Safety Data Sheet
RS-53 (R470A)

SDS Revision Date: **1/10/2023**

1. Identification

1.1. Product identifier

Product Identity	RS-53 (R470A)
Alternate Names	80-182, Blended Formula, RS-53 (R470A) Replacement Refrigerant- 1000 lb

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

For Intended Use	It is used as an ultra-low GWP blend drop-in replacement for existing R410a equipment.
Application method	Read all precautions and instruction carefully before and after use.

1.3. Details of the supplier of the safety data sheet

Company Name	ComStar International Inc. 20-47 128th Street, College Point, NY 11356
Telephone No.	718-445-7900 800-328-0142 Fax: 718-353-5998

Emergency 24 HR response No: 1-800-424-9300 & 703-527-3887 CHEMTREC

Note: The CHEMTREC phone number is only for emergencies involving spills, leaks, fire, exposure, or accident. Please direct all other inquiries to our customer service phone number

2. Hazard(s) identification

Low acute toxicity. High exposures may cause an abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentrations may cause anesthetic effects and asphyxiation. Liquid splashes or spray may cause freeze burns to skin and eyes.

EU Classification Not classified as hazardous according to Directive EC 1272/2008

Label Elements

Signal Word: **Warning**

Hazard Statements (GHS-US) **:** H281 - Contains Refrigerated gases, may cause cryogenic burns or injury.

Precautionary Statements (GHS-US) **:** CLP P282 – Wear cold insulating gloves/ Face shield/ Eye protection
CLP P336 – Thaw frosted parts in lukewarm water. Do not rub affected area.

CLP P315 – Get immediate medical advice/attention.
CLP P403 – Store in a well-ventilated place.

3. Composition/information on ingredients

Ingredients	Weight%	CAS#	EC#	EC Classification
Pentafluoroethane	19	354-33-6	206-557-8	GHS04; H280
Difluoromethane	17	75-10-5	200-839-4	GHS02, 04; H220, H280
1,1,1,2,3,3,3Heptafluoropropane	3	431-89-0	207-079-2	GHS04; H280
Trans-1,3,3,3Tetrafluoroprop-1-ene	44	29118-24-9	471-480-0	H280, H220
1,1,1,2 Tetrafluoroethane	7	811-97-2	212-377-0	GHS04; H280
Carbon Dioxide	10	124-38-9	204-696-9	H280

In accordance with paragraph (i) of §1910.1200, the specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.
*The full texts of the phrases are shown in Section 16.

4. First aid measures

General: Consult a physician for severe cases.

Inhalation: Move to fresh air in case of accidental inhalation of vapours. Oxygen or artificial respiration if needed. Do not apply artificial respiration if patient is breathing. Consult a physician after significant exposure. Do not give adrenaline or similar drugs.

Skin Contact: May cause frostbite. Wash frost-bitten area immediately with plenty of water. Do not remove clothing. Wash affected skin with warm water. If skin irritation persists, call a physician.

Eye Contact: If substance has got into the eyes immediately wash out with plenty of water for at least 15 minutes. Keep eye wide open while rinsing.

Ingestion: Do not induce vomiting without medical advice. Call a physician immediately. Do not give drugs from adrenaline-ephedrine group.

5. Fire-fighting measures

General:
This refrigerant is none flammable in air under ambient conditions of temperature and pressure. Certain mixtures of this refrigerant and air when under pressure may be flammable. Mixtures of this refrigerant and air under pressure should be avoided. Certain mixtures of HFC's and Chlorine may be flammable or reactive under certain conditions. Thermal decomposition will evolve very toxic and corrosive vapors (Hydrogen Fluoride). Containers my rupture violently if overheated.

Extinguishing Media:
As appropriate for the surrounding fire. Keep containers exposed to fire cool, by spraying them with water.

Protective Equipment:
A self-contained breathing apparatus and full protective clothing must be worn in fire conditions. See also section 8

6. Accidental release measures

Personal Protection:
Ensure suitable personal protection (including respiratory protection) during removal of spillages. See also section 8.

General:
Provided it is safe to do so, isolate the source of the leak. Allow small spillages to evaporate, provided there is adequate ventilation. For large spillages, ventilate the area. Contain the spillages with sand, soil or any suitable absorbent material. Prevent liquid from entering drains, sewers, basements and work pits, as the vapor may create a suffocating atmosphere.

7. Handling and storage

Handling:
Avoid inhalation of high concentrations of vapors. Atmospheric levels should be controlled in compliance with the Occupational Exposure Limit. Atmospheric concentrations well below the Occupational Exposure Limit can be achieved by good occupational hygiene practice. The vapor is heavier than air, high concentrations may be produced at low levels where generally ventilation is poor, in such cases provide additional ventilation or wear suitable positive air supply respiratory protective equipment.
Avoid contact with naked flames and hot surfaces as corrosive and very toxic decomposition products can be formed.
Avoid contact between the liquid, skin and eyes.
For correct refrigerant composition, systems should be charged using the liquid phase and not the vapor phase.

Avoid venting to atmosphere.
The fluorinated greenhouse gas RS-53 (R470A) maybe supplied in returnable containers (cylinders or drums). The container contains fluorinated greenhouse gases covered by the Kyoto protocol. The fluorinated greenhouse gases in the containers may not be vented to atmosphere. Regulation (EC) No. 842/2006 of the European Parliament and the council on certain fluorinated greenhouse gases.

Process Hazards:
Liquid refrigerant transfers between refrigerant containers and systems can result in static generation. Ensure adequate earthing. Certain mixtures of HFC's and Chlorine maybe flammable or reactive under certain conditions. Care must be taken to mitigate the risk of developing high pressures in equipment caused by a temperature rise when liquid is trapped in a confined space, between two closed valves for instance.

Storage:
Keep in a well-ventilated place away from fire risk and avoid sources of heat such as electric or steam radiators. Avoid storing near the intake of air conditioning units, boiler units and open drains.

Specific use agent:
Subject to Member State regulations, applicable uses are: refrigerant, blowing propellant, solvent.

8. Exposure controls and personal protection

General:
Wear suitable protective clothing, gloves and eye/face protection. Wear thermal insulating gloves when handling liquefied gases. In cases of insufficient ventilation, where exposure to high concentrations of vapor is possible, suitable respiratory protective equipment, with a positive pressure air supply should be used.

Personal Protective Equipment: Protective goggles. Gloves. Protective clothing.

Occupational Exposure Limits

Occupational Exposure Limits	CAS No	LTEL 8hr TWA ppm	LTEL 8hr TWA mg/m3	STEL (ppm) 15 min average	STEL mg/m3 15 min average	Source
Pentafluoroethane	354-33-6	500	2500	750	3750	GESTIS
Difluoromethane	75-10-5	1000	2200	--	--	Com
1,1,1,2,3,3,3 heptafluoropropane	431-89-0	1000	--	--	--	Com
Trans-1,3,3,3 tetrafluoroprop-1-ene	29118-24-9	800	--	--	--	Com
1,1,1,2 Tetrafluoroethane	811-97-2	1000	4240	--	--	GESTIS
Carbon Dioxide	124-38-9	5000	9150	15000	27400	Com

9. Physical and chemical properties

Form Liquefied:	Gas
Colour:	Colourless
Odour:	Slight Ethereal
Solubility (water):	Insoluble
Solubility (other) Soluble in:	alcohols, chlorinated solvents, esters
Molecular Mass:	89.73
Boiling Point:	-62.5 ℃
Vapour Pressure:	266.9 psia at 25℃
Liquid Density:	1088 kg/m3 at 25℃
Critical Temperature:	98.7℃
Critical Pressure:	810.9 psia
Flammability:	Non-Flammable
Flash Point:	Not Applicable
Auto-ignition temperature:	Not determined

10. Stability and reactivity

Hazardous Reactivity:
Certain mixtures of HFC's and chlorine maybe flammable or reactive under certain conditions. Incompatible materials: finely divided metals, magnesium and alloys containing more than 2% magnesium. Can react violently if in contact with alkali metals and alkaline earth metals – sodium, potassium and barium.

Hazardous Decomposition Products:
Hydrogen Fluoride by thermal decomposition and hydrolysis.

11. Toxicological information

Inhalation:
High exposures may cause an abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentrations may cause anesthetic effects and asphyxiation.

Skin Contact:
Liquid splashes and spray may cause freeze burns. Unlikely to be hazardous by skin absorption.

Eye Contact:
Liquid splashes and spray may cause freeze burns.

Ingestion:
Highly unlikely – but should this occur freeze burns will result.

Long Term Exposure:
HFC 125: LC 50 inhalation (Rat)/4hrs: > 769,000 ppm
HFC 32: LC 50 inhalation (Rat)/4hrs: > 520,000 ppm
HFC 227ea: LC 50 inhalation (Rat)/4hrs: > 800,000 ppm
HFO-1234ze(E) LC 50 inhalation (Rat)/4hrs: > 207,000 ppm
HFC 134a: LC 50 inhalation (Rat)/4hrs: > 350,000 ppm
CO2 No data available

12. Ecological information

Environmental fate and distribution:
High tonnage material produced in wholly contained systems.
High tonnage material used in open systems. Vapor.

Persistence and Degradation:
HFC 227ea: Decomposed slowly in the lower atmosphere (troposphere). Degradation Atmospheric lifetime is 34.2 years.

HFC 125: Decomposed less slowly in the lower atmosphere (troposphere). Atmospheric lifetime is 29 years.

HFC 134a: Decomposed comparatively rapidly in the lower atmosphere (troposphere). Atmospheric lifetime is 14 years.

HFC 32: Decomposed rapidly in the lower atmosphere (troposphere). Atmospheric lifetime is 4.9 years

HFO-1234ze(E): Has an atmospheric lifetime of approximately 0.05 years.

CO2: No data available.

RS-53 (R470A): Does not influence photochemical smog (i.e. is not a VOC under the terms of the UNECE agreement). Does not deplete Ozone. Has a Global Warming Potential (GWP) of 977 (relative to 1 of carbon dioxide at 100 years) according to Annex 1 of regulation 842/2006 on certain fluorinated greenhouse gases. Values in Annex 1 are taken from the Fifth assessment report (AR5) of the Intergovernmental Panel on Climate Change (2001 IPPC GWP values). United Nations Framework Convention on Climate Change (UNFCCC) reporting GWP is 909.

Effect on Effluent Treatment:
Discharges of the product will enter the atmosphere and will not result in long term aqueous contamination.

PBT and vPvB:
This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

13. Disposal considerations

Waste Disposal Recommendations:
It is best to recover and recycle, Refrigerant Solutions Limited will take back product for reclamation provided RS-24 has not been mixed with other products. If this is not possible, destruction is to be in an approved facility which is equipped to absorb and neutralize acidic gases and other toxic processing products.

14. Transport information

UN number: 1078

UN proper shipping name: Refrigerant Gas RS-53 (R470A)

Transport hazard class(es): 2.2

Packing group: 2

Environmental Hazards: The container contains fluorinated greenhouse gases covered by the Kyoto Hazards Protocol and may not be vented to atmosphere.

Special precautions for user: Liquid splashes or spray may cause freeze burns to skin and eyes.

Transport in bulk: It is not intended that this product will be transported in bulk according to Annex II of MARPOL73/78

15. Regulatory information

European Regulations:
Not classified as hazardous according to Directive EC 1272/2008

Special restrictions:
The fluorinated greenhouse gas RS-53 (R470A) may be supplied in returnable containers (drums/cylinders). The container contains fluorinated greenhouse gases covered by the Kyoto Protocol. The fluorinated greenhouse gases in containers may not be vented to atmosphere.

Regulation (EC) No. 842/2006 of the European Parliament and the Council on certain fluorinated gases.

Directive 2006/40/EC of the European Parliament and the Council relating to emissions from the air-conditioning systems in motor vehicle vehicles and amending Council Directive 70/156/EEC.

R-phrase(s):
No R-phrases

S-phrase(s):
S7/9 – Keep container tightly closed in a well-ventilated place
S24/25 – Avoid contact with skin and eyes
S47 – Keep at temperature not exceeding 500 C
S51 – Use only in well ventilated areas
S61 – Avoid release to the environment.

16. Other information

Modifications to Revision 3 SDS Modifications to Section 3

Glossary
GESTIS: GESTIS International Limit values Database
PBT Persistent, Bioaccumulative and Toxic substance
vPvT Very Persistent and Very Bioaccumulative
REACH Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
LC50 Lethal Concentration to 50 % of a test population
CLP Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
EU European Union
CAS# Chemical Abstracts Service number
LTEL Long Term Exposure Limit
STEL Short Term Exposure Limit

The opinions expressed are those of qualified experts within ComStar International Inc. We believe that the information contained is current as of the date of the Safety Data Sheet. Since the use of this information and of these opinions and the conditions of the use of the product are not within the control of ComStar International Inc., it is the user's obligation to determine the conditions of safe use of the product.