautionary information.

End of Safety Data Sheet