RS-51 (R470B)

Safety Data Sheet

16-07-2020

SECTION 1: IDENTIFICATION

Product identifier
Product Form: Mixture
Product Name: In USA as RS-51 (R470B)
Alternate Names: Blended Formula
Intended Use of the Product Refrigerant
Name, Address, and Telephone of the Responsible Party
Company
ComStar International Inc.
20-47 128th Street,
College Point, NY 11356
Emergency Telephone Number
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.

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture
Classification (GHS-US)
Simple Asphyxiant
Liquefied gas H280
Label Elements
GHS-US Labeling
Hazard Pictograms (GHS-US) :

Signal Word (GHS-US) : Warning
Hazard Statements (GHS-US) : H280 - Contains gas under pressure; may explode if heated
May displace oxygen and cause rapid suffocation
Precautionary Statements (GHS-US) : P410+P403 - Protect from sunlight. Store in a well-ventilated place
Skin Irritation. 2; H315 May Cause skin irritation.

Other Hazardsx
Other Hazards Not Contributing to the Classification: Exposure may aggravate those with pre-existing eye, skin, or respiratory conditions. Liquid contact with eyes or skin may cause frostbite.
Unknown Acute Toxicity (GHS-US) Not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Substances-Name	Product identifier	% (w/W)	Classification (GHS-US)
1,1,1,2,3,3,3 Heptafluoropropane (HFC 227)	(CAS No) 431-89-0	7	Simple Asphyxiant Liquefied gas, H280
Pentafluoroethane (HFC125)	(CAS No) 354-33-6	11.5	Simple Asphyxiant Liquefied gas, H280
1,1,1,2-Tetrafluoroethane (HFC-134a)	(CAS No) 811-97-2	3	Simple Asphyxiant Liquefied gas, H280
Difluoromethane (HFC-32)	(CAS No) 75-10-5	11.5	Simple Asphyxiant Flam. Gas 1, H220 Liquefied gas, H280
Trans-1,3,3,3, Tetrafluoroprop-1-ene	(CAS No) 29118-24-9	57	Simple Asphyxiant Flam. Gas 1, H220 Liquefied gas, H280
Carbon Dioxide	(CAS No) 124-38-9	10	H280

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

Description of First Aid Procedures
General: Consult a physician for severe cases.
Inhalation: Move to fresh air in case of accidental inhalation of vapors. 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. Wash affected area with warm water. If skin irritation persists, call a physician.
Eye Contact: If substance has got into eyes immediately wash out with plenty of water for at least 15 minutes. Keep eye wide open while running.
Ingestion: Do not induce vomiting without medical advice. Call a physician immediately. Do not give drugs in adrenaline-ephedrine group.
Most Important Symptoms and Effects Both Acute and Delayed
General: Vapors are heavier than air and may cause asphyxia by reduction of the oxygen content.
Inhalation: May cause respiratory irritation.
Skin Contact: May cause skin irritation. Liquid contact may cause frostbite.
Eye Contact: May cause eye irritation.
Ingestion: Ingestion is likely to be harmful or have adverse effects.
Chronic Symptoms: None expected under normal conditions of use.
Indication of Any Immediate Medical Attention and Special Treatment Needed
If you feel unwell, seek medical advice (show the label where possible).

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media
Suitable Extinguishing Media: Use extinguishing media appropriate for surrounding fire. Keep containers exposed to fire cool, by spraying them with water.
Unsuitable Extinguishing Media: None known.
Special Hazards Arising from the Substance or Mixture
Fire Hazard: RS - 51 is nonflammable 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 every toxic and corrosive vapor (Hydrogen Fluoride). Containers may rupture violently if overheated.
Explosion Hazard: Product is not explosive. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.
Reactivity: Hazardous reactions will not occur under normal conditions.
Advice for Firefighters
Precautionary Measures Fire: Exercise caution when fighting any chemical fire.
Firefighting Instructions: Use water spray or fog for cooling exposed containers.
Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.
Hazardous Combustion Products: Carbon oxides (CO, CO2). Halogenated hydrocarbons. Hydrogen Fluoride (HF).
Reference to Other Sections
Refer to section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions. Protective Equipment and Emergency Procedures
General Measures: 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.
For Non-Emergency Personnel
Protective Equipment: Use appropriate personal protection equipment (PPE).
Emergency Procedures: Evacuate unnecessary personnel.
For Emergency Personnel
Protective Equipment: Equip cleanup crew with proper protection.
Emergency Procedures: Stop leak if safe to do so. Ventilate area.
Environmental Precautions
Avoid release to the environment.
Methods and Material for Containment and Cleaning Up
For Containment: Ventilate area.
Methods for Cleaning Up: Isolate area until gas has dispersed.
Reference to Other Sections
See Heading 8. Exposure controls and personal protection.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling
Handling: Avoid inhalation of high concentrations of vapors. Atmospheric levels should be controlled in compliance with 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 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-51 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 container 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.

Additional Hazards When Processed: Ruptured cylinders may rocket.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations.

Storage Conditions: 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.

Incompatible Materials: Strong acids. Strong bases. Strong oxidizers. Chlorine.

Storage Area: Store in a well-ventilated place.

Specific End Use(s)

Subject to Member State regulations, applicable uses are: refrigerant, blowing propellant, solvent

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Occupational Exposure Limits	CAS No	LTEL 8hr TWA ppm	LTEL 8hr TQA mg/m3	STEL (ppm) 15 min Average	STEL mg/m3	Score
Pentafluoroethane	354-33-6	500	2500	750	3750	GESTIS
Difluoeomethane	75-10-5	1000	2200	-	-	Com
1,1,1,2,3,3,3,heptafluoropropane	431-89-0	1000	-	-	-	Com
Trans-1,3,3,3Tetrafluoroprop-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

Exposure Controls

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

Appropriate Engineering Controls: Ensure adequate ventilation, especially in confined areas. Ensure all national/local regulations are observed.

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

Materials for Protective Clothing: Chemically resistant materials and fabrics.

Hand Protection: Wear gloves

Eye Protection: Wear Eye protection

Skin and Body Protection: Wear suitable protective clothing.

Respiratory Protection: Use a NIOSH-approved respirator or self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.

Environmental Exposure Controls: Do not allow the product to be released into the environment.

Consumer Exposure Controls: Do not eat, drink or smoke during use

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State : Liquefied Gas
Appearance : Colorless
Odor : Slightly ethereal
Odor Threshold : Not available

pH	: Neutral
Relative Evaporation Rate (butylacetate=1)	: Not available
Melting Point	: Not available
Freezing Point	: Not available
Boiling Point	: -61.45°C
Flash Point	: Not available
Auto-ignition Temperature	: Not determined
Decomposition Temperature	: Not available
Flammability (solid, gas)	: Not flammable
Lower Flammable Limit	: Not available
Upper Flammable Limit	: Not available
Vapor Pressure	: 247.7 psia @ 25 °C (77 °F)
Relative Vapor Density at 20 °C	: Not available
Relative Density	: Not available
Density	: Not available
Specific Gravity	: Not available
Solubility	: Not available
Partition coefficient	: n-octanol/water Not available
Viscosity	: Not available
Explosion Data - Sensitivity to Mechanical Impact	: Not expected to present an explosion hazard due to mechanical impact.
Explosion Data - Sensitivity to Static Discharge	: Not expected to present an explosion hazard due to static discharge.

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Certain mixtures of HFC's and chlorine maybe flammable or reactive under certain conditions.
Chemical Stability: Stable under recommended handling and storage conditions (see section 7).
Possibility of Hazardous Reactions: Hazardous polymerization will not occur.
Conditions to Avoid: Direct sunlight. Extremely high or low temperatures. Ignition sources. Incompatible materials.
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

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product
Acute Toxicity: Not classified
LD50 and LC50 Data: Not available
Skin Corrosion/Irritation: Not classified
Serious Eye Damage/Irritation: Not classified
Respiratory or Skin Sensitization: Not classified
Germ Cell Mutagenicity: Not classified
Teratogenicity: Not available
Carcinogenicity: Not classified
Specific Target Organ Toxicity (Repeated Exposure): Not classified
Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified
Aspiration Hazard: Not classified
Symptoms/Injuries After Inhalation: High exposures may cause an abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentrations may cause anesthetic effects and asphyxiation.
Symptoms/Injuries After Skin Contact: Liquid splashes and spray may cause freeze burns. Unlikely to be hazardous by skin absorption.
Symptoms/Injuries After Eye Contact: Liquid splashes and spray may cause freeze burns.
Symptoms/Injuries After Ingestion: Highly unlikely – but should this occur freeze burns will result.
Chronic Symptoms: None expected under normal conditions of use.
Information on Toxicological Effects - Ingredient(s)
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

SECTION 12: ECOLOGICAL INFORMATION

Mobility in Soil Not available
Other Adverse Effects
Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: It is best to recover and recycle, Refrigerant Solutions Limited will take back product for reclamation provided RS-51 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 gasses and other toxic processing products.
Ecology - Waste Materials: Avoid release to the environment.

SECTION 14: TRANSPORT INFORMATION

14.1 In Accordance with DOT
Proper Shipping Name : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane)
Hazard Class : 2.2
Identification Number : UN1078
Label Codes : 2.2
ERG Number : 126

14.2 In Accordance with IMDG
Proper Shipping Name : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2- Tetrafluoroethane)
Hazard Class : 2.2
Identification Number : UN1078
Label Codes : 2.2
EmS-No. (Fire) : F-C
EmS-No. (Spillage) : S-V

14.3 In Accordance with IATA
Proper Shipping Name : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane)
Identification Number : UN1078
Hazard Class : 2.2
Label Codes : 2.2
ERG Code (IATA) : 2L

14.4 In Accordance with TDG
Proper Shipping Name : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2- Tetrafluoroethane)
Hazard Class : 2.2
Identification Number : UN1078
Label Codes : 2.2

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

RS-51 (R470B)	
SARA Section 311/312 Hazard Classes	Sudden release of pressure hazard
RS-51 (R470B)	
EPA Clean Air Act	This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82

Pentafluoroethane (HFC125) (354-33-6) / Difluoromethane (HFC-32) (75-10-5)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Trans-1,3,3,3Tetrafluoroprop-1-ene (HFO 1234ze)	(CAS
Listed on the United States TSCA (Toxic Substances Control Act) inventory	

1,1,1,2-Tetrafluoroethane (HFC-134a) (811-97-2) / 1,1,1,2,3,3,3 Heptafluoropropane (HFC 227) (431-89-0)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

US State Regulations

Difluoromethane (HFC-32) (75-10-5)
U.S. - Massachusetts - Right to Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Canadian Regulations

RS-51 (R470B)	
WHMIS Classification	Class A - Compressed Gas

Pentafluoroethane (HFC125) (354-33-6) / Difluoromethane (HFC-32) (75-10-5)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

1,1-Difluoroethane (HFC R152) (75-37-6)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas

1,1,1,2,3,3,3 Heptafluoropropane (HFC 227) (431-89-0)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class A - Compressed Gas

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by CPR.

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Revision date : 07/01/2016

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

GESTIS	GESTIS International Limit values Database
PBT	Persistent, Bioaccumulative and Toxic substance
vPvT	Very persistent and Very Bioaccumulative
REACH	Registration, Evaluation, Authorization, 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
CAS#	Chemical Abstracts Service number
LTEL	Long Term Exposure Limit
STEL	Short Term Exposure Limit
EU	European Union
COM	The Company aims to control exposure in its workplace to this limit

Party Responsible for the Preparation of This Document

ComStar International Inc.
20-47 128th Street,
College Point, NY 11356
(800) 328-0142
www.comstarproducts.com

The information provided in this Product Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal, and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process unless specified in the text.

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