A. GENERAL INFORMATION

This product safety summary is intended to provide a general overview of the chemical substance in the context of ICCA global product strategy. It is not intended to provide emergency response, medical or treatment information nor to provide an overview of all safety and health information. This summary is not intended to replace the Safety Data Sheet. For detailed guidance on the use or regulatory status of this substance, please refer the Safety Data Sheet.

Company Name	M/s GUJARAT FLUOROCHEMICALS LIMITED
Address	Survey No 16/3, 26, 27, Ranjitnagar Pin-389 380, Tal. Ghoghamba, Dist. Panchmahals, Gujarat, India
Business Phone	+91 – 2678 – 248107, 248152
Business Fax	+91 – 2678 – 248153
Web Site	www.gfl.co.in

B. CHEMICAL PRODUCT IDENTIFICATION:

Product Name	Chlorodifluromethane
Synonyms	R-22, HCFC-22, Fluorocarbon 22 (Freon 22)
IUPAC Name	Chlorodifluoromethane
CAS NO	75-45-6
E C No	200-871-9
Molecular Formula	$CHClF_2$

C. USES AND APPLICATIONS:

- ✓ Chlodifluromethane (R22) is industrially manufactured and used as a chemical intermediate under strictly controlled conditions for the synthesis of Tetrafluroethelene (TFE), which is itself used to manufacture fluropolymers.

D. PHYSICAL / CHEMICAL PROPERTIES:

Properties	Value
Physical state and appearance	Liquefied Gas
Odor	Odorless, faint sweetish smell
Molecular Weigh	86.5 g/mol
Color :	Colorless
PH (1% soln /water)	NA
Boiling Point	- 40.8°C at 101 325Pa
Melting Point	- 160°C at 101 325 Pa
Flash Point	Not available
Critical Temperature	Not available
Relative Density	1.41 kg/m3 at 20°C
Vapor Pressure	913.5 kPa at 20°C
Vapor Density	No information available
Volatility	Not available.
Odor Threshold	Not available.
Water/Oil Dist. Coefficient	1.13 at 25°C .
Ionicity (in Water)	Not available
Dispersion Properties	Not available

E. HEALTH EFFECTS:

Chlorodifluoromethane is rapidly eliminated from the body; therefore it will not accumulate in the bodies of humans or animals. Chlorodifluoromethane is practically non-toxic.

Effect	**Value**
Acute toxicity	Very low inhalation toxicity in animals. At extremely high vapour concentrations, it shows some anaesthetic-like effects and can act as an asphyxiant. Dermal and oral: not relevant for a gas
Irritation / corrosion (Skin / eye/ respiratory tract)	The gas is not irritating to the skin, eyes or respiratory tract. Frostbite can result from contact with liquefied gas.
Respiratory or skin sensitization	Cardiac sensitization: may cause effects on heart function (cardiac arrhythmia). Inhalation: no data. Dermal: not relevant for a gas.
Germ cell mutagenicity	Not expected to cause genetic effects based on available test data, in vitro and in animals.
Carcinogenicity	The cancer risk of chlorodifluoromethane has not been fully agreed. Based on current data, the International Agency for Research on Cancer has concluded that chlorodifluoromethane is not classifiable as to its carcinogenicity to humans since there is inadequate evidence in humans and limited evidence in animals (slight increase in the incidence of fibrosarcomas in salivary glands of male rats exposed to 50000 ppm for 2 years). Overall, most of the available studies in animals support that chlorodifluoromethane presents no human cancer risk.
Reproductive toxicity	Testing has indicated that there were no serious adverse effects on fertility or reproduction upon repeated exposure to chlorodifluoromethane. A low incidence of eye malformations in pups was observed when pregnant rats were exposed to high levels. These effects were not observed in rabbits, & the risk to humans is considered low.
Specific target organ toxicity repeated exposure	Studies of prolonged inhalation in animals showed no specific chronic toxic effects. Dermal and oral: not relevant for a gas.

F. ENVIRONMENTAL EFFECTS

Chlorodifluoromethane is of very low toxicity to algae and aquatic invertebrates.

For fish, no experimental data are available. As it is a gas, any emitted Chlorodifluoromethane will quickly partition to the atmosphere, where it takes several years to photolyse. It will not partition significantly to soil or sediment due to its volatility and expected moderate adsorption. It is not expected to bioaccumulate in the food chain based on its volatility and low lipophilicity (log K_{ow} = 1.13).

Chlorodifluoromethane is an ozone-depleting substance

Effect	Value
Acute Toxicity	Inhalation LC50- 250 000 ppm - 4hr
Degradation/Persistence	Chlorodifluoromethane does not exhibit any biodegradability.
Bioaccumulative potential	Log Pow = 1.13 Low partition coefficient (octanol-water) indicates the absence of bioaccumulation.
Mobility in soil	No data available
Results of PBT and vPvB assessment	Not available
Other adverse effects	May have damaging effect on the ozone layer. EU. Regulation 1005/2009/EC on substances that deplete the ozone layer Ozone depleting substance: Class I - Group VIII Ozone depleting potential: 0,055

G. EXPOSURE

Effect	Value
Precautions for safe handling	Put on appropriate personal protective equipment. Contains gas under pressure. Do not get in eyes or on skin or clothing. Avoid breathing gas. Avoid release to the environment. Refer to special instructions/safety data sheet. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Protection against fire and explosion	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode .
Conditions for safe storage, including any incompatibilities	Keep away from open flames, hot surfaces and sources of ignition. Keep in a cool, well-ventilated place. Protect full containers from sources of heat to avoid over pressurization. Keep away from direct sunlight. Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).
Further information on storage conditions	Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

H. RISK MANAGEMENT MEASURES

Effect	**Value**
Eye/face protection	Tightly fitting safety goggles. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
Skin protection	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Body Protection	Protection suit (cotton)
Respiratory protection	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.Use respirators and

	components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)

I. PERSONAL PROTECTIVE EQUIPMENT AND EMERGENCY MEASURES

- ✓ Control parameters
- ✓ Components with workplace control parameters
- ✓ Exposure controls
- ✓ Appropriate engineering controls
- ✓ Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating /lighting/equipments.

J. ACCIDENTAL RELEASE MEASURES

- ✓ **Personal precautions, protective equipment and emergency procedures**: Avoid contact with skin and eyes. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. In enclosed areas: ventilate or wear a self-contained breathing apparatus (risk of anoxia). Remove all sources of ignition. Do not smoke. Evacuate personnel to safe areas.
- ✓ **Environmental Precautions**: Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). May be harmful to the environment if released in large quantities:
- ✓ **Methods and materials for containment and cleaning up** Stop leak if easy to do so. Immediately contact emergency personal.

K. FIRE FIGHTING MEASURES

Suitable Extinguishing Media	Use extinguishing media that are appropriate for local circumstances and the surrounding environment. Water spray, carbon dioxide (CO2), dry

	chemical, alcohol-resistant foam
Unsuitable Extinguishing Media	Not available

L. CLASSIFICATION AND LABELLING

Pictogram	  – GHS04: Gas cylinder – GHS07: Exclamation mark
Unsuitable Extinguishing Media	Not available
Hazard Statement H280 H420	 Contains gas under pressure; may explode if heated Harms public health and the environment by destroying ozone in the upper atmosphere
Precautionary Statement Precaution: Response: Storage: P410+P403 Disposal: P502	 Not applicable Not applicable Protect from sunlight. Store in a well-ventilated place. Refer to manufacturer/supplier for information on recovery/recycling.
Signal word	Warning

M. BASIC TRANSPORT INFORMATION

UN Number	UN1018
1 UN Proper Shipping Name	Chlorodifluoromethane (Refrigerant Gas – R 22)
Transport hazard class (es)	2.2
Packaging Group	Not applicable (gas).
Environmental hazards	NA

N. REGULATORY INFORMATION

✓ Safety, health and environmental regulations/legislation specific for the Substance or mixture.

International Inventories	**Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture**
TSCA	**Complies**
EINECS/ ELINCS	**Complies**
DSL/NDSL	**Complies**
PICCS	**Complies**
ENCS	**Complies**
IECSC	**Complies**
AICS	**Complies**
KECL	**Complies**
Legend	
TSCA	United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL	Domestic Substances List/ Non-Domestic Substances List
EINECS/ELINCS	European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
PICCS	Philippines Inventory of Chemicals and Chemical Substances

ENCS	Japan Existing and New Chemical Substances
IECSC	China Inventory of Existing Chemical Substances
AICS	Australian Inventory of Chemical Substances
KECL	Korean Existing and Evaluated Chemical Substances

O. CONCLUSIONS

- ✓ By applying the appropriate Risk Management measures the concentrations to be expected at workplaces and to the general public are below recommended exposure limits.

P. CONTACT INFORMATION

Company Name	M/s GUJARAT FLUOROCHEMICALS LIMITED
Address	Survey No 16/3, 26, 27, Ranjitnagar Pin-389 380, Tal. Ghoghamba, Dist. Panchmahals, Gujarat, India
Business Phone	+91 – 2678 – 248107, 248152
Business Fax	+91 – 2678 – 248153
Web Site	www.gfl.co.in

Q. DISCLAIMER

- ✓ The above information and recommendations provided in GPS safety summary only concern to the specific product as described above and may not apply for the same material if used in combination with any other material or any process.
- ✓ They are in good faith as recommendations only and based on data which is available globally. GFL (Gujarat Fluorochemicals Ltd not imply any guarantee concerning the accuracy and validity and accepts no responsibility for any damage or loss that might arise in connection with then use of this material.