Safety Data Sheet

Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier

Product Name
- **Various grades of welding and metal spraying consumable carrying the trademarks DURANICKEL, INCOLOY, INCONEL, INCO-CORED, INCO-WELD, MONEL, Nickel, NILO, NI-ROD, INCOFLUX**

Synonyms
- Filler Metal; Flux; Flux Cored; Thermal Spray (TSW); Welding Electrode; Weldstrip

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

Relevant identified use(s)
- Welding & metal spraying consumables, See applicable product technical data sheets on website for information of typical scope of use and application, not all products are suitable for all processes or applications. Filler Metal: Used for joining and overlaying, using GTAW, GMAW, Plasma and SAW (with suitable flux) welding processes; Flux Cored: Used for joining and overlaying, using GMAW welding rocesses; Welding Electrode: Used for joining and overlaying, using SMAW welding process; Weldstrip: Used for overlaying, (with suitable flux) for submerged arc or electroslag welding process; INCOFLUX: Flux used for joining or overlaying with appropriate filler metal or weldstrip for submerged arc or electroslag welding process; Thermal Stray(TSW): Used to apply nickel alloy coating by a variety of thermal spray process

1.3 Details of the supplier of the safety data sheet

Manufacturer
- Special Metals Welding Products Company

1401 Burris Road
Newton, NC 28658
United States
www.specialmetalswelding.com
info@smwpc.com

Telephone (General)
- +1 828-465-0352

1.4 Emergency telephone number

Manufacturer
- +1 828-465-0352

Section 2: Hazards Identification

EU/EEC
According to: Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 453/2010]

2.1 Classification of the substance or mixture

CLP
- As shipped, these materials have no known toxicological properties other than causing allergic reactions in individuals sensitive to the metals contained in the products. Hazardous fume or dust emissions may be released during use. The classifications below are related to

exposure to the hazardous fume or dust emissions generated while using the product.
Skin Sensitization 1 - H317
Respiratory Sensitization 1 - H334
Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation - H335
Germ Cell Mutagenicity 2 - H341
Carcinogenicity 2 - H351
Reproductive Toxicity 1B - H360Df
Specific Target Organ Toxicity Single Exposure 1 - H370
Specific Target Organ Toxicity Repeated Exposure 1 - H372
Specific Target Organ Toxicity Repeated Exposure 2 - H373

2.2 Label Elements

CLP

DANGER

Hazard statements

- H317 - May cause an allergic skin reaction
- H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled
- H335 - May cause respiratory irritation
- H341 - Suspected of causing genetic defects.
- H351 - Suspected of causing cancer.
- H360Df - May damage the unborn child. Suspected of damaging fertility.
- H370 - Causes damage to organs.
- H372 - Causes damage to organs through prolonged or repeated exposure.
- H373 - May cause damage to organs through prolonged or repeated exposure.

Precautionary statements

Prevention

- P201 - Obtain special instructions before use.
- P202 - Do not handle until all safety precautions have been read and understood.
- P260 - Do not breathe dust or fume.
- P264 - Wash thoroughly after handling.
- P270 - Do not eat, drink or smoke when using this product.
- P271 - Use only outdoors or in a well-ventilated area.
- P272 - Contaminated work clothing should not be allowed out of the workplace.
- P280 - Wear protective gloves .
- P281 - Use personal protective equipment as required.
- P285 - In case of inadequate ventilation wear respiratory protection.

Response

- P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P312 - Call a POISON CENTER or doctor/physician if you feel unwell.
- P302+P352 - IF ON SKIN: Wash with plenty of soap and water.
- P321 - Specific treatment, see supplemental first aid information.
- P363 - Wash contaminated clothing before reuse.
- P333+P313 - If skin irritation or rash occurs: Get medical advice/attention.
- P307+P311 - IF exposed: Call POISON CENTER or doctor/physician.
- P308+P313 - IF exposed or concerned: Get medical advice/attention.
- P314 - Get medical advice/attention if you feel unwell.

Storage/Disposal

- P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
- P405 - Store locked up.
- P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

2.3 Other Hazards

CLP

- Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain.
According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.

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United States (US)

According to: OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

OSHA HCS 2012

- As shipped, these materials have no known toxicological properties other than causing allergic reactions in individuals sensitive to the metals contained in the products. Hazardous fume or dust emissions may be released during use. The classifications below are related to exposure to the hazardous fume or dust emissions generated while using the product.
Skin Sensitization 1
Respiratory Sensitization 1
Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation
Germ Cell Mutagenicity 2
Carcinogenicity 2
Reproductive Toxicity 1B
Specific Target Organ Toxicity Single Exposure 1
Specific Target Organ Toxicity Repeated Exposure 1
Specific Target Organ Toxicity Repeated Exposure 2
Hazards Not Otherwise Classified - Health Hazards - Metalfume fever

2.2 Label elements

OSHA HCS 2012

DANGER

Hazard statements

- May cause an allergic skin reaction
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause respiratory irritation
Suspected of causing genetic defects.
Suspected of causing cancer.
May damage fertility or the unborn child.
Causes damage to organs.
Causes damage to organs through prolonged or repeated exposure.
May cause damage to organs through prolonged or repeated exposure.

Precautionary statements

Prevention

- Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe dust or fume.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Contaminated work clothing should not be allowed out of the workplace.

Wear protective gloves/protective clothing/eye protection/face protection.
In case of inadequate ventilation wear respiratory protection.

Response • IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.
If on skin: Wash with plenty of water .
Specific treatment, see supplemental first aid information.
Wash contaminated clothing before reuse.
If skin irritation or rash occurs: Get medical advice/attention.
IF exposed: Call POISON CENTER or doctor/physician.
IF exposed or concerned: Get medical advice/attention.
Get medical advice/attention if you feel unwell.

Storage/Disposal • Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

2.3 Other hazards

OSHA HCS 2012 • Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain. Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada

According to: WHMIS

2.1 Classification of the substance or mixture

WHMIS • As shipped, these materials have no known toxicological properties other than causing allergic reactions in individuals sensitive to the metals contained in the products. Hazardous fume or dust emissions may be released during use. The classifications below are related to exposure to the hazardous fume or dust emissions generated while using the product.
Toxic - D1B
Other Toxic Effects - D2A
Other Toxic Effects - D2B

2.2 Label elements

WHMIS •

WHMIS • Toxic - D1B
Other Toxic Effects - D2A
Other Toxic Effects - D2B

2.3 Other hazards

WHMIS • Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain.
In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

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Section 3 - Composition/Information on Ingredients

3.1 Substances

- Material does not meet the criteria of a substance.

3.2 Mixtures

Composition					
Chemical Name	**Identifiers**	**%**	**LD50/LC50**	**Classifications According to Regulation/Directive**	**Comments**
Nickel	**CAS:**7440-02-0 **EC Number:**231-111-4	0% TO 100%	NDA	**EU CLP:** Skin Sens. 1, H317; Carc. 2, H351 (Inhl); STOT RE 1, H372 (Lungs, Orl, Skn, Inhl); Aquatic Chronic 3, H412 **OSHA HCS 2012:** Flam. Sol. 1; Comb. Dust; Resp. Sens. 1B; Skin Sens. 1A; Carc. 2 (Inhl); STOT RE 2 (Lungs, Orl, Inhl)	NDA
Copper	**CAS:**7440-50-8 **EC Number:**231-159-6	0% TO 70%	NDA	**EU CLP:** Repr. 1B, H360D (Orl); STOT SE 1, H370 (Kidney, Orl); STOT SE 3: Resp. Irrit., H335; STOT RE 2, H373 (Liver, Orl); Aquatic Acute 1, H400 (M=100); Aquatic Chronic 1, H410 (M=10) **OSHA HCS 2012:** Comb. Dust; Repr. 1B (Orl); STOT SE 1 (Kidney, Orl); STOT SE 3: Resp. Irrit.; STOT RE 2 (Liver, Orl)	NDA
Iron	**CAS:**7439-89-6 **EC Number:**231-096-4	0% TO 60%	Ingestion/Oral-Rat LD50 • 750 mg/kg	**EU CLP:** Acute Tox. 4, H302; Aquatic Chronic 4, H413 **OSHA HCS 2012:** Acute Tox. 4 (Orl)	NDA
Chromium	**CAS:**7440-47-3 **EC Number:**231-157-5	0% TO 40%	NDA	**EU CLP:** Not Classified **OSHA HCS 2012:** Comb. Dust	NDA
Calcium oxide	**CAS:**1305-78-8 **EC Number:**215-138-9	0% TO 33%	NDA	**EU CLP:** Skin Corr. 1C, H314; Eye Dam. 1, H318; EUH071 **OSHA HCS 2012:** Skin Corr. 1C; Eye Dam. 1	NDA
Molybdenum	**CAS:**7439-98-7 **EC Number:**231-107-2	0% TO 30%	NDA	**EU CLP:** Flam. Sol. 1, H228; Repr. 2, H361 (Orl); Aquatic Chronic 4, H413 **OSHA HCS 2012:** Flam. Sol. 1; Comb. Dust; Repr. 2 (Orl)	NDA
Zirconium oxide	**CAS:**1314-23-4 **EC Number:**215-227-2	0% TO 20%	NDA	**EU CLP:** Not Classified **OSHA HCS 2012:** Not Classified	NDA
Manganese	**CAS:**7439-96-5 **EC Number:**231-105-1	0% TO 13%	Ingestion/Oral-Rat LD50 • 9 g/kg	**EU CLP:** Flam. Sol. 2, H228; Eye Irrit. 2, H319; Repr. 2, H361 (Orl); STOT RE 1, H372 (CNS, Lungs; Inhl) **OSHA HCS 2012:** Flam. Sol. 2; Comb. Dust; Eye Irrit. 2; Repr. 2 (Orl); STOT RE 1 (CNS, Lungs; Inhl); Hazards Not Otherwise Classified - Health Hazard - Metal fume fever	NDA

Zirconate(2-), hexafluoro-, dipotassium	**CAS:**16923-95-8 **EINECS:**240-985-6	0% TO 10%	NDA	**EU CLP:** Not Classified **OSHA HCS 2012:** Not Classified	NDA
Titanium dioxide	**CAS:**13463-67-7 **EC Number:**236-675-5	0% TO 10%	NDA	**EU CLP:** Muta. 2, H341; Carc. 2, H351; STOT RE 2 (Lungs), H373 **OSHA HCS 2012:** Muta. 2; Carc. 2; STOT RE 2 (Lungs)	NDA
Strontium carbonate (1:1)	**CAS:**1633-05-2 **EINECS:**216-643-7	0% TO 10%	NDA	**EU CLP:** Not Classified **OSHA HCS 2012:** Not Classified	NDA
Limestone	**CAS:**1317-65-3 **EC Number:**215-279-6	0% TO 10%	NDA	**EU CLP:** Not Classified **OSHA HCS 2012:** Not Classified	NDA
Cryolite	**CAS:**15096-52-3 **EC Number:**239-148-8 **EU Index:**009-016-00-2	0% TO 10%	Ingestion/Oral-Rat LD50 • >5 g/kg	**EU CLP:** Annex VI, Table 3.1: STOT RE 1, H372; Acute Tox. 4, H332; Aquatic Chronic 2, H411 **OSHA HCS 2012:** STOT RE 1 (Lungs); Eye Irrit. 2	NDA
Cobalt	**CAS:**7440-48-4 **EC Number:**231-158-0 **EU Index:**027-001-00-9	0% TO 10%	Ingestion/Oral-Rat LD50 • 6171 mg/kg	**EU CLP:** Annex VI, Table 3.1: Resp. Sens. 1, H334; Skin Sens. 1, H317; Aquatic Chronic 1, H410 (M=1) **OSHA HCS 2012:** Eye Irrit. 2; Resp. Sens. 1; Skin Sens. 1; Carc. 2 (Inhl); STOT RE 2 (Lung / Inhl)	NDA
Calcium fluoride	**CAS:**7789-75-5 **EC Number:**232-188-7	0% TO 7%	Ingestion/Oral-Rat LD50 • 4250 mg/kg	**EU CLP:** Eye Irrit. 2, H319 **OSHA HCS 2012:** Eye Irrit. 2	NDA
Sodium fluoride	**CAS:**7681-49-4 **EC Number:**231-667-8 **EU Index:**009-004-00-7	0% TO 6%	Ingestion/Oral-Rat LD50 • 31 mg/kg	**EU CLP:** Annex VI, Table 3.1: Acute Tox. 3 *, H301; Eye Irrit. 2, H319; Skin Irrit. 2, H315 **OSHA HCS 2012:** Acute Tox. 2 (orl); Eye Irrit. 2; Skin Irrit. 2;	NDA
Amorphous/fused silica	**CAS:**60676-86-0 **EINECS:**262-373-8	0% TO 6%	NDA	**EU CLP:** Not Classified **OSHA HCS 2012:** Not Classified	NDA
Tungsten	**CAS:**7440-33-7 **EC Number:**231-143-9	0% TO 5%	NDA	**EU CLP:** Flam. Sol. 1, H228; Self-heat. 2, H252; Repr. 2, H361fd (Orl); EUH029 **OSHA HCS 2012:** Flam. Sol. 1; Self-heat. 2; Repr. 2 (Orl)	NDA
Titanium	**CAS:**7440-32-6 **EINECS:**231-142-3	0% TO 5%	NDA	**EU CLP:** Pyr. Sol. 1, H250 **OSHA HCS 2012:** Pyr. Sol. 1; Comb. Dust	NDA
Sodium silicate	**CAS:**1344-09-8 **EC Number:**215-687-4	0% TO 5%	Ingestion/Oral-Rat LD50 • 1960 mg/kg Skin-Rabbit LD50 • >4640 mg/kg	**EU CLP:** Acute Tox. 4, H302; Skin Corr. 1, H314; Eye Irrit. 2, H319 **OSHA HCS 2012:** Acute Tox. 4 (Orl); Skin Corr. 1; Eye Irrit. 2	NDA
Sodium oxide	**CAS:**1313-59-3 **EC**	0% TO 5%	NDA	**EU CLP:** Skin Corr. 1B, H314; Eye Dam. 1, H318 **OSHA HCS 2012:** Skin Corr. 1B; Eye Dam. 1	NDA

	Number:215-208-9				
Silicic acid, potassium salt	**CAS:**1312-76-1 **EC Number:**215-199-1	0% TO 5%	NDA	**EU CLP:** Not Classified **OSHA HCS 2012:** Not Classified	NDA
Potassium oxide	**CAS:**12136-45-7 **EINECS:**235-227-6	0% TO 5%	NDA	**EU CLP:** Skin Corr. 1B, H314; Eye Dam. 1, H318 **OSHA HCS 2012:** Skin Corr. 1B; Eye Dam. 1	NDA
Niobium	**CAS:**7440-03-1 **EC Number:**231-113-5	0% TO 5%	NDA	**EU CLP:** Not Classified **OSHA HCS 2012:** Not Classified	NDA
Manganese(II) oxide	**CAS:**1344-43-0 **EINECS:**215-695-8	0% TO 5%	NDA	**EU CLP:** Not Classified **OSHA HCS 2012:** Not Classified	NDA
Magnesium oxide	**CAS:**1309-48-4 **EC Number:**215-171-9	0% TO 5%	NDA	**EU CLP:** Not Classified **OSHA HCS 2012:** Hazard Not Otherwise Classified - Health Hazard - Metal fume fever	NDA
Iron oxide	**CAS:**1317-61-9 **EC Number:**215-277-5	0% TO 5%	NDA	**EU CLP:** Not Classified **OSHA HCS 2012:** Not Classified	NDA
Carbon	**CAS:**7440-44-0 **EC Number:**231-153-3	0% TO 5%	NDA	**EU CLP:** Not Classified **OSHA HCS 2012:** Pyr. Sol. 1; Comb. Dust	NDA
Barium fluoride	**CAS:**7787-32-8 **EINECS:**232-108-0	0% TO 5%	NDA	**EU CLP:** Not Classified **OSHA HCS 2012:** Not Classified	NDA
Barium carbonate (1:1)	**CAS:**513-77-9 **EC Number:**208-167-3 **EU Index:**056-003-00-2	0% TO 5%	NDA	**EU CLP:** Annex VI, Table 3.1: Acute Tox. 4 *, H302 **OSHA HCS 2012:** Acute Tox. 4 (orl)	NDA
Aluminum oxide	**CAS:**1344-28-1 **EC Number:**215-691-6	0% TO 5%	Inhalation-Rat LC50 • 0.2 mg/L 5 Hour(s) 28 Week(s)	**EU CLP:** STOT RE 2 (Lungs, Inhl), H373 **OSHA HCS 2012:** STOT RE 2 (Lungs, Inhl)	NDA
Aluminum	**CAS:**7429-90-5 **EC Number:**231-072-3	0% TO 5%	NDA	**EU CLP:** Annex VI, Table 3.1: Flam. Sol. 1, H228; Water-react. 2, H261 **OSHA HCS 2012:** Flam. Sol. 1; Water-react. 2; Comb. Dust; STOT RE 1 (Lungs, Inhl)	NDA
Tantalum	**CAS:**7440-25-7 **EC Number:**231-135-5	< 1%	NDA	**EU CLP:** Acute Tox. 4, H302 **OSHA HCS 2012:** Acute Tox. 4 (orl)	NDA
Silicon	**CAS:**7440-21-3 **EC Number:**231-130-8	< 1%	Ingestion/Oral-Rat LD50 • 3160 mg/kg	**EU CLP:** Flam. Sol. 2, H228 **OSHA HCS 2012:** Flam. Sol. 2	NDA

Lithium carbonate (2:1)	**CAS:**554-13-2 **EINECS:**209-062-5	< 1%	NDA	**EU CLP:** Acute Tox. 4, H302; Eye Irrit. 2, H319; Repr. 1B, H360F; Muta. 2, H341; STOT SE 3: Narc., H336; Aquatic Chronic 2, H411 **OSHA HCS 2012:** Acute Tox. 4 (orl); Eye Irrit. 2; Repr. 1B; Muta. 2; STOT SE 3: Narc.	NDA
Chromium(III) oxide	**CAS:**1308-38-9 **EC Number:**215-160-9	< 1%	NDA	**EU CLP:** STOT RE 2, H373 **OSHA HCS 2012:** STOT RE 2 (Lungs, Liver, Kidney, Inhl)	NDA
Calcium silicate	**CAS:**1344-95-2 **EINECS:**215-710-8	< 1%	NDA	**EU CLP:** Not Classified **OSHA HCS 2012:** Not Classified	NDA

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See Section 16 for full text of H-statements.

Section 4 - First Aid Measures

4.1 Description of first aid measures

Inhalation • Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. If signs/symptoms continue, get medical attention.

Skin • In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Wash skin with soap and water. Get medical attention if symptoms occur.

Eye • Immediately flush eyes for at least 15 minutes. If eye irritation persists: Get medical advice/attention.

Ingestion • Rinse mouth. Do not give anything by mouth to an unconscious person. Get medical attention if symptoms occur.

4.2 Most important symptoms and effects, both acute and delayed

• Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to Physician • No specific actions or treatments recommended related to exposure to this material.

Section 5 - Firefighting Measures

5.1 Extinguishing media

Suitable Extinguishing Media • In case of fire use media as appropriate for surrounding fire.

Unsuitable Extinguishing Media • No data available

5.2 Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards • Nonflammable except for packaging, however sparks from welding or grinding in user operations could ignite flammable or combustible liquids, vapors and solids.

Hazardous Combustion Products • No data available

5.3 Advice for firefighters

- Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection. Fire fighters should wear complete protective clothing including self-contained breathingapparatus.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions
- Under normal circumstances the materials do not produce any hazardous products and as such do not require any special precautions. Use appropriate Personal Protective Equipment (PPE)

Emergency Procedures
- No emergency procedures are expected to be necessary if material is used under ordinary conditions as recommended.

6.2 Environmental precautions

- No special precautions are necessary.

6.3 Methods and material for containment and cleaning up

Containment/Clean-up Measures
- Pick up spilled articles and place into container.

6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling
- Under normal circumstances the materials do not produce any hazardous products and as such do not require any special precautions. However, see Section 10 "Stability and Reactivity". The transient handling of the materials would not be expected to produce any sensitization but it is good practice to use gloves for handling. The normal precautions for handling heavy objects with possible sharp edges should also be observed. If dusts/fumes are created during processing wear appropriate personal protective equipment. Do not breathe dust or fumes. Wash thoroughly after handling.

7.2 Conditions for safe storage, including any incompatibilities

Storage
- Protect from contamination with other materials. Store in a dry place.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

Exposure Limits/Guidelines						
	Result	**ACGIH**	**Canada Ontario**	**Canada Quebec**	**China**	**Europe**
Chromium (7440-47-3)	TWAs	0.5 mg/m3 TWA	0.5 mg/m3 TWA	0.5 mg/m3 TWAEV	0.05 mg/m3 TWA	2 mg/m3 TWA
	STELs	Not established	Not established	Not established	0.15 mg/m3 STEL	Not established

Copper (7440-50-8)	STELs	Not established	Not established	Not established	2.5 mg/m3 STEL (dust); 0.6 mg/m3 STEL (fume)	Not established
	TWAs	0.2 mg/m3 TWA (fume)	0.2 mg/m3 TWA (fume); 1 mg/m3 TWA (dust and mist)	0.2 mg/m3 TWAEV (fume); 1 mg/m3 TWAEV (dust and mist)	1 mg/m3 TWA (dust); 0.2 mg/m3 TWA (fume)	Not established
Calcium fluoride (7789-75-5)	STELs	Not established	Not established	Not established	2 mg/m3 STEL (mixed dust, total); 1.4 mg/m3 STEL (mixed dust, respirable)	Not established
	TWAs	Not established	Not established	Not established	0.7 mg/m3 TWA (mixed dust, respirable); 1 mg/m3 TWA (mixed dust, total)	Not established
Calcium oxide (1305-78-8)	STELs	Not established	Not established	Not established	5 mg/m3 STEL	Not established
	TWAs	2 mg/m3 TWA	2 mg/m3 TWA	2 mg/m3 TWAEV	2 mg/m3 TWA	Not established
Magnesium oxide (1309-48-4)	STELs	Not established	Not established	Not established	20 mg/m3 STEL (fume)	Not established
	TWAs	10 mg/m3 TWA (inhalable fraction)	10 mg/m3 TWA (inhalable)	10 mg/m3 TWAEV (fume, as Mg)	10 mg/m3 TWA (fume)	Not established
Manganese (7439-96-5)	STELs	Not established	Not established	Not established	0.45 mg/m3 STEL	Not established
	TWAs	0.02 mg/m3 TWA (respirable fraction); 0.1 mg/m3 TWA (inhalable fraction)	0.2 mg/m3 TWA	0.2 mg/m3 TWAEV (total dust and fume)	0.15 mg/m3 TWA	Not established
Titanium dioxide (13463-67-7)	STELs	Not established	Not established	Not established	16 mg/m3 STEL (total dust)	Not established
	TWAs	10 mg/m3 TWA	10 mg/m3 TWA	10 mg/m3 TWAEV (containing no Asbestos and <1% Crystalline silica, total dust)	8 mg/m3 TWA (total dust)	Not established
Cobalt (7440-48-4)	STELs	Not established	Not established	Not established	0.1 mg/m3 STEL	Not established
	TWAs	0.02 mg/m3 TWA	0.02 mg/m3 TWA	0.02 mg/m3 TWAEV	0.05 mg/m3 TWA	Not established
Aluminum oxide (1344-28-1)	STELs	Not established	Not established	Not established	8 mg/m3 STEL (total dust)	Not established
	TWAs	1 mg/m3 TWA (respirable fraction) *as Aluminum insoluble compounds*	1 mg/m3 TWA (respirable) *as Aluminum insoluble compounds*	10 mg/m3 TWAEV (containing no Asbestos and <1% Crystalline silica, total dust, as Al)	4 mg/m3 TWA (total dust)	Not established
Aluminum (7429-90-5)	STELs	Not established	Not established	Not established	6 mg/m3 STEL (total dust)	Not established
	TWAs	1 mg/m3 TWA (respirable fraction)	1 mg/m3 TWA (respirable)	10 mg/m3 TWAEV	3 mg/m3 TWA (total dust)	Not established
Limestone (1317-65-3)	STELs	Not established	Not established	Not established	16 mg/m3 STEL (total dust); 8 mg/m3 STEL (respirable dust)	Not established
	TWAs	Not established	Not established	10 mg/m3 TWAEV (Limestone, containing no Asbestos and <1% Crystalline silica, total dust)	8 mg/m3 TWA (total dust); 4 mg/m3 TWA (respirable dust)	Not established
	STELs	Not established	Not established	Not established	15 mg/m3 STEL	Not established

Molybdenum (7439-98-7)	TWAs	10 mg/m3 TWA (inhalable fraction); 3 mg/m3 TWA (respirable fraction)	10 mg/m3 TWA (metal, inhalable); 3 mg/m3 TWA (metal, respirable)	Not established	6 mg/m3 TWA	Not established
Nickel (7440-02-0)	STELs	Not established	Not established	Not established	2.5 mg/m3 STEL	Not established
	TWAs	1.5 mg/m3 TWA (inhalable fraction)	1 mg/m3 TWA (inhalable)	1 mg/m3 TWAEV	1 mg/m3 TWA	Not established
Tungsten (7440-33-7)	STELs	10 mg/m3 STEL	10 mg/m3 STEL	Not established	10 mg/m3 STEL	Not established
	TWAs	5 mg/m3 TWA	5 mg/m3 TWA	Not established	5 mg/m3 TWA	Not established
Zirconium oxide	STELs	10 mg/m3 STEL (as Zr) *as Zirconium compounds*	10 mg/m3 STEL (as Zr) *as Zirconium compounds*	10 mg/m3 STEV (as Zr) *as Zirconium compounds*	10 mg/m3 STEL (as Zr) *as Zirconium compounds*	Not established
	TWAs	5 mg/m3 TWA (as Zr) *as Zirconium compounds*	5 mg/m3 TWA (as Zr) *as Zirconium compounds*	5 mg/m3 TWAEV (as Zr) *as Zirconium compounds*	5 mg/m3 TWA (as Zr) *as Zirconium compounds*	Not established
Amorphous/fused silica (60676-86-0)	TWAs	Not established	0.1 mg/m3 TWA (respirable)	0.1 mg/m3 TWAEV (containing no Asbestos and <1% Crystalline silica, respirable dust)	Not established	Not established
Tantalum (7440-25-7)	STELs	Not established	Not established	Not established	12.5 mg/m3 STEL	Not established
	TWAs	Not established	Not established	5 mg/m3 TWAEV (dust)	5 mg/m3 TWA	Not established
Calcium silicate (1344-95-2)	TWAs	10 mg/m3 TWA (synthetic nonfibrous, particulate matter containing no asbestos and <1% crystalline silica)	10 mg/m3 TWA (synthetic nonfibrous, containing no Asbestos and <1% Crystalline silica)	10 mg/m3 TWAEV (synthetic, containing no Asbestos and <1% Crystalline silica, total dust)	Not established	Not established
Chromium(III) oxide	TWAs	0.5 mg/m3 TWA (as Cr) *as Chromium (III) inorganic compounds*	0.5 mg/m3 TWA (as Cr, listed under Chromium and inorganic compounds) *as Chromium(III) compounds*	0.5 mg/m3 TWAEV (as Cr) *as Chromium(III) compounds*	Not established	Not established
Silicon (7440-21-3)	TWAs	Not established	Not established	10 mg/m3 TWAEV (containing no Asbestos and <1% Crystalline silica, total dust)	Not established	Not established

Exposure Limits/Guidelines (Con't.)

	Result	Germany DFG	Germany TRGS	NIOSH	OSHA
Chromium (7440-47-3)	TWAs	Not established	2 mg/m3 TWA AGW (inhalable fraction, exposure factor 1)	0.5 mg/m3 TWA	1 mg/m3 TWA
Copper (7440-50-8)	TWAs	Not established	Not established	1 mg/m3 TWA (dust and mist); 0.1 mg/m3 TWA (fume)	0.1 mg/m3 TWA (fume); 1 mg/m3 TWA (dust and mist)
	Ceilings	0.02 mg/m3 Peak (respirable fraction)	Not established	Not established	Not established
	MAKs	0.01 mg/m3 TWA MAK (including inorganic copper compounds, respirable fraction)	Not established	Not established	Not established

Calcium oxide (1305-78-8)	TWAs	Not established	1 mg/m3 TWA AGW (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed. Substance causing local effects, inhalable fraction, exposure factor 2)	2 mg/m3 TWA	5 mg/m3 TWA
	Ceilings	2 mg/m3 Peak (inhalable fraction)	Not established	Not established	Not established
	MAKs	1 mg/m3 TWA MAK (inhalable fraction)	Not established	Not established	Not established
Magnesium oxide (1309-48-4)	TWAs	Not established	Not established	Not established	15 mg/m3 TWA (fume, total particulate)
	MAKs	1.5 mg/m3 TWA MAK (respirable fraction); 4 mg/m3 TWA MAK (inhalable fraction)	Not established	Not established	Not established
Manganese (7439-96-5)	Ceilings	1.6 mg/m3 Peak (Ceiling factor 1 for Permanganates, inhalable fraction); 0.16 mg/m3 Peak (Ceiling factor 1 for Permanganates, respirable fraction)	Not established	Not established	5 mg/m3 Ceiling (fume)
	STELs	Not established	Not established	3 mg/m3 STEL	Not established
	TWAs	Not established	0.5 mg/m3 TWA AGW (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed, inhalable fraction)	1 mg/m3 TWA (fume)	Not established
	MAKs	0.2 mg/m3 TWA MAK (inhalable fraction); 0.02 mg/m3 TWA MAK (respirable fraction)	Not established	Not established	Not established
Titanium dioxide (13463-67-7)	TWAs	Not established	Not established	Not established	15 mg/m3 TWA (total dust)
Cobalt (7440-48-4)	TWAs	Not established	Not established	0.05 mg/m3 TWA (dust and fume)	0.1 mg/m3 TWA (dust and fume)
Aluminum oxide (1344-28-1)	TWAs	Not established	Not established	Not established	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
	MAKs	4 mg/m3 TWA MAK (dust, inhalable fraction); 1.5 mg/m3 TWA MAK (dust, respirable fraction)	Not established	Not established	Not established
Aluminum (7429-90-5)	TWAs	Not established	Not established	10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable dust)	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
	MAKs	4 mg/m3 TWA MAK (dust, inhalable fraction); 1.5 mg/m3 TWA MAK (dust, respirable fraction)	Not established	Not established	Not established
Limestone (1317-65-3)	TWAs	Not established	Not established	10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable dust)	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)

Nickel (7440-02-0)	TWAs	Not established	Not established	0.015 mg/m3 TWA	1 mg/m3 TWA
Tungsten (7440-33-7)	STELs	Not established	Not established	10 mg/m3 STEL	Not established
	TWAs	Not established	Not established	5 mg/m3 TWA	Not established
Zirconium oxide	TWAs	Not established	Not established	5 mg/m3 TWA (except Zirconium tetrachloride, as Zr) *as Zirconium compounds*	5 mg/m3 TWA (as Zr) *as Zirconium compounds*
	STELs	Not established	Not established	10 mg/m3 STEL (except Zirconium tetrachloride, as Zr) *as Zirconium compounds*	Not established
Amorphous/fused silica (60676-86-0)	TWAs	Not established	0.3 mg/m3 TWA AGW (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed, respirable fraction)	Not established	Not established
	MAKs	0.3 mg/m3 TWA MAK (respirable fraction)	Not established	Not established	Not established
Sodium fluoride (7681-49-4)	TWAs	Not established	Not established	2.5 mg/m3 TWA (as F)	Not established
Cryolite (15096-52-3)	TWAs	Not established	Not established	2.5 mg/m3 TWA (as F)	Not established
Manganese(II) oxide (1344-43-0)	Ceilings	1.6 mg/m3 Peak (Ceiling factor 1 for Permanganates, inhalable fraction); 0.16 mg/m3 Peak (Ceiling factor 1 for Permanganates, respirable fraction)	Not established	Not established	Not established
	MAKs	0.2 mg/m3 TWA MAK (inhalable fraction); 0.02 mg/m3 TWA MAK (respirable fraction)	Not established	Not established	Not established
Tantalum (7440-25-7)	TWAs	Not established	Not established	5 mg/m3 TWA (dust)	5 mg/m3 TWA
	STELs	Not established	Not established	10 mg/m3 STEL (dust)	Not established
	MAKs	4 mg/m3 TWA MAK (inhalable fraction); 1.5 mg/m3 TWA MAK (respirable fraction)	Not established	Not established	Not established
Calcium silicate (1344-95-2)	TWAs	Not established	Not established	10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable dust)	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
Chromium(III) oxide	TWAs	Not established	2 mg/m3 TWA AGW (inhalable fraction, exposure factor 1, listed under Chromium) *as Chromium (III) inorganic compounds*	0.5 mg/m3 TWA (as Cr) *as Chromium(III) compounds*	0.5 mg/m3 TWA (as Cr) *as Chromium(III) compounds*
Silicon (7440-21-3)	TWAs	Not established	Not established	10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable dust)	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)

Exposure Control Notations

Canada Quebec

•Cobalt (7440-48-4): **Carcinogens:** (C3 carcinogen - effect detected in animals)

ACGIH

•Aluminum (7429-90-5): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)

•Aluminum as Aluminum insoluble compounds: **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)

•Aluminum oxide as Aluminum insoluble compounds: **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)

•Calcium silicate (1344-95-2): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen (synthetic nonfibrous))

•Cobalt (7440-48-4): **Carcinogens:** (A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans)

•Chromium (7440-47-3): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)

•Chromium(III) oxide as Chromium (III) inorganic compounds: **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)

•Magnesium oxide (1309-48-4): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)

•Manganese (7439-96-5): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)

•Nickel (7440-02-0): **Carcinogens:** (A5 - Not Suspected as a Human Carcinogen)

•Titanium dioxide (13463-67-7): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)

•Zirconium oxide as Zirconium compounds: **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)

Germany TRGS

•Cobalt (7440-48-4): **Carcinogens:** (Category 2 (bioavailable, as inhalable dust/aerosol, except hard metals, cobalt containing spinels and organic cobalt desiccants)) | **Developmental Toxins:** (Based on current data, this substance cannot be classified in categories 1-3 (bioavailable, as inhalable dust/aerosol, except hard metals, cobalt containing spinels and organic cobalt desiccants)) | **Reproductive Toxins:** (Based on current data, this substance cannot be classified in categories 1-3 (bioavailable, as inhalable dust/aerosol, except hard metals, cobalt containing spinels and organic cobalt desiccants)) | **Germ Cell Mutagens:** (Based on current data, this substance cannot be classified in categories 1-3 (bioavailable, as inhalable dust/aerosol, except hard metals, cobalt containing spinels and organic cobalt desiccants))

Germany DFG

•Aluminum (7429-90-5): **Pregnancy:** (classification not yet possible (respirable, inhalable, dust))

•Aluminum oxide (1344-28-1): **Carcinogens:** (Category 2 (considered to be carcinogenic for man, fibre dust)) | **Pregnancy:** (classification not yet possible (respirable, inhalable, dust))

•Calcium oxide (1305-78-8): **Pregnancy:** (no risk to embryo/fetus if exposure limits adhered to)

•Cobalt (7440-48-4): **Carcinogens:** (Category 2 (considered to be carcinogenic for man)) | **Sensitizers:** (respiratory and skin sensitizer) | **Skin:** (skin notation)

•Chromium(III) oxide as Chromium(III) compounds: **Sensitizers:** (skin sensitizer)

•Copper (7440-50-8): **Pregnancy:** (no risk to embryo/fetus if exposure limits adhered to)

•Iron oxide (1317-61-9): **Carcinogens:** (Category 3B (could be carcinogenic for man))

•Magnesium oxide (1309-48-4): **Pregnancy:** (no risk to embryo/fetus if exposure limits adhered to (fume, respirable fraction); no risk to embryo/fetus if exposure limits adhered to (inhalable fraction))

•Manganese (7439-96-5): **Pregnancy:** (no risk to embryo/fetus if exposure limits adhered to (inhalable fraction, respirable fraction))

•Manganese(II) oxide (1344-43-0): **Pregnancy:** (no risk to embryo/fetus if exposure limits adhered to (inhalable fraction, respirable fraction))

•Nickel (7440-02-0): **Carcinogens:** (Category 1 (causes cancer in man)) | **Sensitizers:** (respiratory and skin sensitizer (inhalable fraction, respiratory sensitization confirmed for water soluble Nickel compounds only))

•Nickel as Nickel compounds: **Carcinogens:** (Category 1 (causes cancer in man)) | **Sensitizers:** (respiratory and skin sensitizer (inhalable fraction, respiratory sensitization confirmed for water soluble Nickel compounds only))

•Amorphous/fused silica (60676-86-0): **Pregnancy:** (no risk to embryo/fetus if exposure limits adhered to)

•Tantalum (7440-25-7): **Pregnancy:** (no risk to embryo/fetus if exposure limits adhered to (respirable, inhalable))

•Titanium dioxide (13463-67-7): **Carcinogens:** (Category 3A (could be carcinogenic for man, inhalable fraction with the exception of ultra small particles))

Exposure Limits Supplemental

OSHA

•Amorphous/fused silica (60676-86-0): **Mineral Dusts:** ((80)/(% SiO2) mg/m3 TWA; 20 mppcf TWA)

ACGIH

•Aluminum (7429-90-5): **TLV Basis - Critical Effects:** (pneumoconiosis; lower respiratory tract irritation; neurotoxicity)

•Aluminum as Aluminum insoluble compounds: **TLV Basis - Critical Effects:** (pneumoconiosis; lower respiratory tract irritation; neurotoxicity)

•Aluminum oxide as Aluminum insoluble compounds: **TLV Basis - Critical Effects:** (pneumoconiosis; lower respiratory tract irritation; neurotoxicity)

•Calcium oxide (1305-78-8): **TLV Basis - Critical Effects:** (upper respiratory tract irritation)

•Calcium silicate (1344-95-2): **TLV Basis - Critical Effects:** (upper respiratory tract irritation (synthetic nonfibrous)) | **Notice of Intended Changes (TLVs):** (Withdraw adopted TLV and documentation; refer to Appendix B: Particles (insoluble or poorly soluble) not otherwise specified (PNOS))

•Cobalt (7440-48-4): **BEIs:** (15 µg/L Medium: urine Time: end of shift at end of workweek Parameter: Cobalt (nonspecific)) | **TLV Basis - Critical Effects:** (asthma; myocardial effects; pulmonary function)

•Chromium (7440-47-3): **TLV Basis - Critical Effects:** (skin and upper respiratory tract irritation)

•Chromium(III) oxide as Chromium (III) inorganic compounds: **TLV Basis - Critical Effects:** (skin and upper respiratory tract irritation)

•Copper (7440-50-8): **TLV Basis - Critical Effects:** (metal fume fever (fume))

•Copper as Copper compounds: **TLV Basis - Critical Effects:** (gastrointestinal (dust and mist); irritation (dust and mist))

- Magnesium oxide (1309-48-4): **TLV Basis - Critical Effects:** (metal fume fever; upper respiratory tract irritation)
- Manganese (7439-96-5): **TLV Basis - Critical Effects:** (CNS impairment)
- Nickel (7440-02-0): **TLV Basis - Critical Effects:** (dermatitis; pneumoconiosis)
- Titanium dioxide (13463-67-7): **TLV Basis - Critical Effects:** (lower respiratory tract irritation)
- Tungsten (7440-33-7): **TLV Basis - Critical Effects:** (lower respiratory tract irritation)

8.2 Exposure controls

Engineering Measures/Controls
- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal Protective Equipment

Respiratory
- For limited exposure use an N95 dust mask. For prolonged exposure use an air-purifying respirator with high efficiency particulate air (HEPA) filters. Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.

Eye/Face
- Wear safety glasses.

Skin/Body
- Wear appropriate gloves. Wear long sleeves and/or protective coveralls.

Environmental Exposure Controls
- Follow best practice for site management and disposal of waste.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene
BEI = Biological Exposure Indices
MAK = Maximale Arbeitsplatz Konzentration is the maximum permissible concentration
NIOSH = National Institute of Occupational Safety and Health
OSHA = Occupational Safety and Health Administration
STEL = Short Term Exposure Limits are based on 15-minute exposures
STEV = Short Term Exposure Value
TLV = Threshold Limit Value determined by the American Conference of Governmental Industrial Hygienists (ACGIH)
TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures
TWAEV = Time-Weighted Average Exposure Value

Section 9 - Physical and Chemical Properties

9.1 Information on Physical and Chemical Properties

Material Description			
Physical Form	Solid	Appearance/Description	Filler metal, weld strip and thermal spray wire will be solid with a grey to silver color. Welding electrodes will be solid with varying grey, black, brown coating and a metallic silver inner. Flux cored wire will be a solid and have a metallic silver outer with flux core inner. Flux material will be a particulate varying in grey, brown, and green in color.
Color	Grey to silver/Varying grey, black, brown/Metallic silver/Varying grey, brown,and green.	Odor	Data lacking
Odor Threshold	Data lacking		
General Properties			
Boiling Point	Data lacking	Melting Point/Freezing Point	> 1800 °F(> 982.2222 °C)

Decomposition Temperature	Data lacking	pH	Data lacking
Specific Gravity/Relative Density	> 1 Water=1	Water Solubility	Negligible < 0.1 %
Viscosity	Data lacking	Explosive Properties	Data lacking
Oxidizing Properties:	Data lacking		
Volatility			
Vapor Pressure	Data lacking	Vapor Density	Data lacking
Evaporation Rate	Data lacking		
Flammability			
Flash Point	Data lacking	UEL	Data lacking
LEL	Data lacking	Autoignition	Data lacking
Flammability (solid, gas)	Data lacking		
Environmental			
Octanol/Water Partition coefficient	Data lacking		

9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity

- No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

- Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

- Hazardous polymerization not indicated.

10.4 Conditions to avoid

- No data available

10.5 Incompatible materials

- Nickel can react with carbon monoxide to form nickel carbonyl in reducing atmosphere.

10.6 Hazardous decomposition products

- Nickel can react with carbon monoxide to form nickel carbonyl in reducing atmosphere.

Section 11 - Toxicological Information

11.1 Information on toxicological effects

Components		
Aluminum (0% TO 5%)	7429-90-5	**Multi-dose Toxicity:** Inhalation-Man TCLo • 4 mg/m³ 1 Year(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Cough**; *Lungs, Thorax, or Respiration*:**Dyspnea**; *Nutritional and Gross Metabolic:Gross Metabolite Changes*:**Weight loss or decreased weight gain**; Inhalation-Rat TCLo • 206 mg/m³ 5 Hour(s) 30 Day(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Fibrosis (interstitial)**; *Endocrine*:**Hypoglycemia**; *Blood*:**Changes in serum composition (e.g., TP, bilirubin cholesterol)**
Aluminum oxide (0% TO 5%)	1344-28-1	**Multi-dose Toxicity:** Inhalation-Rat TCLo • 200 mg/m³ 5 Hour(s) 28 Week(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Structural or functional change in trachea or bronchi**; *Lungs, Thorax, or Respiration*:**Chronic pulmonary edema**; *Related to Chronic Data*:**Death in the Other Multiple Dose data**

		type field; **Tumorigen / Carcinogen:** Implant-Rat • 200 mg/kg; *Tumorigenic*:**Equivocal tumorigenic agent by RTECS criteria**; *Tumorigenic*:**Tumors at site of application**; Implant-Rat TDLo • 200 mg/kg; *Tumorigenic*:**Neoplastic by RTECS criteria**; *Tumorigenic*:**Tumors at site of application**; Intrapleural-Rat TDLo • 90 mg/kg; *Tumorigenic*:**Equivocal tumorigenic agent by RTECS criteria**; *Lungs, Thorax, or Respiration*:**Tumors**
Barium carbonate (1:1) (0% TO 5%)	513-77-9	**Acute Toxicity:** Ingestion/Oral-Rat LD50 • 418 mg/kg; Ingestion/Oral-Human TDLo • 29 mg/kg; *Peripheral Nerve and Sensation*:**Flaccid paralysis without anesthesia (usually neuromuscular blockage)**; *Peripheral Nerve and Sensation*:**Paresthesis**; *Behavioral*:**Muscle weakness**; **Multi-dose Toxicity:** Inhalation-Rat TCLo • 5.2 mg/m³ 70 Day(s)-Intermittent; *Reproductive Effects:Paternal Effects*:**Spermatogenesis**; *Reproductive Effects:Paternal Effects*:**Testes, epididymis, sperm duct**; **Reproductive:** Inhalation-Rat TCLo • 3130 µg/m³ 24 Hour(s)(16W pre); *Reproductive Effects:Maternal Effects*:**Oogenesis**; *Reproductive Effects:Maternal Effects*:**Ovaries, fallopian tubes**
Limestone (0% TO 10%)	1317-65-3	**Multi-dose Toxicity:** Inhalation-Rat TCLo • 84 mg/m³ 4 Hour(s) 40 Week(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Fibrosis (interstitial)**; *Liver*:**Other changes**; *Kidney, Ureter, and Bladder*:**Other changes**; Inhalation-Rat TCLo • 250 mg/m³ 2 Hour(s) 24 Week(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Fibrosis, focal (pneumoconiosis)**
Calcium fluoride (0% TO 7%)	7789-75-5	**Acute Toxicity:** Ingestion/Oral-Rat LD50 • 4250 mg/kg; *Behavioral*:**Somnolence (general depressed activity)**; *Behavioral*:**Ataxia**; *Lungs, Thorax, or Respiration*:**Respiratory depression**; **Multi-dose Toxicity:** Ingestion/Oral-Rat TDLo • 44 g/kg 31 Day(s)-Intermittent; *Cardiac*:**EKG changes not diagnostic of above**; *Musculoskeletal*:**Changes in teeth and supporting structures**; *Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels*:**Transaminases**; **Reproductive:** Intraperitoneal-Mouse TDLo • 3200 mg/kg (9D preg); *Reproductive Effects:Effects on Fertility*:**Post-implantation mortality**; Intraperitoneal-Mouse TDLo • 67200 mg/kg (1-21D preg); *Reproductive Effects:Specific Developmental Abnormalities*:**Other developmental abnormalities**
Cobalt (0% TO 10%)	7440-48-4	**Acute Toxicity:** Ingestion/Oral-Rat LD50 • 6171 mg/kg; *Behavioral*:**Somnolence (general depressed activity)**; *Behavioral*:**Ataxia**; *Gastrointestinal*:**Hypermotility, diarrhea**; **Multi-dose Toxicity:** Inhalation-Rabbit TCLo • 10 mg/m³ 2 Hour(s) 56 Day(s)-Intermittent; *Behavioral*:**Food intake (animal)**; *Lungs, Thorax, or Respiration*:**Emphysema**; *Liver*:**Fatty liver degeneration**; Inhalation-Rat TCLo • 2 mg/m³ 4 Day(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Fibrosing alveolitis**; Inhalation-Rat TCLo • 0.09 mg/m³ 24 Hour(s) 8 Week(s)-Continuous; *Lungs, Thorax, or Respiration*:**Other changes**; *Kidney, Ureter, and Bladder*:**Urine volume decreased**; *Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels*:**Dehydrogenases**
Chromium(III) oxide (< 1%)	1308-38-9	**Acute Toxicity:** Ingestion/Oral-Mammal LD50 • 621 mg/kg; **Multi-dose Toxicity:** Inhalation-Rat TCLo • 150 mg/m³ 45 Day(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Emphysema**; *Liver*:**Fatty liver degeneration**; *Kidney, Ureter, and Bladder*:**Changes in tubules (including acute renal failure, acute tubular necrosis)**; **Mutagen:** Mutation in microorganisms • Unreported Route-Salmonella typhimurium • 10 µg/plate (+S9); **Tumorigen / Carcinogen:** Intratracheal-Rat TDLo • 90 mg/kg; *Tumorigenic*:**Equivocal tumorigenic agent by RTECS criteria**; *Lungs, Thorax, or Respiration*:**Tumors**; *Tumorigenic*:**Tumors at site of application**
Copper (0% TO 70%)	7440-50-8	**Acute Toxicity:** Ingestion/Oral-Mouse TDLo • 108 mg/kg; *Behavioral*:**Tremor**; *Gastrointestinal*:**Hypermotility, diarrhea**; *Gastrointestinal*:**Nausea or vomiting**; Ingestion/Oral-Mouse TDLo • 158 mg/kg; *Kidney, Ureter, and Bladder*:**Changes in tubules (including acute renal failure, acute tubular necrosis)**; Ingestion/Oral-Mouse TDLo • 232 mg/kg; *Kidney, Ureter, and Bladder*:**Changes primarily in glomeruli**; *Blood*:**Changes in spleen**; *Blood*:**Changes in serum composition (e.g., TP, bilirubin cholesterol)**; **Multi-dose Toxicity:** Ingestion/Oral-Rabbit TDLo • 3 g/kg 60 Day(s)-Continuous; *Cardiac*:**Other changes**; *Liver*:**Hepatitis (hepatocellular necrosis), zonal**; *Related to Chronic Data*:**Death in the Other Multiple Dose data type field**; **Reproductive:** Ingestion/Oral-Rat TDLo • 152 mg/kg (22W pre); *Reproductive Effects:Effects on Embryo or Fetus*:**Fetotoxicity (except death, e.g., stunted fetus)**; *Reproductive Effects:Specific Developmental Abnormalities*:**Central nervous system**; Ingestion/Oral-Rat TDLo • 1520 µg/kg (22W pre); *Reproductive Effects:Specific Developmental Abnormalities*:**Musculoskeletal system**; Ingestion/Oral-Rat TDLo • 1210 µg/kg (35W pre); *Reproductive Effects:Effects on Fertility*:**Pre-implantation mortality**; *Reproductive Effects:Effects on Fertility*:**Post-implantation mortality**; **Tumorigen / Carcinogen:** Ingestion/Oral-Mouse TDLo • 10.08 mg/kg 12 Week(s)-Continuous; *Tumorigenic*:**Carcinogenic by RTECS criteria**; *Lungs, Thorax, or Respiration*:**Other changes**
Iron (0% TO 60%)	7439-89-6	**Acute Toxicity:** Ingestion/Oral-Rat LD50 • 750 mg/kg; *Blood*:**Changes in serum composition (e.g., TP, bilirubin cholesterol)**; *Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels*:**Transaminases**; Ingestion/Oral-Child TDLo • 77 mg/kg; *Behavioral*:**Irritability**; *Gastrointestinal*:**Nausea or vomiting**; *Blood*:**Normocytic anemia**; **Multi-dose Toxicity:** Ingestion/Oral-Rat TDLo • 105 mg/kg 5 Week(s)-Continuous; *Liver*:**Tumors**;

		Tumorigenic:**Active as anti-cancer agent**; *Tumorigenic*:**Protects against induction of experimental tumors**
Zirconate(2-), hexafluoro-, dipotassium (0% TO 10%)	16923-95-8	**Acute Toxicity:** Ingestion/Oral-Rat LD50 • 2500 mg/kg
Lithium carbonate (2:1) (< 1%)	554-13-2	**Acute Toxicity:** Ingestion/Oral-Rat LD50 • 553 mg/kg; *Peripheral Nerve and Sensation*:**Flaccid paralysis with appropriate anesthesia**; *Behavioral*:**Tetany**; *Cardiac*:**Arrhythmias (including changes in conduction)**; Ingestion/Oral-Human TDLo • 4111 mg/kg; *Behavioral*:**Tremor**; *Behavioral*:**Muscle weakness**; *Gastrointestinal*:**Other changes**; Ingestion/Oral-Man TDLo • 54 mg/kg; *Behavioral*:**Sleep**; *Behavioral*:**Hallucinations, distorted perceptions**; **Mutagen:** Cytogenetic analysis • Ingestion/Oral-Mouse • 1200 µg/kg 3 Day(s)-Intermittent; Sister chromatid exchange • Ingestion/Oral-Mouse • 1200 µg/kg 3 Day(s)-Intermittent; **Reproductive:** Ingestion/Oral-Mouse TDLo • 4650 mg/kg (6-15D preg); *Reproductive Effects:Effects on Embryo or Fetus*:**Fetal death**; *Reproductive Effects:Specific Developmental Abnormalities*:**Craniofacial (including nose and tongue)**; Ingestion/Oral-Rat TDLo • 600 mg/kg (9-14D preg); *Reproductive Effects:Specific Developmental Abnormalities*:**Musculoskeletal system**; **Tumorigen / Carcinogen:** Ingestion/Oral-Woman TDLo • 3600 mg/kg 21 Week(s)-Continuous; *Tumorigenic*:**Carcinogenic by RTECS criteria**; *Blood*:**Leukemia**
Magnesium oxide (0% TO 5%)	1309-48-4	**Multi-dose Toxicity:** Inhalation-Rat TCLo • 1000 mg/m³ 4 Hour(s) 50 Day(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Other changes**; *Blood*:**Other hemolysis with or without anemia**
Manganese (0% TO 13%)	7439-96-5	**Acute Toxicity:** Ingestion/Oral-Rat LD50 • 9 g/kg; Inhalation-Man TCLo • 2300 µg/m³; *Brain and Coverings*:**Other degenerative changes**; *Behavioral*:**Changes in motor activity (specific assay)**; *Behavioral*:**Muscle weakness**; **Irritation:** Eye-Rabbit • 500 mg 24 Hour(s) • Mild irritation; Skin-Rabbit • 500 mg 24 Hour(s) • Mild irritation; **Multi-dose Toxicity:** Inhalation-Human TCLo • 0.5 mg/m³ 39 Week(s)-Intermittent; *Brain and Coverings*:**Other degenerative changes**; *Peripheral Nerve and Sensation*:**Sensory change involving peripheral nerve**; *Behavioral*:**Irritability**; Inhalation-Monkey TCLo • 0.3 mg/m³ 5 Hour(s) 26 Week(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Fibrosis (interstitial)**; *Immunological Including Allergic*:**Decrease in cellular immune response**; Inhalation-Mouse TCLo • 0.7 mg/m³ 24 Hour(s) 22 Week(s)-Continuous; *Lungs, Thorax, or Respiration*:**Fibrosis (interstitial)**; *Immunological Including Allergic*:**Decrease in cellular immune response**; **Reproductive:** Ingestion/Oral-Mouse TDLo • 322.5 mg/kg (43D male); *Reproductive Effects:Paternal Effects*:**Spermatogenesis**; Ingestion/Oral-Rat TDLo • 50 mg/kg (20D post); *Reproductive Effects:Specific Developmental Abnormalities*:**Central nervous system**; *Reproductive Effects:Effects on Newborn*:**Biochemical and metabolic**; *Reproductive Effects:Effects on Newborn*:**Behavioral**
Molybdenum (0% TO 30%)	7439-98-7	**Mutagen:** Cytogenetic analysis • Inhalation-Rat • 19500 µg/m³; **Reproductive:** Ingestion/Oral-Mouse TDLo • 448 mg/kg (multigenerations); *Reproductive Effects:Effects on Embryo or Fetus*:**Fetotoxicity (except death, e.g., stunted fetus)**; *Reproductive Effects:Effects on Embryo or Fetus*:**Fetal death**; Ingestion/Oral-Rat TDLo • 5800 µg/kg (30W pre/1-20D preg); *Reproductive Effects:Specific Developmental Abnormalities*:**Musculoskeletal system**; Ingestion/Oral-Rat TDLo • 6050 µg/kg (35W pre); *Reproductive Effects:Effects on Fertility*:**Pre-implantation mortality**; *Reproductive Effects:Effects on Fertility*:**Post-implantation mortality**; *Reproductive Effects:Specific Developmental Abnormalities*:**Musculoskeletal system**
Sodium silicate (0% TO 5%)	1344-09-8	**Acute Toxicity:** Ingestion/Oral-Rat LD50 • 1960 mg/kg; Skin-Rabbit LD50 • >4640 mg/kg; *Behavioral*:**Somnolence (general depressed activity)**; *Lungs, Thorax, or Respiration*:**Dyspnea**; **Irritation:** Eye-Rabbit • 10 mg 24 Hour(s) • Severe irritation; Skin-Rabbit • 500 mg 24 Hour(s) • Severe irritation
Cryolite (0% TO 10%)	15096-52-3	**Acute Toxicity:** Ingestion/Oral-Rat LD50 • >5 g/kg; *Gastrointestinal*:**Changes in structure or function of salivary glands**; *Skin and Appendages:Other*:**Hair**; **Multi-dose Toxicity:** Inhalation-Rat TCLo • 1 mg/m³ 6 Hour(s) 22 Week(s)-Intermittent; *Peripheral Nerve and Sensation*:**Recording from peripheral motor nerve**; *Lungs, Thorax, or Respiration*:**Structural or functional change in trachea or bronchi**; *Biochemical:Metabolism (intermediary)*:**Glycolytic**; **Mutagen:** Cytogenetic analysis • Inhalation-Rat • 34260 µg/m³ 6 Hour(s) 21 Week(s)-Intermittent
Sodium fluoride (0% TO 6%)	7681-49-4	**Acute Toxicity:** Ingestion/Oral-Rat LD50 • 31 mg/kg; **Irritation:** Eye-Rabbit • 20 mg 24 Hour(s) • Moderate irritation; **Multi-dose Toxicity:** Ingestion/Oral-Mouse TDLo • 187.04 mg/kg 4 Week(s)-Intermittent; *Endocrine*:**Hyperglycemia**; Ingestion/Oral-Rat TDLo • 2.8 mg/kg 8 Week(s)-Intermittent; *Liver*:**Hepatitis (hepatocellular necrosis), zonal**; *Kidney, Ureter, and Bladder*:**Changes in both tubules and glomeruli**; *Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels*:**Multiple enzyme effects**; Ingestion/Oral-Rat TDLo • 350 mg/kg 35 Day(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Emphysema**; *Gastrointestinal*:**Changes in structure or function of endocrine pancreas**; *Biochemical:Metabolism (intermediary)*:**Effect on inflammation or mediation of inflammation**;

		Mutagen: Cytogenetic analysis • Ingestion/Oral-Mouse • 1 ppm 3 Week(s)-Continuous; Cytogenetic analysis • Subcutaneous-Mouse • 40 mg/kg; **Tumorigen / Carcinogen:** Ingestion/Oral-Mouse TDLo • 14 mg/kg 43 Week(s)-Continuous; *Tumorigenic*:**Equivocal tumorigenic agent by RTECS criteria**; *Skin and Appendages:Other*:**Tumors**
Nickel (0% TO 100%)	7440-02-0	**Acute Toxicity:** Ingestion/Oral-Rat TDLo • 200 mg/kg; *Nutritional and Gross Metabolic:Gross Metabolite Changes*:**Weight loss or decreased weight gain**; *Behavioral*:**Somnolence (general depressed activity)**; **Multi-dose Toxicity:** Ingestion/Oral-Mouse TDLo • 500 mg/kg 5 Day(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Fibrosis, focal (pneumoconiosis)**; *Related to Chronic Data*:**Death in the Other Multiple Dose data type field**; Inhalation-Rabbit TCLo • 1 mg/m³ 6 Hour(s) 26 Week(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Other changes**; Inhalation-Rat TCLo • 0.4 mg/m³ 40 Week(s)-Intermittent; *Vascular*:**Thrombosis distant from injection site**; *Lungs, Thorax, or Respiration*:**Other changes**; *Related to Chronic Data*:**Death in the Other Multiple Dose data type field**; **Reproductive:** Ingestion/Oral-Rat TDLo • 158 mg/kg (multigenerations); *Reproductive Effects:Effects on Embryo or Fetus*:**Fetotoxicity (except death, e.g., stunted fetus)**; *Reproductive Effects:Effects on Embryo or Fetus*:**Fetal death**; **Tumorigen / Carcinogen:** Inhalation-Guinea Pig TCLo • 15 mg/m³ 91 Week(s)-Intermittent; *Tumorigenic*:**Equivocal tumorigenic agent by RTECS criteria**; *Lungs, Thorax, or Respiration*:**Tumors**; *Lungs, Thorax, or Respiration*:**Bronchiogenic carcinoma**
Silicon (< 1%)	7440-21-3	**Acute Toxicity:** Ingestion/Oral-Rat LD50 • 3160 mg/kg; **Irritation:** Eye-Rabbit • 3 mg • Mild irritation
Amorphous/fused silica (0% TO 6%)	60676-86-0	**Multi-dose Toxicity:** Inhalation-Rat TCLo • 197 mg/m³ 6 Hour(s) 26 Week(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Changes in lung weight**; **Tumorigen / Carcinogen:** Implant-Rat TDLo • 400 mg/kg; *Tumorigenic*:**Equivocal tumorigenic agent by RTECS criteria**; *Gastrointestinal*:**Tumors**; *Tumorigenic*:**Tumors at site of application**
Titanium (0% TO 5%)	7440-32-6	**Reproductive:** Ingestion/Oral-Rat TDLo • 158 mg/kg (multigeneration); *Reproductive Effects:Effects on Embryo or Fetus*:**Fetotoxicity (except death, e.g., stunted fetus)**; *Reproductive Effects:Effects on Embryo or Fetus*:**Fetal death**
Tantalum (< 1%)	7440-25-7	**Acute Toxicity:** Ingestion/Oral-Mouse LD50 • 595 mg/kg
Titanium dioxide (0% TO 10%)	13463-67-7	**Irritation:** Skin-Human • 300 µg 3 Day(s)-Intermittent • Mild irritation; **Multi-dose Toxicity:** Inhalation-Rat TCLo • 10 mg/m³ 6 Hour(s) 13 Week(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Fibrosis (interstitial)**; *Lungs, Thorax, or Respiration*:**Other changes**; *Biochemical:Metabolism (intermediary)*:**Effect on inflammation or mediation of inflammation**; Inhalation-Rat TCLo • 250 mg/m³ 6 Hour(s) 4 Week(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Chronic pulmonary edema**; *Lungs, Thorax, or Respiration*:**Other changes**; **Mutagen:** Cytogenetic analysis • Ingestion/Oral-Mouse • 280 mg/kg 7 Day(s)-Intermittent; Micronucleus test • Ingestion/Oral-Mouse • 280 mg/kg 7 Day(s)-Intermittent; DNA damage • Ingestion/Oral-Mouse • 280 mg/kg 7 Day(s)-Intermittent; **Tumorigen / Carcinogen:** Inhalation-Rat • 10 mg/m³ 18 Hour(s) 2 Year(s)-Intermittent; *Tumorigenic*:**Carcinogenic by RTECS criteria**; *Lungs, Thorax, or Respiration*:**Tumors**; Inhalation-Rat TCLo • 250 mg/m³ 6 Hour(s) 2 Year(s)-Intermittent; *Tumorigenic*:**Carcinogenic by RTECS criteria**; *Lungs, Thorax, or Respiration*:**Tumors**
Tungsten (0% TO 5%)	7440-33-7	**Irritation:** Eye-Rabbit • 500 mg 24 Hour(s) • Mild irritation; Skin-Rabbit • 500 mg 24 Hour(s) • Mild irritation; **Reproductive:** Ingestion/Oral-Rat TDLo • 1210 µg/kg (35W pre); *Reproductive Effects:Effects on Fertility*:**Post-implantation mortality**; *Reproductive Effects:Specific Developmental Abnormalities*:**Musculoskeletal system**; Ingestion/Oral-Rat TDLo • 1160 µg/kg (30W pre/1-20D preg); *Reproductive Effects:Specific Developmental Abnormalities*:**Musculoskeletal system**

GHS Properties	Classification
Carcinogenicity	**EU/CLP**•Carcinogenicity 2 **OSHA HCS 2012**•Carcinogenicity 2
Aspiration Hazard	**EU/CLP**•Data lacking **OSHA HCS 2012**•Data lacking
Respiratory sensitization	**EU/CLP**•Respiratory Sensitizer 1 **OSHA HCS 2012**•Respiratory Sensitizer 1

Skin corrosion/Irritation	**EU/CLP**•Data lacking **OSHA HCS 2012**•Data lacking
Skin sensitization	**EU/CLP**•Skin Sensitizer 1 **OSHA HCS 2012**•Skin Sensitizer 1
STOT-RE	**EU/CLP**•Specific Target Organ Toxicity Repeated Exposure 1; Specific Target Organ Toxicity Repeated Exposure 2 **OSHA HCS 2012**•Specific Target Organ Toxicity Repeated Exposure 1; Specific Target Organ Toxicity Repeated Exposure 2
STOT-SE	**EU/CLP**•Specific Target Organ Toxicity Single Exposure 1; Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation **OSHA HCS 2012**•Specific Target Organ Toxicity Single Exposure 1; Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation
Toxicity for Reproduction	**EU/CLP**•Toxic to Reproduction 1B **OSHA HCS 2012**•Toxic to Reproduction 1B
Germ Cell Mutagenicity	**EU/CLP**•Germ Cell Mutagenicity 2 **OSHA HCS 2012**•Germ Cell Mutagenicity 2
Serious eye damage/Irritation	**EU/CLP**•Data lacking **OSHA HCS 2012**•Data lacking
Acute toxicity	**EU/CLP**•Data lacking **OSHA HCS 2012**•Data lacking

Potential Health Effects

Inhalation

Acute (Immediate)
- May cause respiratory irritation. Processes such as cutting, grinding, crushing, or impact may result in generation of excessive amounts of airborne dusts in the workplace. Nuisance dust may affect the lungs but reactions are typically reversible.

Chronic (Delayed)
- Repeated and prolonged exposure to dust may cause lung effects including pneumoconiosis. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Prolonged exposure to manganese fumes and dusts has resulted in a progressive deterioration of the Central Nervous System. Symptoms resemble late Parkinsons disease and include weakness in the legs, increased muscle tone, hand tremor, slurred speech, muscle cramps, spastic gate, fixed facial expression and mental deterioration.

Skin

Acute (Immediate)
- Exposure to dust may cause mechanical irritation. May cause skin sensitization. Symptoms include redness, and skin rash.

Chronic (Delayed)
- No data available.

Eye

Acute (Immediate)
- Exposure to dust may cause mechanical irritation. Excessive concentrations of nuisance dust in the workplace may reduce visibility and may cause unpleasant deposits in eyes.

Chronic (Delayed)
- No data available.

Ingestion

Acute (Immediate)
- Ingestion of large amounts of copper may cause damage to the kidneys. Excessive concentrations of nuisance dust in the workplace may cause mechanical irritation to mucous membranes.

Chronic (Delayed)
- Animal studies have shown effects on the liver and reproductive effects from prolonged exposure to copper.

Mutagenic Effects
- Repeated and prolonged exposure may cause mutagenic effects.

Carcinogenic Effects
- Repeated and prolonged exposure may cause cancer.

Carcinogenic Effects			
	CAS	IARC	NTP
Cobalt	7440-48-4	Group 2B-Possible Carcinogen	Not Listed
Nickel	7440-02-0	Group 2B-Possible Carcinogen	Reasonably Anticipated to be Human Carcinogen
Titanium dioxide	13463-67-7	Group 2B-Possible Carcinogen	Not Listed

11.2 Other information

- Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain.

Key to abbreviations

LC = Lethal Concentration
LD = Lethal Dose
TC = Toxic Concentration
TD = Toxic Dose

Section 12 - Ecological Information

12.1 Toxicity

- As a solid metal object, Filler Metal products are not considered toxic to aquatic species. Flux (being of mineral constituents) From Flux coated electrodes, flux cored wire and flux may degrade over time. Observe national and local standards for fume extraction systems.

12.2 Persistence and degradability

- Material data lacking.

12.3 Bioaccumulative potential

- Material data lacking.

12.4 Mobility in Soil

- Material data lacking.

12.5 Results of PBT and vPvB assessment

- No PBT and vPvB assessment has been conducted.

12.6 Other adverse effects

- No studies have been found.

Section 13 - Disposal Considerations

13.1 Waste treatment methods

Product waste
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	NDA	Not Regulated	NDA	NDA	NDA
TDG	NDA	Not Regulated	NDA	NDA	NDA
IMO/IMDG	NDA	Not Regulated	NDA	NDA	NDA
IATA/ICAO	NDA	Not Regulated	NDA	NDA	NDA

14.6 Special precautions for user • None specified.

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

Section 15 - Regulatory Information

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

SARA Hazard Classifications • Acute, Chronic

State Right To Know				
Component	**CAS**	**MA**	**NJ**	**PA**
Aluminum	7429-90-5	Yes	Yes	Yes
Aluminum oxide	1344-28-1	Yes	Yes	Yes
Amorphous/fused silica	60676-86-0	Yes	Yes	No
Barium carbonate (1:1)	513-77-9	No	No	No
Barium fluoride	7787-32-8	No	No	No
Calcium fluoride	7789-75-5	No	No	No
Calcium oxide	1305-78-8	Yes	Yes	Yes
Carbon	7440-44-0	No	No	No
Chromium	7440-47-3	Yes	Yes	Yes
Chromium(III) oxide	1308-38-9	Yes	Yes	No
Cobalt	7440-48-4	Yes	Yes	Yes
Copper	7440-50-8	Yes	Yes	Yes
Cryolite	15096-52-3	No	Yes	No
Iron	7439-89-6	No	No	No
Iron oxide	1317-61-9	No	No	No
Limestone	1317-65-3	Yes	Yes	Yes
Lithium carbonate (2:1)	554-13-2	Yes	Yes	No
Magnesium oxide	1309-48-4	Yes	Yes	Yes
Manganese	7439-96-5	Yes	Yes	Yes
Manganese(II) oxide	1344-43-0	No	No	No
Molybdenum	7439-98-7	Yes	Yes	Yes

Nickel	7440-02-0	Yes	Yes	Yes
Niobium	7440-03-1	No	No	No
Potassium oxide	12136-45-7	No	Yes	No
Silicic acid, potassium salt	1312-76-1	No	No	No
Silicon	7440-21-3	Yes	Yes	Yes
Sodium fluoride	7681-49-4	Yes	Yes	Yes
Sodium oxide	1313-59-3	No	No	No
Sodium silicate	1344-09-8	No	No	No
Strontium carbonate (1:1)	1633-05-2	No	No	No
Tantalum	7440-25-7	Yes	Yes	Yes
Titanium	7440-32-6	No	Yes	No
Titanium dioxide	13463-67-7	Yes	Yes	Yes
Tungsten	7440-33-7	Yes	Yes	Yes
Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Yes	Yes	Yes
Zirconium oxide	1314-23-4	Yes	No	No

Inventory						
Component	**CAS**	**Canada DSL**	**Canada NDSL**	**China**	**EU EINECS**	**EU ELNICS**
Aluminum	7429-90-5	Yes	No	Yes	Yes	No
Aluminum oxide	1344-28-1	Yes	No	Yes	Yes	No
Amorphous/fused silica	60676-86-0	Yes	No	Yes	Yes	Yes
Barium carbonate (1:1)	513-77-9	Yes	No	Yes	Yes	No
Barium fluoride	7787-32-8	Yes	No	Yes	Yes	No
Calcium fluoride	7789-75-5	Yes	No	Yes	Yes	No
Calcium oxide	1305-78-8	Yes	No	Yes	Yes	No
Carbon	7440-44-0	Yes	No	Yes	Yes	No
Chromium	7440-47-3	Yes	No	Yes	Yes	No
Chromium(III) oxide	1308-38-9	Yes	No	Yes	Yes	No
Cobalt	7440-48-4	Yes	No	Yes	Yes	No
Copper	7440-50-8	Yes	No	Yes	Yes	No
Cryolite	15096-52-3	Yes	No	Yes	Yes	No
Iron	7439-89-6	Yes	No	Yes	Yes	No
Iron oxide	1317-61-9	Yes	No	Yes	Yes	No
Limestone	1317-65-3	No	Yes	Yes	Yes	No
Lithium carbonate (2:1)	554-13-2	Yes	No	Yes	Yes	No
Magnesium oxide	1309-48-4	Yes	No	Yes	Yes	No
Manganese	7439-96-5	Yes	No	Yes	Yes	No
Manganese(II) oxide	1344-43-0	Yes	No	Yes	Yes	No
Molybdenum	7439-98-7	Yes	No	Yes	Yes	No
Nickel	7440-02-0	Yes	No	Yes	Yes	No

Niobium	7440-03-1	Yes	No	Yes	Yes	No
Potassium oxide	12136-45-7	Yes	No	Yes	Yes	No
Silicic acid, potassium salt	1312-76-1	Yes	No	Yes	Yes	No
Silicon	7440-21-3	Yes	No	Yes	Yes	No
Sodium fluoride	7681-49-4	Yes	No	Yes	Yes	No
Sodium oxide	1313-59-3	Yes	No	Yes	Yes	No
Sodium silicate	1344-09-8	Yes	No	Yes	Yes	No
Strontium carbonate (1:1)	1633-05-2	Yes	No	Yes	Yes	No
Tantalum	7440-25-7	Yes	No	Yes	Yes	No
Titanium	7440-32-6	Yes	No	Yes	Yes	No
Titanium dioxide	13463-67-7	Yes	No	Yes	Yes	No
Tungsten	7440-33-7	Yes	No	Yes	Yes	No
Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Yes	No	Yes	Yes	No
Zirconium oxide	1314-23-4	Yes	No	Yes	Yes	No

Inventory (Con't.)

Component	CAS	Japan ENCS	Korea KECL	TSCA
Aluminum	7429-90-5	No	Yes	Yes
Aluminum oxide	1344-28-1	Yes	Yes	Yes
Amorphous/fused silica	60676-86-0	Yes	Yes	Yes
Barium carbonate (1:1)	513-77-9	Yes	Yes	Yes
Barium fluoride	7787-32-8	Yes	Yes	Yes
Calcium fluoride	7789-75-5	Yes	Yes	Yes
Calcium oxide	1305-78-8	Yes	Yes	Yes
Carbon	7440-44-0	No	Yes	Yes
Chromium	7440-47-3	No	Yes	Yes
Chromium(III) oxide	1308-38-9	Yes	Yes	Yes
Cobalt	7440-48-4	No	Yes	Yes
Copper	7440-50-8	No	Yes	Yes
Cryolite	15096-52-3	No	Yes	Yes
Iron	7439-89-6	No	Yes	Yes
Iron oxide	1317-61-9	Yes	Yes	Yes
Limestone	1317-65-3	Yes	Yes	Yes
Lithium carbonate (2:1)	554-13-2	Yes	Yes	Yes
Magnesium oxide	1309-48-4	Yes	Yes	Yes
Manganese	7439-96-5	No	Yes	Yes
Manganese(II) oxide	1344-43-0	Yes	Yes	Yes
Molybdenum	7439-98-7	No	Yes	Yes
Nickel	7440-02-0	No	Yes	Yes
Niobium	7440-03-1	No	No	Yes
Potassium oxide	12136-45-7	Yes	Yes	Yes
Silicic acid, potassium salt	1312-76-1	Yes	Yes	Yes
Silicon	7440-21-3	No	Yes	Yes
Sodium fluoride	7681-49-4	Yes	Yes	Yes
Sodium oxide	1313-59-3	Yes	Yes	Yes
Sodium silicate	1344-09-8	Yes	Yes	Yes

Strontium carbonate (1:1)	1633-05-2	Yes	Yes	Yes
Tantalum	7440-25-7	No	Yes	Yes
Titanium	7440-32-6	No	Yes	Yes
Titanium dioxide	13463-67-7	Yes	Yes	Yes
Tungsten	7440-33-7	No	Yes	Yes
Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Yes	Yes	Yes
Zirconium oxide	1314-23-4	Yes	Yes	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

•Barium carbonate (1:1)	513-77-9	D1B
•Sodium oxide	1313-59-3	E
•Sodium fluoride	7681-49-4	D1B, D2A, D2B
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	E
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Uncontrolled product according to WHMIS classification criteria
•Lithium carbonate (2:1)	554-13-2	Uncontrolled product according to WHMIS classification criteria
•Copper	7440-50-8	Uncontrolled product according to WHMIS classification criteria
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	E
•Chromium	7440-47-3	Uncontrolled product according to WHMIS classification criteria
•Magnesium oxide	1309-48-4	Uncontrolled product according to WHMIS classification criteria
•Manganese	7439-96-5	D2A (including powder)
•Tantalum	7440-25-7	Uncontrolled product according to WHMIS classification criteria
•Titanium dioxide	13463-67-7	D2A (In certain cases, this classification does not apply. For more information, consult the section Substance Specific Issues - Titanium dioxide, mixture containing on Health Canada's WHMIS Division website.)
•Cobalt	7440-48-4	D2A, D2B
•Aluminum oxide	1344-28-1	Uncontrolled product according to WHMIS classification criteria
•Aluminum	7429-90-5	B6 (powder); Uncontrolled product according to WHMIS classification criteria
•Limestone	1317-65-3	D2A

•Molybdenum	7439-98-7	Uncontrolled product according to WHMIS classification criteria
•Nickel	7440-02-0	D2A, D2B; B6, D2A (Raney)
•Silicon	7440-21-3	B4
•Tungsten	7440-33-7	Uncontrolled product according to WHMIS classification criteria
•Iron	7439-89-6	Uncontrolled product according to WHMIS classification criteria
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Uncontrolled product according to WHMIS classification criteria
•Zirconium oxide	1314-23-4	Uncontrolled product according to WHMIS classification criteria
•Cryolite	15096-52-3	D2B
•Sodium silicate	1344-09-8	D2B (SiO2:Na2O ratio >2.4:1); E (SiO2:Na2O ratio <2.4:1)
•Iron oxide	1317-61-9	Uncontrolled product according to WHMIS classification criteria
•Chromium(III) oxide	1308-38-9	Uncontrolled product according to WHMIS classification criteria

Canada - WHMIS - Ingredient Disclosure List

•Barium carbonate (1:1)	513-77-9	0.1 %
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	1 %
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	1 %
•Barium fluoride	7787-32-8	1 %
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	1 %
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	1 %
•Chromium	7440-47-3	0.1 %
•Magnesium oxide	1309-48-4	1 %
•Manganese	7439-96-5	1 %
•Tantalum	7440-25-7	1 %
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	0.1 %
•Aluminum oxide	1344-28-1	1 %
•Aluminum	7429-90-5	1 %
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	1 %
•Nickel	7440-02-0	0.1 %
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	1 %
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed

•Amorphous/fused silica	60676-86-0	1 %
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	1 %
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	1 %

Environment

Canada - CEPA - Priority Substances List

•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed

Europe

Other

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Classification

•Barium carbonate (1:1)	513-77-9	Xn; R22
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	T; R25 R32 Xi; R36/38
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed

•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	R42/43 R53
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	F; R11-15
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Carc.Cat.3; R40 R43 T; R48/23
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Xn; R20 T; R48/23/25 N; R51-53
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
EU - CLP (1272/2008) - Annex VI - Table 3.2 - Concentration Limits		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed

•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
EU - CLP (1272/2008) - Annex VI - Table 3.2 - Labelling		
•Barium carbonate (1:1)	513-77-9	Xn R:22 S:(2)-24/25
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	T R:25-32-36/38 S:(1/2)-22-36-45
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Xn R:42/43-53 S:(2)-22-24-37-61
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	F R:11-15 S:(2)-7/8-43
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	T R:40-43-48/23 S:(2)-36/37/39-45
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	T N R:20-48/23/25-51/53 S:(1/2)-22-37-45-61
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
EU - CLP (1272/2008) - Annex VI - Table 3.2 - Notes - Substances and Preparations		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed

•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	T
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	S, 7
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	C
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Safety Phrases

•Barium carbonate (1:1)	513-77-9	S:(2)-24/25
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	S:(1/2)-22-36-45
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	S:(2)-22-24-37-61
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	S:(2)-7/8-43
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	S:(2)-36/37/39-45
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed

•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	S:(1/2)-22-37-45-61
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed

•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed

•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	1000 lb final RQ; 454 kg final RQ
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	1000 lb final RQ; 454 kg final RQ
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	5000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 2270 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	5000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 2270 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	100 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 45.4 kg final RQ (no reporting of releases of this

		hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed

•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed

•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - CERCLA/SARA - Section 313 - Emission Reporting		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	1.0 % de minimis concentration
•Copper	7440-50-8	1.0 % de minimis concentration
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	1.0 % de minimis concentration
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	1.0 % de minimis concentration
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	0.1 % de minimis concentration
•Aluminum oxide	1344-28-1	1.0 % de minimis concentration (fibrous forms)
•Aluminum	7429-90-5	1.0 % de minimis concentration (dust or fume only)
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	0.1 % de minimis concentration
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed

•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - RCRA (Resource Conservation & Recovery Act) - Basis for Listing - Appendix VII		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Included in waste streams: F032, F034, F035, F037, F038, F039
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed

•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Included in waste streams: F006, F039
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - RCRA (Resource Conservation & Recovery Act) - Constituents for Detection Monitoring		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	(total)
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	(total)
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	(total)
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	(total)
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - RCRA (Resource Conservation & Recovery Act) - D Series Wastes - Max Conc of Contaminants for the Tox Characteristic		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed

•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	5.0 mg/L regulatory level
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	hazardous constituent - no waste number
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed

•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	hazardous constituent - no waste number
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - RCRA (Resource Conservation & Recovery Act) - List for Hazardous Constituents		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	(total)
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	(total)
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	(total)
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	(total)
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - RCRA (Resource Conservation & Recovery Act) - Phase 4 LDR Rule - Universal Treatment Standards		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed

•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	2.77 mg/L (total, wastewater); 0.60 mg/L TCLP (total, nonwastewater)
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	3.98 mg/L (wastewater); 11.0 mg/L TCLP (nonwastewater)
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - RCRA (Resource Conservation & Recovery Act) - TSD Facilities Ground Water Monitoring		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	(total)
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	(total)
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	(total)
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed

•Nickel	7440-02-0	(total)
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	carcinogen, 9/2/2011 (airborne, unbound particles of respirable size)
•Cobalt	7440-48-4	carcinogen, 7/1/1992 (powder)
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	carcinogen, 10/1/1989 (metallic)
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

•Barium carbonate (1:1)	513-77-9	Not Listed

•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	developmental toxicity, 1/1/1991
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed

•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Female		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed

•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Male		
•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	Not Listed
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	Not Listed
•Silicon	7440-21-3	Not Listed

•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed

United States - Pennsylvania

Labor

U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List

•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	
•Barium fluoride	7787-32-8	Not Listed
•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	(dust; fume; metal)
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	
•Aluminum oxide	1344-28-1	
•Aluminum	7429-90-5	
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed

U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances

•Barium carbonate (1:1)	513-77-9	Not Listed
•Sodium oxide	1313-59-3	Not Listed
•Sodium fluoride	7681-49-4	Not Listed
•Strontium carbonate (1:1)	1633-05-2	Not Listed
•Potassium oxide	12136-45-7	Not Listed
•Zirconate(2-), hexafluoro-, dipotassium	16923-95-8	Not Listed
•Barium fluoride	7787-32-8	Not Listed

•Manganese(II) oxide	1344-43-0	Not Listed
•Carbon	7440-44-0	Not Listed
•Lithium carbonate (2:1)	554-13-2	Not Listed
•Copper	7440-50-8	Not Listed
•Silicic acid, potassium salt	1312-76-1	Not Listed
•Calcium fluoride	7789-75-5	Not Listed
•Calcium oxide	1305-78-8	Not Listed
•Chromium	7440-47-3	
•Magnesium oxide	1309-48-4	Not Listed
•Manganese	7439-96-5	Not Listed
•Tantalum	7440-25-7	Not Listed
•Titanium dioxide	13463-67-7	Not Listed
•Cobalt	7440-48-4	Not Listed
•Aluminum oxide	1344-28-1	Not Listed
•Aluminum	7429-90-5	Not Listed
•Limestone	1317-65-3	Not Listed
•Molybdenum	7439-98-7	Not Listed
•Nickel	7440-02-0	
•Silicon	7440-21-3	Not Listed
•Tungsten	7440-33-7	Not Listed
•Iron	7439-89-6	Not Listed
•Titanium	7440-32-6	Not Listed
•Niobium	7440-03-1	Not Listed
•Amorphous/fused silica	60676-86-0	Not Listed
•Zirconium oxide	1314-23-4	Not Listed
•Cryolite	15096-52-3	Not Listed
•Sodium silicate	1344-09-8	Not Listed
•Iron oxide	1317-61-9	Not Listed
•Chromium(III) oxide	1308-38-9	Not Listed

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

15.3 Other Information

- WARNING: This product contains a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

Section 16 - Other Information

Relevant Phrases (code & full text)

- H228 - Flammable solid
  H250 - Catches fire spontaneously if exposed to air
  H252 - Self-heating in large quantities; may catch fire
  H261 - In contact with water releases flammable gas
  H301 - Toxic if swallowed
  H302 - Harmful if swallowed
  H314 - Causes severe skin burns and eye damage.
  H315 - Causes skin irritation
  H318 - Causes serious eye damage
  H319 - Causes serious eye irritation
  H332 - Harmful if inhaled
  H336 - May cause drowsiness or dizziness

H361 - Suspected of damaging fertility or the unborn child.
H361fd - Suspected of damaging fertility. Suspected of damaging the unborn child.
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
H412 - Harmful to aquatic life with long lasting effects
H413 - May cause long lasting harmful effects to aquatic life
EUH029 - Contact with water liberates toxic gas.
EUH071 - Corrosive to the respiratory tract.

Revision Date	• 22/April/2016
Preparation Date	• 22/April/2016
Disclaimer/Statement of Liability	• The information in this SDS was obtained from sources which we believe are reliable. However the information is provided without any representation of warranty, express or implied regarding the accuracy or correctness. The conditions of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.

Key to abbreviations
NDA = No Data Available

Nominal Composition (Weight %) Of

Filler Metal, Thermal Spray Wires and Weldstrips Covered By This SDS

Trade Name	UNS Number	Al	Cr	Co	Cu	Fe	Mn	Mo	Ni	Nb	Si	Ti	W
DURANICKEL® 301 & 301TSW™	N03301	4	-	-	-	-	-	-	94	-	1	1	-
INCOLOY® 65	N08065	-	21	-	2	30	1	3	42	-	-	1	-
INCONEL® 52	N06052	<1	29	-	-	9	1	-	59	-	-	-	-
INCONEL® 52M™	N06054	1	30	-	-	9	1	-	57	1	-	1	-
INCONEL® 52MSS™	N06055	-	30	-	-	8.5	-	3.5	55	2.5	-	-	-
INCONEL® 53MD™	N06693	3	29	-	-	3	1	-	64	-	-	-	-
INCONEL® 601	N06601	1	23	-	1	14	1	-	61	-	-	-	-
INCONEL® 617	N06617	1	22	12	-	2	1	9	52	-	1	-	-
INCONEL® 622	N06022	-	20	-	-	5	-	14	58	-	-	-	3
INCONEL® 625, 625T, 625TSW™ and 625ULTRA™	N06625	-	22	-	-	1	-	9	61	4	-	-	-
INCONEL® 718 & 718TSW™	N07718	-	19	-	-	19	-	3	53	5	-	1	-
INCONEL® 72 & 72TSW™	N06072	-	44	-	-	-	-	-	55	-	-	1	-
INCONEL® 72M™	N06073	1	37	-	-	0.5	-	1	57	1	-	0.5	-
INCONEL® 8020 TSW		-	20	-	-	-	-	-	78	-	1	-	-
INCONEL® 8020M TSW		-	20	-	-	-	-	-	78	-	2	-	-
INCONEL® 82 & 82T	N06082	-	20	-	-	1	3	-	72	3	-	-	-
INCONEL® 92	N07092	-	16	-	-	7	2	-	71	1	-	3	-
INCONEL® 740H	N07740	1.5	24	20	-	3	1	2	45	2	1	1	
INCO-WELD® 686CPT®	N06686	-	21	-	-	1	-	16	58	-	-	-	4
INCO-WELD® 725NDUR®	N07725	-	21	-	-	9	-	9	57	3	-	1	-
INCO-WELD® C-276 & C276TSW™	N10276	-	16	2	-	6	-	16	57	-	-	-	3
INCO-WELD® HX	N06002	-	22	2	-	19	-	9	47	-	-	-	1
MONEL® 60, 60N & 60TSW™	N04060	-	-	-	27	-	4	-	65	1	1	2	-
MONEL® 67 & 67N	C71581	-	-	-	68	1	1	-	31	-	1	-	-
NC 80/20		-	20	-	-	-	1	-	79	-	-	-	-
Nickel 200 TSW	N02215	-	-	-	-	-	-	-	99	-	-	-	-
Nickel 61 & 61N	N02061	-	-	-	-	-	-	-	96	-	-	3	-
NILO® CF36™		-	-	-	-	61	-	-	36	2	-	-	-
NI-ROD® 99	N02215	-	-	-	-	-	-	-	99	-	-	-	-
NI-ROD® 44	N02216	-	-	-	-	48	10	-	42	-	-	-	-
NI-ROD® 44HT™		-	7	-	-	37	11	-	43	1	-	-	-
NI-ROD® 55		-	-	-	-	44	-	-	55	-	-	-	-
NI-ROD® 99	N02215	-	-	-	-	-	-	-	99	-	-	-	-

Safety Data Sheet

Reference- SDS
Date- March 2017

Composition of Flux Covered By This SDS																
Product Name	**Al_2O_3**	**CaF_2**	**CaO**	**Cr_2O_3**	**MgO**	**Mn**	**Mn O**	**Ni**	**K_2SiO_3**	**SiO_2**	**$NaAlF_6$**	**TiO_2**	**ZrO_2**	**NaF**	**Others**	
INCOFLUX® 5		60-100					10-30		1-5	1-5	3-7					
INCOFLUX® 5N																
INCOFLUX® 7	15-40	40-70				1-5			1-5		3-7		5-20		Fe_3O_4	1-5
INCOFLUX® 8		60-100					10-30		1-5	1-5	3-7				Fe_3O_4	1-5
INCOFLUX® 9	1-5	15-20	28-33		2-6					28-33			4-8			
INCOFLUX® ESS1	10-15	65-80	10-15	3-8	3-7	1-5		1-5		1-5					Cr	1-5
															Nb	1-5
															K_2ZrF_8	3-7
															K_2O	1-3
INCOFLUX® ESS2	5-10	65-80		3-8	3-7	2-7		1-5	1-5	2-7	2-7			1-6	Cr	1-5
															Nb	1-5
															K_2ZrF_8	1-6
															K_2O	1-5
INCOFLUX® ESS3	20-40	45-70								5-15						
INCOFLUX® ESS4	5-10	65-80		5-10	3-7	2-7		1-5		2-7				1-6	Cr	1-5
															Nb	1-5
															K_2O	1-5
INCOFLUX® ESS5																
INCOFLUX® NT100	15-40	40-70			3-7			1-5	1-5		3-7	3-7				
INCOFLUX® NT110	30-70	10-40					0-20		5-20	0-10		0-10			Cu	0-5
															Na_20	0-5
															$Na_2Si_4O_9$	5-20
INCOFLUX® NT120	26-33	30-35				0-5	2-4	1-5		2-4		4-7	8-13	1-6	$CaSiO_3$	1-5
															Cr	0-5
															Fe	1-6
															Mo	1-6
															Na_2O	2-4
															$Na_2Si_4O_9$	1-6
INCOFLUX® SAS1	30-70	10-40	0-10			0-5	0-5		5-20	0-10		0-10			$CaCO_3$	0-10
															Na_2O	0-5
															$Na_2Si_4O_9$	5-20
INCOFLUX® SAS2	35-45	35-45		2-8		5-10			1-5						$CaSiO_3$	5-15
															Cr	2-6
															$CaTiO_3$	5-15

Composition (Weight %)

Of Flux Coated Electrodes Covered By This SDS

Product Name	INCONEL® 112 & 112T	INCONEL® 117	INCONEL® 122	INCONEL® 152	INCONEL® 152M	INCONEL® 152MSS
UNS Number (coating ~ 20% by weight)	W86112	W86117	W86022	W86152	W86152	W86155
UNS Number (core wire ~ 80% by weight)	N06625	N06617	N06022	N06052	N06054	N06055
Al						
Al_20_3						
$BaCO_3$						
BaF_2						
C						
$CaCO_3$	5-10	5-10	5-10	1-5	1-5	1-5
CaF_2			1-5			
Cr	15-40	15-40	15-40	10-30	10-30	20-30
Co		5-10				
Cu						
Fe	1-5	1-5	1-5	5-10	5-10	5-10
Fe_2O_3						
K_2O						
K_2SiO_3						
Li_2Co_3						
MgO						
Mn		0.5-2		1-5	1-5	
MnO						
Mo	5-10	5-10	10-30			
Nb	1-5			1-5	1-5	1-5
Ni	40-70	40-70	40-70	40-70	40-70	40-70
SiO_2	1-5	0.5-2	0.1-1	0.1-1	0.1-1	
Na_3AlF_6	5-10	5-10	5-10	5-10	5-10	5-10
Na_2SiO_3	1-5	1-5	1-5	1-5	1-5	1-5
$SrCO_3$				1-5	1-5	1-5
Ti						
TiO_2	1-5	1-5	1-5	1-5	1-5	1-10
W			1-5			

Composition (Weight %)

Of Flux Coated Electrodes Covered By This SDS

Product Name	INCONEL® 182 & 182T	INCO-WELD® 686CPT®	INCO-WELD® A	INCO-WELD® C-276	MONEL® 187 & 187N	MONEL® 190 & 190N
UNS Number (coating ~ 20% by weight)	W86182	W86686	W86133	W80276	W60715	W84190
UNS Number (core wire ~ 80% by weight)	N07092	N06686	N06062	N10276	C71581	N04060
Al						
Al_20_3		1-5				
$BaCO_3$						1-5
BaF_2						
C						
$CaCO_3$	5-10	3-7	5-10	1-5	5-10	1-5
CaF_2					1-5	1-5
Cr	10-30	10-30	10-30	10-30		
Co				1-5		
Cu					40-70	15-40
Fe	5-10		6-12	3-7		
Fe_2O_3						
K_2O						
K_2SiO_3						
Li_2Co_3					0.7-0.9	
MgO						
Mn	1-5		1-5	1-5	1-5	1-5
MnO	1-5					
Mo		10-30	1-5	10-30		
Nb	1-5		1-5			
Ni	40-70	30-60	30-60	30-60	15.4	40-70
SiO_2	0.1-1		0.1-2	0.1-1	1.5	1.5
Na_3AlF_6	1-10		5-10	5-10	5-10	5-10
Na_2SiO_3	1-5	1-5	1-5	1-5	1-5	1-5
$SrCO_3$						
Ti	1-5				1-5	1-5
TiO_2	1-5	3-7	3-7	5-10	1-5	1-5
W		1-5		1-5		

Composition (Weight %)

Of Flux Coated Electrodes Covered By This SDS

Product Name	NI-ROD®	NI-ROD® 55	NI-ROD® 55X	NI-ROD® 99X
UNS Number (coating ~ 20% by weight)	**W82001**	**W82002**	**W82001**	**W82002**
UNS Number (core wire ~ 80% by weight)	**N02215**			**N02215**
Al	**1-5**			
Al_20_3				
$BaCO_3$	**0-1**		**1-5**	**1-5**
BaF_2			**1-5**	**1-5**
C	**1-5**	**1-5**	**1-5**	**1-5**
$CaCO_3$	**1-5**	**1-5**	**1-5**	**1-5**
CaF_2	**1-5**	**1-5**		
Cr				
Co				
Cu			**1-5**	**1-5**
Fe	**1-5**	**30-60**	**30-60**	**1-5**
Fe_2O_3	**1-5**	**1-5**		
K_2O				
K_2SiO_3				
Li_2Co_3				
MgO				
Mn			**1-5**	**1-5**
MnO				
Mo				
Nb				
Ni	**60-100**	**30-60**	**30-60**	**60-100**
SiO_2				
Na_3AlF_6				
Na_2SiO_3	**1-5**			
$SrCO_3$	**7-13**	**7-13**	**5-10**	
Ti				
TiO_2				
W				