

 NAVIN FLUORINE INTERNATIONAL LIMITED		MATERIAL SAFETY DATA SHEET (MSDS) REFRIGERANT GAS (MAFRON 22 and R-142b 40/60 blend)	
1. CHEMICAL IDENTITY			
Chemical Name		Chlorodifluoromethane (R-22)/ chlorodefluoroethane (R-142b) blend	
Synonym		None	
Formula		Mixture	
2. COMPOSITION / INFORMATION ON INGREDIENTS			
Ingredients name & CAS no		chlorodifluoromethane (R-22)	75-45-6
		1-chloro-1,1-difluoroethane (R-142b)	75-68-3
3. PHYSICAL / CHEMICAL DATA			
Boiling Point	-28 °C	Vapour Pressure at 21°C	79.4 PSIA
Melting Point	NA	Solubility in water	Slight
Vapour Density (Air = 1)	3.25	Appearance	Colorless liquefied gas.
Specific Gravity (Water=1)	1.16 @ 68F	Odour	Faint ether odor
pH (5% Soln.)	NA	Other	----
Physical state	Liquefied gas.		
4. FIRE / EXPLOSION HAZARD DATA			
Flammability	Non Flammable	LEL%	NA
Auto Ignition Temp.	Not applicable	UEL%	NA
Explosion Sensitivity to Impact	NA		
Explosion Sensitivity to static electricity	NA		
Hazardous Combustion Product	NA		
Hazardous Polymerization	NA		
Combustible liquid	NA	Oxidizer	No
Flammable material	No	Organic Peroxide	No
Pyrophoric material	NA	Corrosive	No
Explosive material	NA	Other	-
5. STABILITY & REACTIVITY DATA			
Chemical stability	This material is chemically stable under specified conditions of storage.		
Incompatibility	Avoid contact with strong alkali or alkaline earth metals, finely powdered metals such as aluminum, magnesium or zinc and strong oxidizers, since they may react or accelerate decomposition		
Conditions to avoid			
Hazardous reaction/decomposition products	Thermal decomposition products include hydrogen fluoride, hydrogen chloride, carbon monoxide, carbon dioxide and chlorine		
6. HEALTH HAZARD DATA			
Effects of exposure/ Symptoms	Skin, Eyes, Inhalation		
	Skin contact and inhalation are expected to be the primary routes of occupational exposure to this material. As with most liquefied gases, contact with the rapidly volatilizing liquid can cause frostbite to any tissue. High vapor concentrations are irritating to the eyes and respiratory tract and may result in central nervous system (CNS) effects such as headache, dizziness, drowsiness and, in severe exposure, loss of consciousness and death. The dense vapor of this material may reduce the available oxygen for breathing. Prolonged exposure to an oxygen-deficient atmosphere may be fatal. Inhalation may cause an increase in the sensitivity of the heart to adrenaline, which could result in irregular or rapid heartbeats. Medical conditions aggravated by exposure to this material include heart disease or compromised heart function		

7. TOXICOLOGICAL INFORMATION

Chlorodifluoromethane (R-22)

Several accidental deaths have been associated with exposure to this material or mixtures with other Fluorocarbons. Death was generally attributed to oxygen deficiency. Microscopic examination of the tissues of some of the victims showed effects on the lungs and fatty deposits in liver cells. An increase in the incidence of a heart palpitation has been claimed by individuals occupationally exposed. Monitoring of workers during occupational exposure showed no connection to exposure and cardiac arrhythmia or neurologic disorders. Other epidemiological studies have reported similar results. Repeated skin application of a 10 second spray caused reddening and slight swelling of the skin and a delay in hair growth. No skin allergy was observed in guinea pigs following repeated exposure. Studies with mice, dogs, rats, rabbits, cats and monkeys have shown that inhalation exposure can cause cardiac arrhythmias. Inhalation causes an initial stimulation and then depression of the central nervous system (CNS). Symptoms in animals include loss of equilibrium, tremors, convulsions and narcosis and death, usually attributed to asphyxiation. At levels that caused anesthesia, dogs exhibited convulsions. Acute exposure by inhalation was fatal to rabbits, also causing hemorrhages and effects on the liver. Following repeated inhalation exposure, no effects were reported in guinea pigs, dogs and cats; mild liver effects were reported in rabbits; and, effects on the lungs, CNS, heart, liver, kidney, spleen were reported in rats, mice and rabbits. An increase in malignant tumors of the salivary a gland was reported in male rats but not in female rats or mice of either sex after long-term inhalation exposure. Long-term oral dosing produced no adverse effects in rats. Inhalation exposure produced no adverse effects on male reproductive performance in rats and mice. Eye malformations were reported in the offspring of rats exposed by inhalation during pregnancy. In rabbits, rats and humans, a small portion of inhaled material was distributed into the brain, heart, lungs, liver, kidneys and fat. It was rapidly eliminated from the body in the inhaled air. No significant metabolism occurs in humans or rats. The results of the tests for genetic changes were mixed. Several accidental deaths have been associated with exposure to this material or mixtures with other fluorocarbons. Death was generally attributed to oxygen deficiency. Microscopic examination of the tissues of some of the victims showed effects on the lungs and fatty deposits in liver cells. An increase in the incidence of heart palpitations has been claimed by individuals occupationally exposed. Monitoring of workers during occupational exposure showed no connection to exposure and cardiac arrhythmia or neurologic disorders. Other epidemiological studies have reported similar results. Repeated skin application of a 10 second spray caused reddening and slight swelling of the skin and a delay in hair growth. No skin allergy was observed in guinea pigs following repeated exposure. Studies with mice, dogs, rats, rabbits, cats and monkeys have shown that inhalation exposure can cause cardiac arrhythmias. Inhalation causes an initial stimulation and then depression of the central nervous system (CNS). Symptoms in animals include loss of equilibrium, tremors, convulsions and narcosis and death, usually attributed to asphyxiation. At levels that caused anesthesia, dogs exhibited convulsions. Acute exposure by inhalation was fatal to rabbits, also causing hemorrhages and effects on the liver. Following repeated inhalation exposure, no effects were reported in guinea pigs, dogs and cats; mild liver effects were reported in rabbits; and, effects on the lungs, CNS, heart, liver, kidney, spleen were reported in rats, mice and rabbits. An increase in malignant tumors of the salivary a gland was reported in male rats but not in female rats or mice of either sex after long-term inhalation exposure.

Long-term oral dosing produced no adverse effects in rats. Inhalation exposure produced no adverse effects on male reproductive performance in rats and mice. Eye malformations were reported in the offspring of rats exposed by inhalation during pregnancy. In rabbits, rats and humans, a small portion of inhaled material was distributed into the brain, heart, lungs, liver, kidneys and fat. It was rapidly eliminated from the body in the inhaled air. No significant metabolism occurs in humans or rats. The results of the tests for genetic changes were mixed.

1-Chloro-1,1-difluoroethane, HCFC-142b

Inhalation exposure can cause cardiac arrhythmias and effects on the cardiac and respiratory system in dogs. Dogs treated with adrenalin then exposed by inhalation exhibited cardiac sensitization. Inhalation exposure causes an initial stimulation and then depression of the central nervous system. Symptoms in animals include loss of equilibrium, tremors, convulsions and narcosis. Death was usually attributed to respiratory failure and animals that died from inhalation exposure generally showed lung irritation. Following repeated inhalation exposures, effects on the lungs were noted in rats. No birth defects were noted in rats exposed by inhalation during pregnancy. The results of tests for genetic changes were mixed. Following repeated inhalation exposure, no increases in urinary fluoride was reported and this material was not detected in tissues.

LD50/LC50

Inhalation - Practically Non-toxic to Rats (6-hr LC50 >200,000 ppm)

Permissible Exposure Limit-

NA

8. ECOLOGICAL INFORMATION			
<p>Ecotoxicological Information: 1-Chloro-1,1-difluoroethane, HCFC-142b- This material is slightly toxic rainbow trout (96-hr LC50 36 ppm) and practically non-toxic to guppies (96-hr LC50220 ppm) and Daphnia magna (48hr EC50 16>190mg/l). Chlorodifluoromethane The toxicity threshold for fish is 180 mg/l (24hrs) and for bacteria under anaerobic conditions is >400 mg/l (24hrs). No effects were reported on the growth of aerobic and anaerobic microorganisms over a 24 hour period ,including gram-positive and gram-negative species, from exposure to a media that contained this material at 5 mg/ml)</p>			
9. PREVENTIVE MEASURES/EXPOSURE CONTROL/PERSONAL PROTECTION			
Engineering Controls		Use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.	
Personal Protective Equipments		Protective gloves, protective goggles, lab coat, respirators.	
10. HANDLING & STORAGE			
Normal Handling		Avoid breathing gas. Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Do not enter confined spaces unless adequately ventilated.	
Storage Recommendation		Store in approved containers only. Store in cool, well-ventilated area. Flammable hydrogen gas can be generated in metal storage containers. Diking of storage tank is recommended.	
11. EMERGENCY / FIRST AID MEASURE			
Fire		Fire extinguishing medium	Not flammable.
Exposure/first aid measures		Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention. Do not give adrenaline, epinephrin or similar drugs following exposure to this product.
		Skin / Eyes	Eye: Immediately flush with plenty of water. Get medical attention if irritation persists. Skin: Flush exposed skin with lukewarm water (not hot), or use other means to warm skin slowly. Get medical attention if frostbitten by liquid or if irritation occurs.
		Ingestion	Not applicable - product is a gas at ambient temperatures.
Special procedure		Fire Fighting Instruction: Stop the flow of gas if possible. Use water spray on person making shut-off. Fire fighters and others who maybe exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self contained breathing apparatus. Fire fighting equipment should be thoroughly decontaminated after use.	
12. ACCIDENTAL RELEASE MEASURES			
General Information		Use proper personal protective equipment as indicated in section 9	
Spills / Release		Use Halogen leak detector or other suitable means to locate leaks or check atmosphere. Keep up wind. Evacuate enclosed spaces and disperse gas with floor-level forced-air ventilation. Exhaust vapors outdoors. Do not smoke or operate internal combustion engines. Remove flames and heating elements	
13. DISPOSAL CONSIDERAIONS:			
Dispose of in a manner consistent with federal, state, and local regulations.			
14. TRANSPORT INFORMATION			
<p>DOT Name : Refrigerant Gas, NOS DOT Technical Name: (Chlorodifluoroethane, Chlorodifluoromethane) DOT Hazard Class: 2.2 UN Number: UN 1078 DOT Packing Group: PG NA Hazard Label</p>			
			

15. REGULATORY INFORMATION	
	Federal, state & International Regulations.
16. NAME OF FIRM - NAVIN FLUORINE INTERNATIONAL LIMITED	
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