

XTRweld	Chemwatch Hazard Alert Code: 2
Chemwatch: 20-4335	Issue Date: 08/20/2021
Version No: 4.1	Print Date: 05/18/2022
Safety Data Sheet according to OSHA HazCom Standard (2012) requirements	S.GHS.USA.EN

SECTION 1 Identification

Product Identifier

Product name	 xTRweld Aluminum Welding Wire Not Applicable 	
Chemical Name		
Synonyms	R A356.0; R 1100; ER 1100; R 2319; R 4043; ER 4043; R 4047 (718); R 4145; R 5356; ER 5356	
Chemical formula	Not Applicable	
Other means of identification	Not Available	

Recommended use of the chemical and restrictions on use

Polovant identified uses	Aluminium bare wire for gas tungsten arc welding (GTAW) and gas metal arc welding (GMAW).
Relevant luentineu uses	Use according to manufacturer's directions.

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	XTRweld	
Address	s 131 Saundersville Rd, Ste 310 Hendersonville, TN 37075 United States	
Telephone	(615) 206-3500	
Fax	(615) 206-3499	
Website	alliancemro.com	
Email	sales@alliancemro.com	

Emergency phone number

Association / Organisation	Chemwatch	CHEMWATCH EMERGENCY RESPONSE
Emergency telephone numbers	(877) 715-9305	+1 855-237-5573
Other emergency telephone numbers	Not Available	+61 3 9573 3188

Once connected and if the message is not in your prefered language then please dial 01

Una vez conectado y si el mensaje no está en su idioma preferido, por favor marque 02

SECTION 2 Hazard(s) identification

Classification of the substance or mixture

NFPA 704 diamond



Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)

Classification

Substances and Mixtures which in Contact with Water Emit Flammable Gases Category 2, Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2A, Carcinogenicity Category 2, Hazardous to the Aquatic Environment Long-Term Hazard Category 3



Signal word Danger

Hazard statement(s)

H261	In contact with water releases flammable gases.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H351	Suspected of causing cancer.
H412	Harmful to aquatic life with long lasting effects.

Hazard(s) not otherwise classified

Not Applicable

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.	
P231+P232	231+P232 Handle under inert gas. Protect from moisture. P280 Wear protective gloves, protective clothing, eye protection and face protection. P273 Avoid release to the environment. P202 Do not handle until all safety precautions have been read and understood.	
P280		
P273		
P202		
P223 Do not allow contact with water.		
P264	Wash all exposed external body areas thoroughly after handling.	

Precautionary statement(s) Response

P308+P313	IF exposed or concerned: Get medical advice/ attention.	
P335+P334	Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages.	
P370+P378	In case of fire: Use dry agent to extinguish.	
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.	
P337+P313	If eye irritation persists: Get medical advice/attention.	
P302+P352	IF ON SKIN: Wash with plenty of water and soap.	
P332+P313	If skin irritation occurs: Get medical advice/attention.	
P362+P364	Take off contaminated clothing and wash it before reuse.	

Precautionary statement(s) Storage

• • • • • • • • • • • • • • • • • • • •	
P405	Store locked up.
P402+P404	Store in a dry place. Store in a closed container.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local re	

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
7429-90-5	85-99.5	aluminium
7440-41-7	0.0008	beryllium
7440-47-3	0.2	chromium
7440-50-8	0.05-6.8	copper
7439-89-6	0.95	iron
7439-95-4	5.6	magnesium
7439-96-5	1	manganese
7440-21-3	0.2-13	silicon
7440-32-6	0.05-0.2	titanium
7440-62-2	0.15	vanadium
7440-66-6	0.25	zinc

CAS No	%[weight]	Name
7440-67-7	0.1-0.25	zirconium

SECTION 4 First-aid measures

Description of first aid measur	es
Eye Contact	 If this product comes in contact with the eyes: Wash out immediately with fresh running water. Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. Seek medical attention without delay; if pain persists or recurs seek medical attention. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. DO NOT attempt to remove particles attached to or embedded in eye . Lay victim down, on stretcher if available and pad BOTH eyes, make sure dressing does not press on the injured eye by placing thick pads under dressing, above and below the eye. Seek urgent medical assistance, or transport to hospital.
Skin Contact	 If skin contact occurs: Immediately remove all contaminated clothing, including footwear. Flush skin and hair with running water (and soap if available). Seek medical attention in event of irritation.
Inhalation	 If fumes or combustion products are inhaled remove from contaminated area. Lay patient down. Keep warm and rested. Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. Transport to hospital, or doctor.
Ingestion	 If swallowed do NOT induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. Observe the patient carefully. Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. Seek medical advice.

Most important symptoms and effects, both acute and delayed

See Section 11

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

Both dermal and oral toxicity of manganese salts is low because of limited solubility of manganese. No known permanent pulmonary sequelae develop after acute manganese exposure. Treatment is supportive.

[Ellenhorn and Barceloux: Medical Toxicology]

In clinical trials with miners exposed to manganese-containing dusts, L-dopa relieved extrapyramidal symptoms of both hypo kinetic and dystonic patients. For short periods of time symptoms could also be controlled with scopolamine and amphetamine. BAL and calcium EDTA prove ineffective.

[Gosselin et al: Clinical Toxicology of Commercial Products.]

SECTION 5 Fire-fighting measures

Extinguishing media

Metal dust fires need to be smothered with sand, inert dry powders.

DO NOT USE WATER, CO2 or FOAM

- Use DRY sand, graphite powder, dry sodium chloride based extinguishers, G-1 or Met L-X to smother fire.
- Confining or smothering material is preferable to applying water as chemical reaction may produce flammable and explosive hydrogen gas.
- Chemical reaction with CO2 may produce flammable and explosive methane.
- ▶ If impossible to extinguish, withdraw, protect surroundings and allow fire to burn itself out.
- DO NOT use halogenated fire extinguishing agents.

Special hazards arising from the substrate or mixture

Fire Incompatibility	Reacts with acids producing flammable / explosive hydrogen (H2) gas None known.
Special protective equipment a	and precautions for fire-fighters
Fire Fighting	 Alert Fire Brigade and tell them location and nature of hazard. Wear breathing apparatus plus protective gloves in the event of a fire. Prevent, by any means available, spillage from entering drains or water courses. Use fire fighting procedures suitable for surrounding area. DO NOT approach containers suspected to be hot. Cool fire exposed containers with water spray from a protected location. If safe to do so, remove containers from path of fire. Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	 DO NOT disturb burning dust. Explosion may result if dust is stirred into a cloud, by providing oxygen to a large surface of hot metal. DO NOT use water or foam as generation of explosive hydrogen may result. With the exception of the metals that burn in contact with air or water (for example, sodium), masses of combustible metals do not represent unusual fire risks because they have the ability to conduct heat away from hot spots so efficiently that the heat of combustion cannot be maintained - this means that it will require a lot of heat to ignite a mass of combustible metal. Generally, metal fire risks exist when sawdust, machine shavings and other metal 'fines' are present.

Metal powders, while generally regarded as non-combustible:
May burn when metal is finely divided and energy input is high.
May react explosively with water.
May be ignited by friction, heat, sparks or flame.
May REIGNITE after fire is extinguished.
Will burn with intense heat.
Note:
Metal dust fires are slow moving but intense and difficult to extinguish.
Containers may explode on heating.
Dusts or fumes may form explosive mixtures with air.
Gases generated in fire may be poisonous, corrosive or irritating.
+ Hot or burning metals may react violently upon contact with other materials, such as oxidising agents and extinguishing agents used on fires
involving ordinary combustibles or flammable liquids.
Temperatures produced by burning metals can be higher than temperatures generated by burning flammable liquids
Some metals can continue to burn in carbon dioxide, nitrogen, water, or steam atmospheres in which ordinary combustibles or flammable
liquids would be incapable of burning.
Decomposition may produce toxic fumes of:
hydrogen chloride
hydrogen fluoride
silicon dioxide (SiO2)
metal oxides
May emit poisonous fumes.
May emit corrosive fumes.

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	 Remove all ignition sources. Clean up all spills immediately. Avoid contact with skin and eyes. Control personal contact with the substance, by using protective equipment. Use dry clean up procedures and avoid generating dust. Place in a suitable, labelled container for waste disposal.
Major Spills	 Moderate hazard. CAUTION: Advise personnel in area. Alert Emergency Services and tell them location and nature of hazard. Control personal contact by wearing protective clothing. Prevent, by any means available, spillage from entering drains or water courses. Recover product wherever possible. IF DRY: Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal. IF WET: Vacuum/shovel up and place in labelled containers for disposal. ALWAYS: Wash area down with large amounts of water and prevent runoff into drains. If contamination of drains or waterways occurs, advise Emergency Services.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	 Avoid all personal contact, including inhalation. Wear protective clothing when risk of exposure occurs. Use in a well-ventilated area. Prevent concentration in hollows and sumps. DO NOT enter confined spaces until atmosphere has been checked. DO NOT allow material to contact humans, exposed food or food utensils. Avoid contact with incompatible materials. When handling, DO NOT eat, drink or smoke. Keep containers securely sealed when not in use. Avoid physical damage to containers. Always wash hands with soap and water after handling. Work clothes should be laundered separately. Launder contaminated clothing before re-use. Use good occupational work practice. Observe manufacturer's storage and handling recommendations contained within this SDS. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
Other information	 Store in original containers. Keep containers securely sealed. Store in a cool, dry, well-ventilated area. Store away from incompatible materials and foodstuff containers. Protect containers against physical damage and check regularly for leaks. Observe manufacturer's storage and handling recommendations contained within this SDS.

Conditions for safe storage, including any incompatibilities

• ·	
Suitable container	 Polyethylene or polypropylene container. Check all containers are clearly labelled and free from leaks.

	 WARNING: Avoid or control reaction with peroxides. All <i>transition metal</i> peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively. The pi-complexes formed between chromium(0), vanadium(0) and other transition metals (haloarene-metal complexes) and mono-or poly-fluorobenzene show extreme sensitivity to heat and are explosive. Avoid reaction with borohydrides or cyanoborohydrides Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
	 These trifluorides are hypergolic oxidisers. They ignite on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition. The state of subdivision may affect the results.
	Many metals may incandesce, react violently, ignite or react explosively upon addition of concentrated nitric acid.
Storage incompatibility	Metals exhibit varying degrees of activity. Reaction is reduced in the massive form (sheet, rod, or drop), compared with finely divided forms. The less active metals will not burn in air but:
	can react exothermically with oxidising acids to form noxious gases.
	catalyse polymerisation and other reactions, particularly when finely divided
	react with halogenated hydrocarbons (for example, copper dissolves when heated in carbon tetrachloride), sometimes forming explosive compounds.
	Many metals in elemental form react exothermically with compounds having active hydrogen atoms (such as acids and water) to form flammable hydrogen gas and caustic products.
	Elemental metals may react with azo/diazo compounds to form explosive products.
	Some elemental metals form explosive products with halogenated hydrocarbons.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US OSHA Permissible Exposure Limits (PELs) Table Z-3	aluminium	Inert or Nuisance Dust: Respirable fraction	5 mg/m3 / 15 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-3	aluminium	Inert or Nuisance Dust: Total Dust	15 mg/m3 / 50 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	aluminium	Aluminum Metal (as Al)- Respirable fraction	5 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	aluminium	Aluminum Metal (as Al)- Total dust	15 mg/m3	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	aluminium	Aluminum - respirable	5 mg/m3	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	aluminium	Aluminum - total	10 mg/m3	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	aluminium	Aluminum (pyro powders and welding fumes, as Al)	5 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	aluminium	Aluminum metal and insoluble compounds (Respirable particulate matter)	1 mg/m3	Not Available	Not Available	A4
US OSHA Permissible Exposure Limits (PELs) Table Z-2	beryllium	Beryllium and beryllium compounds	0.002 mg/m3	0.005 mg/m3	0.025 (30 min) mg/m3	(Z37.29-1970)
US NIOSH Recommended Exposure Limits (RELs)	beryllium	Beryllium & beryllium compounds (as Be)	Not Available	Not Available	Not Available	Ca; See Appendix A
US ACGIH Threshold Limit Values (TLV)	beryllium	Beryllium and compounds, as Be - Soluble and insoluble compounds (Inhalable particulate matter)	0.00005 mg/m3	Not Available	Not Available	SEN
US ACGIH Threshold Limit Values (TLV)	beryllium	Beryllium and compounds, as Be - Soluble compounds (Inhalable particulate matter)	0.00005 mg/m3	Not Available	Not Available	Skin; DSEN
US ACGIH Threshold Limit Values (TLV)	beryllium	Beryllium and compounds, as Be (Inhalable particulate matter)	0.00005 mg/m3	Not Available	Not Available	A1
US OSHA Permissible Exposure Limits (PELs) Table Z-3	chromium	Inert or Nuisance Dust: Respirable fraction	5 mg/m3 / 15 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-3	chromium	Inert or Nuisance Dust: Total Dust	15 mg/m3 / 50 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	chromium	Chromium metal and insol. salts (as Cr)	1 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	chromium	Particulates Not Otherwise Regulated (PNOR)- Respirable fraction	5 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	chromium	Particulates Not Otherwise Regulated (PNOR)- Total dust	15 mg/m3	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	chromium	Chromium metal	0.5 mg/m3	Not Available	Not Available	See Appendix C
US ACGIH Threshold Limit Values (TLV)	chromium	Chromium, and inorganic compounds - Metallic chromium, as Cr(0) (Inhalable particulate	0.5 mg/m3	Not Available	Not Available	Not Available

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Source	Ingredient	Material name	TWA	STEL	Peak	Notes
		matter)				
US ACGIH Threshold Limit Values (TLV)	chromium	Chromium, and inorganic compounds - Chromyl chloride, as Cr(VI) (Inhalable fraction and vapor)	0.0001 ppm	0.00025 ppm	Not Available	Skin; DSEN; RSEN; A1
US OSHA Permissible Exposure Limits (PELs) Table Z-3	copper	Inert or Nuisance Dust: Total Dust	15 mg/m3 / 50 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-3	copper	Inert or Nuisance Dust: Respirable fraction	5 mg/m3 / 15 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	copper	Copper- Fume (as Cu)	0.1 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	copper	Copper- Dusts and mists (as Cu)	1 mg/m3	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	copper	Copper (dusts and mists, as Cu)	1 mg/m3	Not Available	Not Available	[*Note: The REL also applies to other copper compounds (as Cu) except Copper fume.]
US ACGIH Threshold Limit Values (TLV)	copper	Copper Fume, as Cu	0.2 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	copper	Copper Dusts and mists, as Cu	1 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-3	iron	Inert or Nuisance Dust: Total Dust	15 mg/m3 / 50 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-3	iron	Inert or Nuisance Dust: Respirable fraction	5 mg/m3 / 15 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	iron	Particulates Not Otherwise Regulated (PNOR)- Respirable fraction	5 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	iron	Particulates Not Otherwise Regulated (PNOR)- Total dust	15 mg/m3	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	iron	Particulates not otherwise regulated	Not Available	Not Available	Not Available	See Appendix D
US OSHA Permissible Exposure Limits (PELs) Table Z-3	magnesium	Inert or Nuisance Dust: Total Dust	15 mg/m3 / 50 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-3	magnesium	Inert or Nuisance Dust: Respirable fraction	5 mg/m3 / 15 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	magnesium	Particulates Not Otherwise Regulated (PNOR)- Total dust	15 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	magnesium	Particulates Not Otherwise Regulated (PNOR)- Respirable fraction	5 mg/m3	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	magnesium	Particulates not otherwise regulated	Not Available	Not Available	Not Available	See Appendix D
US OSHA Permissible Exposure Limits (PELs) Table Z-3	manganese	Inert or Nuisance Dust: Total Dust	15 mg/m3 / 50 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-3	manganese	Inert or Nuisance Dust: Respirable fraction	5 mg/m3 / 15 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	manganese	Manganese fume (as Mn)	Not Available	Not Available	5 mg/m3	Not Available
US NIOSH Recommended Exposure Limits (RELs)	manganese	Manganese compounds and fume (as Mn)	1 mg/m3	3 mg/m3	Not Available	[*Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl, Methyl cyclopentadienyl manganese tricarbonyl, and Manganese tetroxide.]
US NIOSH Recommended Exposure Limits (RELs)	manganese	Particulates not otherwise regulated	Not Available	Not Available	Not Available	See Appendix D
US ACGIH Threshold Limit Values (TLV)	manganese	Manganese, elemental and inorganic compounds, as Mn (Respirable particulate matter)	0.02 mg/m3	Not Available	Not Available	Α4
US ACGIH Threshold Limit Values (TLV)	manganese	Manganese, elemental and inorganic compounds, as Mn (Inhalable particulate matter)	0.1 mg/m3	Not Available	Not Available	A4
US OSHA Permissible Exposure Limits (PELs) Table Z-3	silicon	Inert or Nuisance Dust: Respirable fraction	5 mg/m3 / 15 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-3	silicon	Inert or Nuisance Dust: Total Dust	15 mg/m3 / 50 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	silicon	Silicon- Respirable fraction	5 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	silicon	Silicon- Total dust	15 mg/m3	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	silicon	Silicon - respirable	5 mg/m3	Not Available	Not Available	Not Available

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US NIOSH Recommended Exposure Limits (RELs)	silicon	Silicon - total	10 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-3	titanium	Inert or Nuisance Dust: Total Dust	15 mg/m3 / 50 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-3	titanium	Inert or Nuisance Dust: Respirable fraction	5 mg/m3 / 15 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	titanium	Particulates Not Otherwise Regulated (PNOR)- Total dust	15 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	titanium	Particulates Not Otherwise Regulated (PNOR)- Respirable fraction	5 mg/m3	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	titanium	Particulates not otherwise regulated	Not Available	Not Available	Not Available	See Appendix D
US OSHA Permissible Exposure Limits (PELs) Table Z-3	vanadium	Inert or Nuisance Dust: Total Dust	15 mg/m3 / 50 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-3	vanadium	Inert or Nuisance Dust: Respirable fraction	5 mg/m3 / 15 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	vanadium	Particulates Not Otherwise Regulated (PNOR)- Respirable fraction	5 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	vanadium	Particulates Not Otherwise Regulated (PNOR)- Total dust	15 mg/m3	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	vanadium	Particulates not otherwise regulated	Not Available	Not Available	Not Available	See Appendix D
US OSHA Permissible Exposure Limits (PELs) Table Z-3	zinc	Inert or Nuisance Dust: Respirable fraction	5 mg/m3 / 15 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-3	zinc	Inert or Nuisance Dust: Total Dust	15 mg/m3 / 50 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	zinc	Particulates Not Otherwise Regulated (PNOR)- Respirable fraction	5 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	zinc	Particulates Not Otherwise Regulated (PNOR)- Total dust	15 mg/m3	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	zinc	Particulates not otherwise regulated	Not Available	Not Available	Not Available	See Appendix D
US OSHA Permissible Exposure Limits (PELs) Table Z-3	zirconium	Inert or Nuisance Dust: Respirable fraction	5 mg/m3 / 15 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-3	zirconium	Inert or Nuisance Dust: Total Dust	15 mg/m3 / 50 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	zirconium	Particulates Not Otherwise Regulated (PNOR)- Total dust	15 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	zirconium	Particulates Not Otherwise Regulated (PNOR)- Respirable fraction	5 mg/m3	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	zirconium	Particulates not otherwise regulated	Not Available	Not Available	Not Available	See Appendix D
US ACGIH Threshold Limit Values (TLV)	zirconium	Zirconium and compounds, as Zr	5 mg/m3	10 mg/m3	Not Available	A4

Emergency Limits

Ingredient	TEEL-1 TEEL-2			TEEL-3	
beryllium	0.0023 mg/m3 Not Available			Not Available	
chromium	1.5 mg/m3	17 mg/m3		99 mg/m3	
copper	3 mg/m3	33 mg/m3		200 mg/m3	
iron	3.2 mg/m3	35 mg/m3		150 mg/m3	
magnesium	18 mg/m3	200 mg/m3		1,200 mg/m3	
manganese	3 mg/m3 5 mg/m3			1,800 mg/m3	
silicon	45 mg/m3	100 mg/m3		630 mg/m3	
titanium	30 mg/m3 330 mg/m			2,000 mg/m3	
vanadium	3 mg/m3	5.8 mg/m3		35 mg/m3	
zinc	6 mg/m3 21 mg/m3			120 mg/m3	
zirconium	10 mg/m3	83 mg/m3		500 mg/m3	
Ingredient	Original IDLH		Revised IDLH		
aluminium	Not Available		Not Available		
beryllium	4 mg/m3		Not Available		
chromium	250 mg/m3		Not Available		
copper	100 mg/m3		Not Available		

Ingredient	Original IDLH	Revised IDLH	
iron	Not Available	Not Available	
magnesium	Not Available	Not Available	
manganese	500 mg/m3	Not Available	
silicon	Not Available	Not Available	
titanium	Not Available	Not Available	
vanadium	Not Available	Not Available	
zinc	Not Available	Not Available	
zirconium	25 mg/m3	Not Available	
Exposure controls			
Metal dusts must be collected at the source of generation as they are notentially explosive			

Avoid ignition sources.

- Good housekeeping practices must be maintained.
- Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions.
 - Do not use compressed air to remove settled materials from floors, beams or equipment
- ▶ Vacuum cleaners, of flame-proof design, should be used to minimise dust accumulation.
- Use non-sparking handling equipment, tools and natural bristle brushes. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations.
- Do not allow chips, fines or dusts to contact water, particularly in enclosed areas.
- Metal spraying and blasting should, where possible, be conducted in separate rooms. This minimises the risk of supplying oxygen, in the form of metal oxides, to potentially reactive finely divided metals such as aluminium, zinc, magnesium or titanium.
- Work-shops designed for metal spraying should possess smooth walls and a minimum of obstructions, such as ledges, on which dust accumulation is possible.
- Wet scrubbers are preferable to dry dust collectors.
- Bag or filter-type collectors should be sited outside the workrooms and be fitted with explosion relief doors.
- Cyclones should be protected against entry of moisture as reactive metal dusts are capable of spontaneous combustion in humid or partially wetted states.
- Local exhaust systems must be designed to provide a minimum capture velocity at the fume source, away from the worker, of 0.5 metre/sec.
- Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuum and electrostatic precipitators must not be used, unless specifically approved for use with flammable/ explosive dusts.

.....

Appropriate engineering controls

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
welding, brazing fumes (released at relatively low velocity into moderately still air)	0.5-1.0 m/s (100-200 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2.5 m/s (200-500 f/min.) for extraction of gases discharged 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Personal protection	
Eye and face protection	 Safety glasses with side shields. Chemical goggles. Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]
Skin protection	See Hand protection below
Hands/feet protection	The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended. Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:

	· dexterity
	Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
	• When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240
	minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
	· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN
	374, AS/NZS 2161.10.1 or national equivalent) is recommended.
	· Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.
	Contaminated gloves should be replaced.
	As defined in ASTM F-739-96 in any application, gloves are rated as:
	Excellent when breakthrough time > 480 min
	· Good when breakthrough time > 20 min
	Fair when breakthrough time < 20 min
	Poor when glove material degrades
	For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.
	It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation
	efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on
	consideration of the task requirements and knowledge of breakthrough times.
	Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers technical
	data should always be taken into account to ensure selection of the most appropriate glove for the task.
	Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:
	Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only
	likely to give short duration protection and would normally be just for single use applications, then disposed of
	Thicker doves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or
	Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed
	misturiser is recommended
	Protective gloves eq. Leather gloves or gloves with Leather facing
	Experience indicates that the following polymers are suitable as drow materials for protection against undissolved dry solids where abrasive
	naticles are not nessent
	h nolvchloronzene
	b nitile nibber
	bitty rubber
	Filiproceautobule
	hoologadalaada
	port minimized
Body protection	See Other protection below
	▶ Overalls.
	▶ P.V.C apron.
Other protection	▶ Barrier cream.
	▶ Skin cleansing cream.
	► Eye wash unit.

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	P1 Air-line*	-	PAPR-P1 -
up to 50 x ES	Air-line**	P2	PAPR-P2
up to 100 x ES	-	P3	-
		Air-line*	-
100+ x ES	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

· Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.

• The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).

• Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.

Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
 Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)

 \cdot Use approved positive flow mask if significant quantities of dust becomes airborne.

Try to avoid creating dust conditions.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Silver-grey coloured solid wire; does not mix with water		
Physical state	Solid	Relative density (Water = 1)	2.5 - 2.9
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available

Melting point / freezing point (°C)	521 - 657	Viscosity (cSt)	Not Applicable
Initial boiling point and boiling range (°C)	Not Applicable	Molecular weight (g/mol)	Not Applicable
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Applicable	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Applicable
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Applicable
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (Not Available%)	Not Applicable
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	 Unstable in the presence of incompatible materials. Product is considered stable. Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of dusts, or fumes, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. Inhalation of dusts, generated by the material during the course of normal handling, may be damaging to the health of the individual.			
Ingestion	Accidental ingestion of the material may be damaging to the health of the individual.			
Skin Contact	Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions. There is some evidence to suggest that this material can cause inflammation of the skin on contact in some persons. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.			
Eye	There is some evidence to suggest that this material can cause eye irrita	ation and damage in some persons.		
Chronic	Substance accumulation, in the human body, may occur and may cause	some concern following repeated or long-term occupational exposure.		
XTRweld Aluminum Welding	TOXICITY	IRRITATION		
Wire	Not Available	Not Available		
	τοχιζιτγ	IRRITATION		
aluminium	Inhalation(Rat) LC50: >2.3 mg/l4h ^[1]	Eve: no adverse effect observed (not irritating) ^[1]		
	Oral (Rat) LD50; >2000 mg/kg ^[1]	Skin: no adverse effect observed (not irritating) ^[1]		
	тохісіту	IRRITATION		
beryllium	Oral (Rat) LD50; >2000 mg/kg ^[1]	Eye: no adverse effect observed (not irritating) ^[1]		
		Skin: no adverse effect observed (not irritating) ^[1]		
	тохісіту	IRRITATION		
chromium	Inhalation(Rat) LC50; >5.41 mg/l4h ^[1]	Not Available		
	Oral (Rat) LD50; >5000 mg/kg ^[1]			
	ΤΟΧΙΟΙΤΥ	IRRITATION		
	dermal (rat) LD50: >2000 mg/kg ^[1]	Eye: no adverse effect observed (not irritating) ^[1]		
copper	Inhalation(Rat) LC50; 0.733 mg/l4h ^[1]	Skin: no adverse effect observed (not irritating) ^[1]		
	Oral (Mouse) LD50; 0.7 mg/kg ^[2]			
	ΤΟΧΙΟΙΤΥ	IRRITATION		
iron	Oral (Rat) LD50; 98600 mg/kg ^[2]	Not Available		

	TOXICITY IRRITATION		
magnesium	dermal (rat) LD50: >2000 mg/kg ^[1]	0: >2000 mg/kg ^[1] Not Available	
	Inhalation(Rat) LC50; >2.1 mg/L4h ^[1]		
	Oral (Rat) LD50; >2000 mg/kg ^[1]		
	TOVICITY		
	Innalation(Rat) LC50; >5.14 mg/l4n ^{L1}		
manganese	Oral (Rat) LD50; >2000 mg/kgl ¹]	Eye: no adverse effect observed (not irritating) ^[1]	
		Skin (rabbit): 500 mg/24h - mild	
		Skin: no adverse effect observed (not irritating)[1]	
	ΤΟΧΙΟΙΤΥ	IRRITATION	
silicon	Dermal (rabbit) LD50: >5000 mg/kg ^[1]	Eye: no adverse effect observed (not irritating) ^[1]	
	Oral (Rat) LD50; 3160 mg/kg ^[2]	Skin: no adverse effect observed (not irritating) ^[1]	
	τοχιατχ	IRRITATION	
titanium	$Oral (Bat) \mid D50: > 2000 ma/ka^{[1]}$	Not Available	
	Oral (Rat) LD50; >2000 mg/kg ^{, ,}		
	ΤΟΧΙΟΙΤΥ	IRRITATION	
vanadium	Inhalation(Rat) LC50; >5.05 mg/l4h ^[1]	Not Available	
	Oral (Rat) LD50; >2000 mg/kg ^[1]		
zinc	Dermal (rabbit) LD50: 1130 mg/kgl ² J	Eye: no adverse effect observed (not irritating)[1]	
	Oral (Rat) LD50; >2000 mg/kg ^[1]	Skin: no adverse effect observed (not irritating) ^[1]	
	ΤΟΧΙCΙΤΥ	IRRITATION	
	Inhalation(Rat) LC50; >4.3 mg/l4h ^[1]	Eye: adverse effect observed (irreversible damage) ^[1]	
zirconium	Oral (Rat) LD50; >5000 mg/kg ^[1]	Eye: adverse effect observed (irritating) ^[1]	
		Skin: no adverse effect observed (not irritating) ^[1]	
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute t	oxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise	
	specified data extracted from RTECS - Register of Toxic Effect of chemical Substances		
BERYLLIUM	The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested. 33nix&11b WARNING: Beryllium and compounds are classified by IARC as Group 1- CARCINOGENIC TO HUMANS Beryllium oxide fume is very toxic to the respiratory tract, lungs and skin and is quick acting.		
	WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS. Mutation DNA damage Human Tumorigenic - peoplestic by RTECS criteria		
CHROMIUM	Mutation DNA damage Human Tumongenic - neoplastic by RTECS criteria. Gastrointestinal tumours, lymphoma, musculoskeletal tumours and tumours at site of application recorded. On skin and inhalation exposure, chromium and its compounds (except hexavalent) can be a potent sensitiser, as particulates. Studies show that they have a complex toxicity mechanism with hexavalent chromium associated with an increased risk of lung damage and respiratory cancers (primarily bronchogenic and nose cancers). However, there is no evidence that elemental, divalent, or trivalent chromium compounds causes cancer or genetic toxicity. The substance is classified by IARC as Group 3: NOT classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing		
COPPER	 WARNING: Inhalation of high concentrations of copper fume may cause "metal fume fever", an acute industrial disease of short duration. Symptoms are tiredness, influenza like respiratory tract irritation with fever. for copper and its compounds (typically copper chloride): Acute toxicity: There are no reliable acute oral toxicity results available. In an acute dermal toxicity study (OECD TG 402), one group of 5 male rats and 5 groups of 5 female rats received doses of 1000, 1500 and 2000 mg/kg bw via dermal application for 24 hours. The LD50 values of copper monochloride were 2,000 mg/kg bw or greater for male (no deaths observed) and 1,224 mg/kg bw for female. Four females died at both 1500 and 2000 mg/kg bw, and one at 1,000 mg/kg bw. Symptom of the hardness of skin, an exudation of hardness site, the formation of scar and reddish changes were observed on application sites in all treated animals. Skin inflammation and injury were also noted. In addition, a reddish or black urine was observed in females at 2,000, 1,500 and 1,000 mg/kg bw. Female rats appeared to be more sensitive than male based on mortality and clinical signs. No reliable skin/eye irritation studies were available. The acute dermal study with copper monochloride suggests that it has a potential to cause skin irritation. Repeat dose toxicity: In repeated dose toxicity study performed according to OECD TG 422, copper monochloride was given orally (gavage) to Snraque-Dawley rats for 30 days to males and for 39 - 51 days to females at concentrations of 0, 13, 5, 0, 20, and 80 mg/kg bw. The NOA El 		

value was 5 and 1.3 mg/kg bw/day for male and female rats, respectively. No deaths were observed in male rats. One treatment-related death

	 was observed in female rats in the high dose group. Erythropoietic toxicity (anaemia) was seen in both sexes at the 80 mg/kg bw/day. The frequency of squamous cell hyperplasia of the forestomach was increased in a dose-dependent manner in male and female rats at all treatment groups, and was statistically significant in males at doses of =20 mg/kg bw/day and in females at doses of =5 mg/kg bw/day doses. The observed effects are considered to be local, non-systemic effect on the forestomach which result from oral (gavage) administration of copper monochloride. Genotoxicity: An in vitro genotoxicity study with copper monochloride showed negative results in a bacterial reverse mutation test with Salmonella typhimurium strains (TA 98, TA 100, TA 1535, and TA 1537) with and without S9 mix at concentrations of up to 1,000 ug/plate. An in vitro test for chromosome aberration in Chinese hamster lung (CHL) cells showed that copper monochloride induced structural and numerical aberrations at the concentration of 50, 70 and 100 ug/mL without S9 mix. In the presence of the metabolic activation system, significant increases of structural aberrations were observed at 50 and 70 ug/mL and significant increases of numerical aberrations were observed at 70 ug/mL. In an in vivo mammalian erythrocyte micronucleus assay, all animals dosed (15 - 60 mg/kg bw) with copper monochloride exhibited similar PCE/(PCE+NCE) ratios and MNPCE frequencies compared to those of the negative control animals. Therefore copper monochloride is not an in vivo mutagen. Carcinogenicity: there was insufficient information to evaluate the carcinogenic activity of copper monochloride. Reproductive and developmental toxicity: In the combined repeated dose toxicity study with the reproduction/developmental toxicity screening test (OECD TG 422), copper monochloride was given orally (gavage) to Sprayue-Dawley rats for 30 days to males and for 39-51 days to females at concentrations of 0, 1.3, 5.0, 20, and 80 mg/kg bw/day. The		
SILICON	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophila. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production. Injection of silicon into the peritoneal cavity produced only minor local trauma and foreign body reaction. In animal testing, silicon dioxide given by		
ALUMINIUM & CHROMIUM & SILICON & TITANIUM & ZINC & ZIRCONIUM	No significant acute toxicological data identified in literature search.		
BERYLLIUM & CHROMIUM	Tenth Annual Report on Carcinogens: Substance known to be Carcinogenic [National Toxicology Program: U.S. Dep. of Health and Human Services 2002]		
MANGANESE & SILICON	The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.		
MANGANESE & ZINC	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.		
Acute Toxicity	×	Carcinogenicity	¥
Skin Irritation/Corrosion	¥	Reproductivity	×
Serious Eye Damage/Irritation	×	STOT - Single Exposure	×
Respiratory or Skin sensitisation	×	STOT - Repeated Exposure	×
Mutagenicity	×	Aspiration Hazard	×
		Legend: 🗙 – Data either n	ot available or does not fill the criteria for classification

Data either not available or does not fill the criteria for classification
 Data available to make classification

SECTION 12 Ecological information

Toxicity

JAIOITY						
	Endpoint	Test Duration (hr)	Species		Value	Source
XTRweld Aluminum Welding Wire	Not Available	Not Available	Not Available		Not Available	Not Available
	Endpoint	Test Duration (hr)	Species	Valu	le	Source
	NOEC(ECx)	48h	Crustacea	>10	0mg/l	1
	LC50	96h	Fish	0.07	78-0.108mg/l	2
aluminium	EC50	72h	Algae or other aquatic plants	0.2r	ng/l	2
	EC50	48h	Crustacea	1.5r	ng/l	2
	EC50	96h	Algae or other aquatic plants	0.02	24mg/l	2
beryllium	Endpoint	Test Duration (hr)	Species		Value	Source
	LC50	96h	Fish		37.9mg/l	4
chromium	Endpoint	Test Duration (hr)	Species	Valu	e	Source
	EC50(ECx)	48h	Crustacea	<0.0	01mg/l	2
	LC50	96h	Fish	0.10	6mg/L	4
	EC50	72h	Algae or other aquatic plants	0.02	6-0.208mg/L	4
	EC50	48h	Crustacea	<0.0	01mg/l	2
	EC50	96h	Algae or other aquatic plants	36m	g/L	4

	Endpoint	Test Duration (hr)	S	pecies	Value)	Source
	EC50(ECx)	24h	A	Igae or other aquatic plants	<0.00)1mg/L	4
	LC50	96h	F	ish	~0.00)5mg/L	4
copper	EC50	72h	A	Igae or other aquatic plants	0.011	-0.017mg/L	4
	EC50	48h	С	rustacea	<0.00)1mg/L	4
	EC50	96h	A	Igae or other aquatic plants	0.03-	0.058mg/l	4
				· · ·		-	
	Endpoint	Test Duration (hr)		Species		Value	Source
	NOEC(ECx)	48h		Algae or other aquatic plants		0.1-4mg/l	4
iron	LC50	96h		Fish		0.05mg/l	2
	EC50	72h		Algae or other aquatic plants		18mg/l	2
	EC50	48h		Crustacea		>100mg/l	2
	Endpoint	Test Duration (br)		Spacies		Value	Source
		72h		Algae or other aquatic plants			2
		96b		Fish		541mg/l	2
magnesium	EC50	30h		Algoe or other equatio plants		> 12mg/l	2
	EC50	7211 48b				344mg/l	2
	EC50	4811		Algae or other equatio plants		222.27mg/l	2
	EC30	9011		Aigae of other aquatic plants		222.37 mg/i	2
	Endpoint	Test Duration (hr)		Species	١	/alue	Source
	NOEC(ECx)	504h		Algae or other aquatic plants	C	0.05-3.7mg/l	4
manganese	LC50	96h		Fish	>	•3.6mg/l	2
	EC50	72h		Algae or other aquatic plants	2	2.8mg/l	2
	EC50	48h		Crustacea	>	•1.6mg/l	2
	Endneint	Test Durstion (br)		Spacing .	Va	lu o	Sauraa
silicon	EC10(ECx)			Algae or other aquatic plants	va >-	66~-88ma/l	2
Silcon	EC50	72h		Algae or other aquatic plants	~2	50~=0011g/1 50mg/l	2
					1		1
	Endpoint	Test Duration (hr)		Species		Value	Source
	NOEC(ECx)	48h		Crustacea		<=1mg/l	2
titanium	LC50	96h		Fish		>100mg/l	2
	EC50	72h		Algae or other aquatic plants		13mg/l	2
	EC50	48h		Crustacea		>100mg/l	2
	Endpoint	Test Duration (hr)		Species		Value	Source
vanadium	NOEC(ECx)	48h		Algae or other aquatic plants		0.5-18mg/l	4
	LC50	96h		Fish		1.8mg/l	4
zinc	Endpoint	Test Duration (br)	c	inecies	Valu	e	Source
	EC50(FCx)	72h	Δ	lgae or other aguatic plants	0.00	- 5ma/l	4
	LC50	96h	F	ish	0.16	ma/L	4
	EC50	72h	Α	lgae or other aquatic plants	0.00	5ma/l	4
	EC50	48h		Crustacea 1 4mg/l		a/l	2
	EC50	96h	A	lgae or other aquatic plants	0.26	4-0 881ma/l	4
	2000				0.20	- cicc mign	
	Endpoint	Test Duration (hr)		Species		Value	Source
zirconium	EC50(ECx)	96h		Algae or other aquatic plants		2.6mg/l	2
Litomum	LC50	96h		Fish		>20mg/l	2
	EC50	96h		Algae or other aquatic plants		2.6mg/l	2
Legend:	Extracted from Ecotox databas - Bioconcentrati	1. IUCLID Toxicity Data 2. Europe E e - Aquatic Toxicity Data 5. ECETO ion Data 8. Vendor Data	∃CHA Registered)C Aquatic Hazar	l Substances - Ecotoxicological Inform d Assessment Data 6. NITE (Japan) -	nation - Aquatio Bioconcentrat	: Toxicity 4. L ion Data 7. M	IS EPA, ETI (Japan)

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. **DO NOT** discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air	
	No Data available for all ingredients	No Data available for all ingredients	

Ingredient	Bioaccumulation
	No Data available for all ingredients
Mobility in soil	
Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 Disposal considerations

 Product / Packaging disposal Recycle wherever possible or consult manufacturer for recycling options. Consult State Land Waste Management Authority for disposal. Bury residue in an authorised landfill. Recycle constainers if possible or dispose of in an authorised landfill. 	Waste treatment methods		
	Product / Packaging disposal	 Recycle wherever possible or consult manufacturer for recycling options. Consult State Land Waste Management Authority for disposal. Bury residue in an authorised landfill. Recycle containers if possible, or dispose of in an authorised landfill. 	

SECTION 14 Transport information

Labels Required Marine Pollutant NO

Land transport (DOT): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
aluminium	Not Available
beryllium	Not Available
chromium	Not Available
copper	Not Available
iron	Not Available
magnesium	Not Available
manganese	Not Available
silicon	Not Available
titanium	Not Available
vanadium	Not Available
zinc	Not Available
zirconium	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
aluminium	Not Available
beryllium	Not Available
chromium	Not Available
copper	Not Available
iron	Not Available
magnesium	Not Available
manganese	Not Available
silicon	Not Available
titanium	Not Available
vanadium	Not Available
zinc	Not Available
zirconium	Not Available

SECTION 15 Regulatory information

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

aluminium is found on the following regulatory lists

Manufactured Nanomaterials (MNMS)

Air Pollutants Other Than PM-2.5

International WHO List of Proposed Occupational Exposure Limit (OEL) Values for

US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for

XTRweld Aluminum Welding Wire

US - Massachusetts - Right To Know Listed Chemicals US ACGIH Threshold Limit Values (TLV) US ACGIH Threshold Limit Values (TLV) - Carcinogens US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs) US Department of Homeland Security (DHS) - Chemical Facility Anti-Terrorism Standards (CFATS) - Chemicals of Interest beryllium is found on the following regulatory lists Chemical Footprint Project - Chemicals of High Concern List US CWA (Clean Water Act) - Priority Pollutants US CWA (Clean Water Act) - Toxic Pollutants International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs US DOE Temporary Emergency Exposure Limits (TEELs) International Agency for Research on Cancer (IARC) - Agents Classified by the IARC US EPA Carcinogens Listing Monographs - Group 1: Carcinogenic to humans US EPA Integrated Risk Information System (IRIS) US - California - Biomonitoring - Priority Chemicals US EPCRA Section 313 Chemical List US - California Proposition 65 - Carcinogens US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens Carcinogens US - California Safe Drinking Water and Toxic Enforcement Act of 1986 - Proposition 65 US NIOSH Carcinogen List List US NIOSH Recommended Exposure Limits (RELs) US - Massachusetts - Right To Know Listed Chemicals US OSHA Permissible Exposure Limits (PELs) Table Z-2 US ACGIH Threshold Limit Values (TLV) US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory US ACGIH Threshold Limit Values (TLV) - Carcinogens US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs) US Clean Air Act - Hazardous Air Pollutants chromium is found on the following regulatory lists International Agency for Research on Cancer (IARC) - Agents Classified by the IARC US DOE Temporary Emergency Exposure Limits (TEELs) Monographs US EPA Drinking Water Treatability Database International WHO List of Proposed Occupational Exposure Limit (OEL) Values for US EPCRA Section 313 Chemical List Manufactured Nanomaterials (MNMS) US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for Air Pollutants Other Than PM-2.5 US - Massachusetts - Right To Know Listed Chemicals US ACGIH Threshold Limit Values (TLV) US ACGIH Threshold Limit Values (TLV) - Carcinogens US Clean Air Act - Hazardous Air Pollutants US CWA (Clean Water Act) - Priority Pollutants US CWA (Clean Water Act) - Toxic Pollutants copper is found on the following regulatory lists International WHO List of Proposed Occupational Exposure Limit (OEL) Values for US EPA Integrated Risk Information System (IRIS) Manufactured Nanomaterials (MNMS) US EPCRA Section 313 Chemical List US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for US NIOSH Recommended Exposure Limits (RELs) Air Pollutants Other Than PM-2.5 US OSHA Permissible Exposure Limits (PELs) Table Z-1 US - Massachusetts - Right To Know Listed Chemicals US OSHA Permissible Exposure Limits (PELs) Table Z-3 US ACGIH Threshold Limit Values (TLV) US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs) US CWA (Clean Water Act) - Priority Pollutants US CWA (Clean Water Act) - Toxic Pollutants US DOE Temporary Emergency Exposure Limits (TEELs) iron is found on the following regulatory lists International WHO List of Proposed Occupational Exposure Limit (OEL) Values for US OSHA Permissible Exposure Limits (PELs) Table Z-1 Manufactured Nanomaterials (MNMS) US OSHA Permissible Exposure Limits (PELs) Table Z-3 US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory Air Pollutants Other Than PM-2.5 US DOE Temporary Emergency Exposure Limits (TEELs) US NIOSH Recommended Exposure Limits (RELs) magnesium is found on the following regulatory lists International WHO List of Proposed Occupational Exposure Limit (OEL) Values for US NIOSH Recommended Exposure Limits (RELs) Manufactured Nanomaterials (MNMS) US OSHA Permissible Exposure Limits (PELs) Table Z-1 US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for US OSHA Permissible Exposure Limits (PELs) Table Z-3 Air Pollutants Other Than PM-2.5 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory US - Massachusetts - Right To Know Listed Chemicals US TSCA Chemical Substance Inventory - Interim List of Active Substances US Department of Homeland Security (DHS) - Chemical Facility Anti-Terrorism Standards (CFATS) - Chemicals of Interest

US DOE Temporary Emergency Exposure Limits (TEELs)

manganese is found on the following regulatory lists

US EPCRA Section 313 Chemical List

US NIOSH Recommended Exposure Limits (RELs)

US OSHA Permissible Exposure Limits (PELs) Table Z-1

US OSHA Permissible Exposure Limits (PELs) Table Z-3

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US TSCA Chemical Substance Inventory - Interim List of Active Substances

US National Toxicology Program (NTP) 15th Report Part A Known to be Human

US TSCA Chemical Substance Inventory - Interim List of Active Substances

US NIOSH Recommended Exposure Limits (RELs) US OSHA Permissible Exposure Limits (PELs) Table Z-1

US OSHA Permissible Exposure Limits (PELs) Table Z-3

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US TSCA Chemical Substance Inventory - Interim List of Active Substances

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US TSCA Chemical Substance Inventory - Interim List of Active Substances

US TSCA Chemical Substance Inventory - Interim List of Active Substances

International WHO List of Proposed Occupational Exposure Limit (OEL) Values for US DOE Temporary Emergency Exposure Limits (TEELs) Manufactured Nanomaterials (MNMS) US EPA Integrated Risk Information System (IRIS) US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for US EPCRA Section 313 Chemical List Air Pollutants Other Than PM-2.5 US NIOSH Recommended Exposure Limits (RELs) US - California - Biomonitoring - Priority Chemicals US OSHA Permissible Exposure Limits (PELs) Table Z-1 US - California Hazardous Air Pollutants Identified as Toxic Air Contaminants US OSHA Permissible Exposure Limits (PELs) Table Z-3 US - Massachusetts - Right To Know Listed Chemicals US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory US ACGIH Threshold Limit Values (TLV) US TSCA Chemical Substance Inventory - Interim List of Active Substances US ACGIH Threshold Limit Values (TLV) - Carcinogens US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs) US Clean Air Act - Hazardous Air Pollutants silicon is found on the following regulatory lists US OSHA Permissible Exposure Limits (PELs) Table Z-1 International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS) US OSHA Permissible Exposure Limits (PELs) Table Z-3 US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory Air Pollutants Other Than PM-2.5 US TSCA Chemical Substance Inventory - Interim List of Active Substances US - Massachusetts - Right To Know Listed Chemicals US DOE Temporary Emergency Exposure Limits (TEELs) US NIOSH Recommended Exposure Limits (RELs) titanium is found on the following regulatory lists International WHO List of Proposed Occupational Exposure Limit (OEL) Values for US OSHA Permissible Exposure Limits (PELs) Table Z-1 Manufactured Nanomaterials (MNMS) US OSHA Permissible Exposure Limits (PELs) Table Z-3 US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory Air Pollutants Other Than PM-2.5 US TSCA Chemical Substance Inventory - Interim List of Active Substances US DOE Temporary Emergency Exposure Limits (TEELs) US NIOSH Recommended Exposure Limits (RELs) vanadium is found on the following regulatory lists Chemical Footprint Project - Chemicals of High Concern List US EPCRA Section 313 Chemical List International WHO List of Proposed Occupational Exposure Limit (OEL) Values for US NIOSH Recommended Exposure Limits (RELs) Manufactured Nanomaterials (MNMS) US OSHA Permissible Exposure Limits (PELs) Table Z-1 US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for US OSHA Permissible Exposure Limits (PELs) Table Z-3 Air Pollutants Other Than PM-2.5 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory US - Massachusetts - Right To Know Listed Chemicals US TSCA Chemical Substance Inventory - Interim List of Active Substances US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs) US DOE Temporary Emergency Exposure Limits (TEELs) zinc is found on the following regulatory lists International WHO List of Proposed Occupational Exposure Limit (OEL) Values for US EPCRA Section 313 Chemical List Manufactured Nanomaterials (MNMS) US NIOSH Recommended Exposure Limits (RELs) US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for US OSHA Permissible Exposure Limits (PELs) Table Z-1 Air Pollutants Other Than PM-2.5 US OSHA Permissible Exposure Limits (PELs) Table Z-3 US - Massachusetts - Right To Know Listed Chemicals US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs) US TSCA Chemical Substance Inventory - Interim List of Active Substances US CWA (Clean Water Act) - Priority Pollutants US TSCA Section 12(b) - List of Chemical Substances Subject to Export Notification US CWA (Clean Water Act) - Toxic Pollutants Requirements US DOE Temporary Emergency Exposure Limits (TEELs) US EPA Integrated Risk Information System (IRIS) zirconium is found on the following regulatory lists International WHO List of Proposed Occupational Exposure Limit (OEL) Values for US NIOSH Recommended Exposure Limits (RELs) Manufactured Nanomaterials (MNMS) US OSHA Permissible Exposure Limits (PELs) Table Z-1 US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for US OSHA Permissible Exposure Limits (PELs) Table Z-3 Air Pollutants Other Than PM-2.5 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory US - Massachusetts - Right To Know Listed Chemicals US TSCA Chemical Substance Inventory - Interim List of Active Substances US ACGIH Threshold Limit Values (TLV) US ACGIH Threshold Limit Values (TLV) - Carcinogens US DOE Temporary Emergency Exposure Limits (TEELs) Federal Regulations Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 hazard categories

Flammable (Gases, Aerosols, Liquids, or Solids)	No
Gas under pressure	No
Explosive	No
Self-heating	No
Pyrophoric (Liquid or Solid)	No
Pyrophoric Gas	No
Corrosive to metal	No
Oxidizer (Liquid, Solid or Gas)	No
Organic Peroxide	No
Self-reactive	No
In contact with water emits flammable gas	Yes

Combustible Dust	No
Carcinogenicity	Yes
Acute toxicity (any route of exposure)	No
Reproductive toxicity	No
Skin Corrosion or Irritation	Yes
Respiratory or Skin Sensitization	No
Serious eye damage or eye irritation	Yes
Specific target organ toxicity (single or repeated exposure)	No
Aspiration Hazard	No
Germ cell mutagenicity	No
Simple Asphyxiant	No
Hazards Not Otherwise Classified	No

US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4)			
Name	Reportable Quantity in Pounds (lb)	Reportable Quantity in kg	
beryllium	10	4.54	
chromium	5000	2270	
copper	5000	2270	
zinc	1000	454	

State Regulations

US. California Proposition 65

WARNING: This product can expose you to chemicals including beryllium, which is known to the State of California to cause cancer. For more information, go to www.P65Warnings.ca.gov.

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (aluminium; beryllium; chromium; copper; iron; magnesium; manganese; silicon; titanium; vanadium; zinc; zirconium)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (aluminium; beryllium; chromium; copper; iron; magnesium; manganese; silicon; titanium; vanadium; zinc; zirconium)
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	08/20/2021
Initial Date	11/01/2009

SDS Version Summary

Version	Date of Update	Sections Updated
3.1	10/31/2019	One-off system update. NOTE: This may or may not change the GHS classification
4.1	08/19/2021	Classification change due to full database hazard calculation/update.

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chernwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC-TWA: Permissible Concentration-Time Weighted Average

PC-STEL: Permissible Concentration-Short Term Exposure Limit

IARC: International Agency for Research on Cancer ACGIH: American Conference of Governmental Industrial Hygienists STEL: Short Term Exposure Limit TEEL: Temporary Emergency Exposure Limit_\circ IDLH: Immediately Dangerous to Life or Health Concentrations ES: Exposure Standard OSF: Odour Safety Factor NOAEL :No Observed Adverse Effect Level LOAEL: Lowest Observed Adverse Effect Level TLV: Threshold Limit Value LOD: Limit Of Detection OTV: Odour Threshold Value BCF: BioConcentration Factors BEI: Biological Exposure Index AIIC: Australian Inventory of Industrial Chemicals DSL: Domestic Substances List NDSL: Non-Domestic Substances List IECSC: Inventory of Existing Chemical Substance in China EINECS: European INventory of Existing Commercial chemical Substances ELINCS: European List of Notified Chemical Substances NLP: No-Longer Polymers ENCS: Existing and New Chemical Substances Inventory KECI: Korea Existing Chemicals Inventory NZIoC: New Zealand Inventory of Chemicals PICCS: Philippine Inventory of Chemicals and Chemical Substances TSCA: Toxic Substances Control Act TCSI: Taiwan Chemical Substance Inventory INSQ: Inventario Nacional de Sustancias Químicas NCI: National Chemical Inventory FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

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