SMART
HI TECH
SOLUTIONS

PRODUCT CATALOGUE

HCFCs

The use and sale of hydrochlorofluorocarbons as refrigerants is restricted by the European Regulation 2037 / 2000 dated 29th June 2000 due to their depletion effect on the ozone layer (Montreal Protocol). HCFCs are banned in all new equipment with the exception of reversible heat pumps which are allowed untill 01/01/04. The ban in other air conditioning equipment came into effect on 1st July 2002. New HCFCs will be allowed to use in existing equipment until 2010. Between 2010 and 2015 only recycled HCFCs will be allowed.

HFCs

The use of hydrochlorofluorocarbons is not restricted by regulations. Nevertheless, it is essential to use these refrigerants in closed systems and to provide a recovery service because of their "greenhouse" effect. HFCs have no ozone depletion potential and are recommended as replacement refrigerants for HCFCs.

TABLE OF THE MAIN GASES

REFRIGERANT	HC GAS	SPECIALTY GAS	AEROSOL PROPELLANT	FIRE SUPPRESSION CLEAN AGENT
R22 (HCFC-22)	R600a (Isobutane)	SULFUR HEXAFLUORIDE (SF6)	R600a (Isobutane)	HFC-227ea
R134a (HFC-134a)	R600 (N-butane)	CARBON TETRAFLUORIDE (CF4)	R600 (N-butane)	ICOOL-5112
R404a (HFC-404a)	R290 (Propane)		R290 (Propane)	HFC-236fa
R407c (HFC-407c)	R1270 （Propene）		R152a (HFC-152a)	HFC-125
R410a (HFC-410a)			DME	HFC-23
R507 (HFC-507)			HFA-134a	HFP
R32 (HFC-32)			HFA-227ea	
R125 (HFC-125)				
R23 (HFC-23)				
R508b （HFC-508b）				
R462a (HFC-462a)				
R1234yf(HFO-1234yf)				

CATALOGUE

ODP: 0.055
GWP_{100}: 1810

R22 (HCFC-22)

A colourless, non-flammable, non-toxic gas. In low concenrations it is odourless, in higher concentrations its odour is mild and somewhat ethereal. It is shipped in steel cylinders as a liqufied gas.

CLASSIFICATIONS

CAS NO.: 75-45-6
UN NUMBER: 1018
CLASS: 2.2

USES AND FEATURES

- R22 is very popular for use in all types of household and commerical refrigeration and air conditioning equipment with reciprocationg rotary, scroll and screw compressors.
- The high refrigeration properties of R22 permit the use of smaller equipment-a considerable advantage where space is at a premium.

MATERIAL COMPATIBILITY

METALS GENERAL BEHAVIOR	Slight risk of corrosion in presence of water
Aluminium	Satisfactory
Stainless Steel	Satisfactory
PLASTICS	
PTFE	Acceptable but strong rate of permeation
PA(NYLON)	Satisfactory
ELASTOMERS	
Butyl rubber(IIR)	Acceptable but important swelling
Nitrile rubber(NBR)	Non recommended, significant swelling

PACKAGE

- Cannister of 340g, 750g, 800g, 900g, 1kg etc.
- Non-refillabe cylinder of 3.4kgs, 6.8kgs, 13.6kgs, 22.7kgs, Yellow cartons and white cartons available
- Ton cylinder of 930kgs
- ISO Tank of 18tons, 20tons, 22tons.

OIL COMPATIBILITY

- Mineral oil
- POE

PHYSICAL PROPERTIES

CHEMICAL NAME	CHLORODIFLUOROMETHANE
PURITY	⩾ 99.9
BOILLING POINT °C @101.3kPa	-40.8
°F @14.7psia	-41.5
CRITICAL TEMPERATURE °C	96.2
°F	205.2
WATER CONTENT ppm by weight (max)	10
ACIDITY ppm by weight (max)(as HCl)	1.0
NON CONDENSABLE GASSES	1.5
RESUDYES AT HIGH BOILING POINT %by volume(max)	0.01
CHLORIDE No visible turbidity	pass

R134a (HFC-134a)

A clourless, non-flammable gas at atmospheric pressure with a slight ethereal odour. Supplied at low pressure in metal cylinders. Also available premixed with UV dye.

ODP: 0
GWP_{100}: 1430

PACKAGE

- Cannister of 250g, 340g, 450g, 500g, 750g, 1kg etc.
- Non-refillable cylinder of 3.4kgs, 6.8kgs, 13.6kgs, 22.7kgs Yellow cartons and white cartons available
- Refillable Cylinder of 12kgs, 13.6kgs, 14.3kgs
- Ton cylinder of 930kgs
- ISO TANK of 18tons, 20tons, 22tons.

OIL COMPATIBILITY

PAG

CLASSIFICATIONS

CAS NO.:	811-97-2
UN NUMBER:	3159
CLASS:	2.2

USES AND FEATURES

- Wide use in household and commercial refrigeration, and automotive air-conditioning. Properties make R134a suitable for use in medium temperature food cabinets, water chillers and fountains, heat pumps and dehumidifiers.
- Increasing use as a replacement for CFC-12.
- Blowing agent for various foams.
- Propellant for aerosol pharmaceuticals, lacquers, deodourants, perfumes, mousses, air fresheners, insecticedes, cleaning and other household products.

MATERIAL COMPATIBILITY

Most common materials are suitable for use under normal conditions in a dry system. At high temperatures, use stainless steel or inconel to resist corrosive breakdown products. Avoid using alloys with more than 2% magnesium (i.e some aluminium alloys) especially when moisture is present. May react violently with sodium, potassiium, barium and other alkali or alkaline earth metals. Flexible hoses or gaskets should not contain natural rubber as rapid withdrawals of gas/liquid can extract compounding ingredients and it also suffers from excessive swelling.

PHYSICAL PROPERTIES

CHEMICAL NAME	1,1,1,2-TETRAFLUOROETHANE
PURITY	⩾ 99.9
BOILLING POINT °C @101.3kPa	-26.1
°F @14.7psia	-14.9
CRITICAL TEMPERATURE °C	101.1
°F	214
WATER CONTENT ppm by weight (max)	10
ACIDITY ppm by weight (max)(as HCl)	1.0
NON CONDENSABLE GASSES CONTENT MEASURED ON VAPOUR PHASE % by volume (max)	1.5
RESUDYES AT HIGH BOILING POINT %by volume(max)	0.01
CHLORIDE No visible turbidity	pass

ODP: 0
GWP_{100}: 3922

R404a (HFC-404a)

A colorless, non-flammable gas at atmospheric pressure with a slight ethereal odour. Supplied in low pressure cylinders.

CLASSIFICATIONS

INGREDIENT NAME	CAS NUMBER	WEIGHT %
Pentafluorethane(HFC-125)	354-33-6	44
1,1,1-Trifluoroethane(HFC-143a)	420-46-2	52
1,1,1,2-Tetrafluoroethane(HFC-134a)	811-97-2	4

UN NUMBER: 3337
CLASS: 2.2

USES AND FEATURES

- Commerial and medium temperature refrigeration applications.
- A replacement for CFC-502.

MATERIAL COMPATIBILITY

- Most common materials are suitable for use under normal conditions in a dry system, At high temperatures, use stainless steel or inconel to resist corrosive breakdown products. Avoid using alloys with more than 2% magnesium(i.e. some aluminium alloys) especially when moisture is present. May react violently with sodium, potassium, barium and other alkali or alkaline earth matal. Flexible hoses or gaskets should not contain natural rubber as rapid withdrawals of gas/liquid can extract compounding ingredients and it also suffers from exccsive swelling.

PACKAGE

- Canister of 650g,750g,850g,ect.
- Non-refillable cylinder of 2.7kgs,5.4kgs,10.9kgs
- Ton cylinder of 740kgs
- ISO TANK of 18tons, 19.5tons

OIL COMPATIBILITY

POE

PHYSICAL PROPERTIES

CHEMICAL NAME	PENTAFLUOROETHANE
PURITY	⩾ 99.9
BOILLING POINT °C @101.3kPa	-46.2
°F @14.7psia	-51.2
CRITICAL TEMPERATURE °C	72.1
°F	161.8
WATER CONTENT ppm by weight (max)	10
ACIDITY ppm by weight (max)(as HCl)	1.0
NON CONDENSABLE GASSES CONTENT MEASURED ON VAPOUR PHASE % by volume (max)	1.5
RESUDYES AT HIGH BOILING POINT %by volume(max)	0.01
CHLORIDE No visible turbidity	pass

ODP: 0
GWP_{100}: 2107

R407c (HFC-407c)

A clourless, flammable gas at atmospheric pressure with a slight ethreal odour. Supplied in low pressure cylinders.

CLASSIFICATIONS

INGREDIENT NAME	CAS NUMBER	WEIGHT %
Pentafluorethane(HFC-32)	75-10-5	23
1,1,1-Trifluoroethane(HFC-125)	354-33-6	25
1,1,1,2-Tetrafluoroethane(HFC-134a)	811-97-2	52

UN NUMBER: 3340
CLASS: 2.2

USES AND FEATURES

- Large commercial refrigerated air conditioning systems.
- A replacement for HCFC-22

MATERIAL COMPATIBILITY

Most common materials are suitable for use under normal conditions in a dry system. At high temperatures, use stainless steel or inconel to resist corrosive breakdown products. Avoid using alloys with more than 2% magnesium (i.e some aluminium alloys) especially when moisture is present. May react violently with sodium, potassiium, barium and other alkali or alkaline earth metals. Flexible hoses or gaskets should not contain natural rubber as rapid withdrawals of gas/liquid can extract compounding ingredients and it also suffers from excessive swelling.

PACKAGE

- Cannister of 650g, 750g etc.
- Non-refillable cylinder of 2.8kgs,5.6kgs,11.3kgs
- Ton cylinder of 870kgs
- ISO TANK of 18tons, 20tons.

OIL COMPATIBILITY

POE

PHYSICAL PROPERTIES

CHEMICAL NAME	R-32/125/134A(23/25/52)
PURITY	⩾ 99.9
BOILLING POINT °C @101.3kPa	-43.6
°F @14.7psia	-46.5
CRITICAL TEMPERATURE °C	86.0
°F	186.8
WATER CONTENT ppm by weight (max)	10
ACIDITY ppm by weight (max)(as HCl)	1.0
NON CONDENSABLE GASSES CONTENT MEASURED ON VAPOUR PHASE % by volume (max)	1.5
RESUDYES AT HIGH BOILING POINT %by volume(max)	0.01
CHLORIDE No visible turbidity	pass

ODP: 0
GWP_{100}: 2088

R410a (HFC-410a)

A colorless, non-flammable gas at atmospheric pressure with a slight ethereal odour. Supplied in low pressure cylinders.

CLASSIFICATIONS

INGREDIENT NAME	CAS NUMBER	WEIGHT %
Difluoromethane	75-10-5	50
Pentafluoroethane	354-33-6	50

UN NUMBER: 3163
CLASS: 2.2

USES AND FEATURES

- Commerial and medium temperature refrigeration applications.
- A replacement for CFC-502.

MATERIAL COMPATIBILITY

- Most common materials are suitable for use under normal conditions in a dry system, At high temperatures, use stainless steel or inconel to resist corrosive breakdown products. Avoid using alloys with more than 2% magnesium(i.e. some aluminium alloys) especially when moisture is present. May react violently with sodium, potassium, barium and other alkali or alkaline earth matal. Flexible hoses or gaskets should not contain natural rubber as rapid withdrawals of gas/liquid can extract compounding ingredients and it also suffers from exccsive swelling.

PACKAGE

- Cannister of 650g, 750g, 850g etc.
- Non-refillable cylinder of 2.8kgs,5.6kgs,11.3kgs
- Ton cylinder of 740kgs
- ISO TANK of 18tons, 20tons.

OIL COMPATIBILITY

POE

PHYSICAL PROPERTIES

CHEMICAL NAME	PENTAFLUOROETHANE
PURITY	⩾ 99.9
BOILLING POINT °C @101.3kPa	-46.2
°F @14.7psia	-51.2
CRITICAL TEMPERATURE °C	72.1
MPa	4.95
WATER CONTENT ppm by weight (max)	10
ACIDITY ppm by weight (max)(as HCl)	1.0
NON CONDENSABLE GASSES CONTENT MEASURED ON VAPOUR PHASE % by volume (max)	1.5
RESUDYES AT HIGH BOILING POINT %by volume(max)	0.01
CHLORIDE No visible turbidity	pass

R507 (HFC-507)

A clourless, non-flammable gas at atmospheric pressure with a slight ethreal odour. Supplied in low pressure cylinders.

CLASSIFICATIONS

UN NUMBER: 3163
CLASS: 2.2

USES AND FEATURES

- Commercial and medium temperature refrigeration application.
- A replacement for CFC-502.

MATERIAL COMPATIBILITY

Most common materials are suitable for use under normal conditions in a dry system. At high temperatures, use stainless steel or Inconel to resist corrosive breakdown products. Avoid using alloys with more than 2% magnesium (i.e some aluminium alloys) especially when moisture is present. May react violently with sodium, potassiium, barium and other alkali or alkaline earth metals. Flexible hoses or gaskets should not contain natural rubber as rapid withdrawals of gas/liquid can extract compounding ingredients and it also suffers from excessive swelling.

PACKAGE

- Cannister of 650g, 850g, etc
- Non-refillable cylinder of 11.3Kgs
- Ton cylinder of 740kgs

OIL COMPATIBILITY

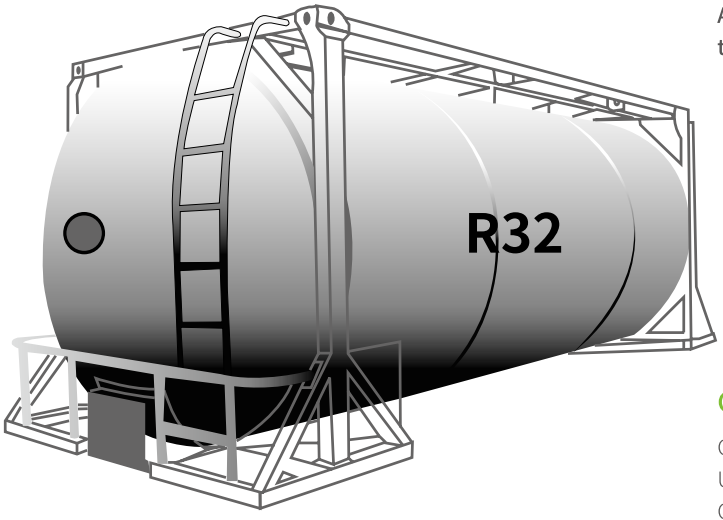
PAG

PHYSICAL PROPERTIES

CHEMICAL NAME	R-32/125/134A(23/25/52)
PURITY	⩾ 99.9
BUBBLE POINT °C @101.3kPa	-46.7
°F @14.7psia	-52.0
CRITICAL TEMPERATURE °C	78.9
WATER CONTENT ppm by weight (max)	10
ACIDITY ppm by weight (max)(as HCl)	1.0
NON CONDENSABLE GASSES CONTENT MEASURED ON VAPOUR PHASE % by volume (max)	1.5
RESUDYES AT HIGH BOILING POINT %by volume(max)	0.01
CHLORIDE No visible turbidity	pass

R32 (HFC-32)

A colourless and non-flammable gas at normal temperature and pressuree.



CLASSIFICATIONS

CAS NO.:	75-10-5
UN NUMBER:	1984
CLASS:	2.2

USES AND FEATURES

◎ HFC-32 is a colorless gas under room temperature, and bacomes colorless and transparent liquid under its saturated vapor pressure.As a major component of blend refrigerabt, it is used to produce blend refrigerant R-407c and R-410a in substitution for HCFC-22.

PACKAGE

◎ Non- refillable cylinder of 3kgs, 5kgs, 7kgs, 10kgs
◎ Ton cylinder of 685kgs.
◎ ISO TANK of 18tons, 19tons.

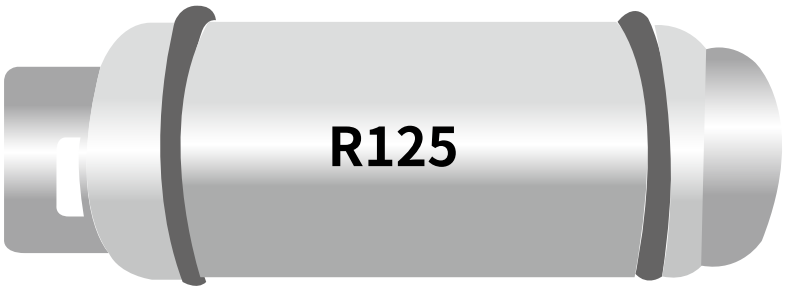
ODP: 0
GWP_{100}: 675

PHYSICAL PROPERTIES

CHEMICAL NAME	TRIFLUOROMETHANE
PURITY	⩾ 99.9
BOILLING POINT °C @101.3kPa	-51.65
CRITICAL TEMPERATURE °C	78.1
WATER CONTENT ppm by weight (max)	10
ACIDITY ppm by weight (max)(as HCl)	1.0
NON CONDENSABLE GASSES CONTENT MEASURED ON VAPOUR PHASE % by volume (max)	1.5
RESUDYES AT HIGH BOILING POINT %by volume(max)	0.01
CHLORIDE No visible turbidity	pass

R125 (HFC-125)

A colorless and transparent liquid at room temperature.



ODP: 0
GWP_{100}: 3500

CLASSIFICATIONS

CAS NO.: 354-33-6
UN NUMBER: 3220
CLASS: 2.2

USES AND FEATURES

- As alternative to refrigerant R-502, R-22;
- As alternative to fire extinguisher Halon-1211 and Halon-1302.

MATERIAL COMPATIBILITY

- Wear safety glasses, use leather/plastic protective gloves, wear overalls and safety shoes when handling cylinders.

PACKAGE

- Ton cylinder of 700kgs
- ISO TANK of 18 tons

PHYSICAL PROPERTIES

CHEMICAL NAME	PENTAFLUOROETHANE
PURITY	⩾ 99.9
BOILLING POINT °C @101.3kPa	-48.1
°F @14.7psia	-54.6
CRITICAL TEMPERATURE °C	66.0
°F	150.8
WATER CONTENT ppm by weight (max)	10
ACIDITY ppm by weight (max)(as HCl)	1.0
NON CONDENSABLE GASSES CONTENT MEASURED ON VAPOUR PHASE % by volume (max)	1.5
RESUDYES AT HIGH BOILING POINT %by volume(max)	0.01
CHLORIDE No visible turbidity	pass

R23 (HFC-23)

A colourless and non-flammable gas at normal temperature and pressuree.

CLASSIFICATIONS

CAS NO.: 75-46-7
UN NUMBER: 1984
CLASS: 2.2

USES AND FEATURES

- Refrigerant and substitute for Halon fire extinguishant
- Used in plasma etching of silicon oxide or nitride layers.

PACKAGE

- High-pressure gas cylinder of 9kgs, 30kgs
- Ton cylinder of 380kgs

ODP: 0
GWP_{100}: 14800

PHYSICAL PROPERTIES

CHEMICAL NAME	TRIFLUOROMETHANE
PURITY	⩾ 99.9
BOILLING POINT °C @101.3kPa	-82.1
°F @14.7psia	-115.6
CRITICAL TEMPERATURE °C	25.9
WATER CONTENT ppm by weight (max)	20
ACIDITY ppm by weight (max)(as HCl)	1.0
NON CONDENSABLE GASSES CONTENT MEASURED ON VAPOUR PHASE % by volume (max)	1.5
RESUDYES AT HIGH BOILING POINT %by volume(max)	0.01
CHLORIDE No visible turbidity	pass

R508b (HFC-508b)

ODP: 0
GWP_{100}: 13396

A colourless and non-flammable gas at normal temperature and pressure.

CLASSIFICATIONS

INGREDIENT NAME	CAS NUMBER	WEIGHT %
Trifluoromethane(HFC 23)	000075-46-7	46
Hexafluoroethane(FC 116)	000076-16-4	54

UN NUMBER: 1078
CLASS: 2.2

USES AND FEATURES

- R-508b is a HFC azeotropic blend intended for very low temperature refrigeration applications.
- It has also been used to replace R-13 or R-503 in an existing system.
- Higher capacity and lower discharge temperature compared to R-23.

PRECAUTIONS OF USE

Refer to the Safety Data Sheet

PACKAGE

- High-Pressure gas cylinder of 7kgs, 8kgs, 9kgs.

OIL COMPATIBILITY

Use a polyol ester (POE) oil.

PHYSICAL PROPERTIES

CHEMICAL NAME	PENTAFLUOROETHANE
GUARANTEED PURITY	⩾ 99.9
COMPOSITION R-23 % (± 1 %)	46
R-116 % (± 1 %)	54
WATER CONTENT ppm by weight (max)	10
CHLORIDE ION TEST	Negative
ACIDITY ppm by weight (max)(as HCl)	1.0
NON-CONDENSABLE CONTENT (GAS PHASE) % by volume (max)	1.5
HIGH-BOILING RESIDUES %by volume(max)	0.01

R462a (HFC-462a)

NOVOCOOL® R-462a is a patent-pending, energy-efficient refrigerant that replaces R-22 in most applications.

THE BETTER REPLACEMENT VALUE

- No equipment modifications needed
- No oil change required
- Discharge pressure within 3% of R-22
- Energy efficiency comparable to R-22

THE FUTURE OF REFRIGERANT IS HERE!

NOVOCOOL® proudly introduces your replacement solution for R22.

NOVOCOOL® 462a is a cost-effective, energy-efficient refrigerant with low Global Warming Potential and a zero-ODP. Ask your local distributor for our patent-pending NOVOCOOL® 462a as well as our full line of refrigerants and line sets.

PACKAGE

- Non-refillable cylinder of 11.3kgs

INNOVATING FOR THE FUTURE

PHYSICAL PROPERTIES

CHEMICAL NAME	R-22	R-462a
CAPACITY	BASELINE	EQUAL
VAPOR PRESSURE AT 100F (psig)	195.00	190.10
LATENT HEAT OF VAPORIZATION (kJ/kg)	234.00	219.00
MOLAR MASS (g/mol)	86.50	97.10
GWP	1810.00	2250.00
ODP	Yes	None
EQUIPMENT MODIFICATION	Baseline	None
OIL COMPATIBILITY	MO, AB	MO, POE, AB

R1234yf (HFO-1234yf)

The thrid generation of mobile air-conditioning refrigerant

CLASSIFICATIONS

CAS NO.:	754-12-1
UN NUMBER:	3161
CLASS:	2.1

USES AND FEATURES

- Refrigerant substitution for R134a
  ODP=0
  GWP<1

PACKAGE

- Non-refillable cylinder of 4.5kgs, 5kgs, 10kgs.

ODP: 0
GWP_{100}: 4

PHYSICAL PROPERTIES

CHEMICAL NAME	2,3,3,3-TETRAFLUORO-1-PROPENE
PURITY	⩾ 99.9
BOILLING POINT °C @101.3kPa	-29.4
CRITICAL TEMPERATURE °C	94.7
CIQVID DENSITY (g/cm^3)@20°C	1.11(Water=1)
RELATIVE MOLAR MASS(g/mol)	114
ATEL/ODL (g/m^3)	0.47
PRATICAL LIMIT (g/m^3)	0.058
LOW FLAMMABILITY LEVEL	6.5%
AIT (°C)	405

R600a Isobutane

A colorless, non-ozone depleting non-corrosive, non-toxic, non-global warming refrigerant.
Isobutane is a specially deodorized gas with guaranteed specifications, used as an expansion agent in plastic foams (polyethyene, polystyrene and PVC). It can be blended with other hydrocarbons (propane, n-butane) for polystyrene foams expansion. Not ozone layer depleting, it is specially formulated for HCFCs products substitution.

ODP: 0
GWP_{100}: 20

CLASSIFICATIONS

CAS NO.:	75-28-5
UN NUMBER:	1011
CLASS:	2.1

USES AND FEATURES

- Used as XPS blowing agent.
- Used as aerosol propellant, solvent.
- Used widely in refrigerator.
- Used as blends in most aerosols field for harmaceutical, the agrochemical, the cosmetics, cleaning, household aerosol products.
- Used as fuel gas.

PACKAGE

- Canister of 80g, 120g, 160g, 200g, 420g, 480g, etc.
- Non-refillable cylinder of 6.5kgs
- Ton cylinder of 450kgs.
- ISO TANK of 11.5tons.

PHYSICAL PROPERTIES

CHEMICAL NAME	ISOBUTANE
PURITY	⩾ 99.9
BOILLING POINT °C @101.3kPa	-11.75
°F @14.7psia	10.85
CRITICAL TEMPERATURE °C	134.66
°F	274.38
MOISTURE CONTENT ppm by weight (max)	10
ACIDITY ppm by weight (max)(as HCl)	1
NON CONDENSABLE GASSES CONTENT MEASURED ON VAPOUR PHASE % by volume (max)	1.5
RESUDYES AT HIGH BOILING POINT %by volume(max)	0.01
SULFUR CONTENT mg/m3	50

R600
N-butane

Normal Butane is used in calibration gas mixtures for petrochemical industry; environmental emission monitoring, industrial hygiene monitors and trace impurity analyzers. N-butane could be a fuel gas in atomic absorption spectrometry. When blended with propane and other hydrocarbons, it is referred to commercially as Liquified Petroleum Gas (LPG). It is also used as a component of gasoline (petrol).

ODP: 0
GWP_{100}: 4

CLASSIFICATIONS

CAS NO. :	106-97-8
UN NUMBER:	1011
CLASS:	2.1

USES AND FEATURES

- Used as blends in most aerosols field for pharmaceutical, the agrochemical, the cosmetics, cleaning, household aerosol products.
- Used for advanced lighter.

PACKAGE

- Cannister of 120g, 220g, 420g, 500g etc.
- Ton cylinder of 380kgs, 470kgs
- ISO TANK of 11.5tons.

PHYSICAL PROPERTIES

CHEMICAL NAME	NORMAL BUTANE
PURITY	⩾ 99.9
BOILLING POINT °C @101.3kPa	-0.49
°F @14.7psia	31.1
CRITICAL TEMPERATURE °C	151.98
°F	305.56
MOISTURE CONTENT ppm by weight (max)	10
SULFUR ppm by weight (max)(as HCl)	1.0
PACKAGE % weight (max)	0.01

R290
Propane

A colorless, non-ozone depleting non-corrosive, non-toxic, non-global warming propellant.

ODP: 0
GWP_{100}: 3

CLASSIFICATIONS

CAS NO.:	74-98-6
UN NUMBER:	1978
CLASS:	2.1

USES AND FEATURES

- Extremely pure propane (R-290) is a hydrocarbon (HC) which is used as refrigerant to replace HCFC-22.
- Used as blends in most aerosols field for harmaceutical, the agrochemical, the cosmetics, cleaning, household aerosol products.
- Used as metal welding gas.
- Used as fuel gas.

PACKAGE

- Canister of 80g , 120g , 150g , 200g , 400g , etc .
- Non-refillable cylinder of 5kgs.
- Ton cylinder of 380kgs
- ISO TANK of 9.5 tons , 10 tons.

PHYSICAL PROPERTIES

CHEMICAL NAME	PROPANE
PURITY	⩾ 99.5 ， ⩾ 99.9
BOILLING POINT °C @101.3kPa	-42.11
°F @14.7psia	-43.79
CRITICAL TEMPERATURE °C	96.74
°F	206.13
MOISTURE CONTENT ppm by weight (max)	10
ACIDITY ppm by weight (max)(as HCl)	1
RESUDYES AT HIGH BOILING POINT %by volume(max)	0.01
GWP_{100} CO2 =1	3.3
ODP R11=1	0

R1270
Propene

CLASSIFICATIONS

CAS NO.: 115-07-1
UN NUMBER: 1077
CLASS: 2.1

USES AND FEATURES

- For refrigerant,also as a raw material for polypropylene.

PACKAGE

- Canister of 80g, 200g, 420g, etc .
- Cylinder of 5kgs, 5.5kgs, 9kgs, 9.5kgs,
- Ton Cylinder of 926L.
- ISO TANK of 9.5tons.

PHYSICAL PROPERTIES

PHYSICAL PROPERTY	PROPENE
MOLECULAR FORMULA	CH_3CHCH_2
MOLECULAR WEIGHT	42.08
BOILING POINT °C	-47.8
CRITICAL TEMPERATURE °C	92.42
CRITICAL PRESSURE MPa	4.665
ODP R11=1	0
GWP_{100} CO2 =1	1.8
QUALITY INDEX	**PROPENE**
PURITY %	⩾ 99.9
SULFUR(ppm)	⩽ 1.0
MOISTURE(PPM BY WEIGHT)	⩽ 1.0
ACIDITY(PPM BY WEIGHT, AS HCL)	⩽ 1.0
VAPOR RESIDUE(BY VOLUME)	⩽ 0.01

FIRE SUPPRESSION CLEAN AGENT

A colourless, non-flammable, non-toxic gas. In low concenrations it is odourless, in higher concentrations its odour is mild and somewhat ethereal. It is shipped in steel cylinders as a liqufied gas.

HFC-227ea

- Colorless, odorless, liquefied compressed gas
- Zero ozone depleting potential
- Low global warming potential
- It is suitable for use in a wide range of fire extinguishing applications, including total flooding, streaming, and inerting applications.

ODP: 0
GWP_{100}: 3220

CLASSIFICATIONS

UN NUMBER: 3296
CLASS: 2.2

CONDITIONS OF USE

HFC-227ea does not displace oxygen and therefore is safe for use in occupied spaces without fear of oxygen deprivation. Please be sure to read the Material Safety Data Sheet (MSDS) before use. Workers handling the product should be trained about risks and preventive measures.

PACKAGE

- Ton cylinder of 100kgs, 500kgs, 1000kgs
- ISO TANK of 18 tons, 20 tons

STORAGE

- All packaging will be stored in a dry, well ventilated, easily accessible place, sheltered from sunlight and bad weather, away from any ignition source.

PERFORMANCE

As a clean, environmental-friendly, high effective, and low toxic fire-extinguishiing agent, HFC-227ea is an ideal substitute for halon 1301, and has been listd on NFPA2011 standard fire-extinguishing agent catalogue by US NFPA. It provides superior fire protection in a wide range of applications from sensitive electrical equipment to industrial applications using flammable liquids.

PHYSICAL PROPERTIES

CHEMICAL NAME	1,1,1,2,3,3,3-HEPTAFLUOROPROPANE
CHEMICAL FORMULA	C_3HF_7
CAS NUMBER	431-89-0
BOILING POINT °C	-16.4
SOLIDIFYING POINT °C	-131.1
CRITICAL TEMPERATURE °F	102.8
CRITICAL PRESSURE	2.98MPa
VAPOR PRESSURE(25°C)	453.3KPA\65.7PSI
FIRE EXTINGUISHING CONCENTRATION (cup)	6.5%
NORMAL HEPTANE	13.2
HYDROGEN	7
NOAEL(V/V,%)	9.0
LOAEL(V/V,%)	>10.5
LC50 (V/V,%)	>80
Heptafluopropane content (%)	⩾99.9
Acid content [HF](mg/kg)	⩽1
Water content (mg/kg)	⩽10
Non-volatile residue (%)	⩽0.01
Suspended and precipitated substance	invisible

5112
(2-METHYL-3-PENTANONE)

- A clear, colorless, low odor fluid at room temperature with zero ozone depletion potential
- Long-term, sustainable alternative to Halons, HFCs and PFCs
- A clean agent, leaves no residue behind and will not affect sensitive high-value electronics.

ODP: 0
GWP_{100}: 1

PERFORMANCE

PERFLUORO(2-METHYL-3-PENTANONE) has met the requirements of registration under SNAP and is approved for use as an alternative to Halon 1301 for flooding applications in occupied spaces.It is an effective fire extinguishing agent in standard fire scenarios where halons historically have been used and where halon alternatives are now

BEING USED.CONDITIONS OF USE

Please be sure to read the Safety Data Sheet (SDS) before use. Workers handling the product should be trained about risks and preventive measures.

STORAGE

- All packaging will be stored in a dry, well ventilated, easily accessible place, sheltered from sunlight and bad weather, away from any ignition source.

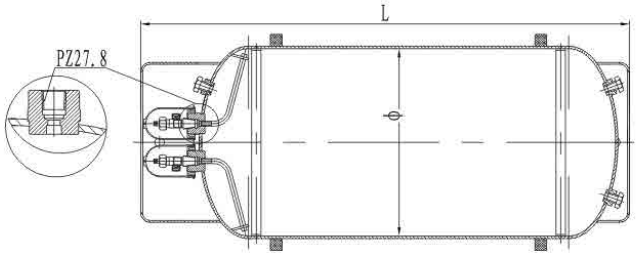
PACKAGE

- Iron drum of 250kgs

PHYSICAL PROPERTIES

CHEMICAL NAME	PERFLUORO(2-METHYL-3-PENTANONE)
PURITY % by weight(min)	99.9
CHEMICAL FORMULA	$C_6F_{12}O$
CAS NUMBER	756-13-8
BOILLING POINT °C @101.3kPa	-108
°F @14.7psia	-162
CRITICAL TEMPERATURE °C	49
°F	120
WATER CONTENT ppm by weight (max)	10
ACIDITY AS HCL, PP, BY WEIGHT(MA	3
FIRE EXTINGUISHING CONCENTRATION (cup)	4.5%
NOAEL(V/V,%)	10
LOAEL(V/V,%)	>10
LC50 (V/V,%)	>10

HFC 236fa



- A colorless, nonflammable, liquefied gas.
- Noncorrosive, electrically nonconductive, free of residue, and has an ODP of zero.
- Used as a fire extinguishant and explosion suppression agent.

CLASSIFICATIONS

UN NUMBER: 3220
CLASS: 2.2

CONDITIONS OF USE

Use personal protective equipment, such as side shield glasses, gloves, and safety shoes, when handling containers.Avoid skin contact with liquid HFC-236fa because it can cause frostbite.Please be sure to read the Material Safety Data Sheet (MSDS) before use. Workers handling the product should be trained about risks and preventive measures.

PERFORMANCE

HFC236fa is listed as an acceptable Halon replacement in the EPA SNAP Program for Halon 1211 in portable fire extinguishers and local application systems.It is ideally suited for protecting highvalue equipment such as in computer rooms, telecommunication facilities, and aircraft. It also can be used as a pure refrigerant for low-pressure chillers.

ODP: 0
GWP_{100}: 9810

STORAGE

- All packaging will be stored in a dry, well ventilated, easily accessible place, sheltered from sunlight and bad weather, away from any ignition source.

PACKAGE

- Ton cylinder of 1000kgs
- ISO TANK of 18 tons, 20 tons

PHYSICAL PROPERTIES

CHEMICAL NAME	2,2-DICHLORO-1,1,1-TRIFLUOROETHANE
PURITY % by weight(min)	99.6
CHEMICAL FORMULA	$C_3H_2F_6$
CAS NUMBER	690-39-1
BOILLING POINT °C @101.3kPa	-1.4
°F @14.7psia	29.4
CRITICAL TEMPERATURE °C	124.9
°F	-256.9
WATER CONTENT ppm by weight (max)	10
ACIDITY ppm by weight (max)(as HCl)	3.0
NON CONDENSABLE GASSES CONTENT MEASURED ON VAPOUR PHASE % by volume (max)	1.5
RESUDYES AT HIGH BOILING POINT %by volume(max)	0.01
CHLORIDE, NO VISIBLE TURBIDITY	Pass
FIRE EXTINGUISHING CONCENTRATION (cup)	6.3%
NOAEL(V/V,%)	10
LOAEL(V/V,%)	15
LC50 (V/V,%)	>45.7

HFC 125

- An odorless, colorless, liquefied compressed gas with a zero ozone depleting potential and a low global warming potential.
- A safe, clean, and electrically nonconductive agent that is intended to protect people, high value assets and the continuity of business

CLASSIFICATIONS

UN NUMBER: 3220
CLASS: 2.2

PERFORMANCE

HFC-125 is an environmentally acceptable replacement for Halon 1301 that can be used on many types of fires. It is effective for many surface fires and most solid combustible materials. HFC-125 also can be used to protect a wide range of applications from sensitive electrical equipment to industrial applications.

ODP: 0
GWP_{100}: 3500

CONDITIONS OF USE

HFC-125 does not displace xygen and therefore is safe for use in occupied spaces without fear of oxygen eprivation. Please be sure to read the Material Safety Data Sheet (MSDS) before use. Workers handling the product should be trained about risks and preventive measures.

PACKAGE

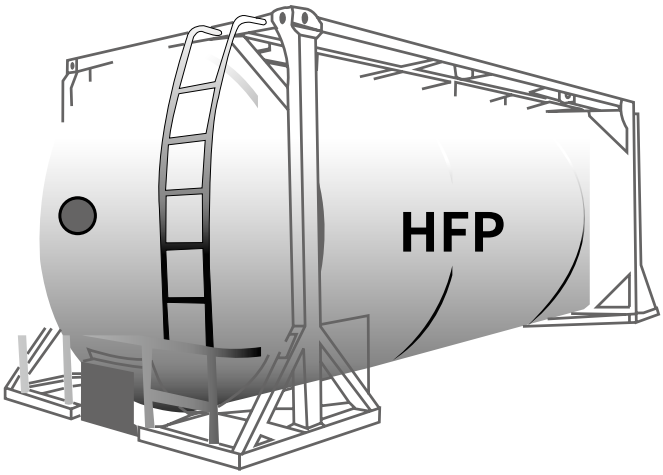
- Ton cylinder of 700kgs
- ISO TANK of 18 tons

STORAGE

- All packaging will be stored in a dry, well ventilated, easily accessible place, sheltered from sunlight and bad weather, away from any ignition source.

PHYSICAL PROPERTIES

CHEMICAL NAME	2,2-DICHLORO-1,1,1-TRIFLUOROETHANE
PURITY % by weight(min)	99.9
CHEMICAL FORMULA	$C_2HCL_2F_3$
CAS NUMBER	306-83-2
BOILLING POINT °C @101.3kPa	-48.1
°F @14.7psia	-54.6
CRITICAL TEMPERATURE °C	66
°F	150.8
WATER CONTENT ppm by weight (max)	10
ACIDITY ppm by weight (max)(as HCl)	1.0
NON CONDENSABLE GASSES CONTENT MEASURED ON VAPOUR PHASE % by volume (max)	1.5
RESUDYES AT HIGH BOILING POINT %by volume(max)	0.01
SULFUR CONTENT mg/m^3	50
FIRE EXTINGUISHING CONCENTRATION (cup)	8.7%
NOAEL(V/V,%)	7.5
LOAEL(V/V,%)	10
LC50 (V/V,%)	70



HFP

(HEXAFLUOROPROPENE)

HFP is a colorless and odorless gas under ambient conditiong,and is a major fluroine-containing monomer.It can copolymerize with other alkenes to make fluorine-containing polymers.It is also a raw material for medicine intermediates,fire-extinguishers,and fluoine-comtaining fine chenicals.

CLASSIFICATIONS

CAS NO.: 116-15-4
UN NUMBER: 1858
CLASS: 2.2

PROPERTIES AND APPLICATIONS

Chemical formula: CF_2=CF-CF_3
Molecular weight:150.02
Boiling point(°C):-29.6
Melting point(°C):-156.2
Critical temperature(°C):85
Critical pressure(MPa):3.04
Critical density(g/cm^3):0.60
Liquid density[g/cm^3]:1.105[60°C];1.332[20°C];1.419[0°C];1.498[-20°C];
Liquid density[air =1]:5.2
20°C Vapor pressure[absolute pressure](MPa):0.64
Vapor pressure[243.75<T<358.15]:logP(Kpa)=6.6938-1139.156/T
Inhalation toxicity[rat.4h](ppm):LC50=3000

PACKAGE

◎ Filled or stored in surface-deactivated and stainless steel container (cylinder or tank) with working pressure ⩾ 2Mpa.Filling ratio shall be less thasn 1.06kg/L.

◎ ISO TANK of 20 tons

STORAGE

◎ Shall not be stored for more than hall a year prior to use.Other wise spontaneous polymerizayion may occur.Transported under 50 °C .Avoid sunlight and violent shock.

PHYSICAL PROPERTIES

INDEX	SPECIFICATION
APPEARANCE	Colorless and transparent liquid free of physical impurity and suspended substasnce.
HEXAFLUOROPROPENE(%) ⩾	99.8
Saturated fluorine-containing hydrocarbon(%) ⩽	0.12
Unsaturated fluorine-containing hydrocarbon(%) ⩽	0.08
Oxygen content(%) ⩽	0.0030
Water content(%) ⩽	0.0020
Non-volatile residue(%) ⩽	0.0050

SPECIALTY GAS

A colourless, non-flammable, non-toxic gas. In low concenrations it is odourless, in higher concentrations its odour is mild and somewhat ethereal. It is shipped in steel cylinders as a liqufied gas.

SULFUR HEXAFLUORIDE (SF6)

- Sulfur Hexafluoride (SF6) is liquid under normal temperature and pressure, with no color, no smell, notoxic and no corrosion; melting point is -50°C; boiling point is -63.8°C; and gas density is 6.16g/L(20°C,0.1MPa)
- Sulfur hexafluoride(SF6) is fine inertia insulating gas and is widely used in high pressure electronic equipment, underground wire, rador, Tevatron, potential transformer aspect and so on

CLASSIFICATIONS

CAS NO.: 2551-62-4
UN NUMBER: 1080
CLASS: 2.2

AVAILABLE PURITY

3N: 99.9%
4.5N: 99.995%
5N: 99.999%

PACKAGE

CYLINDER SIZE	4L	8L	10L	28L	40L	500L	40FT ISO
FILLING VOLUME	4kg	8kg	10kg	30kg	50kg	500kg	12.5tons

SPECIFICATION（4.5N）

ITEM (M/M)	GB/T 21287-2007	IEC60376	Factory Standard
SF_6, 10^{-2}	⩾ 99.9	⩾ 99.7	⩾ 99.995
AIR, 10^{-2}	⩽ 0.03	⩽ 0.20	⩽ 0.001
CF_4, 10^{-2}	⩽ 0.01	⩽ 0.24	⩽ 0.0001
Moisture, 10^{-2}	⩽ 0.0005	⩽ 0.0025	⩽ 0.0001
C_2F_6, 10^{-2}	⩽ 0.02	/	⩽ 0.001
C_3F_8, 10^{-2}	⩽0.005	/	⩽0.0005
Acidity (as HF), 10^{-2}	⩽0.2	⩽1	⩽0.00001
Hydrolyzable Fluoride (as HF)	⩽0.0001	/	⩽2
Mineral Oil, 10^{-2}	⩽0.0004	⩽10	⩽0.0001
TOXICITY	Non-toxic	Non-toxic	Non-toxic

SPECIFICATION（5.5N）

ITEM (M/M)	GB/T 21287-2007	IEC60376	Factory Standard
SF_6, 10^{-2}	⩾ 99.999	⩾ 99.999	⩾ 99.9995
O_2+AR, 10^{-6}	⩽ 2.0	/	⩽ 1.0
O_2, 10^{-6}	/	⩽ 1.0	/
N_2, 10^{-6}	⩽ 2.0	⩽ 4.0	⩽ 2.0
CF_4, 10^{-6}	⩽ 1.0	⩽ 1.0	⩽ 1.0
CO, 10^{-6}	⩽0.5	⩽0.5	⩽0.1
CO_2, 10^{-6}	⩽0.5	⩽0.5	⩽0.2
CH_4, 10^{-6}	⩽0.5	⩽0.5	0
Moisture, 10^{-6}	⩽3.0	⩽2.0	⩽1.0
ACIDITY (AS HF), 10^{-6}	⩽0.1	⩽0.1	⩽0.1
Hydrolyzable Fluoride (as HF) , 10^{-6}	⩽0.8	/	⩽0.3
Impurities, 10^{-6}	⩽10.0	/	⩽5.0

CARBON TETRAFLUORIDE (CF4)

CF4 is also named as Carbon Tetrafluoride, Tetrafluoromethane, or R14. It's a colorless, non-toxic, non-flammable, non-corrosive gas with a slight ether-like odor. CF4 is normally compressed and shipped at high pressure. CF4 is an extremely stable compound, and widely used for etching polysilicon, silicon dioxide, silicon nitrite, some metal silicides and metals. CF4 is also a cryogenic refrigerant, a good cleaning gas for waters and chambers, and can be used as a insulant gas.

CLASSIFICATIONS

CAS NO.: 75-73-0
UN NUMBER: 1982
CLASS: 2.2

PACKAGE

CYLINDER SIZE	8L	10L	40L	47	440L
FILLING VOLUME	5kg	6.5kg	25.5kg	30kg	260kg

SPECIFICATION （5N）

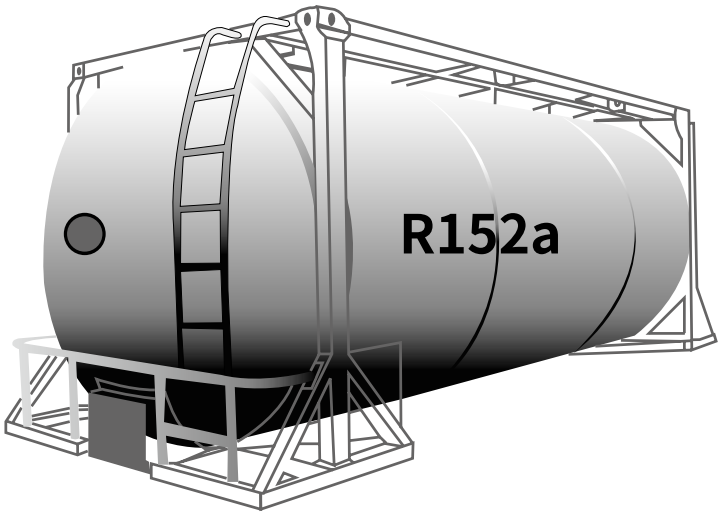
ITEM (M/M)	ISO/IEC 17050	FACTORY STANDARD
CF_4 V/V%	⩾ 99.9	⩾ 99.999
OXYGEN (O_2) PPMV	⩽ 100	⩽ 1
NITROGEN (N_2) ppmv	⩽ 400	⩽ 4
MOISTURE ppmv	⩽ 10	⩽ 1
CARBON DIOXIDE (CO_2) ppmv	⩽ 80	⩽ 1
CARBON MONOXIDE (CO) ppmv	⩽50	⩽0.3
ACIDITY (AS HF) ppm/m	⩽1.0	⩽0.1
FLUOROCARBON ppmv	/	⩽1
SF6 ppmv	⩽15	⩽1
IMPURITIES PPMV	/	⩽10

AEROSOL PROPELLANT

A colourless, non-flammable, non-toxic gas. In low concenrations it is odourless, in higher concentrations its odour is mild and somewhat ethereal. It is shipped in steel cylinders as a liqufied gas.

R152a (HFC-152a)

A clourless and transparent gas at the room temperature.



ODP: 0
GWP_{100}: 124

CLASSIFICATIONS

CAS NO.:	75-37-6
UN NUMBER:	1030
CLASS:	2.1

USES AND FEATURES

- Used as refrigerant, intermediate of refrigerant and raw materials of fluororubbers.
- Used as XPS blowing agent.
- Used as aerosol propellant.

MATERIAL COMPATIBILITY

METALS GENERAL BEHAVIOR	Slight risk of corrosion in presence of water
Aluminium	Satisfactory
Stainless Steel	Satisfactory
PLASTICS	
PTFE	Satisfactory
PA(NYLON)	Satisfactory
ELASTOMERS	
Butyl rubber(IIR)	Acceptable but important swelling
Nitrile rubber(NBR)	Satisfactory

PACKAGE

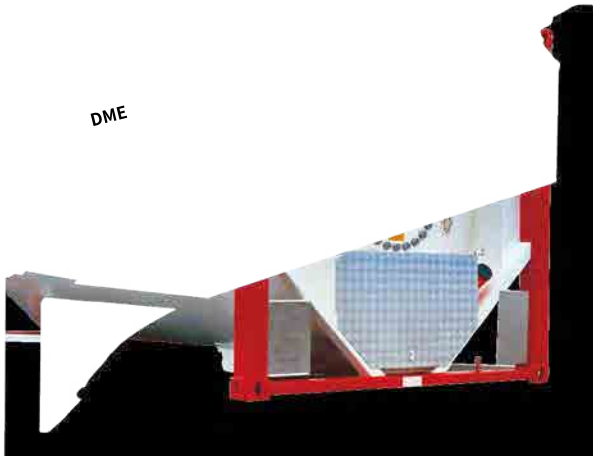
- Ton cylinder of 700kgs
- ISO TANK of 18tons

PHYSICAL PROPERTIES

CHEMICAL NAME	1,1-DIFLUOROETHANE
PURITY	⩾ 99.9
BOILLING POINT °C @101.3kPa	-82.0
°F @14.7psia	-115.6
CRITICAL TEMPERATURE °C	26.1
°F	79.0
WATER CONTENT ppm by weight (max)	10
ACIDITY ppm by weight (max)(as HCl)	1.0
NON CONDENSABLE GASSES CONTENT MEASURED ON VAPOUR PHASE % by volume (max)	1.5
RESUDYES AT HIGH BOILING POINT %by volume(max)	0.01
CHLORIDE No visible turbidity	pass

DME

- A colourless, liquefied gas with a slight(ether-like) odor
- Flammable, medium-high pressure propellant with zero ozone depleting potential
- Be commonly used in aerosol Industry



ODP: 0
GWP_{100}: <1

CLASSIFICATIONS

UN NUMBER:	1033
CLASS	2.1

APPLICATION

DME can be used alone or blended with other propellants, it’ s an excellent solvent for resins, thus popular in products such as hair sprays, paints, air fresheners and other personal care items.

STORAGE AND SHELF LIFE

- All packaging will be stored in a dry, well ventilated, easily accessible place, sheltered from sunlight and bad weather, away from any ignition source.
- Shelf Life: Six Months

PACKAGE

- Ton cylinder of 510 kgs
- ISO TANK of 14 tons

CONDITIONS OF USE

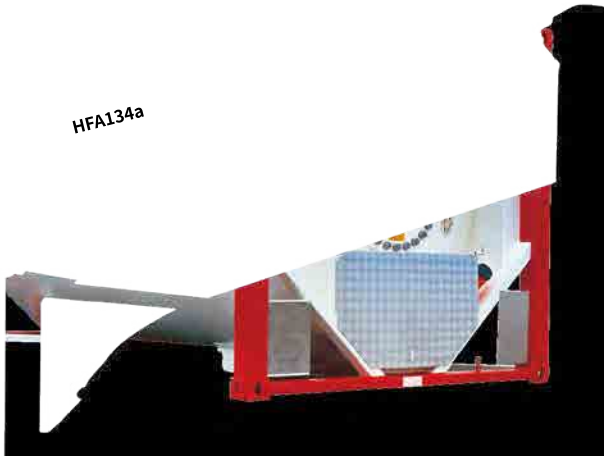
Pure DME is extremely flammable and only trained personnel using proper equipment should handle it. Please be sure to read the Safety Data Sheet (SDS) before use.

SPECIFICATION

CHEMICAL NAME	DIMETHYL ETHER
PURITY, % by weight(min)	99.99
FORMULA	CH3OCH3
CAS NUMBER	115-10-6
MOLECULAR WEIGHT	46.07
BOILING POINT	-24.8°C @ 1,013 BAR
VAPOUR PRESSURE	77 PSIA @ 20 ° C
C1-C4 HYDROCARBONS (M/M)	<0.01%
METHANOL	⩽ 30PPM
LIGHT COMPONENT	⩽ 20PPM
MOISTURE(WT%)	⩽ 50PPM
ACIDITY (as H_2SO_4)	⩽ 0.0003%

HFA-134a

- A colourless, liquefied gas with a slight(ether-like) odor
- Nonflammable in air under ambient conditions of temperature and pressure.
- Low boiling and non-toxic hydrofluoroalkane(HFA) aerosol propellant gases.
- Zero ozone depleting potential and low Volatile Organic Compound (VOC) potential



ODP: 0
GWP_{100}: 1470

CLASSIFICATIONS

UN NUMBER: 3159
CLASS: 2.2

APPLICATION

HFA 134a is a main alternative for CFCs propellant, it is widely used in Metered Dose Inhalers, it also usded as anti-asthma aerosol to treat Chronic Obstructive Pulmonary Disease, as Nasal aerosol to treat allergic rhinitis, etc.

CONDITIONS OF USE

The product should not be mixed with air for leak testing or used with air for any other purpose above atmospheric pressure. Contact with chlorine or other strong oxidizing agents should also be avoided. Please be sure to read the Safety Data Sheet (SDS) before use. Workers handling the product should be trained about risks and preventive measures.

STORAGE AND SHELF LIFE

- All packaging will be stored in a dry, well ventilated, easily accessible place, sheltered from sunlight and bad weather, away from any ignition source.
- Shelf Life: Six Months

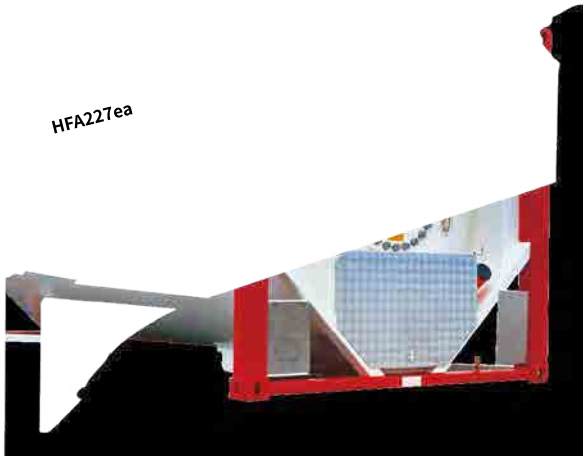
PACKAGE

- Ton cylinder of 400L,800L,926L,1000L
- ISO TANK of 18 tons

SPECIFICATION

CHEMICAL NAME	1,1,1,2-TETRAFLUOROETHANE
CHEMICAL FORMULA	CH2FCF3
CAS NUMBER	811-97-2
MOLECULAR WEIGHT	102.03
ACIDITY (%, content of HCl)	⩽ 0.00001
EVAPORATING RESIDUE (%,m/m)	⩽ 0.01
CHLORIDE (%, content of Cl-)	⩽ 0.0003
MOISTURE (%,m/m)	⩽ 0.0010
NON-CONDENSING VAPOR (%,v/v 25°C)	⩽ 1.5
PURITY (%)	⩾ 99.99
CFC-12 (%)	⩽ 0.0002
HFC-143A (%)	⩽ 0.0003
HFC-32 (%)	⩽ 0.0003
CFC-114A (%)	⩽ 0.0003
CFC-114 (%)	⩽ 0.0003
HFC-125 (%)	⩽ 0.0010
HCFC-1131 (%)	⩽ 0.0003
HCFC-124 (%)	⩽ 0.0003
HFC-134 (%)	⩽ 0.0090
HFCF-133A (%)	⩽ 0.0003
CFC-113A (%)	⩽ 0.0003
TOTAL UNSATURATED MATTER (%)	⩽ 0.0020
TOTAL UNKNOWN IMPURITIES (%)	⩽ 0.0010

HFA-227ea



- A colourless, liquefied gas with a slight(ether-like) odor
- Nonflammable in air under ambient conditions of temperature and pressure.
- Low boiling and non-toxic hydrofluoroalkane(HFA) aerosol propellant gases.
- Zero ozone depleting potential and low Volatile Organic Compound (VOC) potential

ODP: 0

GWP_{100}: 3220

CLASSIFICATIONS

UN NUMBER: 3296

CLASS: 2.2

APPLICATION

HFA 227ea is a suitable alternative to CFCs that currently used in the formulation of medicinal products, including metered dose inhalers for the treatment of asthma.

CONDITIONS OF USE

Wherever it is handled, there must be no open flames or heat sources (e.g. hot metallic surfaces) or reactive products. Please be sure to read the Safety Data Sheet (SDS) before use. Workers handling the product should be trained about risks and preventive measures.

STORAGE AND SHELF LIFE

- All packaging will be stored in a dry, well ventilated, easily accessible place, sheltered from sunlight and bad weather, away from any ignition source.
- Shelf Life: Six Months

PACKAGE

- Ton cylinder of 1000kgs
- ISO TANK of 18 tons

SPECIFICATION

CHEMICAL NAME	1,1,1,2,3,3,3-HEPTAFLUOROPROPANE
CHEMICAL FORMULA	CH2FCF3
CAS NUMBER	431-89-0
MOLECULAR WEIGHT	170.03
BOILING POINT	-16.45° C @ 1,013 BAR
ACIDITY (hydrogen fluoride)	⩽ 0.1
WATER (Karl Fischer)	⩽ 10
NON-VOLATILE MATTER	⩽ 20
NON-CONDENSABLE GASES (GC)	⩽ 1.0
VOLATILE RELATED SUBSTANCES (GC-MS)	
FC 1216 PPM (v/v)	⩽ 1.5
HFC 1225ZC PPM (v/v)	⩽ 2
FC C-216 PPM (v/v)	⩽ 2
HCFC 124 PPM (v/v)	⩽ 2
FC 218 PPM (v/v)	⩽ 10
CFC 115 PPM (v/v)	⩽ 2
CFC 217BA PPM (v/v)	⩽ 2
HFC 236FA PPM (v/v)	⩽ 2
HFC 1327 PPM (v/v)	⩽ 2
C6F12-1 PPM (v/v)	⩽ 2
C6F12-2 PPM (v/v)	⩽ 2
C6HF13 PPM (v/v)	⩽ 2
SUM OF OTHERS PPM(v/v)	⩽ 2
INDIVIDUAL UNSPECIFIED IMPURITIES PPM (v/v)	⩽ 1
TOTAL VOLATILE IMPURITIES PPM (v/v)	⩽ 20

VARIAL

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