MATERIAL SAFETY DATA SHEET

2-Chloro-5-(trifluoromethyl)pyridine

Revision Date: 20-06-22

Revision Number: 5.1

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

Product Name	2-CHLORO-5-(TRIFLUOROMETHYL)PYRIDINE
Chemical Name	Not Available
Synonyms	C6H3Cl-F3-N
Proper Shipping Name	TOXIC SOLID, ORGANIC, N.O.S. (contains 2-chloro-5-(trifluoromethyl)pyridine)
Chemical Formula	$C_6H_3ClF_3N$
Other means of identification	Not available
CAS Number	52334-81-3

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

Relevant identified uses	• Intermediate

Details of the manufacturer or supplier of the safety data sheet:

Registered company name	**Cohizon Life Sciences Limited**
Address	Plot No. 6102/3, 6117-19, 5809-10, GIDC, Ankleshwar Gujarat 393002 India
Telephone	Not Available
Fax	Not Available
Website	Not Available
Email	Not Available

Emergency telephone number:

Association / Organisation	**Cohizon Life Sciences Limited**
Emergency telephone number(s)	(+91) 7046611150/51
Other emergency telephone number(s)	(+91) 6357684904

SECTION 2 Hazards identification

Classification of the substance or mixture

Hazard Ratings

		Min	Max		
Flammability	**1**	▨		**0 =**	**Minimum**
Toxicity	**2**	▨		**1 =**	**Low**
Body Contact	**2**	▨		**2 =**	**Moderate**
Reactivity	**1**	▨		**3 =**	**High**
Chronic	**0**			**4 =**	**Extreme**

NFPA 704 diamond

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

Classification	Flammable Solids Category 1, Acute Toxicity (Oral and Dermal) Category 3, Skin Corrosion/Irritation Category 1B, Serious Eye Damage/Eye Irritation Category 1, Specific Target Organ Toxicity - Repeated Exposure Category 1, Hazardous to the Aquatic Environment Long-Term Hazard Category 3

Label elements

Hazard pictogram(s)	

Signal word	Danger

Hazard statement(s)

H228 H301+H311 H314 H372 H412	Flammable solid. Toxic if swallowed or in contact with skin. Causes severe skin burns and eye damage. Causes damage to organs through prolonged or repeated exposure. Harmful to aquatic life with long lasting effects.

Precautionary statement(s) Prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
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.
P280	Wear protective gloves, protective clothing, eye protection and face protection.
P240	Ground and bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting/intrinsically safe equipment.
P273	Avoid release to the environment.

Precautionary statement(s) Response

P301+P312	IF SWALLOWED: Call a POISON CENTER/doctor/physician/first aider if you feel unwell.
P302+P352	IF ON SKIN: Wash with plenty of water.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P330	Rinse mouth.
P362+P364	Take off contaminated clothing and wash it before reuse.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313	If eye irritation persists: Get medical advice/attention.
P332+P313	If skin irritation occurs: Get medical advice/attention.

Precautionary statement(s) Storage

P405	Store locked up.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

Precautionary statement(s) Disposal

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

SECTION 3 Composition / information on ingredients

Substances

Cas No.	%[weight]	Name
52334-81-3	>98	2-Chloro-5-(trifluoromethyl)pyridine

Mixtures

See Section above for composition of substances

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: • Immediately hold eyelids apart and flush the eye continuously with 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. • Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. • Transport to hospital or doctor without delay. • Removal of contact lenses after an eye injury should only be undertaken by skilled personnel

Skin Contact	If skin or hair contact occurs: • Immediately remove all contaminated clothing, including footwear. • Flush skin and hair with running water. (and soap if available) • Seek medical attention in event of irritation
Inhalation	• If fumes or combustion products are inhaled remove from contaminated area. • Lay patient down. Keep warm and rested. • Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. • Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. • Transport to hospital, or doctor, without delay.
Ingestion	**IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.** For advice, contact a Poisons Information Centre or a doctor. • Urgent hospital treatment is likely to be needed. • In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition. • If the services of a medical officer or medical doctor are readily available, the patient 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 patient to a hospital together with a copy of the SDS. **Where medical attention is not immediately available 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-down position, if possible) to maintain open airway and prevent aspiration. • **NOTE:** Wear a protective glove when inducing vomiting by mechanical means.

Indication of any immediate medical attention and special treatment needed
As in all cases of suspected poisoning, follow the ABCDEs of emergency medicine (airway, breathing, circulation, disability, exposure), then the ABCDEs of toxicology (antidotes, basics, change absorption, change distribution, change elimination).
For poisons (where specific treatment regime is absent):
Basic Treatment:

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary
- Administer oxygen by non-rebreather mask at 10 to 15 L/min
- Monitor and treat, where necessary, for pulmonary oedema
- Monitor and treat, where necessary, for shock
- Anticipate seizures
- **DO NOT** use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.

Advanced Treatment:

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred. ‣ Positive-pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications. ‣ Drug therapy should be considered for pulmonary oedema.
- Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications. ‣ Treat seizures with

diazepam.

- Proparacaine hydrochloride should be used to assist eye irrigation. BRONSTEIN, A.C. and CURRANCE, P.L
- EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994
- Treat symptomatically

SECTION 5 Firefighting measures

Extinguishing media

For **SMALL FIRES**: Dry chemical, CO2, water spray or foam.

For **LARGE FIRES:** Water-spray, fog or foam.

Special hazards arising from the substrate or mixture

Fire Incompatibility	Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result.

Advice for firefighters

Fire Fighting	• 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. • Use fire fighting procedures suitable for surrounding area. • **DO NOT** approach containers suspected to be hot • Cool fire exposed containers with water spray from a protected location • If safe to do so, remove containers from path of fire. • Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	• Combustible solid which burns but propagates flame with difficulty; it is estimated that most organic dusts are combustible (circa 70%) - according to the circumstances under which the combustion process occurs, such materials may cause fires and / or dust explosions. • Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions). • Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust (420 micron or less) may burn rapidly and fiercely if ignited - particles exceeding this limit will generally not form flammable dust clouds; once initiated, however, larger particles up to 1400 microns diameter will contribute to the propagation of an explosion. • In the same way as gases and vapours, dusts in the form of a cloud are only ignitable over a range of concentrations; in principle, the concepts of lower explosive limit (LEL) and upper explosive limit (UEL) are applicable to dust clouds but only the LEL is of practical use; - this is because of the inherent difficulty of achieving homogeneous dust clouds at high temperatures (for dusts the LEL is often called the "Minimum Explosible Concentration", MEC). • When processed with flammable liquids/vapors/mists,ignitable (hybrid) mixtures may be formed with combustible dusts. Ignitable mixtures will increase the rate of explosion pressure rise and the Minimum Ignition Energy (the minimum amount of energy required to ignite dust clouds - MIE) will be lower than the pure dust in air mixture. The Lower Explosive Limit (LEL) of the vapour/dust mixture will be lower than the individual LELs for the vapors/mists or dusts. • A dust explosion may release of large quantities of gaseous products; this in turn creates a subsequent pressure rise of explosive force capable of

	damaging plant and buildings and injuring people. • Usually the initial or primary explosion takes place in a confined space such as plant or machinery, and can be of sufficient force to damage or rupture the plant. If the shock wave from the primary explosion enters the surrounding area, it will disturb any settled dust layers, forming a second dust cloud, and often initiate a much larger secondary explosion. All large scale explosions have resulted from chain reactions of this type. • Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport. ‣ Build-up of electrostatic charge may be prevented by bonding and grounding. • Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting. • All movable parts coming in contact with this material should have a speed of less than 1-meter/sec. • A sudden release of statically charged materials from storage or process equipment, particularly at elevated temperatures and/ or pressure, may result in ignition especially in the absence of an apparent ignition source. • One important effect of the particulate nature of powders is that the surface area and surface structure (and often moisture content) can vary widely from sample to sample, depending of how the powder was manufactured and handled; this means that it is virtually impossible to use flammability data published in the literature for dusts (in contrast to that published for gases and vapours). • Autoignition temperatures are often quoted for dust clouds (minimum ignition temperature (MIT)) and dust layers (layer ignition temperature (LIT)); LIT generally falls as the thickness of the layer increases **Combustion products include.** • carbon monoxide (CO) • carbon dioxide (CO2) • Hydrogen Chloride • Phosgene • Hydrogen Fluoride • nitrogen oxides (NOx) • other pyrolysis products typical of burning organic material.

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures
See section 8

Environmental precautions
See section 12

Methods and material for containment and cleaning up

Minor Spills	• Remove all ignition sources. • Clean up all spills immediately. • Avoid contact with skin and eyes. • Control personal contact with the substance, by using protective equipment. • Use dry clean up procedures and avoid generating dust. • Place in a suitable, labelled container for waste disposal.
Major Spills	• Clear area of personnel and move upwind. • Alert fire Brigade and tell them location and nature of hazard. • **DO NOT** touch or walk through spilled material • Wear full protective clothing and breathing apparatus • Prevent, by any means available, spillage from entering drains or water courses. • No smoking, naked lights or ignition sources • Increase ventilation

	• Stop leak if safe to do so. • Contain spill with sand, earth or vermiculite. • Contain or cover with sand, earth or vermiculite. • Use only spark-free shovels and explosion proof equipment. • Collect recoverable products into labelled containers for recycling. • Collect solid residues and seal in labelled drums for disposal • Wash area with water and dike for later disposal; prevent runoff into drains. • After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using. • If contamination of drains or waterways occurs, advise emergency services

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

SECTION 7 Handling and storage

Precautions for safe handling

Safe Handling	• Avoid all personal contact, including inhalation. • Wear protective clothing when risk of exposure occurs • Use in a well-ventilated area • Prevent concentration in hollows and sumps. • DO NOT enter confined spaces until the atmosphere has been checked. • DO NOT allow material to contact humans, exposed food or food utensils • Avoid contact with incompatible materials • When handling, DO NOT eat, drink or smoke. • Keep containers securely sealed when not in use • Avoid physical damage to containers • Always wash hands with soap and water after handling • Work clothes should be laundered separately. Launder contaminated clothing before re-use • Use good occupational work practice • Observe manufacturer's storage and handling recommendations contained within this SDS. • Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained. • Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions) • Minimise airborne dust and eliminate all ignition sources. Keep away from heat, hot surfaces, sparks, and flame. • Establish good housekeeping practices. • Remove dust accumulations on a regular basis by vacuuming or gentle sweeping to avoid creating dust clouds. • Use continuous suction at points of dust generation to capture and minimize the accumulation of dusts. Particular attention should be given to overhead and hidden horizontal surfaces to minimize the probability of a "secondary" explosion. According to NFPA Standard 654, dust layers 1/32 in.(0.8 mm) thick can be sufficient to warrant immediate cleaning of the area. • Do not use air hoses for cleaning. • Minimize dry sweeping to avoid generation of dust clouds. Vacuum dust-accumulating surfaces and remove to a chemical disposal area. Vacuums with explosion-proof motors should be used. • Control sources of static electricity. Dusts or their packages may accumulate static charges, and static discharge can be a source of ignition. • Solids handling systems must be designed in accordance with applicable standards (e.g. NFPA including 654 and 77) and other national guidance. • Do not empty directly into flammable solvents or in the presence of flammable vapors. • The operator, the packaging container and all equipment must be grounded

	with electrical bonding and grounding systems. Plastic bags and plastics cannot be grounded, and antistatic bags do not completely protect against development of static charges. • Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source. • Do NOT cut, drill, grind or weld such containers. • In addition, ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit
Other information	• Store in original containers. • Keep containers securely sealed. • Store in a cool, dry, well-ventilated area. • Store away from incompatible materials and foodstuff containers. • Protect containers against physical damage and check regularly for leaks. • Observe manufacturer's storage and handling recommendations contained within this SDS

Conditions for safe storage, including any incompatibilities

Suitable container	• Lined metal can, lined metal pail/ can. • Plastic Pail. • Polylinear drum • Packing as recommended by manufacturer. • Check all containers are clearly labelled and free from leaks • For low viscosity materials • Drums and jerricans must be of the non-removable head type. • Where a can is to be used as an inner package, the can must have a screwed enclosure • Removable head packaging Cans with friction closures and low pressure tubes and cartridges may be used. Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages *. In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage*. * Unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.
Storage incompatibility	• Avoid reactions with oxidising agents.

Control Parameters
Occupational Exposure Limits (OEL)

INGREDIENT DATA
Not Available

Ingredient	Original IDLH	Revised IDLH
2-Chloro-5-(trifluoromethyl)pyridine	Not Available	Not Available

Exposure controls

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.

- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.
- If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered. Such protection might consist of:

(a) particle dust respirators, if necessary, combined with an absorption cartridge;

(b) filter respirators with absorption cartridge or canister of the right type;

(c) fresh-air hoods or masks

- Build-up of electrostatic charge on the dust particle, may be prevented by bonding and grounding.
- Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

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

Type of Contaminant	**Air Speed**
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 ft/min)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)

Which each range the appropriate value depends on

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

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore, the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 ft/min) for extraction of crusher dusts generated 2 metres distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Individual protection measures, such as personal protective equipment

Eye and face protection

- Safety glasses with side shields.
- Chemical goggles. [AS/NZS 1337.1, EN166 or national equivalent]
- 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]
Skin protection	See Hand protection below
Hands/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 moisturizer 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 thickness typically greater than 0.35 mm, are recommended. It should be emphasized 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 • Eye wash unit • Barrier Cream • Skin Cleansing cream

Respiratory protection:

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

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

* - Negative pressure demand ** - Continuous flow

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

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Transparent crystalline solid; does not mix well with water		
Physical state	Divided Solid	**Relative density (Water = 1)**	1.417
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Applicable	**Decomposition temperature (°C)**	Not Available
Melting point / freezing point (°C)	**32 – 34℃**	**Viscosity (cSt)**	Not Applicable
Initial boiling point and boiling range (°C)	**Not Available**	**Molecular weight (g/mol)**	181.55
Flash point (°C)	> 110	**Taste**	Not Available
Evaporation rate	Not Applicable	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Applicable
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Negligible
Vapour pressure (kPa)	Negligible	**Gas group**	Not Available
Solubility in water	Partly miscible	**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	Based on available data, the classification criteria are not met.
e) Mutagenicity	Based on available data, the classification criteria are not met.
f) Carcinogenicity	Based on available data, the classification criteria are not met.
g) Reproductivity	Based on available data, the classification criteria are not met.

h) STOT - Single Exposure	There is sufficient evidence to classify this material as toxic to specific organs through single exposure
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	• Inhalation of vapours, aerosols (mists, fumes) or dusts, generated by the material during the course of normal handling, may produce serious damage to the health of the individual. • Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled. • If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures. • Pyridine and its derivatives generally produce local irritation on contact with the mucous membranes. Overexposure to pyridine and some of its derivatives may produce headache, nausea, loss of consciousness, nervousness, loss of appetite, sleeplessness and narcosis.
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
Skin Contact	• Skin contact with the material may produce toxic effects; systemic effects may result following absorption • The material can produce chemical burns following direct contact with the skin • 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. • Pyridine and derivatives cause local irritation to the skin; absorption through the skin can cause similar effects as inhalation.
Eye	• This material can cause eye irritation and damage in some persons. Pyridine and its derivatives generally produce local irritation on contact with the cornea
Chronic	• Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. • Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure. • There has been some concern that this material can cause cancer or mutation but there is not enough data to make an assessment. • Long-term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis, caused by particles less than 0.5 micron penetrating and remaining in the lung.

2-Chloro-5-(trifluoromethyl)pyridine	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: >13.7 mg/l4h[1]	Skin: no adverse effect observed (not irritating)[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*	

2-Chloro-5-(trifluoromethyl)pyridine	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non- allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without 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. No significant acute toxicological data identified in literature search.

Acute Toxicity	✓	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✓	**Reproductivity**	✗
Serious Eye Damage/Irritation	✓	**STOT - Single Exposure**	✓
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗
Legand: ✗ – *Data either not available or does not fill the criteria for classification* ✓– *Data available to make classification*			

SECTION 12 Ecological information

Toxicity

2-Chloro-5-(trifluoromethyl)pyridine	**End Point**	**Test Duration (hr.)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
Legand:	*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*				

Harmful to aquatic organisms.

May cause long-term adverse effects in the aquatic environment.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.
Wastes resulting from use of the product must be disposed
of on site or at approved waste sites.
For Pyridine and its Derivatives:
Environmental Fate: As molecular weight/substitution increase in the pyridine category, greater distribution to water and soil, and less to air, is predicted. Atmospheric Fate: The lower weight pyridine, piperidine, is expected to be rapidly degraded by UV light in the atmosphere, with an estimated half-life of < 1 day. Higher molecular weight pyridines are expected to be broken down by sunlight, (photodegrades), more slowly, (half-lives ranging from 10-30 days). Lutidines and collidines are expected to photodegrade even more slowly. The nitrile derivatives of pyridine are also predicted to photodegrade slowly, with half-lives of 164 days; however, the nitrile derivatives of pyridine are predicted to partition to air much less favorably than to soil and water.
Terrestrial Fate: Depending upon the environmental conditions, different types of bacteria, fungi, and enzymes are involved in the breakdown of these substances. Aquatic Fate: Pyridines are not expected to be broken down by

water; however, breakdown by microbes is expected, if sufficient oxygen is available. These substances are expected to be stable in low oxygen/sterile conditions.
Ecotoxicity: Pyridine and its derivatives range from slightly to moderately toxic to fish, invertebrates and algae.
DO NOT discharge into sewer or waterways

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
2-Chloro-5-(trifluoromethyl)pyridine	High	High

Bio accumulative potential

Ingredient	Bioaccumulation
2-Chloro-5-(trifluoromethyl)pyridine	Low (Log KOW = 3.3065)

Mobility in soil

Ingredient	Mobility
2-Chloro-5-(trifluoromethyl)pyridine	LOW (Log KOC = 1912)

SECTION 13 Disposal considerations

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 authorised 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. 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. In most instances the supplier of the material should be consulted. • **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. • 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) • Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed

SECTION 14 Transport information

Labels Required

	 
Marine Pollutant	**No**

Land transport (UN)

14.1. **UN number or ID number**	2811	
14.2. **UN proper shipping name**	TOXIC SOLID, ORGANIC, N.O.S. (contains 2-chloro-5-(trifluoromethyl)pyridine)S	
14.3. **Transport hazard class(es)**	Class	6.1
	Subsidiary Hazard	Not Available
14.4. **Packing group**	III	
14.5. **Environmental hazard**	Not Applicable	
14.6. **Special precautions for user**	Special Provisions	223; 274
	Limited Quality	5 kg

Air transport (ICAO-IATA / DGR)

14.1. **UN number**	2811	
14.2. UN proper shipping name	Toxic solid, organic, n.o.s. * (contains 2-chloro-5-(trifluoromethyl)pyridine)	
14.3. **Transport hazard class(es)**	ICAO/IATA Class	6.1
	ICAO / IATA Subsidiary Hazard	Not Available
	ERG Code	6 L
14.4. **Packing group**	**III**	
14.5. **Environmental hazard**	Not Applicable	
14.6. **Special precautions for user**	Special provisions	A3 A5
	Cargo Only Packing Instructions	677
	Cargo Only Maximum Qty / Pack	200 kg
	Passenger and Cargo Packing Instructions	670
	Passenger and Cargo Maximum Qty / Pack	100 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Y645
	Passenger and Cargo Limited Maximum Qty / Pack	10 kg

Sea transport (IMDG-Code/ GGVSee)

14.1. **UN number**	2811	
14.2. **UN proper shipping name**	TOXIC SOLID, ORGANIC, N.O.S. (contains 2-chloro-5-(trifluoromethyl)pyridine)	
14.3. **Transport hazard class(es)**	IMDG Class	6.1
	IMDG Subsidiary Hazard	Not Applicable
14.4. **Packing group**	**III**	
14.5 **Environmental hazard**	Not Applicable	
14.6. **Special precautions for user**	EMS Number	F-A , S-A
	Special provisions	223; 274
	Limited Quantities	5 Kg

14.7 Maritime transport in bulk according to IMO instruments

14.7.1 Transport in bulk in accordance to Annex II of MARPOL and the IBC Code

Not Applicable

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

Product Name	Ship Type
2-Chloro-5-(trifluoromethyl)pyridine	Not Available

2-Chloro-5-(trifluoromethyl)pyridine k in accordance with the IGC Code

Product Name	Ship Type
2-Chloro-5-(trifluoromethyl)pyridine	Not Available

SECTION 15 Regulatory information

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

2-Chloro-5-(trifluoromethyl)pyridine is found on the following lists

Not Applicable

Additional Regulatory Information

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	No (2-chloro-5-(trifluoromethyl)pyridine)
Canada - DSL	No (2-chloro-5-(trifluoromethyl)pyridine)
Canada - NDSL	No (2-chloro-5-(trifluoromethyl)pyridine)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	No (2-chloro-5-(trifluoromethyl)pyridine)
Philippines - PICCS	No (2-chloro-5-(trifluoromethyl)pyridine)
USA - TSCA	No (2-chloro-5-(trifluoromethyl)pyridine)
Taiwan - TCSI	Yes
Mexico - INSQ	No (2-chloro-5-(trifluoromethyl)pyridine)
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.*

SECTION 16 Other information

Revision Date	20/06/2022
Initial Date	12/05/2005

SDS Version Summary

Version	Date of Update	Sections Updated
4.1	27/06/2017	Toxicological information - Acute Health (eye), Toxicological information - Acute Health (inhaled), Toxicological information - Acute Health (skin), Toxicological information - Acute Health (swallowed), First Aid measures - Advice to Doctor, Toxicological information - Chronic Health, Hazards identification - Classification, Disposal considerations - Disposal, Exposure controls / personal protection - Engineering Control, Ecological Information - Environmental, Exposure controls / personal protection - Exposure Standard, Firefighting measures - Fire Fighter (fire/explosion hazard), Firefighting measures - Fire Fighter (fire fighting), Firefighting measures - Fire Fighter (fire incompatibility), First Aid measures - First Aid (inhaled), First Aid

		measures - First Aid (swallowed), Handling and storage - Handling Procedure, Exposure controls / personal protection - Personal Protection (other), Exposure controls / personal protection - Personal Protection (Respirator), Exposure controls / personal protection - Personal Protection (eye), Exposure controls / personal protection - Personal Protection (hands/feet), Accidental release measures - Spills (major), Accidental release measures - Spills (minor), Handling and storage - Storage (storage requirement), Handling and storage - Storage (suitable container), Toxicological information - Toxicity and Irritation (Other), Transport information - Transport, Transport Information
5.1	20/06/2022	Expiration. Review and Update

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources.

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: Bio Concentration 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
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

This Material Safety Data Sheet (MSDS) has been prepared in accordance with our company standards and is intended solely for the use of trained personnel. The information provided herein is believed to be accurate as of the date of issue, but no warranty, express or implied, is made regarding its accuracy, completeness, or suitability for any particular purpose. The user is responsible for ensuring safe conditions and compliance with applicable laws and regulations.