

Safety Data Sheet

Material Name: Hydrogen Cyanide

Section 1 - IDENTIFICATION

Product Name:	HYDROGEN CYANIDE GAS
Other name(s):	Hydrogen cyanide gas (decomposition product of sodium cyanide); Hydrocyanic acid gas.
Recommended Use of the Chemical and Restrictions on Use	Decomposition product of sodium cyanide.
Manufacturer Information	Electronic Fluorocarbons 3266 Bergey Road Hatfield PA 19440
General Information	1-215-443-9600
Emergency #	1-800-535-5053
Outside the US	1-352-323-3500 (Call collect)

Section 2 - HAZARDS IDENTIFICATION

DANGEROUS GOODS.

HAZARDOUS SUBSTANCE.

Classification of the substance or mixture:

Flammable liquids - Category 1
Acute Oral Toxicity - Category 1
Acute Dermal Toxicity - Category 1
Acute Inhalation Toxicity - Category 1
Specific target organ toxicity (single exposure) - Category 1

The following health/environmental hazard categories fall outside the scope of the Workplace Health and Safety Regulations: Acute

Aquatic Toxicity - Category 1
Chronic Aquatic Toxicity - Category 1

SIGNAL WORD: DANGER



Hazard Statement(s):

H224 Extremely flammable liquid and vapour.
H300+H310+H330 Fatal if swallowed, in contact with skin or if inhaled.
H370 Causes damage to organs.

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Precautionary Statement(s):

Prevention:

P210 Keep away from heat / sparks / open flames / hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground / bond container and receiving equipment.
P241 Use explosion-proof electrical / ventilating / lighting equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P260 Do not breathe mist / vapours / spray.
P264 Wash hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves / protective clothing / eye protection / face protection.
P284 Wear respiratory protection.

Response:

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P330 Rinse mouth.
P302+P350 IF ON SKIN: Gently wash with plenty of soap and water.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P310 Immediately call a POISON CENTER or doctor/physician.
P320 Specific treatment is urgent (see First Aid Measures on this Safety Data Sheet).
P322 Specific measures (see First Aid Measures on Safety Data Sheet).
P361 Take off immediately all contaminated clothing.
P363 Wash contaminated clothing before re-use.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P307+P311 IF exposed: Call a POISON CENTER or doctor/physician.
P314 Get medical advice/attention if you feel unwell.
P370+P378 In case of fire: Use extinguishing media as outlined in Section 5 of this Safety Data Sheet to extinguish.

Storage:

P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P403+P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.

Disposal:

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Poisons Schedule (SUSMP): S7 Dangerous Poison.

* * *Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS* * *

Components	CAS Number	Proportion	Hazard Codes
Hydrogen cyanide	74-90-8	>99.9%	H224 H300 H310 H330 H370 H372 H410
Stabiliser	-	<0.1%	-

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Section 4 - FIRST AID MEASURES

May be fatal if inhaled, swallowed or absorbed through skin. At all places where there is a risk of cyanide poisoning, items to facilitate the prompt and effective treatment of cyanide poisoning (as determined by the treatment protocol to be employed) should be kept in an accessible and convenient location.

Recommended items include:

- An oxygen resuscitator and a source of oxygen and a clearly marked CYANIDE ANTIDOTE box containing:
- An approved airway, elasticised tourniquet, 5 mL sterile disposable syringe and needles for blood samples, fluoride heparinised blood sample tubes, skin prep swabs, dressing and adhesive tape
- Either:
 - 2 Cyanokits containing hydroxocobalamin 5g x 2 amps and the prescribing information outlining side effects and precautions OR
 - 2 Ampoules of Kelocyanor (Dicobalt edetate), including the prescribing information outlining side effects and precautions
- Intravenous injection equipment
- A copy of the appropriate Safety Data Sheet and
- A written copy of the relevant treatment protocol

Protect the rescuer

Prior to any attempt at rescue, an assessment of the dangers must be undertaken and measures including the use of appropriate personal protective equipment must be applied to protect the rescuer. Personal protective equipment may include:

- Protective gloves to avoid contact with contaminated skin, clothing and equipment
- Chemical goggles to protect the eyes
- Suitable respiratory protective equipment to prevent inhalation of sodium cyanide dust.

Inhalation:

Shout and send for help.

Remove the person from the source of exposure and ideally to a source of fresh air.

Look for verbal and physical responses from the person suffering from poisoning. Check that they are breathing.

If Patient is Breathing: Oxygen, preferably 100% oxygen if available, should be administered by a qualified person. If the person has collapsed or is unconscious, lie on their side, ensuring airway is clear and open.

If Patient is not Breathing: Ensure airway is clear and open and commence resuscitation using a resuscitation bag or mask connected to an oxygen source (or 100% oxygen via a non rebreathing facemask). Do not use mouth-to-mouth resuscitation. Oxygen, preferably 100% oxygen if available, should be administered by a qualified person. Check for pulse. If pulse is absent start external cardiac massage.

Transport promptly to hospital or medical centre.

Skin Contact:

If skin or hair contact occurs, immediately remove any contaminated clothing and place in a sealed bag for decontamination or disposal. Wash skin and hair thoroughly with running water. Transport promptly to hospital or medical centre. Treat as for 'Inhaled'.

Eye Contact:

Immediately wash in and around the eye area with large amounts of water for at least 15 minutes. Eyelids to be held apart. Remove clothing if contaminated and wash skin. Urgently seek medical assistance. Transport promptly to hospital or medical centre. Treat as for 'Inhaled'.

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Ingestion:

Do not give anything by mouth. Treat as for 'Inhaled'.

Indication of immediate medical attention and special treatment needed:

Be certain that victims have been decontaminated properly. Victims who have undergone decontamination pose no serious risks of secondary contamination to rescuers or medical staff treating the victim. In such cases, Support Zone personnel require no specialized protective gear.

Upon presentation, immediately assess the need or otherwise for assisted ventilation, administer 100% oxygen, insert intravenous lines and institute cardiac and blood pressure monitoring if available.

Assess and monitor level of consciousness.

Obtain arterial/venous blood gas as metabolic acidosis, often severe, combined with a small difference between the arterial and venous oxygen saturation levels (<10 mmHg) suggests cyanide poisoning: Correct any severe metabolic acidosis (pH below 7.20) and concurrent electrolyte imbalances (for example, hyperkalaemia, hypercalcaemia).

Take a blood sample in a fluoride heparinised tube for analysis of blood cyanide levels to confirm poisoning, but do not delay treatment while awaiting results. Treatment decisions must be made on clinical grounds.

Symptoms of fear and anxiety about possible cyanide poisoning may mimic those of mild, or the early stages, of cyanide poisoning. It is therefore important to establish cyanide poisoning has actually occurred before administering an antidote as some cyanide antidotes have severe side effects if administered in the absence of cyanide poisoning or if the dose is too great.

If a history of exposure to cyanide has been confirmed and the patient presents with, or develops, severe symptoms of cyanide poisoning (particularly if the patient has lost consciousness, is lapsing into unconsciousness or enters cardiac arrest) then antidote administration may be required.

Antidotes

There are two main antidotes for severe cyanide poisoning

- Hydroxocobalamin (preferred) OR
- Dicobalt edetate (Kelocyanor)

Hydroxocobalamin

Reconstitute the hydroxocobalamin by diluting one flask (5g) of the freeze-dried with 200mL of 0.9% saline and shake rigorously. Administer 5 grams of reconstituted solution via a fast intravenous drip over 15 minutes (approximately 15mL/ min). A further (5g) dose may be given if necessary at a slower rate of infusion - 30 min - 2 hours (or alternatively I.V. sodium thiosulphate 12.5g (50mL) may be given by slow intravenous injection) through a separate IV line. Hydroxocobalamin should not be administered if person has known hypersensitivity to Vitamin B12.

Dicobalt edetate (Kelocyanor)

Note: Overzealous administration of the antidote is contraindicated and may result in serious adverse reactions of an anaphylactic (allergic) nature. Adverse reactions reported include gross oedema of the face and neck, urticaria, palpitations, hypotension, convulsions, vomiting, chest pains, difficulty in breathing, and collapse.

Administer one ampoule containing 300mg Dicobalt edetate in 20mL glucose solution (Kelocyanor) intravenously by slow injection. The initial effect is a fall in blood pressure, rise in pulse rate, and sometimes retching. Immediately after this phase, lasting about one minute, the patient should recover. The injection should be discontinued if allergic adverse effects are noted. A second dose may be given if the response is inadequate and allergic adverse effects have not been observed (or alternatively I.V. sodium thiosulphate 12.5g (50mL) may be given by slow intravenous injection through a separate IV line.

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If cyanide has been swallowed, gastric lavage, charcoal and cathartics may be used after antidote treatment if less than two hours have elapsed since ingestion if recommended by an appropriately qualified specialist physician in a specific case although the effectiveness of this measure is not strongly supported by evidence.

Cases of proven and symptomatic cyanide poisoning should be monitored for at least 24 hours and longer if antidote administration had been required for severe poisoning. Eye splashes should be assessed by an ophthalmologist within 24 hours (as cyanide is a severe eye irritant). Persons without symptoms but with significant areas of skin contact should be observed for at least 6 hours to ensure there are no delayed effects.

Section 5 - FIRE FIGHTING MEASURES

Suitable Extinguishing Media:

Dry agent (dry chemical powder).

Unsuitable Extinguishing Media:

Carbon dioxide.

Hazchem or Emergency Action Code: 2WE

Specific hazards arising from the substance or mixture:

Extremely flammable. Toxic substance.

Special protective equipment and precautions for fire-fighters:

Fire fighters to wear self-contained breathing apparatus and suitable protective clothing if risk of exposure to vapour or products of combustion.

Section 6 - ACCIDENTAL RELEASE MEASURES

Emergency procedures/Environmental precautions:

Clear area of all unprotected personnel. Shut off all possible sources of ignition. If contamination of sewers or waterways has occurred advise local emergency services. For large spills notify the Emergency Services.

Personal precautions/Protective equipment/Methods and materials for containment and cleaning up:

Clear area of all unprotected personnel. Wear protective equipment to prevent skin and eye contact and breathing in vapours/dust.

Section 7 - HANDLING AND STORAGE

This material is a Scheduled Poison S7 and must be stored, maintained and used in accordance with the relevant regulations.

Precautions for safe handling:

Extremely flammable - eliminate all potential ignition sources. Keep out of reach of children.

Conditions for safe storage, including any incompatibilities:

Not applicable.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Hydrogen cyanide: Peak Limitation = 11 mg/m³ (10 ppm), Sk
Cyanides (as CN): 8hr TWA = 5 mg/m³, Sk

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TWA - The time-weighted average airborne concentration of a particular substance when calculated over an eight-hour working day, for a five-day working week.

'Sk' (skin) Notice - absorption through the skin may be a significant source of exposure. The exposure standard is invalidated if such contact should occur.

Peak Limitation - a maximum or peak airborne concentration of a particular substance determined over the shortest analytically practicable period of time which does not exceed 15 minutes.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Appropriate engineering controls:

Ensure ventilation is adequate to maintain air concentrations below Workplace Exposure Standards.

If in the handling and application of this material, safe exposure levels could be exceeded, the use of engineering controls such as local exhaust ventilation must be considered and the results documented. If achieving safe exposure levels does not require engineering controls, then a detailed and documented risk assessment using the relevant Orica Personal Protection Guide information (refer to PPE section below) as a basis must be carried out to determine the minimum PPE requirements.

Individual protection measures, such as Personal Protective Equipment (PPE):

The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

OVERALLS, CHEMICAL GOGGLES, RUBBER BOOTS, AIR MASK , GLOVES (Long), APRON.

* Not required if wearing air supplied mask.



Wear overalls, chemical goggles, full face shield, elbow-length impervious gloves, splash apron or equivalent chemical impervious outer garment, and rubber boots. Use with adequate ventilation. If determined by a risk assessment an inhalation risk exists, wear an air-supplied mask meeting the requirements of AS/NZS 1715 and AS/NZS 1716. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Gas
Colour:	Colourless
Odour:	Distinctive 'Bitter almonds'
Molecular Formula:	HCN
Solubility:	Soluble in water.
Specific Gravity:	0.938 g/L
Relative Vapour Density (air=1):	0.93 @26°C

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Vapour Pressure (20 °C): 62 kPa
Flash Point (°C): -17.8 (CC)
Flammability Limits (%): 6-41
Autoignition Temperature (°C): 538
% Volatile by Volume: 100
Boiling Point/Range (°C): Not applicable
pH: Not applicable

Section 10 - STABILITY AND REACTIVITY

Reactivity: Reacts with oxidising agents.

Chemical stability: No information available.

Possibility of hazardous reactions: If not stabilised, can polymerise violently.

Conditions to avoid: Avoid exposure to heat, sources of ignition, and open flame.

Incompatible materials: Incompatible with oxidising agents .

Hazardous decomposition products: Cyanides.

Section 11 - TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion: Swallowing can result in nausea, vomiting, diarrhoea, abdominal pain, convulsions and loss of consciousness. Collapse and possible death may occur.

Eye contact: May be an eye irritant.

Skin contact: Contact with skin may result in irritation. Can be absorbed through the skin. Effects can include those described for 'INGESTION'.

Inhalation: Breathing in high concentrations may result in the same symptoms described for 'INGESTION'. High inhaled concentrations may lead to a feeling of suffocation and cause difficulty in breathing, headaches, dizziness and loss of consciousness. Can cause suffocation.

Acute toxicity:
Oral LD50 (mice): 3700 ug/kg

Chronic effects: Repeated or prolonged skin contact may lead to irritant contact dermatitis - 'cyanide rash' - characterised by itching and skin eruptions. Chronic and subchronic exposure to cyanide is known to induce thyroid effects due to the cyanide metabolite, thiocyanate. Thiocyanate adversely affects the thyroid gland via competitive inhibition of iodide uptake and perturbation of the homeostatic feedback mechanisms that regulate the synthesis and secretion of essential thyroid hormones.

Section 12 - ECOLOGICAL INFORMATION

Ecotoxicity Avoid contaminating waterways.

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Aquatic toxicity: Very toxic to aquatic organisms. May cause long term adverse effects in the aquatic environment.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal methods:
Refer to Waste Management Authority. Waste treatment is essential.

Section 14 - TRANSPORT INFORMATION

Road and Rail Transport
DANGEROUS GOODS.



UN No: 1051
Transport Hazard Class: 6.1 Toxic
Subrisk 1: 3 Flammable Liquid
Packing Group: I
Proper Shipping Name or Technical Name: HYDROGEN CYANIDE, STABILIZED
Hazchem or Emergency Action Code: 2WE

Marine Transport
DANGEROUS GOODS.

UN No: 1051
Transport Hazard Class: 6.1 Toxic
Subrisk 1: 3 Flammable liquid
Packing Group: I
Proper Shipping Name or Technical Name: HYDROGEN CYANIDE, STABILIZED

IMDG EMS Fire: F-E
IMDG EMS Spill: S-D

Marine Pollutant Yes

Air Transport
DANGEROUS GOODS.

TRANSPORT PROHIBITED under the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air in Passenger and Cargo Aircraft, and Cargo Aircraft Only.

UN No: 1051
Transport Hazard Class: 6.1 Toxic
Subrisk 1: 3 Flammable Liquid
Packing Group: I
Proper Shipping Name or Technical Name: HYDROGEN CYANIDE, STABILIZED

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Special precautions for user: Hydrogen cyanide (HCN) gas is a decomposition product of sodium cyanide. The above dangerous goods classification indicates that HCN is a compressed gas and could be present as a liquid. HCN liquid nor HCN compressed gas are sold or used by Ixom Operations Pty Ltd.

* * *Section 15 - REGULATORY INFORMATION* * *

Classification:

HAZARDOUS SUBSTANCE.

Classification of the substance or mixture:

Flammable liquids - Category 1

Acute Oral Toxicity - Category 1

Acute Dermal Toxicity - Category 1

Acute Inhalation Toxicity - Category 1

Specific target organ toxicity (single exposure) - Category 1

The following health/environmental hazard categories fall outside the scope of the Workplace Health and Safety Regulations:

Acute Aquatic Toxicity - Category 1

Chronic Aquatic Toxicity - Category 1

Hazard Statement(s):

H224 Extremely flammable liquid and vapour.

H300+H310+H330 Fatal if swallowed, in contact with skin or if inhaled.

H370 Causes damage to organs.

Poisons Schedule (SUSMP): S7 Dangerous Poison.

16. OTHER INFORMATION

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

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Other Information

Electronic Fluorocarbons makes no express or implied warranties, guarantees or representations regarding the product or the information herein, including but not limited to any implied warranty or merchantability or fitness for use. Electronic Fluorocarbons shall not be liable for any personal injury, property or other damages of any nature, whether compensatory, consequential, exemplary, or otherwise, resulting from any publication, use or reliance upon the information herein.