WA3551.3Lithium Battery Pack

Positec Australia

Chemwatch Hazard Alert Code: 4

Chemwatch: **9002-33**
Version No: **2.1**
Safety Data Sheet according to Work Health and Safety Regulations (Hazardous Chemicals) 2023 and ADG requirements

Initial Date: **02/02/2026**
Revision Date: **02/02/2026**
Print Date: **03/02/2026**
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SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	WA3551.3Lithium Battery Pack
Chemical Name	Not Applicable
Synonyms	Not Available
Proper shipping name	LITHIUM ION BATTERIES (including lithium ion polymer batteries)
Chemical formula	Not Applicable
Other means of identification	Not Available

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

Relevant identified uses	Battery. NOTE: Hazard statement relates to battery contents. Potential for exposure should not exist unless the battery leaks, is exposed to high temperatures or is mechanically, physically or electrically abused. Use involves discharge then regenerative charging cycle from external DC power source. CHARGING HAZARD. Completion of charging process includes evolution of highly flammable and explosive hydrogen gas which is readily detonated by electric spark. No smoking or naked lights. Do not attach/detach metal clips or operate open switches during charging process because of arcing/sparking hazard. Overcharging to excess results in vigorous hydrogen evolution - boiling - which may cause generation of corrosive acid mist.

Details of the manufacturer or importer of the safety data sheet

Registered company name	**Positec Australia**
Address	14 Corporate Boulevard Bayswater VIC 3153 Australia
Telephone	0419663987
Fax	03 8761 6394
Website	Au.worx.com
Email	con.dekazos@positecgroup.com.

Emergency telephone number

Association / Organisation	**Poisons Information Centre (AU)**
Emergency telephone number(s)	13 11 26 (24 hours)
Other emergency telephone number(s)	Not Available

SECTION 2 Hazards identification

Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification [1]	Acute Toxicity (Oral) Category 2, Acute Toxicity (Dermal) Category 4, Skin Corrosion/Irritation Category 1B, Sensitisation (Skin) Category 1, Serious Eye Damage/Eye Irritation Category 1, Acute Toxicity (Inhalation) Category 4, Sensitisation (Respiratory) Category 1, Germ Cell Mutagenicity Category 1A, Carcinogenicity Category 1A, Specific Target Organ Toxicity - Repeated Exposure Category 2, Hazardous to the Aquatic Environment Long-Term Hazard Category 2
Legend:	***1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI***

Label elements

Hazard pictogram(s)	
Signal word	**Danger**

Hazard statement(s)

H300	Fatal if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H340	May cause genetic defects.
H350	May cause cancer.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s) Prevention

P260	Do not breathe dust/fume.
P264	Wash all exposed external body areas thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves, protective clothing, eye protection and face protection.
P284	[In case of inadequate ventilation] wear respiratory protection.
P273	Avoid release to the environment.
P202	Do not handle until all safety precautions have been read and understood.
P272	Contaminated work clothing should not be allowed out of the workplace.

Precautionary statement(s) Response

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.
P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. If more than 15 mins from Doctor, INDUCE VOMITING (if conscious).
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313	IF exposed or concerned: Get medical advice/ attention.
P342+P311	If experiencing respiratory symptoms: Call a POISON CENTER/doctor/physician/first aider.
P302+P352	IF ON SKIN: Wash with plenty of water.
P363	Wash contaminated clothing before reuse.
P333+P313	If skin irritation or rash occurs: Get medical advice/attention.
P362+P364	Take off contaminated clothing and wash it before reuse.
P391	Collect spillage.

Precautionary statement(s) Storage

P405	Store locked up.

Precautionary statement(s) Disposal

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

No further product hazard information.

SECTION 3 Composition / information on ingredients

Substances

Continued...

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available		hermetically sealed metal case with
107-10-8	21.95	n-propylamine
7439-89-6	12.62	iron
7440-50-8	11.41	copper
7440-44-0	11.08	carbon, activated
65997-17-3	6.59	glass fibres
12031-65-1	5.29	lithium nickel oxide
7429-90-5	4.68	aluminium
7440-02-0	3.63	nickel
12057-17-9	3.17	lithium manganate
616-38-6	3.09	dimethyl carbonate
7439-96-5	2.76	manganese
12190-79-3	2.12	lithium cobaltate
9002-88-4	1.97	polyethylene
7782-44-7.	1.61	oxygen
21324-40-3	1.2	lithium fluorophosphate
96-49-1	1.26	ethylene carbonate
623-53-0	0.97	ethyl methyl carbonate
9003-07-0	0.76	polypropylene
25038-59-9	0.54	polyethylene terephthalate
1333-86-4	0.39	carbon black
24937-79-9	0.39	vinylidene fluoride homopolymer
24937-78-8	0.33	ethylene/ vinyl acetate copolymer
35239-19-1	0.3	acrylic acid/ butyl acrylate/ 2-ethylhexyl acrylate/ vinyl acetate
114435-02-8	0.2	fluoroethylene carbonate
9004-32-4	0.12	sodium carboxymethylcellulose
110-61-2	0.1	succinonitrile
36671-85-9	0.07	vinyl N-octadecylcarbamate homopolymer
9003-55-8	0.07	styrene/ butadiene rubber
13463-67-7	0.07	titanium dioxide
14807-96-6	0.06	talc
9010-94-0	0.05	ABS/ methylmethacrylate polymer
9010-93-9	0.05	poly(butadiene-co-methacrylic acid-co-styrene)
68604-67-1	0.05	fatty acids, coco/ pentaerythritol/ phthalic anhydride/ benzoic acid
24968-12-5	0.05	1,4-butylene terephthalate homopolymer
14283-07-9	0.02	lithium fluoroborate
9003-56-9	0.02	styrene/ butadiene/ acrylonitrile copolymer
36888-99-0	0.02	C.I. Pigment Yellow 139
7439-95-4	0.02	magnesium

Legend:	***1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; * EU IOELVs available***

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	‣ Generally not applicable. If this product comes in contact with eyes: ‣ Wash out immediately with water. ‣ If irritation continues, seek medical attention. ‣ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	‣ Generally not applicable. If skin or hair contact occurs: ‣ Flush skin and hair with running water (and soap if available).

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	‣ Seek medical attention in event of irritation.
Inhalation	‣ Generally not applicable. ‣ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ‣ Other measures are usually unnecessary.
Ingestion	‣ Generally not applicable. ‣ Not considered a normal route of entry. ‣ 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.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known. ‣ Keep dry ‣ **NOTE:** May develop pressure in containers; open carefully. Vent periodically.

Advice for firefighters

Fire Fighting	Slight hazard when exposed to heat, flame and oxidisers.
Fire/Explosion Hazard	‣ Non combustible. ‣ Not considered to be a significant fire risk. ‣ Heating may cause expansion or decomposition leading to violent rupture of containers. ‣ May emit acrid smoke. May emit corrosive and poisonous fumes. Articles and manufactured articles may constitute a fire hazard where polymers form their outer layers or where combustible packaging remains in place. Certain substances, found throughout their construction, may degrade or become volatile when heated to high temperatures. This may create a secondary hazard.
HAZCHEM	2Y

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	Clean up all spills immediately. Avoid contact with skin and eyes. Place in suitable containers for disposal.
Major Spills	‣ Clean up all spills immediately. ‣ Wear protective clothing, safety glasses, dust mask, gloves. ‣ Secure load if safe to do so. Bundle/collect recoverable product. ‣ Use dry clean up procedures and avoid generating dust. ‣ Vacuum up (consider explosion-proof machines designed to be grounded during storage and use). ‣ Water may be used to prevent dusting. ‣ Collect remaining material in containers with covers for disposal. ‣ Flush spill area with water.

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

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SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	Do not connect the positive terminal to the negative terminal with electrical wire or chain. Avoid polarity reverse connection when installing the battery to an instrument. Do not wet the battery with water, seawater or acid; or expose to strong oxidizer. Do not damage or remove the external tube. Keep the battery away from heat and fire. Do not disassemble or reconstruct the battery; or solder the battery directly. Do not give a mechanical shock or deform. Do not use unauthorized charger or other charging method. This battery is manufactured in a charged state. It is NOT designed for recharging. Recharging can cause battery leakage or in some cases, high pressure rupture. Inadvertent charging can occur if a battery is installed backwards. Use good occupational work practice. Observe manufacturer's storage and handling recommendations contained within this SDS. Avoid physical damage to containers.
Other information	▸ Keep dry. ▸ Store under cover. ▸ Protect containers against physical damage. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. Keep out of reach of children. Store out of direct sunlight ▸ Store away from incompatible materials.

Conditions for safe storage, including any incompatibilities

Suitable container	Generally packaging as originally supplied with the article or manufactured item is sufficient to protect against physical hazards. If repackaging is required ensure the article is intact and does not show signs of wear. As far as is practicably possible, reuse the original packaging or something providing a similar level of protection to both the article and the handler.
Storage incompatibility	Avoid contamination of water, foodstuffs, feed or seed. ▸ Keep dry ▸ **NOTE:** May develop pressure in containers; open carefully. Vent periodically.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	copper	Copper (fume)	0.2 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	copper	Copper, dusts & mists (as Cu)	1 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	aluminium	Aluminium, pyro powders (as Al)	5 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	aluminium	Aluminium (metal dust)	10 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	aluminium	Aluminium (welding fumes) (as Al)	5 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	nickel	Nickel, metal	1 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	nickel	Nickel, powder	1 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	lithium manganate	Manganese, dust & compounds (as Mn)	1 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	manganese	Manganese, fume (as Mn)	1 mg/m3	3 mg/m3	Not Available	Not Available
Australia Exposure Standards	carbon black	Carbon black	3 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	titanium dioxide	Titanium dioxide	10 mg/m3	Not Available	Not Available	(a) This value is for inhalable dust containing no asbestos and < 1% crystalline silica.
Australia Exposure Standards	talc	Talc, (containing no asbestos fibres)	2.5 mg/m3	Not Available	Not Available	Not Available

MATERIAL DATA

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Exposure controls

Appropriate engineering controls	General exhaust is adequate under normal operating conditions. Articles or manufactured items, in their original condition, generally don't require engineering controls during handling or in normal use. Exceptions may arise following extensive use and subsequent wear, during recycling or disposal operations where substances, found in the article, may be released to the environment.
Individual protection measures, such as personal protective equipment	
Eye and face protection	None under normal operating conditions. **OTHERWISE:** ‣ Safety glasses.
Skin protection	See Hand protection below
Hands/feet protection	None under normal operating conditions. **OTHERWISE:** ‣ Rubber Gloves
Body protection	See Other protection below
Other protection	No special equipment needed when handling small quantities

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
WA3551.3Lithium Battery Pack

Material	CPI
TEFLON	A

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type KAX-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	KAX-AUS P2	-	KAX-PAPR-AUS / Class 1 P2
up to 50 x ES	-	KAX-AUS / Class 1 P2	-
up to 100 x ES	-	KAX-2 P2	KAX-PAPR-2 P2 ^

^ - Full-face
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)

Respiratory protection not normally required due to the physical form of the product.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Solid.

Physical state	Manufactured	**Relative density (Water = 1)**	Not Available
Odour	No Odour	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Applicable	**Decomposition temperature (°C)**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Applicable
Initial boiling point and boiling range (°C)	Not Applicable	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Applicable	**Taste**	Not Available

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Evaporation rate	Not Applicable	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Applicable	**Surface Tension (dyn/cm or mN/m)**	Not Applicable
Lower Explosive Limit (%)	Not Applicable	**Volatile Component (%vol)**	Not Applicable
Vapour pressure (kPa)	Not Applicable	**Gas group**	Not Available
Solubility in water	Not Available	**pH as a solution (1%)**	Not Applicable
Vapour density (Air = 1)	Not Applicable	**VOC g/L**	Not Applicable
Heat of Combustion (kJ/g)	Not Available	**Ignition Distance (cm)**	Not Available
Flame Height (cm)	Not Available	**Flame Duration (s)**	Not Available
Enclosed Space Ignition Time Equivalent (s/m3)	Not Available	**Enclosed Space Ignition Deflagration Density (g/m3)**	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

a) Acute Toxicity	There is sufficient evidence to classify this material as acutely toxic.
b) Skin Irritation/Corrosion	There is sufficient evidence to classify this material as skin corrosive or irritating.
c) Serious Eye Damage/Irritation	There is sufficient evidence to classify this material as eye damaging or irritating
d) Respiratory or Skin sensitisation	There is sufficient evidence to classify this material as sensitising to skin or the respiratory system
e) Mutagenicity	There is sufficient evidence to classify this material as mutagenic
f) Carcinogenicity	There is sufficient evidence to classify this material as carcinogenic
g) Reproductivity	Based on available data, the classification criteria are not met.
h) STOT - Single Exposure	Based on available data, the classification criteria are not met.
i) STOT - Repeated Exposure	There is sufficient evidence to classify this material as toxic to specific organs through repeated exposure
j) Aspiration Hazard	Based on available data, the classification criteria are not met.

Inhaled	Vapors or fumes may cause respiratory tract irritation. Not normally a hazard due to physical form of product.
Ingestion	Considered an unlikely route of entry in commercial/industrial environments Ingestion may result in nausea, abdominal irritation, pain and vomiting
Skin Contact	The electrolyte causes severe skin burns and irritation. Not normally a hazard due to physical form of product.
Eye	The electrolyte causes eye irritation and damage. Not normally a hazard due to physical form of product.
Chronic	The chemicals in this product are contained in a sealed case and exposure does not occur during normal handling and use. Not normally a hazard due to physical form of product.

WA3551.3Lithium Battery Pack	**TOXICITY**	**IRRITATION**
	Not Available	Not Available

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n-propylamine	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: 560 mg/kg[2]	Eye (Rodent - rabbit): 720ug - Severe
	Inhalation (Rat) LC50: 2310 ppm4h[2]	Eye: adverse effect observed (irritating)[1]
	Oral (Rat) LD50: ~370 mg/kg[1]	Skin (Rodent - rabbit): 100ug/24H
		Skin: adverse effect observed (corrosive)[1]
iron	**TOXICITY**	**IRRITATION**
	Oral (Rat) LD50: 98600 mg/kg[2]	Eye: no adverse effect observed (not irritating)[1]
		Skin: no adverse effect observed (not irritating)[1]
copper	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: 0.733 mg/l4h[1]	Skin: no adverse effect observed (not irritating)[1]
	Oral (Mouse) LD50; 0.7 mg/kg[2]	
carbon, activated	**TOXICITY**	**IRRITATION**
	Oral (Rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
		Skin: no adverse effect observed (not irritating)[1]
glass fibres	**TOXICITY**	**IRRITATION**
	Not Available	Eye: no adverse effect observed (not irritating)[1]
		Skin: no adverse effect observed (not irritating)[1]
lithium nickel oxide	**TOXICITY**	**IRRITATION**
	Oral (Rat) LD50: >2000 mg/kg[1]	Eye: adverse effect observed (irreversible damage)[1]
		Skin: adverse effect observed (corrosive)[1]
aluminium	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: >2.3 mg/l4h[1]	Eye: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: >2000 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]
nickel	**TOXICITY**	**IRRITATION**
	Oral (Rat) LD50: 5000 mg/kg[2]	Skin (Human): 5pph/48H - Severe
lithium manganate	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
dimethyl carbonate	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: >5.36 mg/l4h[1]	Skin: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: >5000 mg/kg[1]	
manganese	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: >5.14 mg/l4h[1]	Eye (Rodent - rabbit): 500mg/24H - Mild
	Oral (Rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
		Skin (Rodent - rabbit): 500mg/24H - Mild
		Skin: no adverse effect observed (not irritating)[1]
lithium cobaltate	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: 5.05 mg/l4h[1]	Skin: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: >5000 mg/kg[1]	

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polyethylene	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Not Available
	Oral (Rat) LD50: >2000 mg/kg[1]	
oxygen	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
lithium fluorophosphate	**TOXICITY**	**IRRITATION**
	Oral (Rat) LD50: 50-300 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
		Skin: adverse effect observed (corrosive)[1]
ethylene carbonate	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
	Oral (Rat) LD50: >2000 mg/kg[1]	Skin (Rodent - rabbit): 660mg - Mild
		Skin: no adverse effect observed (not irritating)[1]
ethyl methyl carbonate	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: >17.6 mg/l4h[1]	Not Available
	Oral (Rat) LD50: >5000 mg/kg[1]	
polypropylene	**TOXICITY**	**IRRITATION**
	Oral (Mouse) LD50; 3200 mg/kg[2]	Not Available
polyethylene terephthalate	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
carbon black	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: >2000 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]
vinylidene fluoride homopolymer	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
ethylene/ vinyl acetate copolymer	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
acrylic acid/ butyl acrylate/ 2-ethylhexyl acrylate/ vinyl acetate	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
fluoroethylene carbonate	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Not Available
	Oral (Rat) LD50: ~500 mg/kg[1]	
sodium carboxymethylcellulose	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >2000 mg/kg[2]	Not Available
	Inhalation (Rat) LC50: >5.8 mg/L4h[2]	
	Oral (Guinea) LD50; 16000 mg/kg[2]	
succinonitrile	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Oral (Mouse) LD50; 129 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]
vinyl N-octadecylcarbamate homopolymer	**TOXICITY**	**IRRITATION**
	Not Available	Not Available

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styrene/ butadiene rubber	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >20000 mg/kg[2]	Eye (Rodent - rabbit): 500mg/24H - Mild
	Oral (Rat) LD50: 71000 mg/kg[2]	Skin (Rodent - rabbit): 500mg - Mild
titanium dioxide	**TOXICITY**	**IRRITATION**
	dermal (hamster) LD50: >=10000 mg/kg[2]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: >2.28 mg/l4h[1]	Skin (Human): 300ug/3D (intermittent) - Mild
	Oral (Rat) LD50: >=2000 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]
talc	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: >2.1 mg/l4h[1]	Skin (Human): 300ug/3D (intermittent) - Mild
	Oral (Rat) LD50: >5000 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]
ABS/ methylmethacrylate polymer	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
poly(butadiene-co-methacrylic acid-co-styrene)	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
fatty acids, coco/ pentaerythritol/ phthalic anhydride/ benzoic acid	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
1,4-butylene terephthalate homopolymer	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
lithium fluoroborate	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Not Available
	Oral (Rat) LD50: ~500 mg/kg[1]	
styrene/ butadiene/ acrylonitrile copolymer	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: 5010 mg/kg[2]	Not Available
	Oral (Rat) LD50: 5010 mg/kg[2]	
C.I. Pigment Yellow 139	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2500 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: >5.42 mg/l4h[1]	Skin: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: >10000 mg/kg[2]	
magnesium	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: >2.1 mg/l4h[1]	Skin: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: >2000 mg/kg[1]	
Legend:	***1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances***	

N-PROPYLAMINE	Primary irritation recorded. Human health effects data are available for the C1-C13 primary amines. In some cases (repeated dose and reproductive toxicity), the tested substance was the salt of amines to avoid damage to the gastrointestinal tract following gavage administration due to the caustic mode of action. Testing the salt also provides the ability to distinguish between symptoms caused by local effects such as irritation or corrosion and symptoms that are due to systemic toxicity. Observed corrosive properties overwhelm the systemic toxicity of the primary amines in most cases including acute toxicity; the known acute oral and dermal effects are generally related to the alkaline properties and are expected to be a general feature of the category. Structure-activity similarities for mammalian toxicity and structure-activity relationships (SAR) shown for aquatic toxicity endpoints lend support to the category Acute toxicity Acute inhalation toxicity studies are available for most members

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Four hour vapour LC50 values(rat) range from <1548 mg/m3 (2-ethylhexylamine) to 9,800 mg/m3 (males, ethylamine). Clinical signs and findings at gross necropsy were consistent with generally severe local effects of eye and respiratory irritation, respiratory distress and lung damage; similar effects of irritation were not seen following a 6-hour exposure to 2460 mg/m3 1-amino-2-propanol The effects observed in most cases were quite severe due to the corrosive nature of the substances tested.
Dermal LD50 values (rat or rabbit) are available for most members Dermal LD50 values (for 24-hour covered contact) ranged from around 200 mg/kg bw (sec-butyl and octylamine) to 2000 mg/kg bw (3-methoxypropylamine).
Severe skin necrosis at the site of application was noted in most studies. Similar results including severe skin necrosis would be expected for all substances based on structural similarities
Acute oral LD50 values in rats range between 122 mg/kg bw (isopropylamine)and approximately 2813 mg/kg bw (1-amino-2-propanol).In the acute oral studies, most deaths occurred on day 1; clinical signs generally included salivation, breathing abnormalities, oral-nasal staining, decreased defecation, diarrhea, polyuria, piloerection, decreased activity, convulsions, ataxia, rough hair coat, urine stains and dehydration. Site of contact effects (irritation) were noted in the gastrointestinal tract at gross necropsy in some studies.
Irritation
Reliable skin irritation studies are available for most category members All tested category members were corrosive to skin. Based on the available data and known eye irritation potential of alkyl amines in general, it is expected that all the amines in the category are corrosive to the eye
The C10-C13 primary amines are known irritants of the human respiratory tract; supporting animal data confirm this finding.Sensitization
There was no evidence of positive sensitization results at the concentrations tested in animal studies for isopropylamine, butylamine, octylamine, 3-methoxypropylamine, or 1-amino-2-propanol. There were no data located for methylamine, ethylamine, sec-butylamine, tert-butylamine, 2-ethylhexylamine, 4,4'-methylenebis cyclohexylamine, a similar lack of skin sensitization potential is expected for these substances.
Repeated dose toxicity
Local effects (irritation of the respiratory tract and mucous membranes) are the major effects following repeated inhalation exposure (methylamine, ethylamine, isopropylamine and tert-butylamine).This occurred in rats exposed to 96 mg/m3 of methylamine for 10 days, or to 200 mg/m3 of tert-butylamine for 13 weeks, and at higher concentrations of ethylamine and isopropylamine.Systemic effects (changes in clinical chemistry parameters) were also noted following repeated dose inhalation of tert-butylamine at 200 mg/m3. The oral NOAEL in rats were 15 mg/kg bw/d for 4,4 -methylenebis cyclohexylamine,500 mg/kg bw/day as methylamine hydrochloride; CAS No. 593-51-1; 100 mg/kg bw for octylamine (as the hydrochloride, CAS No 142-95-0), 300 mg/kg bw/ d for 1-amino-2-propanol (as the hydrochloride; CAS No. 7780-04-3)and 1000 mg/kg bw/day (females) for 3-methoxypropylamine (as the hydrochloride; CAS No. 18600-41-4). The effects observed in these studies included reductions in body weight, body weight gain, and food consumption; and/or changes in blood, urine and clinical chemistry parameters, as well as histopathological findings in various organs with 4,4 -methylenebis-cyclohexylamine.Similar effects following repeated exposure are expected for the remaining members (sec-butylamine, butylamine and 2-ethylhexylamine) are expected. For those category members for which read-across is applied, the lowest NOAEC/NOAEL level is used.
Genetic toxicity
All of the members of the category have been tested in the Ames test and no evidence of mutagenic potential was detected with the exception of 1-amino-2-propanol which was positive in one bacterial mutagenicity assay with Salmonella TA1535 with activation; the second bacterial mutagenicity assay was negative.Of the five compounds evaluated in a mouse lymphoma assay, all but methylamine gave negative results. Four of these five, including methylamine, have been examined in micronucleus tests in rodents and none showed any evidence of clastogenic activity. 1-Amino-2-propanol was negative in a mammalian gene mutation assay and an in vitro chromosomal aberration assay.4,4'-methylenebis cyclohexylamine-was negative in two in vivo micronucleus assays. A third micronucleus assay (with experimental limitations) was positive; data for clastogenicity are equivocal for this substance. The weight-of-evidence suggests the category members are not mutagenic.
Reproductive toxicity
Effects on fertility
Reproductive toxicity has been directly investigated following inhalation or oral (gavage) exposure on eight members of the category. Following oral (gavage) exposure, no reproductive toxicological potential was detected for octylamine, propylamine, 3-methoxypropylamine or 1-amino 2-propanol, (each tested as the hydrochloride). 4,4 -methylenebis cyclohexylamine reduced the number of implantation sites in an OECD 422 study in rats at an oral dose of 50 mg/kg bw/day that also produced other indications of parental systemic toxicity. No reproductive or systemic toxicity occurred at 15 mg/kg bw/day. Methylamine (as the hydrochloride), in an oral (gavage) OECD 422 study did produce adverse reproductive effects at 1000 mg/kg bw/day, a dose that also produced overt indications of parental toxicity. The NOAEL for systemic and reproductive toxicity was considered to be 500 mg/kg bw/day. Following inhalation exposure, no reproductive toxicological potential was detected for isopropylamine in a one generation study with rats. Reproductive toxicity has also been investigated as part of repeated dose inhalation studies. In a 24-week repeated dose inhalation toxicity study, ethylamine did not adversely effect male and female gonads up to 922 mg/m3. In a 13-week repeated dose inhalation toxicity test, tert-Butylamine produced no adverse effects on the testes up to 2000 mg/m3. Substances that have not been tested for reproductive toxicity (butylamine,sec-butylamine,and , 2-ethylhexyl)hexylamine are not expected to be reproductive toxicants based on read across to other category members.
Developmental toxicity
Developmental toxicity has been investigated following inhalation and oral (gavage) exposures in rats. An inhalation study found isopropylamine not to be foetotoxic in rats at test concentrations that also produced maternal toxicity; administration of butylamine by the inhalation route was associated with significant respiratory tract (portal of entry) irritation of the dams at even the lowest tested concentration of 50 mg/m3, while fetal effects were not observed at the highest test concentration of 450 mg/m3. Rat studies involving repeated oral exposures to methylamine, octylamine, 3-methoxypropylamine, and 1-amino- 2-propanol (each tested as the hydrochloride) or 4,4 -methylenebis cyclohexylamine,during pregnancy identified no evidence of developmental toxicity potential.
Butylamine (tested as the hydrochloride, CAS 3858-78-4) produced fetal malformations in rats at an oral gavage dose of 400 mg/kg bw/day that was not overtly toxic to the dams.
Rat studies involving repeated inhalation exposures to isopropylamine, or butylamine during pregnancy identified no evidence of developmental toxic potential.The reported developmental effects of butylamine (as the hydrochloride salt) are therefore expected to be route specific occurring only after oral exposure.For those substances where data exist for

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	developmental toxicity, the results indicate a lack of effect with the exception of butylamine, which was negative by inhalation but positive when administered as the hydrochloride salt by oral (gavage). Taking a precautionary approach, ethylamine, sec-butylamine, tert-butylamine and 2-ethylhexylamine are regarded as potential developmental toxicants when administered by the oral (gavage) route. Toxicokinetics The C10-C13 primary amines may be absorbed through the skin up to chain length of about six carbon atoms. The charged form will hinder absorption across biological membranes, and the corrosive properties of the substances may also affect absorption. Dermal exposures to dilute solutions, aerosols and vapours might not have sufficient base capacity to overwhelm the skin's natural acidity and only a few of these molecules exist as the uncharged free base. In situations where the majority of the molecules would exist as the free base on the skin, the individual would experience a chemical burn. At the pH of the GI tract, only limited, non-ionized compound would be absorbed.Following inhalation, the C10-C13 primary amines will be removed by dissolution in the upper respiratory tract and swallowed. Vapors or particulates that get to the deep lungs will be primarily in the charged form which is expected to slow absorption somewhat and contribute to the local metabolism of these C10-C13 primary amines by alveolar and bronchiolar tissues. The major routes of metabolism of C10-C13 primary amines involve various processes including oxidation, conjugation, and other enzyme-catalyzed reactions leading to detoxification and excretion. Additionally, N-acetylation may occur, but represents only a very minor pathway in the metabolism of aliphatic amines.Methylamine, which has the amino group attached to a methyl group rather than a methylene group, is not a substrate for monoamine oxidase. Pharmacokinetic studies have indicated that a substantial amount of methylamine is oxidized to carbon dioxide, even though some is excreted unchanged in expired air and urine. Although metabolic pathways have not been identified for tert-butylamine, it is expected, based on its structure, to have a different metabolic pathway than the other members of the category Note: Category members are structurally similar showing trend in physical-chemical properties and ecotoxicity and similar toxicological properties. This category is defined as below: · A structure that contains only aliphatic organic substituents that are linear, branched or cyclic · Molecular weights from approximately 30 to 250 Dalton, classifying these primary amines as low molecular weight aliphatic amines · Incremental structural change across the group consisting of an increasing number of atoms in the molecular backbone; moderate branching is acceptable. The change is restricted to adding elements that do not greatly change the physicochemical properties of the amino moiety, as evidenced by the consistency of pKa values within the narrow range of 9.86 to 10.87. SIDS Initial Assessment Profile C1-13 Primary Amines April 2011
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 Sprague-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 NOAEL 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 Sprague-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 NOAEL of copper monochloride for fertility toxicity was 80 mg/kg bw/day for the parental animals. No treatment-related effects were observed on the reproductive organs and the fertility parameters assessed. For developmental toxicity the NOAEL was 20 mg/kg bw/day. Three of 120 pups appeared to have icterus at birth; 4 of 120 pups appeared runted at the highest dose tested (80 mg/kg bw/day).
GLASS FIBRES	The dust has been associated with skin irritation due to the mechanical action of the fibres [CHEMINFO, Sax, ILO ENCYCLOPAEDIA]. MMMF are manufactured to definite fibre diameters and cannot split along their length rather they break across and form small particles not needles [FARIMA].

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	Borosilicate ingredients are insoluble, inert, and will not significantly penetrate the skin. The metal cations (such as lead, zinc, silver are secure in the molecules and will not be bioavailable. Therefore, there would not be any systemic toxicity expected from dermal application or contact. These ingredients are not dermal irritants or sensitizers. Borosilicate use in personal care products introduces the possibility of inhalation exposure. The particle size of borosilicate glasses was reported to range from 50 nm – 1000 um with the largest portion being in the 50 – 300 um range. The sizes of a substantial majority of the particles of these ingredients, as manufactured, are larger than the respirable range and/or aggregate and agglomerate to form much larger particles in formulation. These ingredients are reportedly used at concentrations up to 4% in cosmetic products that may be aerosolized and up to 97% in products that may become airborne. Around 95% – 99% of droplets/particles would not be respirable to any appreciable amount. Coupled with the small actual exposure in the breathing zone and the short exposure time, this information indicates that incidental inhalation would not be a significant route of exposure that might lead to local respiratory or systemic toxic effects. Notably there is a lack of irritation or sensitization in tests of dermal exposure, no systemic toxicity at 5000 mg/kg, and the absence of genotoxicity in an Ames test for a supernatant of the related chemical calcium borosilicate. Borosilicate glasses are chemically inert and thus not systemically toxic. The substance is classified by IARC as Group 3: NOT classifiable as to its carcinogenicity to humans. For fibre glass wool: In October 2001, IARC classified fiber glass wool as Group 3, "not classifiable as to its carcinogenicity to humans." The 2001 decision was based on current human and animal research that shows no association between inhalation exposure to dust from fibre glass wool and the development of respiratory disease. This is a reversal of the IARC finding in 1987 of a Group 2B designation (possibly carcinogenic to humans) based on earlier studies in which animals were injected with large quantities of fiber glass. NTP and ACGIH have not yet reviewed the IARC reclassification or the most current fibre glass health research; at this time, both agencies continue to classify glass wool based on the earlier animal injection studies. There is little evidence for acute toxicity after inhalation of rockwool/ slagwool/ glasswool mineral fibres (MMMF). Rockwool/glasswool administered by inhalation produced little pulmonary fibrosis in experimental animals. [IARC Monograph 43] Animal studies with amorphous silica show that surviving rats rapidly recovered on removal from dust, the silica was largely eliminated and cellular nodules, perivascular infiltrations and emphysema were almost completely resolved [Patty's]. The dust has been associated with skin irritation due to the mechanical action of the fibres [CHEMINFO, Sax, ILO ENCYCLOPEDIA]. MMMF are manufactured to definite diameters and cannot split along their length rather they break across and form small particles not needles [FARIMA].
NICKEL	Oral (rat) TDLo: 500 mg/kg/5D-I Inhalation (rat) TCLo: 0.1 mg/m3/24H/17W-C Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [***National Toxicology Program: U.S. Dep. of Health & Human Services 2002***]
MANGANESE	The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
LITHIUM COBALTATE	Allergic reactions which develop in the respiratory passages as bronchial asthma or rhinoconjunctivitis, are mostly the result of reactions of the allergen with specific antibodies of the IgE class and belong in their reaction rates to the manifestation of the immediate type. In addition to the allergen-specific potential for causing respiratory sensitisation, the amount of the allergen, the exposure period and the genetically determined disposition of the exposed person are likely to be decisive. Factors which increase the sensitivity of the mucosa may play a role in predisposing a person to allergy. They may be genetically determined or acquired, for example, during infections or exposure to irritant substances. Immunologically the low molecular weight substances become complete allergens in the organism either by binding to peptides or proteins (haptens) or after metabolism (prohaptens). Particular attention is drawn to so-called atopic diathesis which is characterised by an increased susceptibility to allergic rhinitis, allergic bronchial asthma and atopic eczema (neurodermatitis) which is associated with increased IgE synthesis. Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved. Such allergy is of the delayed type with onset up to four hours following exposure. Goitrogenic:. Goitrogens are substances that suppress the function of the thyroid gland by interfering with iodine uptake, which can, as a result, cause an enlargement of the thyroid, i.e., a goitre Goitrogens include: ▸ Vitexin, a flavanoid, which inhibits thyroid peroxidase thus contributing to goiter. ▸ Ions such as thiocyanate and perchlorate which decrease iodide uptake by competitive inhibition; as a consequence of reduced thyroxine and triiodothyronine secretion by the gland, at low doses, this causes an increased release of thyrotropin (by reduced negative feedback), which then stimulates the gland. ▸ Lithium which inhibits thyroid hormone release. ▸ Certain foods, such as soy and millet (containing vitexins) and vegetables in the genus Brassica (e.g. broccoli, brussels sprouts, cabbage, horseradish). ▸ Caffeine (in coffee, tea, cola, chocolate) which acts on thyroid function as a suppressant.
POLYETHYLENE	polyethylene pyrolyzate Inclusion of polyethylene in the diet of rats at 8 g/kg/day did not result in treatment-related effects. Polyethylene implanted into rats and mice has reportedly caused local tumorigenic activity at doses of 33 to 2120 mg/kg, but the relevance to human exposure is not certain.
OXYGEN	Inhalation (human) TCLo: 100pph (100%)/14hNil reported
ETHYLENE CARBONATE	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. for ethylene carbonate **Mammalian toxicity:** Reliable acute toxicity tests are available on ethylene carbonate. Ethylene carbonate is practically nontoxic following acute oral exposure in a test that meets OECD and EPA test guidelines; the LD50 is >5000 mg/kg. The dermal LD50 is >2000 mg/kg, in a test that meets OECD and EPA test guidelines.

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	Ethylene carbonate is rapidly metabolized to ethylene glycol. Following gavage administration to rats, ethylene carbonate is rapidly converted into ethylene glycol; the half-life for disappearance of ethylene carbonate from blood was 0.25 hours. As a result, the mammalian toxicity of ethylene carbonate is nearly identical to that of ethylene glycol for endpoints where both have been tested Ethylene carbonate was mixed in the diet of 26 male and 26 female Crl: CD(SD) rats for 18 months at concentrations of 25,000 ppm for males and females and 50,000 ppm for females; males were also fed 50,000 ppm for 42 weeks, and 40,000 ppm for 16 weeks. Survivors were observed to 24 months. Compound intake (mg/kg/day) was not reported, but is estimated to be approximately 250 and 500 mg/kg/day. No toxic effects were found in females, but increased mortality was seen in males at both dose levels. No high-dose males survived week 60 and only 10 low-dose males survived to week 78. Males had severe nephrotoxicity, characteristic of ethylene glycol toxicity. The following ***in vitro*** genotoxicity tests were conducted on ethylene carbonate, without indications of genotoxicity: an Ames mutagenicity assay, an unscheduled DNA synthesis assay using rat hepatocytes, and a cell transformation assay using BALB/3T3 cells. No ***in vivo*** genotoxicity studies on ethylene carbonate were found; however, ethylene glycol has been tested and was negative in a rat dominant lethal assay. Gavage administration of ethylene carbonate to pregnant rats days 6-15 of gestation resulted in systemic toxicity at doses of 3000 mg/kg/day, including post-dose salivation. The NOAEL for maternal toxicity was 1500 mg/kg/day. Similar to ethylene glycol, there were increased soft tissue (hydrocephalus, umbilical herniation, gastroschisis, cleft palate, misshapen and compressed stomach) and skeletal malformations at 3000 mg/kg/day, but not at 1500 mg/kg/day. For ethylene glycol: Ethylene glycol is quickly and extensively absorbed throughout the gastrointestinal tract. Limited information suggests that it is also absorbed through the airways; absorption through skin is apparently slow. Following absorption, it is distributed throughout the body. In humans, it is initially metabolized by alcohol dehydrogenase to form glycoaldehyde, which is rapidly converted to glycolic acid and glyoxal. These breakdown products are oxidized to glyoxylate, which may be further metabolized to formic acid, oxalic acid, and glycine. Breakdown of both glycine and formic acid can generate carbon dioxide, which is one of the major elimination products of ethylene glycol. In addition to exhaled carbon dioxide, ethylene glycol is eliminated in the urine as both the parent compound and glycolic acid. Elimination is rapid and occurs within a few hours. Respiratory effects: Respiratory system involvement occurs 12-24 hours after swallowing sufficient amounts of ethylene glycol. Symptoms include hyperventilation, shallow rapid breathing, and generalized swelling of the lungs with calcium oxalate deposits occasionally appearing in the lungs. Respiratory system involvement appears to be dose-dependent and occurs at the same time as cardiovascular changes. Later, there may be other changes compatible with adult respiratory distress syndrome (ARDS). Swelling of the lung can be a result of heart failure, ARDS, or aspiration of stomach contents. Symptoms related to acidosis such as fast or excessive breathing are frequently observed; however, major symptoms such as swelling of the lung and inflammation of the bronchi and lungs are relatively rare, and are usually seen only in extreme poisoning. Cardiovascular effects: Cardiovascular system involvement in humans occurs at the same time as respiratory system involvement, during the second phase of ethylene glycol poisoning by swallowing, which is 12-24 hours after acute exposure. The symptoms of poisoning involving the heart include increased heart rate, heart enlargement and ventricular gallop. There may also be high or low blood pressure, which may progress to cardiogenic shock. In lethal cases, inflammation of the heart muscle has been observed at autopsy. Cardiovascular involvement appears to be rare and usually seen after swallowing higher doses of ethylene glycol. In summary, acute exposure to high levels of ethylene glycol can cause serious cardiovascular effects in humans. The effects of a long-term, low-dose exposure are unknown. Gastrointestinal effects: Common early acute effects of swallowing ethylene glycol include nausea, vomiting with or without blood, heartburn and abdominal cramping and pain. One patient showed intermittent diarrhea and pain, and after surgery, deposition of oxalate crystals was shown to have occurred. Musculoskeletal effects: Reported musculoskeletal effects in cases of acute ethylene glycol poisoning include diffuse muscle tenderness and pain, associated with high levels of creatinine in the blood, and jerks and contractions associated with low calcium. Liver effects: Autopsies carried out on people who died following acute ethylene glycol poisoning showed deposition of calcium oxalate in the liver as well as hydropic and fatty degeneration and cell death (necrosis) of the liver. Kidney effects: Adverse kidney effects are seen during the third stage of ethylene glycol poisoning, 2-3 days after acute exposure. Calcium oxalate crystals are deposited in the tubules and are seen in the urine. There may also be degeneration and death of tubule cells, and inflammation of the tubule interstitium. If untreated, the degree of kidney damage progresses and leads to blood and protein in the urine, decreased kidney function, reduction in urine output and ultimately, kidney failure. With adequate supportive therapy, kidney function can return to normal or near normal. Metabolic effects: Metabolic changes can occur within 12 hours of exposure to ethylene glycol. There may be metabolic acidosis, caused by accumulation of glycolic acid in the blood and therefore a reduction in blood pH. The anion gap is increased, due to increased unmeasured anions (mainly glycolate). Effects on the nervous system: Adverse reactions involving the nervous system are among the first symptoms to appear in humans after ethylene glycol is swallowed. These early effects are also the only symptoms caused by unmetabolised ethylene glycol. Together with metabolic effects (see above), they occur from 0.5-12 hours after exposure and are considered to be part of the first stage in ethylene glycol poisoning. Inco-ordination, slurred speech, confusion and sleepiness are common in the early stages, as are irritation, restlessness and disorientation. Later, there may be effects on cranial nerves (which may be reversible over many months). Swelling of the brain (cerebrum) and crystal deposits of calcium oxalate in the walls of the small blood vessels of the brain were found at autopsy in people who died after acute ethylene glycol poisoning. Reproductive effects: Animal testing showed that ethylene glycol may affect fertility, survival of fetuses and the male reproductive organs. Effects on development: Animal studies indicate that birth defects may occur after exposure in pregnancy; there may also be reduction in foetal weight. Cancer: No studies are known regarding cancer effects in humans or animal, after skin exposure to ethylene glycol. Genetic toxicity: No human studies available, but animal testing results are consistently negative.
POLYPROPYLENE	* For pyrolyzate
POLYETHYLENE TEREPHTHALATE	PET might yield endocrine disruptors under conditions of common use . Proposed mechanisms include leaching of phthalates as well as leaching of antimony (a catalyst used in its production). For polyethylene terephthalate (PET polyesters) and its derivatives

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	No adverse effects described in animals from short exposures by inhalation, ingestion or skin contact. Animal testing indicates that this compound does not have carcinogenic mutagenic, embryotoxic, nor reproductive effects. * DuPont Acetaldehyde forms by degradation of PET through the mishandling of the material. At high temperatures, (PET decomposes above 300 C or 570 F), high pressures, extruder speeds (excessive shear flow raises temperature) and long barrel residence times all contribute to the production of acetaldehyde. When acetaldehyde is produced, some of it remains dissolved in the walls of a container and then diffuses into the product stored inside, altering the taste and aroma. For bottled water low acetaldehyde content is quite important, because if nothing masks the aroma, even extremely low concentrations (10–20 parts per billion in the water) of acetaldehyde can produce an off-taste. Is is suggested that polyethylene terephthlatae (PET) may yield endocrine disruptors under conditions of common use . Proposed mechanisms include leaching of phthalates as well as leaching of antimony (a catalyst used in its production. However phthalate ester plasticizers are not used to manufacture polyethylene terephthalate. Some reports of phthalate esters in PET bottled water containers suggest that these might originated from contamination of the bottled water, or from phthalate ester contamination of recycled PET used in manufacturing water and beverage containers. When comparing water of the same spring that is packed in glass or plastic bottles made of polyethylene terephthalate (PET), one study found estrogenic activity is three times higher in water from plastic bottles. These data support the hypothesis that PET packaging materials are a source of estrogen-like compounds. Furthermore, the findings presented here conform to previous studies and indicate that the contamination of bottled water with endocrine disruptors is a transnational phenomenon. Endocrine disruptors in bottled mineral water: Estrogenic activity in the E-Screen: Martin Wagnerand Jörg Oehlmann: The Journal of Steroid Biochemistry and Molecular Biology Volume 127, Issues 1–2, October 2011, Pages 128-135 An article published in Journal of Environmental Monitoring in April 2012 concludes that antimony concentration in deionized water stored in PET bottles stays within EU's acceptable limit even if stored briefly at temperatures up to 60 deg C (140 deg F), while bottled contents (water or soft drinks) may occasionally exceed the EU limit after less than a year of storage at room temperature
CARBON BLACK	Inhalation (rat) TCLo: 50 mg/m3/6h/90D-I Nil reported
FLUOROETHYLENE CARBONATE	A study was performed to assess the skin sensitisation potential of Monofluoroethylene carbonate in the CBA/Ca strain mouse following topical application to the dorsal surface of the ear. The test material was considered to be a sensitiser under the conditions of the test. An inverse dose response relationship was noted in the Stimulation Index results. The reason for this is unknown but could be due to decreased bioactivity of the test material with increasing concentrations in dimethyl formamide, or due to immunosuppression at higher concentrations of test material. Genetic toxicity: in vitro Significant increases of revertant colonies were observed in Salmonella typhimurium TA98 in the presence of metabolic activation system and Salmonella typhimurium TA 100 in the absence and presence of metabolic activation system. It is concluded that Monofluoroethylene carbonate exhibited mutagenic activity in Salmonella typhimurium TA98, TA 100 under the conditions employed for this test. Genetic toxicity: in vivo Monofluoroethylene carbonate was cytotoxic to bone marrow cells, but did not show any indication of chromosomal damage and/or damage to the mitotic apparatus of the bone marrow target cells in female mice, treated intraperitoneally with it is concluded that Monofluoroethylene carbonate was cytotoxic to the bone marrow cells, but did not show any indication of chromosomal damage and/or damage to the mitotic apparatus of the bone marrow target cells in female mice, treated intraperitoneally with monofluoroethylene carbonate, up to 100 mg/kg bw., up to 100 mg/kg bw. *REACh Dossier
SODIUM CARBOXYMETHYLCELLULOSE	Neoplastic by RTECS criteria While thought to be uncommon, case reports of severe reactions to carboxymethylcellulose exist. In one such instance, a woman was known to experience anaphylaxis following exposure. Skin testing is believed to be a useful diagnostic tool for this purpose. Effects on inflammation, microbiota-related metabolic syndrome, and colitis are a subject of research Carboxymethyl cellulose has been found to cause inflammation of the gut, altering microbiota, and was found to be a triggering factor of inflammatory bowel diseases such as ulcerative colitis and Crohn's disease
SUCCINONITRILE	Spastic paralysis, convulsions, nausea, changes in urine composition, foetotoxicity, specific developmental abnormalities (central nervous system) recorded.
STYRENE/ BUTADIENE RUBBER	Occupational exposures in the rubber-manufacturing industry are carcinogenic to humans (Group 1).IARC Working Groups There is sufficient evidence in humans for the carcinogenicity of occupational exposures in the rubber-manufacturing industry. Occupational exposures in the rubber-manufacturing industry cause leukaemia, lymphoma, and cancers of the urinary bladder, lung, and stomach. Also, a positive association has been observed between occupational exposures in the rubber-manufacturing industry and cancers of the prostate, oesophagus, and larynx.IARC Working Group. The multiple genetic and cytogenetic effects observed among workers employed in the rubber-manufacturing industry provide strong evidence to support genotoxicity as one mechanism for the observed increase in cancer risks. However, due to the complexity and changing nature of the exposure mixture and the potential interactions between exposures in the rubber-manufacturing industry, other mechanisms are also likely to play a role. While it is clear that exposure to some agents in the rubber-manufacturing industry has been reduced over time, the results of recent cytogenetic studies continue to raise concerns about cancer risks. The rubber-manufacturing industry has used and still uses a wide variety of substances that belong to many different chemical categories, e.g. carbon black, aromatic amines, PAH, N-nitrosamines, mineral oils, other volatile organic compounds from curing fumes, trace amounts of monomers from synthetic rubber like 1,3-butadiene, acetonitrile, styrene, vinyl chloride, ethylene oxide, etc.. For this reason, it has been difficult to relate the observed cancer hazards in the rubber-manufacturing industry to exposure to specific chemicals.
TITANIUM DIOXIDE	* IUCLID Laboratory (in vitro) and animal studies show, exposure to the material may result in a possible risk of irreversible effects, with the possibility of producing mutation. For titanium dioxide: Humans can be exposed to titanium dioxide via inhalation, ingestion or dermal contact. In human lungs, the clearance kinetics of titanium dioxide is poorly characterized relative to that in experimental animals. (General particle characteristics and host factors that are considered to affect deposition and retention patterns of inhaled, poorly soluble particles such as titanium dioxide are summarized in the monograph on carbon black.) With regard to inhaled titanium dioxide, human data

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	are mainly available from case reports that showed deposits of titanium dioxide in lung tissue as well as in lymph nodes. A single clinical study of oral ingestion of fine titanium dioxide showed particle size-dependent absorption by the gastrointestinal tract and large interindividual variations in blood levels of titanium dioxide. Studies on the application of sunscreens containing ultrafine titanium dioxide to healthy skin of human volunteers revealed that titanium dioxide particles only penetrate into the outermost layers of the stratum corneum, suggesting that healthy skin is an effective barrier to titanium dioxide. There are no studies on penetration of titanium dioxide in compromised skin. Respiratory effects that have been observed among groups of titanium dioxide-exposed workers include decline in lung function, pleural disease with plaques and pleural thickening, and mild fibrotic changes. However, the workers in these studies were also exposed to asbestos and/or silica. No data were available on genotoxic effects in titanium dioxide-exposed humans. Many data on deposition, retention and clearance of titanium dioxide in experimental animals are available for the inhalation route. Titanium dioxide inhalation studies showed differences — both for normalized pulmonary burden (deposited mass per dry lung, mass per body weight) and clearance kinetics — among rodent species including rats of different size, age and strain. Clearance of titanium dioxide is also affected by pre-exposure to gaseous pollutants or co-exposure to cytotoxic aerosols. Differences in dose rate or clearance kinetics and the appearance of focal areas of high particle burden have been implicated in the higher toxic and inflammatory lung responses to intratracheally instilled vs inhaled titanium dioxide particles. Experimental studies with titanium dioxide have demonstrated that rodents experience dose-dependent impairment of alveolar macrophage-mediated clearance. Hamsters have the most efficient clearance of inhaled titanium dioxide. Ultrafine primary particles of titanium dioxide are more slowly cleared than their fine counterparts. Titanium dioxide causes varying degrees of inflammation and associated pulmonary effects including lung epithelial cell injury, cholesterol granulomas and fibrosis. Rodents experience stronger pulmonary effects after exposure to ultrafine titanium dioxide particles compared with fine particles on a mass basis. These differences are related to lung burden in terms of particle surface area, and are considered to result from impaired phagocytosis and sequestration of ultrafine particles into the interstitium. Fine titanium dioxide particles show minimal cytotoxicity to and inflammatory/pro-fibrotic mediator release from primary human alveolar macrophages in vitro compared with other particles. Ultrafine titanium dioxide particles inhibit phagocytosis of alveolar macrophages in vitro at mass dose concentrations at which this effect does not occur with fine titanium dioxide. In-vitro studies with fine and ultrafine titanium dioxide and purified DNA show induction of DNA damage that is suggestive of the generation of reactive oxygen species by both particle types. This effect is stronger for ultrafine than for fine titanium oxide, and is markedly enhanced by exposure to simulated sunlight/ultraviolet light. **Animal carcinogenicity data** Pigmentary and ultrafine titanium dioxide were tested for carcinogenicity by oral administration in mice and rats, by inhalation in rats and female mice, by intratracheal administration in hamsters and female rats and mice, by subcutaneous injection in rats and by intraperitoneal administration in male mice and female rats. In one inhalation study, the incidence of benign and malignant lung tumours was increased in female rats. In another inhalation study, the incidences of lung adenomas were increased in the high-dose groups of male and female rats. Cystic keratinizing lesions that were diagnosed as squamous-cell carcinomas but re-evaluated as non-neoplastic pulmonary keratinizing cysts were also observed in the high-dose groups of female rats. Two inhalation studies in rats and one in female mice were negative. Intratracheally instilled female rats showed an increased incidence of both benign and malignant lung tumours following treatment with two types of titanium dioxide. Tumour incidence was not increased in intratracheally instilled hamsters and female mice. In-vivo studies have shown enhanced micronucleus formation in bone marrow and peripheral blood lymphocytes of intraperitoneally instilled mice. Increased Hprt mutations were seen in lung epithelial cells isolated from titanium dioxide-instilled rats. In another study, no enhanced oxidative DNA damage was observed in lung tissues of rats that were intratracheally instilled with titanium dioxide. The results of most in-vitro genotoxicity studies with titanium dioxide were negative. The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
TALC	For talc (a form of magnesium silicate) The overuse of talc in nursing infants has resulted in pulmonary oedema, pneumonia and death within hours of inhaling talcum powder.The powder dries the mucous membranes of the bronchioles, disrupts pulmonary clearance, clogs smaller airways. Victims display wheezing, rapid or difficult breathing, increased pulse, cyanosis, fever. Mild exposure may cause relatively minor inflammatory lung disease. Long term exposure may show wheezing, weakness, productive cough, limited chest expansion, scattered rales, cyanosis.
POLY(BUTADIENE-CO-METHACRYLIC ACID-CO-STYRENE)	**WARNING:** This substance has been classified by the IARC as Group 1: **CARCINOGENIC TO HUMANS**.
STYRENE/ BUTADIENE/ ACRYLONITRILE COPOLYMER	Ultrafine particles (UFPs) may be produced at lower temperatures during the 3D printing process Concerns have been raised regarding airborne UFP concentrations generated while printing with ABS, as UFPs have been linked with adverse health effects
N-PROPYLAMINE & COPPER & LITHIUM NICKEL OXIDE & NICKEL & LITHIUM COBALTATE & FLUOROETHYLENE CARBONATE	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.
N-PROPYLAMINE & GLASS FIBRES & LITHIUM NICKEL OXIDE & LITHIUM FLUOROPHOSPHATE & ETHYLENE CARBONATE & SUCCINONITRILE & VINYL N-	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

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OCTADECYLCARBAMATE HOMOPOLYMER & TITANIUM DIOXIDE & TALC & LITHIUM FLUOROBORATE	inflammation, without eosinophilia. 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.
CARBON, ACTIVATED & ALUMINIUM & LITHIUM MANGANATE & LITHIUM COBALTATE & OXYGEN & LITHIUM FLUOROPHOSPHATE & ETHYL METHYL CARBONATE & POLYETHYLENE TEREPHTHALATE & CARBON BLACK & VINYLIDENE FLUORIDE HOMOPOLYMER & ETHYLENE/ VINYL ACETATE COPOLYMER & ACRYLIC ACID/ BUTYL ACRYLATE/ 2-ETHYLHEXYL ACRYLATE/ VINYL ACETATE & VINYL N-OCTADECYLCARBAMATE HOMOPOLYMER & TITANIUM DIOXIDE & TALC & ABS/ METHYLMETHACRYLATE POLYMER & POLY(BUTADIENE-CO-METHACRYLIC ACID-CO-STYRENE) & FATTY ACIDS, COCO/ PENTAERYTHRITOL/ PHTHALIC ANHYDRIDE/ BENZOIC ACID & 1,4-BUTYLENE TEREPHTHALATE HOMOPOLYMER & LITHIUM FLUOROBORATE & C.I. PIGMENT YELLOW 139	No significant acute toxicological data identified in literature search.
CARBON, ACTIVATED & GLASS FIBRES & POLYETHYLENE & POLYPROPYLENE & TALC & STYRENE/ BUTADIENE/ ACRYLONITRILE COPOLYMER	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.
NICKEL & CARBON BLACK & ACRYLIC ACID/ BUTYL ACRYLATE/ 2-ETHYLHEXYL ACRYLATE/ VINYL ACETATE & TITANIUM DIOXIDE	**WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
MANGANESE & ETHYLENE CARBONATE & STYRENE/ BUTADIENE RUBBER & TITANIUM DIOXIDE	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.
POLYETHYLENE & POLYPROPYLENE	For poly-alpha-olefins (PAOs): PAOs are highly branched isoparaffinic chemicals produced by oligomerisation of 1-octene, 1-decene, and/or 1-dodecene. The crude polyalphaolefin mixture is then distilled into appropriate product fractions to meet specific viscosity specifications and hydrogenated. Read across data exist for health effects endpoints from the following similar hydrogenated long chain branched alkanes derived from a C8, C10, and/or C12 alpha olefins: ▸ Decene homopolymer ▸ Decene/dodecene copolymer ▸ Octene/decene/dodecene copolymer ▸ Dodecene trimer The data for these structural analogs demonstrated no evidence of health effects. In addition, there is evidence in the literature that alkanes with 30 or more carbon atoms are unlikely to be absorbed when administered orally. The physicochemical data suggest that it is unlikely that significant absorption will occur. If a substance of the size and structure of a typical PAO is absorbed, then the principal mechanisms of absorption after oral administration are likely to be passive diffusion and absorption by way of the lymphatic system. The former requires both good lipid solubility and good water solubility as the substance has to partition from an aqueous environment through a lipophilic membrane into another aqueous environment during absorption. Absorption by way of the lymphatics occurs by mechanisms analogous to those that absorb fatty acids and is limited by the size of the molecule. Lipophilicity generally enhances the ability of chemicals to cross biological membranes. Biotransformation by mixed function oxidases often increases the water solubility of a substance; however, existing data suggest that these substances will not undergo oxidation to more hydrophilic metabolites. Finally, a chemical must have an active functional group that can interact chemically or physically with the target cell or receptor upon reaching it; there are no moieties in PAOs that represent a functional group that may have biological activity. The water solubilities of a C10 dimer PAO and a C12 trimer PAO were determined to be <1 ppb and < 1 ppt respectively. The partition coefficient for a C12 trimer PAO was determined to be log Kow of >7 . Given the very low water solubility it is

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extremely unlikely that PAOs will be absorbed by passive diffusion following oral administration, and the size of the molecules suggest that the extent of lymphatic absorption is likely to be very low. Although PAOs are relatively large lipophilic compounds, and molecular size may be a critical limiting determinant for absorption, there is some evidence that these substances are absorbed. However, the lack of observed toxicity in the studies with PAOs suggests that these products are absorbed poorly, if at all. Furthermore, a review of the literature regarding the absorption and metabolism of long chain alkanes indicates that alkanes with 30+ carbon atoms are unlikely to be absorbed. For example the absorption of squalane, an analogous C30 product, administered orally to male CD rats was examined - essentially all of the squalane was recovered unchanged in the faeces. At the same time, the hydrophobic properties of PAOs suggest that, should they be absorbed, they would undergo limited distribution in the aqueous systemic circulation and reach potential target organs in limited concentrations.
In addition to the general considerations discussed above, the low volatility of PAOs indicates that, under normal conditions of use or transportation, exposure by the inhalation route is unlikely. In particular, the high viscosity of these substances suggests that it would be difficult to generate a high concentration of respirable particles in the air.
Acute toxicity: PAOs (decene/dodecene copolymer, octene/decene/dodecene homo-polymer, and dodecene trimer) have been adequately tested for acute oral toxicity. There were no deaths when the test materials were administered at doses of 5,000 mg/kg (decene/dodecene copolymer and dodecene trimer) and at 2,000 mg/kg (octene/decene/dodecene copolymer) in rats. Overall, the acute oral LD50 for these substances was greater than the 2000 mg/kg limit dose, indicating a relatively low order of toxicity.
PAOs (decene/dodecene copolymer, octene/decene/dodecene copolymer, and dodecene trimer) have been tested for acute dermal toxicity. No mortality was observed for any substance when administered at the limit dose of 2000 or 5000 mg/kg. Overall, the acute dermal LD50 for these substances was greater than the 2000 mg/kg limit dose, indicating a relatively low order of toxicity.
1-Decene, homopolymer, is absorbed (unexpectedly for a high molecular weight polymer) to a moderate degree in rat skin and is eliminated slowly
PAOs (decene homopolymer, decene/dodecene copolymer, and decene trimer) have been tested for acute inhalation toxicity. Rats were exposed to aerosols of the substances at nominal atmospheric concentrations of 2.5, 5.0, and 5.06 mg/L, respectively, for four hours. These levels were the maximum attainable concentrations under the conditions of the tests, due to the low volatility and high viscosity of the test material. No mortality was noted, and all animals fully recovered following depuration. The lack of mortality at concentrations at or above the limit dose of 2.0 mg/L indicates a relatively low order of toxicity for these substances.
Repeat dose toxicity: Eight repeated-dose toxicity studies using two different animal species, rats and mice, and oral and dermal routes of administration have been conducted with three structural analogs. These data suggest that the structural analogs exhibit a low order of toxicity following repeated applications, due to their similarity in chemical structures and physicochemical properties.
One 28-day oral toxicity study in rats, one 90-day dermal and two 90-day dietary studies in rats, and a dermal carcinogenicity study in mice exist for decene homopolymer. A rat oral combined reproductive toxicity and 91-day systemic toxicity study was also conducted with decene homopolymer. In addition, 28-day rat oral toxicity studies exist for two structurally analogous substances (dodecene trimer and octene/decene/dodecene copolymer); and a 90-day rat dermal toxicity study exists for octene/decene/dodecene copolymer. Results from these studies show a low order of repeated dose toxicity. The dermal NOAEL for systemic toxicity studies was equal to or greater than 2000 mg/kg/day.
The oral NOAEL for 1-decene homopolymer is between 5,000 and 20,000 mg/kg/day in Sprague-Dawley rats.
Rats exposed repeatedly by dermal exposure at doses of 2000 mg/kg decene/dodecene copolymer showed increased incidences of hyperplasia of the sebaceous glands, hyperplasia/hyperkeratosis of the epidermis and dermal inflammation. These symptoms generally subsided within 2 weeks. Males showed decreased body weight gain and altered serum chemistry.
In a 90-day feeding study rats receiving 20000 ppm of 1-decene, homopolymer, hydrogenated did not exhibit any clinical signs of systemic toxicity. Marginal effects on clinical chemistry (glucose and ALT in males; sodium, phosphorus and calcium in females) were seen.
Reproductive toxicity: Data are available for decene homopolymer. Results from these studies show a low order of reproductive/ developmental toxicity. The NOAEL for reproductive toxicity was 1000 mg/kg/day, the highest concentration tested. The lack of effects on fertility in this study or effects on reproductive organs in this or other subchronic studies with closely related chemicals indicates that PAOs are unlikely to exert effects on reproduction.
Developmental toxicity: Decene homopolymer (with 10 ppm of an antioxidant) was administered once daily on gestation days 0-19 via dermal application to presumed-pregnant rats at doses of 0, 800, and 2000 mg/kg/day. Dermal administration of the test material did not adversely affect parameters of reproductive performance during gestation, nor did it adversely affect in utero survival and development of the offspring. The NOAEL in this study for developmental parameters was 2000 mg/kg/day.
Genotoxicity: Information for the following PAOs (decene homopolymer, octene/decene/dodecene copolymer, dodecene trimer; and decene/dodecene copolymer [prepared from 10% C12 and 90% C10 alpha olefins; approx. 33% trimer and 51% tetramer, 16% pentamer and higher]) is available. Either bacterial or mammalian gene mutation assays, in vitro chromosomal aberration assays, or in vivo chromosomal aberration assays have been conducted for these substances. Neither mutagenicity nor clastogenicity were exhibited by any of these substances in the referenced in vivo or in vitro tests, with or without metabolic activation.
Carcinogenicity: While alpha-olefin polymers have similar properties to mineral oils, they do not contain polycyclic aromatic hydrocarbons, or other known possible carcinogens.
Decene homopolymer produced no treatment-related tumors in C3H mice treated with a 50 ul/application twice weekly for 104 weeks. In addition, survival (56%) was greater than in any other group, including the untreated control.

Acute Toxicity	✔	**Carcinogenicity**	✔
Skin Irritation/Corrosion	✔	**Reproductivity**	✘
Serious Eye Damage/Irritation	✔	**STOT - Single Exposure**	✘

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Respiratory or Skin sensitisation	✔	**STOT - Repeated Exposure**	✔
Mutagenicity	✔	**Aspiration Hazard**	✘

Legend: ✘ ***– Data either not available or does not fill the criteria for classification***
✔ ***– Data available to make classification***

SECTION 12 Ecological information

Toxicity

WA3551.3Lithium Battery Pack

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

n-propylamine

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	0.12mg/l	2
EC50	48h	Crustacea	70.7mg/l	2
NOEC(ECx)	72h	Algae or other aquatic plants	0.01mg/l	2
LC50	96h	Fish	~46mg/l	2

iron

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	18mg/l	2
EC50	48h	Crustacea	>100mg/l	2
NOEC(ECx)	48h	Algae or other aquatic plants	0.1-4mg/l	4
LC50	96h	Fish	0.005-0.008mg/L	4

copper

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	0.011-0.017mg/L	4
EC50	48h	Crustacea	<0.001mg/L	4
EC50	96h	Algae or other aquatic plants	0.03-0.058mg/l	4
NOEC(ECx)	48h	Fish	<0.001mg/L	4
LC50	96h	Fish	0.003mg/L	2

carbon, activated

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	48h	Crustacea	>10mg/l	2
EC50(ECx)	48h	Crustacea	>10mg/l	2

glass fibres

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>1000mg/l	2
NOEC(ECx)	72h	Crustacea	>=1000mg/l	2
LC50	96h	Fish	>1000mg/l	2

lithium nickel oxide

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

aluminium

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	0.017mg/L	2
EC50	48h	Crustacea	0.736mg/L	2
EC50	96h	Algae or other aquatic plants	0.005mg/L	2
NOEC(ECx)	72h	Algae or other aquatic plants	>100mg/l	1
LC50	96h	Fish	0.078-0.108mg/l	2

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nickel

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	0.18mg/l	1
EC50	48h	Crustacea	>100mg/l	1
EC50	96h	Algae or other aquatic plants	0.174-0.311mg/L	4
EC50(ECx)	72h	Algae or other aquatic plants	0.18mg/l	1
LC50	96h	Fish	0.06mg/L	4

lithium manganate

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

dimethyl carbonate

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>57.29mg/l	2
EC50	48h	Crustacea	>74.16mg/l	2
EC50	96h	Algae or other aquatic plants	166.6-211mg/l	2
NOEC(ECx)	504h	Crustacea	25mg/l	2
LC50	96h	Fish	>=100mg/l	2

manganese

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	2.8mg/l	2
EC50	48h	Crustacea	>1.6mg/l	2
NOEC(ECx)	504h	Algae or other aquatic plants	0.05-3.7mg/l	4
LC50	96h	Fish	>3.6mg/l	2

lithium cobaltate

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	0.029mg/L	2
EC50	48h	Crustacea	0.241mg/L	2
EC10(ECx)	168h	Crustacea	0.001mg/L	2
EC50	96h	Algae or other aquatic plants	23.8mg/l	2
LC50	96h	Fish	0.8mg/l	2

polyethylene

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

oxygen

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

lithium fluorophosphate

Endpoint	Test Duration (hr)	Species	Value	Source
NOEC(ECx)	528h	Fish	0.2mg/l	2
EC50	72h	Algae or other aquatic plants	62mg/l	2
EC50	48h	Crustacea	98mg/l	2
EC50	96h	Algae or other aquatic plants	43mg/l	2
LC50	96h	Fish	42mg/l	2

ethylene carbonate

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>100mg/l	2
EC50	48h	Crustacea	>100mg/l	2
LC50	96h	Fish	>100mg/l	2
NOEC(ECx)	72h	Algae or other aquatic plants	100mg/l	2

ethyl methyl carbonate

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>62mg/l	2
EC50	48h	Crustacea	>100mg/l	2
NOEC(ECx)	72h	Algae or other aquatic plants	62mg/l	2
LC50	96h	Fish	>100mg/l	2

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polypropylene

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

polyethylene terephthalate

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

carbon black

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>0.2mg/l	2
EC50	48h	Crustacea	33.076-41.968mg/l	4
NOEC(ECx)	24h	Crustacea	3200mg/l	1
LC50	96h	Fish	>100mg/l	2

vinylidene fluoride homopolymer

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

ethylene/ vinyl acetate copolymer

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

acrylic acid/ butyl acrylate/ 2-ethylhexyl acrylate/ vinyl acetate

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

fluoroethylene carbonate

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	6.3mg/l	2
EC50	48h	Crustacea	8.4mg/l	Not Available
NOEC(ECx)	48h	Crustacea	2.8mg/l	Not Available
LC50	96h	Fish	6-60mg/l	Not Available

sodium carboxymethylcellulose

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	48h	Crustacea	46.04-165.37mg/l	4
EC50(ECx)	48h	Crustacea	46.04-165.37mg/l	4
LC50	96h	Fish	>20000mg/L	4

succinonitrile

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	48h	Crustacea	>100mg/l	2
NOEC(ECx)	504h	Crustacea	0.784mg/l	2
LC50	96h	Fish	>100mg/l	2

vinyl N-octadecylcarbamate homopolymer

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

styrene/ butadiene rubber

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

Continued...

titanium dioxide	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	BCF	1008h	Fish	<1.1-9.6	7
	EC50	72h	Algae or other aquatic plants	3.75-7.58mg/l	4
	EC50	48h	Crustacea	1.9mg/l	2
	NOEC(ECx)	672h	Fish	>=0.004mg/L	2
	EC50	96h	Algae or other aquatic plants	179.05mg/l	2
	LC50	96h	Fish	1.85-3.06mg/l	4
talc	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	NOEC(ECx)	720h	Algae or other aquatic plants	918.089mg/l	2
	EC50	96h	Algae or other aquatic plants	7202.7mg/l	2
	LC50	96h	Fish	89581.016mg/l	2
ABS/ methylmethacrylate polymer	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
poly(butadiene-co-methacrylic acid-co-styrene)	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
fatty acids, coco/ pentaerythritol/ phthalic anhydride/ benzoic acid	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
1,4-butylene terephthalate homopolymer	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
lithium fluoroborate	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	EC50	48h	Crustacea	~35.53mg/l	2
	NOEC(ECx)	72h	Algae or other aquatic plants	~10mg/l	2
	LC50	96h	Fish	>100mg/l	2
styrene/ butadiene/ acrylonitrile copolymer	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
C.I. Pigment Yellow 139	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	EC50	72h	Algae or other aquatic plants	>10mg/l	2
	EC50	48h	Crustacea	>2mg/l	2
	EC50(ECx)	48h	Crustacea	>2mg/l	2
	LC50	96h	Fish	~11000mg/l	2
magnesium	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	EC50	72h	Algae or other aquatic plants	>12mg/l	2
	EC50	48h	Crustacea	344mg/l	2
	EC50	96h	Algae or other aquatic plants	222.37mg/l	2
	NOEC(ECx)	72h	Algae or other aquatic plants	>=12mg/l	2
	LC50	96h	Fish	541mg/l	2
Legend:	***Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. US EPA, Ecotox database - Aquatic Toxicity Data 4. ECETOC Aquatic Hazard Assessment Data 5. NITE (Japan) - Bioconcentration Data 6. METI (Japan) - Bioconcentration Data 7. Vendor Data***				

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
n-propylamine	LOW	LOW

Continued...

Ingredient	Persistence: Water/Soil	Persistence: Air
dimethyl carbonate	HIGH	HIGH
polyethylene	LOW	LOW
ethylene carbonate	HIGH	HIGH
ethyl methyl carbonate	HIGH	HIGH
polypropylene	LOW	LOW
vinylidene fluoride homopolymer	LOW	LOW
succinonitrile	LOW	LOW
titanium dioxide	HIGH	HIGH

Bioaccumulative potential

Ingredient	Bioaccumulation
n-propylamine	LOW (LogKOW = 0.48)
iron	LOW (LogKOW = -0.77)
carbon, activated	LOW (LogKOW = 1.09)
aluminium	LOW (LogKOW = 0.33)
nickel	LOW (LogKOW = -0.57)
dimethyl carbonate	LOW (LogKOW = 0.2336)
polyethylene	LOW (LogKOW = 17.04)
ethylene carbonate	LOW (LogKOW = -0.3388)
ethyl methyl carbonate	LOW (LogKOW = 0.7247)
polypropylene	LOW (LogKOW = 17.21)
vinylidene fluoride homopolymer	LOW (LogKOW = 1.24)
succinonitrile	LOW (LogKOW = -0.99)
titanium dioxide	LOW (BCF = 10)
C.I. Pigment Yellow 139	LOW (LogKOW = -1.91)
magnesium	LOW (LogKOW = -0.57)

Mobility in soil

Ingredient	Mobility
n-propylamine	LOW (Log KOC = 32.9)
dimethyl carbonate	LOW (Log KOC = 8.254)
polyethylene	LOW (Log KOC = 14.3)
ethylene carbonate	LOW (Log KOC = 9.168)
ethyl methyl carbonate	LOW (Log KOC = 15.22)
polypropylene	LOW (Log KOC = 23.74)
vinylidene fluoride homopolymer	LOW (Log KOC = 35.04)
succinonitrile	LOW (Log KOC = 28.23)
titanium dioxide	LOW (Log KOC = 23.74)

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	▸ Recycle wherever possible or consult manufacturer for recycling options. ▸ Consult State Land Waste Management Authority for disposal.

SECTION 14 Transport information

Labels Required

Continued...

Marine Pollutant	
HAZCHEM	2Y

Land transport (ADG)

14.1. **UN number or ID number**	3480
14.2. **UN proper shipping name**	LITHIUM ION BATTERIES (including lithium ion polymer batteries)
14.3. **Transport hazard class(es)**	Class: 9 Subsidiary Hazard: Not Applicable
14.4. **Packing group**	Not Applicable
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: 188 230 310 348 376 377 384 387 Limited quantity: 0

Air transport (ICAO-IATA / DGR)

14.1. **UN number**	3480
14.2. **UN proper shipping name**	Lithium ion batteries (including lithium ion polymer batteries)
14.3. **Transport hazard class(es)**	ICAO/IATA Class: 9 ICAO / IATA Subsidiary Hazard: Not Applicable ERG Code: 12FZ
14.4. **Packing group**	Not Applicable
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: A88 A99 A154 A164 A183 A201 A213 A331 A334 A802 Cargo Only Packing Instructions: See 965 Cargo Only Maximum Qty / Pack: See 965 Passenger and Cargo Packing Instructions: Forbidden Passenger and Cargo Maximum Qty / Pack: Forbidden Passenger and Cargo Limited Quantity Packing Instructions: Forbidden Passenger and Cargo Limited Maximum Qty / Pack: Forbidden

Sea transport (IMDG-Code / GGVSee)

14.1. **UN number**	3480
14.2. **UN proper shipping name**	LITHIUM ION BATTERIES (including lithium ion polymer batteries)
14.3. **Transport hazard class(es)**	IMDG Class: 9 IMDG Subsidiary Hazard: Not Applicable
14.4. **Packing group**	Not Applicable
14.5 **Environmental hazard**	Marine Pollutant
14.6. **Special precautions for user**	EMS Number: F-A, S-I Special provisions: 188 230 310 348 376 377 384 387 Limited Quantities: 0

14.7. Maritime transport in bulk according to IMO instruments

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

Continued...

Not Applicable

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

Product name	Group
n-propylamine	Not Applicable
iron	Not Applicable
copper	Not Applicable
carbon, activated	Not Applicable
glass fibres	Not Applicable
lithium nickel oxide	Not Applicable
aluminium	Not Applicable
nickel	Not Applicable
lithium manganate	Not Applicable
dimethyl carbonate	Not Applicable
manganese	Not Applicable
lithium cobaltate	Not Applicable
polyethylene	Not Applicable
oxygen	Not Applicable
lithium fluorophosphate	Not Applicable
ethylene carbonate	Not Applicable
ethyl methyl carbonate	Not Applicable
polypropylene	Not Applicable
polyethylene terephthalate	Not Applicable
carbon black	Not Applicable
vinylidene fluoride homopolymer	Not Applicable
ethylene/ vinyl acetate copolymer	Not Applicable
acrylic acid/ butyl acrylate/ 2-ethylhexyl acrylate/ vinyl acetate	Not Applicable
fluoroethylene carbonate	Not Applicable
sodium carboxymethylcellulose	Not Applicable
succinonitrile	Not Applicable
vinyl N-octadecylcarbamate homopolymer	Not Applicable
styrene/ butadiene rubber	Not Applicable
titanium dioxide	Not Applicable
talc	Not Applicable
ABS/ methylmethacrylate polymer	Not Applicable
poly(butadiene-co-methacrylic acid-co-styrene)	Not Applicable
fatty acids, coco/ pentaerythritol/ phthalic anhydride/ benzoic acid	Not Applicable
1,4-butylene terephthalate homopolymer	Not Applicable
lithium fluoroborate	Not Applicable
styrene/ butadiene/ acrylonitrile copolymer	Not Applicable
C.I. Pigment Yellow 139	Not Applicable
magnesium	Not Applicable

14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
n-propylamine	Not Applicable

Continued...

Product name	Ship Type
iron	Not Applicable
copper	Not Applicable
carbon, activated	Not Applicable
glass fibres	Not Applicable
lithium nickel oxide	Not Applicable
aluminium	Not Applicable
nickel	Not Applicable
lithium manganate	Not Applicable
dimethyl carbonate	Not Applicable
manganese	Not Applicable
lithium cobaltate	Not Applicable
polyethylene	Not Applicable
oxygen	Not Applicable
lithium fluorophosphate	Not Applicable
ethylene carbonate	Not Applicable
ethyl methyl carbonate	Not Applicable
polypropylene	Not Applicable
polyethylene terephthalate	Not Applicable
carbon black	Not Applicable
vinylidene fluoride homopolymer	Not Applicable
ethylene/ vinyl acetate copolymer	Not Applicable
acrylic acid/ butyl acrylate/ 2-ethylhexyl acrylate/ vinyl acetate	Not Applicable
fluoroethylene carbonate	Not Applicable
sodium carboxymethylcellulose	Not Applicable
succinonitrile	Not Applicable
vinyl N-octadecylcarbamate homopolymer	Not Applicable
styrene/ butadiene rubber	Not Applicable
titanium dioxide	Not Applicable
talc	Not Applicable
ABS/ methylmethacrylate polymer	Not Applicable
poly(butadiene-co-methacrylic acid-co-styrene)	Not Applicable
fatty acids, coco/ pentaerythritol/ phthalic anhydride/ benzoic acid	Not Applicable
1,4-butylene terephthalate homopolymer	Not Applicable
lithium fluoroborate	Not Applicable
styrene/ butadiene/ acrylonitrile copolymer	Not Applicable
C.I. Pigment Yellow 139	Not Applicable
magnesium	Not Applicable

SECTION 15 Regulatory information

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

n-propylamine is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

iron is found on the following regulatory lists

Continued...

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 2
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6
Australian Inventory of Industrial Chemicals (AIIC)
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

copper is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6
Australian Inventory of Industrial Chemicals (AIIC)
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

carbon, activated is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

glass fibres is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

lithium nickel oxide is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans

aluminium is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

nickel is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

lithium manganate is found on the following regulatory lists

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

dimethyl carbonate is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)

manganese is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

lithium cobaltate is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

polyethylene is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

oxygen is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Continued...

Australian Inventory of Industrial Chemicals (AIIC)

lithium fluorophosphate is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

ethylene carbonate is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

ethyl methyl carbonate is found on the following regulatory lists

Not Applicable

polypropylene is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

polyethylene terephthalate is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

carbon black is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

vinylidene fluoride homopolymer is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

ethylene/ vinyl acetate copolymer is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

acrylic acid/ butyl acrylate/ 2-ethylhexyl acrylate/ vinyl acetate is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

fluoroethylene carbonate is found on the following regulatory lists

Not Applicable

sodium carboxymethylcellulose is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

succinonitrile is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

vinyl N-octadecylcarbamate homopolymer is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

styrene/ butadiene rubber is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

titanium dioxide is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

talc is found on the following regulatory lists

Continued...

Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

ABS/ methylmethacrylate polymer is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

poly(butadiene-co-methacrylic acid-co-styrene) is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

fatty acids, coco/ pentaerythritol/ phthalic anhydride/ benzoic acid is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

1,4-butylene terephthalate homopolymer is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

lithium fluoroborate is found on the following regulatory lists

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

styrene/ butadiene/ acrylonitrile copolymer is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

C.I. Pigment Yellow 139 is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

magnesium is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

Additional Regulatory Information

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	No (lithium nickel oxide; lithium manganate; ethyl methyl carbonate; fluoroethylene carbonate; lithium fluoroborate)
Canada - DSL	No (lithium nickel oxide; lithium manganate; lithium fluorophosphate; ethyl methyl carbonate; fluoroethylene carbonate; vinyl N-octadecylcarbamate homopolymer; lithium fluoroborate)
Canada - NDSL	No (iron; copper; carbon, activated; glass fibres; lithium nickel oxide; aluminium; nickel; lithium manganate; dimethyl carbonate; manganese; lithium cobaltate; polyethylene; oxygen; ethylene carbonate; polypropylene; polyethylene terephthalate; carbon black; vinylidene fluoride homopolymer; ethylene/ vinyl acetate copolymer; acrylic acid/ butyl acrylate/ 2-ethylhexyl acrylate/ vinyl acetate; sodium carboxymethylcellulose; succinonitrile; styrene/ butadiene rubber; talc; ABS/ methylmethacrylate polymer; poly(butadiene-co-methacrylic acid-co-styrene); fatty acids, coco/ pentaerythritol/ phthalic anhydride/ benzoic acid; 1,4-butylene terephthalate homopolymer; styrene/ butadiene/ acrylonitrile copolymer; C.I. Pigment Yellow 139; magnesium)
China - IECSC	No (lithium nickel oxide; fluoroethylene carbonate; succinonitrile)
Europe - EINEC / ELINCS / NLP	No (lithium nickel oxide; lithium manganate; polyethylene; polypropylene; polyethylene terephthalate; vinylidene fluoride homopolymer; acrylic acid/ butyl acrylate/ 2-ethylhexyl acrylate/ vinyl acetate; sodium carboxymethylcellulose; vinyl N-octadecylcarbamate homopolymer; styrene/ butadiene rubber; ABS/ methylmethacrylate polymer; poly(butadiene-co-methacrylic acid-co-styrene); fatty acids, coco/ pentaerythritol/ phthalic anhydride/ benzoic acid; 1,4-butylene terephthalate homopolymer; styrene/ butadiene/ acrylonitrile copolymer)
Japan - ENCS	No (iron; copper; carbon, activated; glass fibres; aluminium; nickel; lithium manganate; manganese; oxygen; vinyl N-octadecylcarbamate homopolymer; talc; ABS/ methylmethacrylate polymer; fatty acids, coco/ pentaerythritol/ phthalic anhydride/ benzoic acid; magnesium)
Korea - KECI	Yes
New Zealand - NZIoC	No (lithium fluorophosphate; ethyl methyl carbonate; fluoroethylene carbonate; vinyl N-octadecylcarbamate homopolymer)
Philippines - PICCS	No (lithium nickel oxide; lithium manganate; lithium cobaltate; fluoroethylene carbonate; poly(butadiene-co-methacrylic acid-co-styrene); fatty acids, coco/ pentaerythritol/ phthalic anhydride/ benzoic acid)
USA - TSCA	All chemical substances in this product have been designated as TSCA Inventory 'Active'
Taiwan - TCSI	Yes

Continued...

National Inventory	Status
Mexico - INSQ	No (lithium nickel oxide; lithium manganate; lithium cobaltate; lithium fluorophosphate; ethylene carbonate; ethyl methyl carbonate; vinylidene fluoride homopolymer; acrylic acid/ butyl acrylate/ 2-ethylhexyl acrylate/ vinyl acetate; fluoroethylene carbonate; vinyl N-octadecylcarbamate homopolymer; ABS/ methylmethacrylate polymer; poly(butadiene-co-methacrylic acid-co-styrene); fatty acids, coco/ pentaerythritol/ phthalic anhydride/ benzoic acid; 1,4-butylene terephthalate homopolymer; lithium fluoroborate; C.I. Pigment Yellow 139)
Vietnam - NCI	Yes
Russia - FBEPH	No (lithium nickel oxide; lithium manganate; lithium cobaltate; lithium fluorophosphate; acrylic acid/ butyl acrylate/ 2-ethylhexyl acrylate/ vinyl acetate; vinyl N-octadecylcarbamate homopolymer; ABS/ methylmethacrylate polymer; poly(butadiene-co-methacrylic acid-co-styrene); fatty acids, coco/ pentaerythritol/ phthalic anhydride/ benzoic acid; lithium fluoroborate)
UAE - Control List (Banned/Restricted Substances)	No (n-propylamine; iron; copper; carbon, activated; glass fibres; lithium nickel oxide; lithium manganate; dimethyl carbonate; manganese; lithium cobaltate; polyethylene; oxygen; lithium fluorophosphate; ethylene carbonate; ethyl methyl carbonate; polypropylene; polyethylene terephthalate; carbon black; vinylidene fluoride homopolymer; ethylene/ vinyl acetate copolymer; acrylic acid/ butyl acrylate/ 2-ethylhexyl acrylate/ vinyl acetate; fluoroethylene carbonate; sodium carboxymethylcellulose; succinonitrile; vinyl N-octadecylcarbamate homopolymer; styrene/ butadiene rubber; titanium dioxide; talc; ABS/ methylmethacrylate polymer; poly(butadiene-co-methacrylic acid-co-styrene); fatty acids, coco/ pentaerythritol/ phthalic anhydride/ benzoic acid; 1,4-butylene terephthalate homopolymer; lithium fluoroborate; styrene/ butadiene/ acrylonitrile copolymer; C.I. Pigment Yellow 139)
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	02/02/2026
Initial Date	02/02/2026

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch 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。
- 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
- DNEL: Derived No-Effect Level
- PNEC: Predicted no-effect concentration
- MARPOL: International Convention for the Prevention of Pollution from Ships
- IMSBC: International Maritime Solid Bulk Cargoes Code
- IGC: International Gas Carrier Code
- IBC: International Bulk Chemical Code

- 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

Continued...

- 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