Version No: **1** Issue date: **30/APR/2024** Revision date: **Not Applicable**

Safety Data Sheet (Conforms to Annex II of REACH (1907/2006) - Regulation 2020/878)

SECTION 1. Identification of the substance / mixture and of the company / undertaking

1.1. Product Identifier

Product name	CHB Binding
Synonyms	Not Available
Other means of identification	Not Available

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

Relevant identified uses	Laboratory use.
Uses advised against	Not Applicable

1.3. Details of the manufacturer or supplier of the safety data sheet

Registered company name	**CleanNA**
Address	Coenecoop 75, 2741 PH, Waddinxveen, The Netherlands
Telephone	+31 (0) 182 22 33 50
Fax	+31 (0) 182 22 33 98
Website	www.cleanna.com
Email	info@cleanna.com

1.4. Emergency telephone number

Emergency telephone numbers	112 (European emergency number)

SECTION 2. Hazards identification

2.1. Classification of the substance or mixture

Classification according to regulation (EC) No 1272/2008 [CLP] and amendments	H271 – Oxidizing Liquids - Category 1, H302 – Acute Toxicity (Oral) - Category 4 H373 – Specific target Organ Toxicity - Repeated Exposure - Category 2

2.2. Label elements

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

Hazard statement(s)

H271	May cause fire or explosion, strong oxidizer.
H302	Harmful if swallowed.
H373	May cause damage to organs through prolonged or repeated exposure

Supplementary statement(s)

Not Applicable

Precautionary statement(s) Prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P220	Keep away from clothing and other combustible materials
P260	Do not breathe mist / vapours / spray
P264	Wash all exposed external body areas thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves, protective clothing, eye protection and face protection.
P283	Wear fire resistant or flame retardant clothing

Precautionary statement(s) Response

P370 + P378	In case of fire: Use… to extinguish
P371 + P380 + P375	In case of major fire and large quantities: evacuate area. Fight fire remotely de to the risk of explosion.
P306 + P360	IF ON CLOTHING: Rinse immediately contaminated clothing and skin with plenty of water before removing clothes
P314	Get medical advice / attention if you feel unwell
P301 + P312	IF SWALLOWED: Call a POISON CENTER/doctor/physician/first aider if you feel unwell.
P330	Rinse mouth.

Precautionary statement(s) Storage

P420	Store seperately

Precautionary statement(s) Disposal

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

2.3. Other hazards

May produce discomfort of the respiratory system and skin*.
May possibly be harmful to the foetus / embryo *.

REACH – Art. 57-59: The mixture does not contain Substances of Very High Concern (SVHC) ats the SDS print date

SECTION 3. Composition / information on ingredients

3.1 Substances

See 'Composition on ingredients' in Section 3.2

3.2 Mixtures

1. **CAS No** 2. **EC No** 3. **Index No** 4. **REACH No**	**%[weight]**	**Name**	**Classification according to regulation (EC) No 1272/2008 [CLP] and amendments**	**SCL / M-Factor**	**Nanoform Particle Characteristics**
1. 7601-89-0 2. 231-511-9 3. 017-010-00-6 4. Not Available	50 - 100	Sodium perchlorate	Oxidizing Solids- category 1, Acute Toxicity (Oral) – Category 4 H271, H302 [2]	Not Available	Not Available
Legend:	*2. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 3. Classification drawn from C&L; * EU IOELVs available; [e] Substance identified as having endocrine disrupting properties*				

SECTION 4. First aid measures

4.1. Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: - Wash out immediately with fresh running water. - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. - Seek medical attention without delay; if pain persists or recurs seek medical attention - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: - Immediately remove all contaminated clothing, including footwear. - Flush skin and hair with running water (and soap of available) - Seek medical attention in event of irritation.
Inhalation	- If fumes or combustion products are inhaled remove from contaminated area. - Lay patient down. Keep warm and rested. - Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. - Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. - Transport to hospital, or doctor, without delay.

Ingestion	- **IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY** - For advice, contact a POISON INFORMATION CENTER or a doctor - Urgent hospital treatment is likely to be needed - In the meantime, qualified first-air personnel should treat the patinet following observation and employing supportive measures as indicated ny the patient's condition - If the services of a mdeical officer or medical doctor are readily available, th epatient should be placed in his/her care and a copy of the SDS should be provided. Further action will be the responsibility of the medical specialist - If medical attention is not available on the worksite or surroundings send the patinet to a hospita together with a copy of the SDS. **Where medical attention is not immediately avaialable or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:** - **INDUCE** vomiting with fingers down the back of the throat, **ONLY IF CONSCIOUS**. Lean patient forward or place on left side (head-downposition, if possoble) to maintain open airway and prevent aspiration. **NOTE:** wear a protective glove when inducing vomiting by mechnaicla means.

4.2 Most important symptoms and effects, both acute and delayed

See Section 11

4.3. Indication of any immediate medical attention and special treatment needed

Antithyroid effects produced by the perchlorates may be reversed with iodine.
Patients should be warned to report the development of sore throat, fever or rashes since these are indicative of blood abnormalities.

For chlorates:
Severe intoxication:

- Empty the stomach by lavage and aspiration or by emesis
- Give demulcents or sweetened drinks and maintain respiration
- Pethidine may be given if required.
- A 1% solution of sodium thiosulfate may be used for lavage and may also be given by intravenous infusion
- Haemodialysis, peritoneal dialysis or exchange perfusions may be of value in removing chlorate from the blood.
- Forced diuresis should not be attempted if there is inadequate urine input

MARTINDALE: The extra Pharmacopoeia, 27th Edition

The high sensitivity of glucose-6-phosphate dehydrogenase to denaturation by chlorate explains the inefficacy of methylene blue to reduce methaemoglobin formed, as the antidotal effect of methylene blue depends on NADPH formed mainly by the oxidation of glucose-6-phosphate. The observed changes occur only in the presence f methaemoglobin which forms a destabilising complex with chlorate. Methaemoglobin thus automatically increases methaemoglobin formation and destruction of the erythrocyte.

SECTION 5. Firefighting measures

5.1 Extinguishing media

- There is no restriction on the type of extinguisher which may be used
- Use extinguishing media suitable for surrounding area

5.2 Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.

5.3. Advice for firefighters

Fire Fighting	- Alert Fire Brigade and tell them location and nature of hazard. - Wear breathing apparatus plus protective gloves in the event of a fire - Prevent, by any means available, spillage from entering drains or water course. - Use firefighting procedures suitable for surrounding area. - **DO NOT** approach containers suspected to be hot. - Cool fire exposed containers with water spray from a protected location. - If safe to do so, remove containers from path of fire. - Equipment should be thoroughly decontaminated after use
Fire/Explosion Hazard	- Will not burn but increases intensity of fire - Heating may cay=use expansion or decomposition leading to violent rupture of containers - Heat affected containers remain hazardous - Contact with combustibles such as wood, paper, oil or finely divide metal may produce spontaneous combustion or violent decomposition - May emit irritating, poisonous or corrosive fumes Decomposition may produce toxic fumes of: - hydrogen chloride May emit poisonous fumes. May emit corrosive fumes.

SECTION 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

See section 8

6.2 Environmental precautions

See section 12

6.3 Methods and material for containment and cleaning up

Minor Spills	- Clean up all spills immediately - No smoking, naked lights, ignition sources - Avoid all contact with any organic matter including fuel, solvents, sawdust, paper or cloth and other incompatible materials, as ignition may result - Avoid breathing dust or vapours and all contact with skin and eye - Control personal contact with the substance by using protective equipment - Contain and absorb spill with dry sand, earth, inert material or vermiculite - **DO NOT** use sawdust as fire may result - Scoop up solid residues and seal in labelled drums for disposal - Neutralize / decontaminate area
Major Spills	Moderate hazard - Clear are of personnel and move upwind - Alert Fire Brigade and tell them location and nature of hazard - Wear breathing apparatus plus protective gloves - Prevent, by any means available, spillage from entering drains or water course - Stop leak if safe to do so - Contain spill with sand, earth or vermiculite - Collect recoverable product into labelled containers for recycling - Neutralize / decontaminate residue (see Section 13 for specific agent) - Collect solid residues an seal I labelled drums for disposal - Wash area and prevent runoff into drains - After cleanup operations, decontaminate and launder all protective clothing and equipment before storing and reuse. - If contamination of drains or waterways occurs, advise emergency services

6.4. Reference to other sections

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

SECTION 7. Handling and storage

7.1. Precautions for safe handling

Safe handling	- Avoid all personal contact, including inhalation - Wear protective clothing when risk of exposure occurs - Use in a well-ventilated area - Avoid contact with moisture - Avoid contact with incompatible materials - When handling, **DO NOT** eat, drink or smoke - Keep containers securely sealed when not in use - Avoid physical damage to containers - Always wash hands with soap and water after handling - Work clothes should be laundered separately. Launder contaminated clothing before reuse - Use good occupational work practice. - Observe manufacturer's storage and handling recommendations contained within this SDS - Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained - **DO NOT** allow clothing wet with material to stay in contact with skin
Fire and explosion protection	See section 5
Other information	None known

7.2. Conditions for safe storage, including any incompatibilities

Suitable container	- Glass container is suitable for laboratory quantities - Polyethylene or polypropylene container - Packing as recommended by manufacturer - Check all container are clearly labelled and free from leaks
Storage incompatibility	- Inorganic peroxy compounds are potent oxidisers that pose fire or explosive hazards when in contact with ordinary combustible materials - Inorganic peroxides react with organic compounds to generate organic peroxide and hydroperoxide products that react violently with reducing agents - Inorganic oxidising agents can react with reducing agents to generate heat and products that may be gaseous (causing pressurization of closed containers). The products may themselves be capable of further reactions (such as combustion in the air). - Organic compounds in general have some reducing power and can in principle react with compounds in this class. Actual reactivity varies greatly with the identity or the organic compound - Inorganic oxidising agents can react violently with active metals, cyanide, esters and thiocyanates - Peroxides, in contact with inorganic cobalt and copper compounds, iron and iron compounds, acetone, metal oxide salts and acids and bases can react with rapid, uncontrolled decomposition, leading to fires and explosions - Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible or otherwise reactive. Their reactions with oxidizing agents may be violent. - Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions **NOTE:** May contain traces of perchloric acid or may, on contact witch acids, produce an anhydrous perchloric acid an extremely reactive and explosive species. Many of the reported explosions involving perchlorate may result its ability to form unstable perchlorate esters or salts of the anhydrous acid. **WARNING** - On the basis of experience with cobalt (III) perchlorate, attention is drawn to the possibility of stable metal perchlorates being converted by unintentional dehydration to unstable (endothermic) lower hydrates capable of explosive decomposition in the absence of impurities. Great care must be taken to avoid dehydration or desolvation of perchlorates. - Metal perchlorates may be explosively reactive with finely divided aluminium, magnesium and zinc and other metals, calcium and strontium hydrides, glycol (on heating). Sulfuric acid (with the formation of unstable perchloric acid), and trifluoromethanesulfonic acid. - The perchlorate salts of the complexes of divalent cobalt, nickel and particularly iron (tetramethyl{14}-N8 complexes) are potentially explosive and storage for more than 4 weeks is inadvisable - Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous - Avoid storage with reducing agents - Segregate chlorates from organic matter, acids, poisonous gasses, flammables, corrosives, aluminium and ammonium salts and any other combustible material - Mixtures of chlorates with fibrous and absorbent organic materials such as wood, paper, leather, flour, sawdust, sugar, shellac, may be ignited or caused to explode by static sparks, friction or shock - The extreme hazardous nature of mixtures of metal chlorides with phosphorus or sulfur, apart from being powerful explosives, are dangerously sensitive to friction or shock; spontaneous ignition occasionally occurs - Mixtures with sucrose, lactose, chromium, sulfur dioxide, sodium amide, zirconium, germanium and titanium explode on heating - Forms incompatible sometimes explosive mixtures with thorium dicarbide, strontium hydride, hydrogen iodide, fluorine, cyanoguanidine, cyanides, dinickel trioxide, powdered carbon, aqua regia and ruthenium, nitric acid, manganese dioxide and potassium hydroxide or boron - Chlorates should not be allowed to come into contact with ammonium salts, aluminium and other powered metals, phosphorous, silicon, sulfur, sulfides, sulfuric acid, nitrobenzene, iodides and tartaric acid

	- Mixtures with hydrocarbons, metal phosphides (Zn, Ag, Al, Hg, Cu, Mg, etc), metal thiocyanates, metal sulfides, arsenic, carbon, phosphorous, sulfur, ammonium salts ,powdered metals, arsenic trioxide, phosphorous, silicon, sulfides, sulfites and hyposulfites are easily ignited (by friction or heat) and are potentially explosive - Metal chlorates in contact with strong acids liberate explosive chlorine dioxide gas. With concentrated sulfuric acid a violent explosion can occur unless effective cooling is used. Mixing potassium chlorate and concentrated sulfuric acid results in an explosion with optimum temperature range being 120 – 130. Heating a moist mixture of metal chlorate and a dibasic organic acid (tartaric or citric acid) liberates chlorine dioxide diluted with carbon oxide - Fusion of chlorates with metal cyanides may lead to an explosion - Chlorates containing 1 – 2 % bromate or sulfur are liable to spontaneous explosion - Chlorates releases oxygen, chlorine and chlorine dioxide when heated above 300 deg. C - In presence of moisture may release oxygen and ozone - Intimate mixtures of chlorates, bromates or iodates of barium, cadmium, magnesium, potassium, sodium or zinc, with finely divided aluminium, arsenic, copper, carbon, phosphorus, sulfur, hydrides of alkali- and alkaline earth-metal, sulfides of antimony, arsenic, copper or tin, metal cyanides, thiocyanates or impure manganese dioxide may react explosively or violently, either spontaneously (especially in the presence of moisture) or on initiation by heat, impact or friction, sparks or addition of sulfuric acid. *BRETHERICKS HANDBOOK OF REACTIVE CHENICAL HAZARDS, 4th edition*

7.3. Specific end use(s)

See section 1.2

SECTION 8. Exposure controls / personal protection

8.1. Control parameters

Ingredient	**DNELs** **Exposure Pattern Worker**			**PNECs** **Compartment**	
Sodium perchlorate	Dermal	2.16 mg/kg bw/day	(Systemic, Chronic)	0.021 mg/L	(Water (Fresh))
	Inhalation	0.28 mg/m^3	(Systemic, Chronic)	0.002 mg/L	(Water – Intermittent release)
	Oral	*0.02 mg/kg bw/day*	*(Systemic, Chronic) **	1 mg/L	(Water (Marine))
				4.67 mg/kg sediment dw	(Sediment (Fresh Water))
				0.467 mg/kg sediment dw	(Sediment (Marine))
				2.55 mg/kg soil dw	(Soil)
				7 mg/L	(STP)

* Values for General Population

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	**Ingredient**	**Material name**	**TWA**	**STEL**	**Peak**	**Notes**
Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	**TEEL-1**	**TEEL-2**	**TEEL-3**
Sodium perchlorate	3.8 mg/m^3	41 mg/m^3	250 mg/m^3

Ingredient	**Original IDLH**	**Revised IDLH**
Sodium perchlorate	Not Available	Not Available

Occupational Exposure Banding

Ingredient	**Occupational Exposure Band Rating**	**Occupational Exposure Band Limit**
Sodium perchlorate	E	<= 0.01 mg/m^3
Notes:	*Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band 9OEB), which corresponds to a range of exposure concentrations that are expected to protect the worker health.*	

8.2. Exposure controls

8.2.1 Appropriate engineering controls

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:

Process controls which involve changing the way a job activity or process is done to reduce the risk.

Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.

Employers may need to use multiple types of controls to prevent employee overexposure.

General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in special circumstances. If risk of overexposure exists, wear approved respirator. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection. Provide adequate ventilation in warehouses and enclosed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
Solvent, vapours, degreasing etc. , evaporating from tank (in still air)	0.25 – 0.5 m/s (50-100 f/min)
Aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding spray drift, plating acid fumes, pickling (release at low velocity into zone of active generation)	0.5 – 1 m/s (100 – 200 f/min)
Direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1 – 2.5 m/s (200 – 500 f/min)
Grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of vey high rapid air motion)	2.5 – 10 m/s (500 – 2000 f/min)

Within each range the appropriate value depends on:

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

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extracting of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

8.2.2. Personal protection

Eye and face protection

- Safety glasses with side shields.
- Chemical goggles.

Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]

Skin protection See Hand protection below

Hand / feet protection

- Wear chemical protective gloves, e.g. PVC.
- Wear safety footwear or safety gumboots, e.g. Rubber

The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.

Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:
· frequency and duration of contact,
· chemical resistance of glove material,
· glove thickness and
· dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.
· Contaminated gloves should be replaced.
As defined in ASTM F-739-96 in any application, gloves are rated as:
· Excellent when breakthrough time > 480 min
· Good when breakthrough time > 20 min
· Fair when breakthrough time < 20 min
· Poor when glove material degrades

For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.

It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times.

Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers technical data should always be taken into account to ensure selection of the most appropriate glove for the task.

NOTE:
Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:
· Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of.
· Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

Body protection See Other protection below

Other protection

- Overalls
- P.V.C. Apron
- Barrier cream
- Skin cleansing cream
- Eye was unit

Respiratory protection

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures
- The decision to use respiratory protection should be based on professional judgement that takes into account toxicity information, exposure measurement data, frequency and likelihood of the worker's exposure – ensure users are not subject high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option)
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program
- Where protection form nuisance levels of dusts are desired, use type 95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)
- Use approved positive flow mask if significant quantities of dust becomes airborne
- Try to avoid creating dust conditions

Class P2 particulate filters are used for protection against mechanically and thermally generated particulates or both.
P2 is a respiratory filter rating under various international standards and filters at least 94% of airborne particles.
Suitable for:

- Relatively small particles generated by mechanical processes e.g. grinding, cutting, sanding, drilling, sawing
- Sub-micron thermally generated particles e.g. welding fumes, fertilizer and bushfire smoke
- Biologically active airborne particles under specified infection control applications e.g. viruses, bacteria, COVID-19, SARS

8.2.3. Environmental exposure controls

See section 12

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	Not Available

Physical state	Liquid	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature (°C)**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Available
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Available	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water	Immiscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available
Nanoform Solubility	Not Available	**Nanoform Particle Characteristics**	Not Available
Particle Size	Not Available		

9.2. Other information

Not Available

SECTION 10. Stability and reactivity

10.1.Reactivity	See section 7.2
10.2. Chemical stability	- Unstable in the presence of incompatible materials. - Product is considered stable. - Hazardous polymerisation will not occur.
10.3. Possibility of hazardous reactions	See section 7.2
10.4. Conditions to avoid	See section 7.2
10.5. Incompatible materials	See section 7.2
10.6. Hazardous decomposition products	See section 5.3

SECTION 11. Toxicological information

11.1. Information on toxicological effects

Inhaled	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
Ingestion	Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual. Symptoms of exposure to perchlorates include shortness of breath, difficulty breathing and a bluish discolouration of the skin. The effects mat be delayed for several hours following exposure. Nausea and vomiting are almost always apparent after chlorate poisonings usually with upper stomach pain. Diarrhoea may also occur.
Skin Contact	This material can cause inflammation of the skin on contact in some persons. The material may accentuate any pre-existing dermatitis condition Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).
Chronic	Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed. This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects. Chronic or sublethal exposure to inorganic chlorate may have negative effects on human health, such as redness of the eyes and skin (including skin inflammation), sore throat, abdominal pain, blue lips r skin, diarrhoea, nausea, vomiting, shortness of breath, and unconsciousness. Sodium chlorate may damage the liver, kidneys and blood cells of humans. Animal testing showed that chlorate is toxic to the thyroid gland, although it does not cause mutations and is therefore unlikely to cause cancer. Chlorate does not appear to cause birth defects or chromosomal abnormalities in animal testing. Perchlorates may affect the us eof iodine by the thyroid gland and chronic exposures may result in symptoms of thyroid dysfunction such as goitre.

	TOXICITY	IRRITATION
CHB Binding	Not Available	Not Available
Sodium perchlorate	Oral (Rat) LD50: 2100 mg/kg [2]	Not Available
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*	

CHB Binding

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 or previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without 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 substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production.

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 (a goitre).

Goitrogens include:
- Vitexin, a flavonoid, which inhibits thyroid peroxidase, contributing to goitre
- Thiocyanate and perchlorate, which decrease iodide uptake by competitive inhibition and consequently increase release of TSH from the pituitary gland
- Lithium, which inhibits thyroid hormone release
- Certain foods, such as soy and millet (containing vitexins) and vegetables in the genus Brassica (which includes broccoli, Brussels sprouts, cabbage, cauliflower and horseradish).
- Caffeine (found in coffee, tea, cola and chocolate), which acts on thyroid function as a suppressant.

Acute Toxicity	✓	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✗	**Reproductivity**	✗
Serious Eye Damage/Irritation	✗	**STOT - Single Exposure**	✗
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗

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

11.2. Information on other hazards

1. Endocrine Disruption Properties

Not Available

2. Other Information

See Section 11.1

SECTION 12. Ecological information

12.1 Toxicity

	Endpoint	Test duration (hr)	Species	Value	Source
CHN Binding	Not available	Not available	Not available	*Not available*	*Not available*
Sodium perchlorate	**Endpoint**	**Test duration (hr)**	**Species**	**Value**	**Source**
	NOEC(ECx)	48	Fish	0.004 mg/l	4
	EC50	72	Algae or other aquatic plants	> 435.7 mg/l	2
	EC50	48	Crustacea	> 100 mg/l	2
	LC50	96	Fish	396.486 – 712.077 mg/l	4
Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*				

Perchlorate poses a human health concern because this contaminant has the same ionic size as iodide, and can compete with iodide for uptake into the thyroid gland, causing changes in thyroid hormone levels and possibly thyroid disorders. Public concerns have generated considerable legislation designed to minimise potential damage.

The environmental impacts of perchlorate have been less well studied, but the pollutant is clearly being transferred between abiotic and biotic ecosystem components. Perchlorate is a highly soluble oxyanion that is very stable and nonreactive in water.

Perchlorate salts also have a very low volatility. Although a strong oxidizing agent, the perchlorate anion is stable in the environment.
Perchlorate does not form complexes with metals in the same manner as other anions, and it does not readily sorb to material in the environment. This combination of perchlorate solubility, stability, and mobility creates the potential for both localised and area-wide potential ecotoxicological effects, as it is a relatively non-reactive and very stable contaminant, with very low biodegradation rates under many natural conditions. Biodegradation of perchlorate in the natural environment (e.g., sediments) will not occur unless significant levels of organic carbon are present, oxygen and nitrate are depleted, and perchlorate-degrading anaerobic bacteria are present.

Perchlorate is a highly toxic compound that is stable and persistent in the environment. Once perchlorate gets into the food chain or water supply, it does not break down easily. It has been detected in surface and ground water, soils and food (lettuce, bottled water, milk, meat, kelp, animal feed). It is stable, water soluble and persistent; it is not volatile and does not readily adhere to soil. It is also found in plants because its solubility in water allows it be taken up by their roots. The populations considered to be most sensitive to perchlorate exposure are nursing infants, children, post-menopausal women, and people with hypothyroidism.

Perchlorate interferes with thyroid functioning and is especially dangerous to fetuses, babies, and children. It causes thyroid iodine deficiency that in turn limits the gland s ability to produce a hormone essential to neurological development, leading to neurological disorders.

A human reference dose (daily exposure level below which EPA believes there would be no serious negative effects to a human over their lifetime) of 0.0007 mg/kg per day has been suggested by the US EPA, who considers drinking water safe if it contains no more than 24.5 parts per billion (ppb) of perchlorate.

Perchlorate has contaminated ground and surface waters that are currently being used for irrigation in food production. Physical processes, including mixing and dispersion, control the distribution of perchlorate in groundwater. Soil is not expected to naturally contain perchlorate. Perchlorate does not adsorb onto inorganic surfaces, including hydrous ferric oxide, smectite, and manganese oxide. The inorganic perchlorate compounds introduced into soils are readily soluble and are not strongly adsorbed by other soil components. In soils, perchlorate is chemically stable and is expected to behave in a manner similar to dissolved minerals. While perchlorate is subject to leaching, its content in the soil is expected to remain in equilibrium in irrigated crop production systems.

Perchlorate has been shown to be absorbed into crops from irrigation water or other sources such as fertilizers. Plants absorb nutrients and pollutants from solutions in the soil and are expected to accumulate perchlorate taken from the soil, which may be influenced by external factors such as plant species and maturity, nutrient concentrations, and consumptive use of water. While there is evidence that a portion of the absorbed perchlorate may be reduced inside the plant through biochemical pathways, the majority of the absorbed perchlorate will translocate to and concentrate in the leaf tissue where oxygen is always present and will thus limit its reduction. This is illustrated by the detection of higher perchlorate concentrations in leaves collected later in the growing season and in dead leaves compared to younger, live leaves, proving that perchlorate is recycled back into the soil upon decomposition of dead leaf litter.

To minimise the potential recycling of perchlorate by leaf litter it is recommended that dead leaves be collected and composted, or phytoremediation be designed to enhance rapid rhizodegradation (rhizoremediation). The fate of perchlorate in streambed sediments is becoming a concern due to the increasing number of groundwater and surface water contamination sites. Results indicate that ClO4- penetration into sediments could be affected by numerous factors, such as temperature, microbial degradation, ClO4- surface water concentration, and sediment physico-geological properties. Maximum ClO4- penetration into sediments at study sites was 30 cm below the sedimentwater surface. Evidence suggests that microbial reduction is responsible for perchlorate depletion in stream sediments. Biodegradation of ClO4- occurred over a seasonally variable active depth zone of 1-10 cm, implying that there was a rapid natural attenuation potential of perchlorate in near-surface sediments. Perchlorate is reduced to intermediate compounds (chlorate [Cl(V)] and chlorite [Cl(III)]) and eventually to chloride in anaerobic environments.

Perchlorate reduction is both thermodynamically and microbially enhanced under denitrifying conditions. There are numerous strains of micro-organisms capable of reducing both chlorate and perchlorate under anoxic conditions. Perchlorate is not likely to come out of solution given its low vapour pressure. Droplet size during showering would likely preclude significant inhalation of perchlorate-contaminated water as an aerosol. In perchlorate-contaminated lakes and streams, perchlorate is detected infrequently in fish heads, fillets, and whole bodies, but may be detected more often depending on species and seasonal trends, and always at concentrations higher in the fish than in the water.

Perchlorates may perturb thyroid-hormone concentration in fish; this may affect growth and neurological development. Data from fish indicates that perchlorate can also disrupt sexual development. Certain have been so dramatic that female fish have been mistaken for males. Several females displayed malecourtship behaviour and produced sperm. This is suggestive of the fact that perchlorate may act as an androgen (male sex hormone). The concentration of perchlorate used in these studies was at least a 1000 times the US EPA limit (24.5 parts per billion in natural bodies of water

DO NOT discharge into sewer or waterways.

12.2. Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	Not Available	Not Available

12.3. Bio accumulative potential

Ingredient	Bioaccumulation
	Not Available

12.4. Mobility in soil

Ingredient	Mobility
	Not Available

12.5. Results of PBT and vPvB assessment

	P	**B**	**T**
Relevant available data	Not Available	Not Available	Not Available
PBT	❌	❌	❌
vPvB	❌	❌	❌

PBT Criteria fulfilled?	No
vPvB	No

12.6. Endocrine Disruption Properties

Not Available

12.7. Other adverse effects

Not Available

SECTION 13. Disposal considerations

13.1. Waste treatment methods

Product / Packaging disposal	- Containers may still present a chemical hazard/ danger when empty. - Return to supplier for reuse/ recycling if possible. Otherwise: - If container cannot be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorized landfill. - Where possible retain label warnings and SDS and observe all notices pertaining to the product. Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate: - Reduction - Reuse - Recycling - Disposal (if all else fails) This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate. - **DO NOT** allow wash water from cleaning or process equipment to enter drains. - It may be necessary to collect all wash water for treatment before disposal. - In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. - Where in doubt contact the responsible authority. - Recycle wherever possible or consult manufacturer for recycling options - Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. - Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or incineration in a licensed apparatus (after admixture with suitable combustible material). **FOR DISPOSAL OF SMALL QUANTITIES** - Cautiously acidify a 3% solution or a suspension of the material to pH 2 with sulfuric acid - Gradually add a 50% excess of aqueous sodium bisulfite with stirring at room temperature (Other reducers such as thiosulfate or ferrous salts may substitute; **DO NOT** use carbon, sulfur or other strong reducing agents. An increase in temperature indicates reaction is taking place. If no reaction is observed on the addition of about 10% of the sodium bisulfite solution, initiate it by cautiously adding more acid. - If manganese, chromium or molybdenum are present adjust the pH of the solution to 7 and treat with sulfide to precipitate for burial as a hazardous waste. Destroy excess sulfide, neutralise and flush the solution down the drain (subject to State and Local Regulation) [Signa/Aldrich] - Recycle wherever possible - Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified - Dispose or by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or incineration in a licensed apparatus (after admixture with suitable combustible material) - Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.
Waste treatment options	Not Available
Sewage disposal options	Not Available

SECTION 14 Transport information

Labels Required

Marine Pollutant	NO

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

14.1. **UN number**	Not Applicable	
14.2. **UN proper shipping name**	Not Applicable	
14.3. **Transport hazard class(es)**	Class	Not Applicable
	Sub risk	Not Applicable
14.4. **Packing group**	Not Applicable	
14.5. **Environmental hazard**	Not Applicable	
14.6. **Special precautions for user**	Hazard identification (Kemler)	Not Applicable
	Classification code	Not Applicable
	Hazard Label	Not Applicable
	Special provisions	Not Applicable
	Limited quantity	Not Applicable
	Tunnel Restriction Code	Not Applicable

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

14.1. **UN number**	Not Applicable	
14.2. **UN proper shipping name**	Not Applicable	
14.3. **Transport hazard class(es)**	ICAO/IATA Class	Not Applicable
	ICAO / IATA Sub risk	Not Applicable
	ERG Code	Not Applicable
14.4. **Packing group**	Not Applicable	
14.5. **Environmental hazard**	Not Applicable	
14.6. **Special precautions for user**	Special provisions	Not Applicable
	Cargo Only Packing Instructions	Not Applicable
	Cargo Only Maximum Qty / Pack	Not Applicable
	Passenger and Cargo Packing Instructions	Not Applicable
	Passenger and Cargo Maximum Qty / Pack	Not Applicable
	Passenger and Cargo Limited Quantity Packing Instructions	Not Applicable
	Passenger and Cargo Limited Maximum Qty / Pack	Not Applicable

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

14.1. **UN number**	Not Applicable	
14.2. **UN proper shipping name**	Not Applicable	
14.3. **Transport hazard class(es)**	IMDG Class	Not Applicable
	IMDG Sub risk	Not Applicable
14.4. **Packing group**	Not Applicable	
14.5. **Environmental hazard**	Not Applicable	
14.6. **Special precautions for user**	EMS Number	Not Applicable
	Special provisions	Not Applicable
	Limited Quantities	Not Applicable

Inland waterways transport (ADN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

14.1. **UN number**	Not Applicable	
14.2. **UN proper shipping name**	Not Applicable	
14.3. **Transport hazard class(es)**	Not applicable	Not Applicable
14.4. **Packing group**	Not applicable	
14.5. **Environmental hazard**	Not applicable	
14.6 **Special precautions for user**	Classification code	Not Applicable
	Special provisions	Not Applicable
	Limited quantity	Not Applicable
	Equipment required	Not Applicable
	Fire cones number	Not Applicable

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

Not Applicable

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

Product name	Group
Sodium perchlorate	Not Available

14.9. Transport in bulk in accordance with the ICG Code

Product name	Ship Type
Sodium perchlorate	Not Available

SECTION 15. Regulatory information

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

Sodium perchlorate is found on the following regulatory lists

EU European Chemcials Agency (ECHA) Community Rolling Action Plan (CoRAP) List of Substances	European Union – European Inventory of Existing Commercial Chemical Substances (EINICS)
Europe EC Inventory	European Union (EU) regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures – Annex VI

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable - : Directives 98/24/EC, - 92/85/EEC, - 94/33/EC, - 2008/98/EC, - 2010/75/EU; Commission Regulation (EU) 2020/878; Regulation (EC) No 1272/2008 as updated through ATPs.

15.2. Chemical safety assessment

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

ECHA SUMMARY

Ingredient	CAS number	Index No	ECHA Dossier
Sodium perchlorate	7601-89-0	017-010-00-6	Not Available

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Harmonization (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Ox. Sol. 1; Acute Tox. 4	GHS03; GHS07; Dgr	H271; H302
2	Ox. Sol. 1; Acute Tox. 4; Eye Irrit. 2 ; STOT RE 2	GHS03; Dgr; GHS08	H271; H302; H319; H373; H371

Harmonization Code 1 = The most prevalent classification. Harmonization Code 2 = The most severe classification

National Inventory Status

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

SECTION 16. Other information

Full text Risk and Hazard codes

H319	Causes serous eye irritation
H371	May cause damage to organs

Version Summary

Version	Date of Update	Sections Updated
1	30/APR/2024	Initial version

Other information

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.

For detailed advice on Personal Protective Equipment, refer to the following EU CEN Standards:

EN 166 Personal eye-protection
EN 340 Protective clothing
EN 374 Protective gloves against chemicals and micro-organisms
EN 13832 Footwear protecting against chemicals
EN 133 Respiratory protective devices

Definitions and abbreviations

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