

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Sid Harvey item # R417AX25 & R417AUR

SDS # Z0330

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

SECTION 1. IDENTIFICATION

Product name : Freon™ MO59 (R-417A) Refrigerant

SDS-Identcode : 130000000132

Manufacturer or supplier's details

Company name of supplier : The Chemours Company FC, LLC

Address : 1007 Market Street
Wilmington, DE 19899 United States of America (USA)

Telephone : 1-844-773-CHEM (outside the U.S. 1-302-773-1000)

Emergency telephone : Medical emergency: 1-866-595-1473 (outside the U.S. 1-302-773-2000) ; Transport emergency: +1-800-424-9300 (outside the U.S. +1-703-527-3887)

Recommended use of the chemical and restrictions on use

Recommended use : Refrigerant

Restrictions on use : For professional and industrial installation and use only.


SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200

Gases under pressure : Liquefied gas

Simple Asphyxiant

GHS label elements

Hazard pictograms : 

Signal Word : Warning

Hazard Statements : H280 Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary Statements : **Storage:**
P410 + P403 Protect from sunlight. Store in a well-ventilated place.

Other hazards

Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing. Misuse or intentional inhalation abuse may cause death without warning symptoms, due to

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

cardiac effects.
Rapid evaporation of the product may cause frostbite.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Components

Chemical name	CAS-No.	Concentration (% w/w)
1,1,1,2-Tetrafluoroethane*	811-97-2	50
Pentafluoroethane*	354-33-6	46.6
Butane	106-97-8	3.4

* Voluntarily-disclosed non-hazardous substance

SECTION 4. FIRST AID MEASURES

- General advice : In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.
- If inhaled : If inhaled, remove to fresh air.
Get medical attention if symptoms occur.
- In case of skin contact : Thaw frosted parts with lukewarm water. Do not rub affected area.
Get medical attention immediately.
- In case of eye contact : Get medical attention immediately.
- If swallowed : Ingestion is not considered a potential route of exposure.
- Most important symptoms and effects, both acute and delayed : May cause cardiac arrhythmia.
Other symptoms potentially related to misuse or inhalation abuse are
Cardiac sensitization
Anaesthetic effects
Light-headedness
Dizziness
confusion
Lack of coordination
Drowsiness
Unconsciousness
Contact with liquid or refrigerated gas can cause cold burns and frostbite.
- Protection of first-aiders : No special precautions are necessary for first aid responders.
- Notes to physician : Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

- Suitable extinguishing media : Not applicable
Will not burn
- Unsuitable extinguishing media : Not applicable
Will not burn
- Specific hazards during fire fighting : Exposure to combustion products may be a hazard to health. If the temperature rises there is danger of the vessels bursting due to the high vapor pressure.
- Hazardous combustion products : Hydrogen fluoride
carbonyl fluoride
Carbon oxides
Fluorine compounds
- Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Fight fire remotely due to the risk of explosion.
Use water spray to cool unopened containers.
Remove undamaged containers from fire area if it is safe to do so.
Evacuate area.
- Special protective equipment for fire-fighters : Wear self-contained breathing apparatus for firefighting if necessary.
Use personal protective equipment.
-

SECTION 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures : Evacuate personnel to safe areas.
Avoid skin contact with leaking liquid (danger of frostbite).
Ventilate the area.
Follow safe handling advice and personal protective equipment recommendations.
- Environmental precautions : Prevent further leakage or spillage if safe to do so.
Retain and dispose of contaminated wash water.
- Methods and materials for containment and cleaning up : Ventilate the area.
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.
-

SECTION 7. HANDLING AND STORAGE

- Technical measures : Use equipment rated for cylinder pressure. Use a backflow preventative device in piping. Close valve after each use and when empty.
- Local/Total ventilation : Use only with adequate ventilation.
-

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

- Advice on safe handling : Do not breathe gas.
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment
Wear cold insulating gloves/ face shield/ eye protection.
Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point.
Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.
Prevent backflow into the gas tank.
Use a pressure reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems.
Close valve after each use and when empty. Do NOT change or force fit connections.
Prevent the intrusion of water into the gas tank.
Never attempt to lift cylinder by its cap.
Do not drag, slide or roll cylinders.
Use a suitable hand truck for cylinder movement.
Keep away from heat and sources of ignition.
Take precautionary measures against static discharges.
Take care to prevent spills, waste and minimize release to the environment.
- Conditions for safe storage : Cylinders should be stored upright and firmly secured to prevent falling or being knocked over.
Separate full containers from empty containers.
Do not store near combustible materials.
Avoid area where salt or other corrosive materials are present.
Keep in properly labeled containers.
Keep in a cool, well-ventilated place.
Keep away from direct sunlight.
Store in accordance with the particular national regulations.
- Materials to avoid : Do not store with the following product types:
Self-reactive substances and mixtures
Organic peroxides
Oxidizing agents
Flammable liquids
Flammable solids
Pyrophoric liquids
Pyrophoric solids
Self-heating substances and mixtures
Substances and mixtures which in contact with water emit flammable gases
Explosives
Acutely toxic substances and mixtures
Substances and mixtures with chronic toxicity
- Recommended storage temperature : < 126 °F / < 52 °C
- Storage period : > 10 y

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

Further information on storage stability : The product has an indefinite shelf life when stored properly.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
1,1,1,2-Tetrafluoroethane	811-97-2	TWA	1,000 ppm	US WEEL
Pentafluoroethane	354-33-6	TWA	1,000 ppm	US WEEL
Butane	106-97-8	TWA	800 ppm 1,900 mg/m ³	NIOSH REL
		STEL	1,000 ppm	ACGIH

Engineering measures : Ensure adequate ventilation, especially in confined areas. Minimize workplace exposure concentrations.

Personal protective equipment

Respiratory protection : General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection
Material : Heat resistant gloves

Remarks : Choose gloves to protect hands against chemicals depending on the concentration specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday. Breakthrough time is not determined for the product. Change gloves often!

Eye protection : Wear the following personal protective equipment:
Chemical resistant goggles must be worn.
Face-shield

Skin and body protection : Skin should be washed after contact.

Protective measures : Wear cold insulating gloves/ face shield/ eye protection.

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

Hygiene measures : Ensure that eye flushing systems and safety showers are located close to the working place.
When using do not eat, drink or smoke.
Wash contaminated clothing before re-use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Liquefied gas

Color : colorless

Odor : slight, ether-like

Odor Threshold : No data available

pH : No data available

Melting point/freezing point : No data available

Initial boiling point and boiling range : -38.4 °F / -39.1 °C

Flash point : Not applicable

Evaporation rate : Not applicable

Flammability (solid, gas) : Will not burn

Upper explosion limit / Upper flammability limit : Upper flammability limit
Method: ASTM E681
None.

Lower explosion limit / Lower flammability limit : Lower flammability limit
Method: ASTM E681
None.

Vapor pressure : 9,835 hPa (77 °F / 25 °C)

Relative vapor density : 3.8
(Air = 1.0)

Relative density : 1.15 (77 °F / 25 °C)

Density : 1.2 g/cm³ (68 °F / 20 °C)
(as liquid)

Solubility(ies)
Water solubility : No data available

Partition coefficient: n-octanol/water : Not applicable

Autoignition temperature : No data available

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

Decomposition temperature : No data available

Viscosity
Viscosity, kinematic : Not applicable

Explosive properties : Not explosive

Oxidizing properties : The substance or mixture is not classified as oxidizing.

Particle size : Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Not classified as a reactivity hazard.

Chemical stability : Stable if used as directed. Follow precautionary advice and avoid incompatible materials and conditions.

Possibility of hazardous reactions : Can react with strong oxidizing agents.

Conditions to avoid : Heat, flames and sparks.

Incompatible materials : Oxidizing agents

Hazardous decomposition products : No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation
Skin contact
Eye contact

Acute toxicity

Not classified based on available information.

Components:

1,1,1,2-Tetrafluoroethane:

Acute inhalation toxicity : LC50 (Rat): > 567000 ppm
Exposure time: 4 h
Test atmosphere: gas

No observed adverse effect concentration (Dog): 40000 ppm
Test atmosphere: gas
Symptoms: Cardiac sensitization

Lowest observed adverse effect concentration (Dog): 80000 ppm
Test atmosphere: gas
Symptoms: Cardiac sensitization

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

Cardiac sensitisation threshold limit (Dog): 334,000 mg/m³
Test atmosphere: gas
Symptoms: Cardiac sensitization

Pentafluoroethane:

Acute inhalation toxicity : LC0 (Rat): > 800000 ppm
Exposure time: 4 h
Test atmosphere: gas
Method: OECD Test Guideline 403

Butane:

Acute inhalation toxicity : LC50 (Rat): 570000 ppm
Exposure time: 15 min
Test atmosphere: gas
Remarks: Based on data from similar materials

Skin corrosion/irritation

Not classified based on available information.

Components:

1,1,1,2-Tetrafluoroethane:

Species : Rabbit
Result : No skin irritation

Serious eye damage/eye irritation

Not classified based on available information.

Components:

1,1,1,2-Tetrafluoroethane:

Species : Rabbit
Result : No eye irritation

Respiratory or skin sensitization

Skin sensitization

Not classified based on available information.

Respiratory sensitization

Not classified based on available information.

Components:

1,1,1,2-Tetrafluoroethane:

Routes of exposure : Skin contact
Species : Guinea pig
Result : negative

Species : Rat
Result : negative

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

Germ cell mutagenicity

Not classified based on available information.

Components:

1,1,1,2-Tetrafluoroethane:

Germ cell mutagenicity - Assessment : Weight of evidence does not support classification as a germ cell mutagen.

Pentafluoroethane:

Genotoxicity in vitro : Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: inhalation (gas)
Method: OECD Test Guideline 474
Result: negative

Butane:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Rat
Application Route: inhalation (gas)
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Carcinogenicity

Not classified based on available information.

Components:

1,1,1,2-Tetrafluoroethane:

Carcinogenicity - Assessment : Weight of evidence does not support classification as a carcinogen

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Not classified based on available information.

Components:

1,1,1,2-Tetrafluoroethane:

Reproductive toxicity - Assessment : Weight of evidence does not support classification for reproductive toxicity

Pentafluoroethane:

Effects on fertility : Test Type: One-generation reproduction toxicity study
Species: Rat
Application Route: inhalation (vapor)
Result: negative
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: inhalation (gas)
Method: OECD Test Guideline 414
Result: negative

Butane:

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: inhalation (gas)
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: inhalation (gas)
Method: OECD Test Guideline 422
Result: negative

STOT-single exposure

Not classified based on available information.

Components:

Butane:

Assessment : May cause drowsiness or dizziness.
Remarks : Based on data from similar materials

STOT-repeated exposure

Not classified based on available information.

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

Components:

1,1,1,2-Tetrafluoroethane:

Assessment : No significant health effects observed in animals at concentrations of 250 ppmV/6h/d or less.

Repeated dose toxicity

Components:

1,1,1,2-Tetrafluoroethane:

Species : Rat
NOAEL : 50000 ppm
LOAEL : > 50000 ppm
Application Route : inhalation (gas)
Exposure time : 90 d
Method : OECD Test Guideline 413
Remarks : No significant adverse effects were reported

Pentafluoroethane:

Species : Rat
NOAEL : >= 50000 ppm
Application Route : inhalation (gas)
Exposure time : 13 Weeks
Method : OECD Test Guideline 413

Butane:

Species : Rat
NOAEL : >= 9000 ppm
Application Route : inhalation (gas)
Exposure time : 6 Weeks
Method : OECD Test Guideline 422

Aspiration toxicity

Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

1,1,1,2-Tetrafluoroethane:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 450 mg/l
Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 980 mg/l
Exposure time: 48 h
Toxicity to algae : ErC50 (algae): 142 mg/l
Exposure time: 96 h
Remarks: Based on data from similar materials

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

NOEC (Pseudokirchneriella subcapitata (green algae)): 13.2 mg/l
Exposure time: 72 h
Remarks: Based on data from similar materials

Pentafluoroethane:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 450 mg/l
Exposure time: 96 h
Method: Directive 67/548/EEC, Annex V, C.1.
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 980 mg/l
Exposure time: 48 h
Method: Directive 67/548/EEC, Annex V, C.2.
Remarks: Based on data from similar materials

Toxicity to algae : EC50 (Pseudokirchneriella subcapitata (green algae)): > 114 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: Based on data from similar materials

NOEC (Pseudokirchneriella subcapitata (green algae)): 13.2 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: Based on data from similar materials

Persistence and degradability

Components:

1,1,1,2-Tetrafluoroethane:

Biodegradability : Result: Not readily biodegradable.

Pentafluoroethane:

Biodegradability : Result: Not readily biodegradable.
Biodegradation: 5 %
Exposure time: 28 d
Method: OECD Test Guideline 301D

Butane:

Biodegradability : Result: Readily biodegradable.
Remarks: Based on data from similar materials

Bioaccumulative potential

Components:

1,1,1,2-Tetrafluoroethane:

Partition coefficient: n- : log Pow: 1.06

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

|| octanol/water

Pentafluoroethane:

|| Partition coefficient: n-octanol/water : Pow: 1.48 (77 °F / 25 °C)

Butane:

|| Partition coefficient: n-octanol/water : log Pow: 2.89

Mobility in soil

No data available

Other adverse effects

Product:

Results of PBT and vPvB assessment : This mixture contains no substance considered to be persistent, bioaccumulating and toxic (PBT). This mixture contains no substance considered to be very persistent and very bioaccumulating (vPvB).

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Dispose of in accordance with local regulations.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.
Empty pressure vessels should be returned to the supplier.
If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG

UN number : UN 1078
Proper shipping name : REFRIGERANT GAS, N.O.S.
(1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
Class : 2.2
Packing group : Not assigned by regulation
Labels : 2.2

IATA-DGR

UN/ID No. : UN 1078
Proper shipping name : Refrigerant gas, n.o.s.
(1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
Class : 2.2
Packing group : Not assigned by regulation
Labels : Non-flammable, non-toxic Gas
Packing instruction (cargo) : 200

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

aircraft)

Packing instruction (passenger aircraft) : 200

IMDG-Code

UN number : UN 1078
Proper shipping name : REFRIGERANT GAS, N.O.S.
(1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
Class : 2.2
Packing group : Not assigned by regulation
Labels : 2.2
EmS Code : F-C, S-V
Marine pollutant : no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

Domestic regulation

49 CFR

UN/ID/NA number : UN 1078
Proper shipping name : Refrigerant gases, n.o.s.
(1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
Class : 2.2
Packing group : Not assigned by regulation
Labels : NON-FLAMMABLE GAS
ERG Code : 126
Marine pollutant : no

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Gases under pressure
Simple Asphyxiant

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version 6.0 Revision Date: 10/16/2018 SDS Number: 1324862-00033 Date of last issue: 06/20/2018
Date of first issue: 02/27/2017

US State Regulations

Pennsylvania Right To Know

1,1,1,2-Tetrafluoroethane 811-97-2
Pentafluoroethane 354-33-6
Butane 106-97-8

California List of Hazardous Substances

Butane 106-97-8

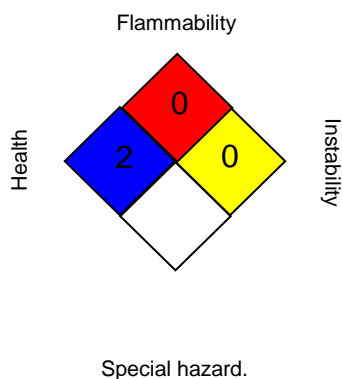
California Permissible Exposure Limits for Chemical Contaminants

Butane 106-97-8

SECTION 16. OTHER INFORMATION

Further information

NFPA 704:



HMIS® IV:

HEALTH	/	0
FLAMMABILITY		0
PHYSICAL HAZARD		3

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

Freon™ and any associated logos are trademarks or copyrights of The Chemours Company FC, LLC.

Chemours™ and the Chemours Logo are trademarks of The Chemours Company.

Before use read Chemours safety information.

For further information contact the local Chemours office or nominated distributors.

All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

Full text of other abbreviations

ACGIH : USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL : USA. NIOSH Recommended Exposure Limits
US WEEL : USA. Workplace Environmental Exposure Levels (WEEL)
ACGIH / STEL : Short-term exposure limit
NIOSH REL / TWA : Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
US WEEL / TWA : 8-hr TWA

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the

SAFETY DATA SHEET



Freon™ MO59 (R-417A) Refrigerant

Version	Revision Date:	SDS Number:	Date of last issue: 06/20/2018
6.0	10/16/2018	1324862-00033	Date of first issue: 02/27/2017

German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Sources of key data used to compile the Material Safety Data Sheet : Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, <http://echa.europa.eu/>

Revision Date : 10/16/2018

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

US / Z8

**DuPont™ ISCEON® MO59 (R-417A) Refrigerant**

Version 2.0

Revision Date 04/01/2015

Ref. 130000000132

This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : DuPont™ ISCEON® MO59 (R-417A) Refrigerant
Tradename/Synonym : Isceon® MO59
R-417A
MO59

Product Grade/Type : ASHRAE Refrigerant number designation: R-417A

Product Use : Refrigerant

Restrictions on use : For professional users only.

Manufacturer/Supplier : DuPont
1007 Market Street
Wilmington, DE 19898
United States of America

Product Information : +1-800-441-7515 (outside the U.S. +1-302-774-1000)
Medical Emergency : 1-800-441-3637 (outside the U.S. 1-302-774-1139)
Transport Emergency : CHEMTREC: +1-800-424-9300 (outside the U.S. +1-703-527-3887)

SECTION 2. HAZARDS IDENTIFICATION

Product hazard category
Gases under pressure Liquefied gas

DuPont™ ISCEON® MO59 (R-417A) Refrigerant

Version 2.0

Revision Date 04/01/2015

Ref. 130000000132

Label content

Pictogram

:



Signal word

: Warning

Hazardous warnings

: Contains gas under pressure; may explode if heated.

Hazardous prevention
measures

: Protect from sunlight. Store in a well-ventilated place.

Other hazards

Misuse or intentional inhalation abuse may lead to death without warning.

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

Rapid evaporation of the liquid may cause frostbite.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
1,1,1,2-Tetrafluoroethane (HFC-134a)	811-97-2	50 %
Pentafluoroethane (HFC-125)	354-33-6	46.6 %
n-Butane (HC-600)	106-97-8	3.4 %

**DuPont™ ISCEON® MO59 (R-417A) Refrigerant**

Version 2.0

Revision Date 04/01/2015

Ref. 130000000132

SECTION 4. FIRST AID MEASURES

- General advice : Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt seek medical advice.
- Inhalation : Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician.
- Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Take off all contaminated clothing immediately. Consult a physician. Wash contaminated clothing before re-use. Treat for frostbite if necessary by gently warming affected area.
- Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Consult a physician if necessary.
- Ingestion : Is not considered a potential route of exposure.
- Most important symptoms/effects, acute and delayed : Anaesthetic effects Light-headedness irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness
- Protection of first-aiders : If potential for exposure exists refer to Section 8 for specific personal protective equipment.
- Notes to physician : Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution.

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : No applicable data available.

**DuPont™ ISCEON® MO59 (R-417A) Refrigerant**

Version 2.0

Revision Date 04/01/2015

Ref. 13000000132

- Specific hazards** : Cylinders are equipped with pressure and temperature relief devices, but may still rupture under fire conditions. Decomposition may occur. Contact of welding or soldering torch flame with high concentrations of refrigerant can result in visible changes in the size and colour of the torch flame. This flame effect will only occur in concentrations of product well above the recommended exposure limit. Therefore stop all work and ventilate to disperse refrigerant vapors from the work area before using any open flames. This substance is not flammable in air at temperatures up to 100 deg. C (212 deg. F) at atmospheric pressure. However, mixtures of this substance with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. This substance can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing this substance and air, or this substance in an oxygen enriched atmosphere become combustible depends on the inter-relationship of 1) the temperature 2) the pressure, and 3) the proportion of oxygen in the mixture. In general, this substance should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example this substance should NOT be mixed with air under pressure for leak testing or other purposes. Experimental data have also been reported which indicate combustibility of this substance in the presence of certain concentrations of chlorine.
- Special protective equipment for firefighters** : In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment. Wear neoprene gloves during cleaning up work after a fire.
- Further information** : Cool containers/tanks with water spray. Water runoff should be contained and neutralized prior to release.

SECTION 6. ACCIDENTAL RELEASE MEASURES

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

- Safeguards (Personnel)** : Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where heavy vapours might collect.
- Environmental precautions** : Should not be released into the environment. In accordance with local and national regulations.

**DuPont™ ISCEON® MO59 (R-417A) Refrigerant**

Version 2.0

Revision Date 04/01/2015

Ref. 130000000132

- Spill Cleanup : Evaporates.
Ventilate area using forced ventilation, especially low or enclosed places where heavy vapors might collect.
- Accidental Release Measures : Avoid open flames and high temperatures. Self-contained breathing apparatus (SCBA) is required if a large release occurs.

SECTION 7. HANDLING AND STORAGE

- Handling (Personnel) : Avoid breathing vapours or mist. Avoid contact with skin, eyes and clothing. Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8.
- Handling (Physical Aspects) : Contact with chlorine or other strong oxidizing agents should also be avoided.
- Dust explosion class : Not applicable
- Storage : Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems. Never attempt to lift cylinder by its cap. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over.
Separate full containers from empty containers. Keep at temperature not exceeding 52°C. Do not store near combustible materials. Avoid area where salt or other corrosive materials are present.
The product has an indefinite shelf life when stored properly.
- Storage period : > 10 yr
- Storage temperature : < 52 °C (< 126 °F)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- Engineering controls : Normal ventilation for standard manufacturing procedures is generally adequate. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low or enclosed places. Refrigerant Concentration monitors may be necessary to determine vapor concentrations


DuPont™ ISCEON® MO59 (R-417A) Refrigerant

Version 2.0

Revision Date 04/01/2015

Ref. 130000000132

in work areas prior to use of torches or other open flames, or if employees are entering enclosed areas.

Personal protective equipment

- Respiratory protection : Under normal manufacturing conditions, no respiratory protection is required when using this product.
- Hand protection : Additional protection: Impervious gloves
- Eye protection : Wear safety glasses with side shields. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.
- Protective measures : Self-contained breathing apparatus (SCBA) is required if a large release occurs.

Exposure Guidelines
Exposure Limit Values

1,1,1,2-Tetrafluoroethane (HFC-134a)			
AEL *	(DUPONT)	1,000 ppm	8 & 12 hr. TWA
Pentafluoroethane (HFC-125)			
AEL *	(DUPONT)	1,000 ppm	8 & 12 hr. TWA
Butane (<0.1% butadiene)			
TLV	(ACGIH)	1,000 ppm	STEL

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES
Appearance

- Physical state : gaseous
 Form : Liquefied gas
 Color : colourless

**DuPont™ ISCEON® MO59 (R-417A) Refrigerant**

Version 2.0

Revision Date 04/01/2015

Ref. 130000000132

Odor	: slight, ether-like
Odor threshold	: No applicable data available.
pH	: neutral
Melting point/freezing point	: Melting point/range Not available for this mixture.
Boiling point/boiling range	: Boiling point -39.1 °C (-38.4 °F)
Flash point	: does not flash
Evaporation rate	: No applicable data available.
Flammability (solid, gas)	: Not applicable
Upper explosion limit	: Method: None per ASTM E681
Lower explosion limit	: Method: None per ASTM E681
Vapor pressure	: 9,835 hPa at 25 °C (77 °F)
Vapor density	: 3.8 at 25°C (77°F) and 1013 hPa (Air=1.0)
Specific gravity (Relative density)	: 1.15 at 25 °C (77 °F)
Water solubility	: No applicable data available.
Solubility(ies)	: No applicable data available.
Partition coefficient: n-octanol/water	: No applicable data available.
Auto-ignition temperature	: No applicable data available.
Decomposition temperature	: No applicable data available.
Viscosity, kinematic	: No applicable data available.
Viscosity	: No applicable data available.


DuPont™ ISCEON® MO59 (R-417A) Refrigerant

Version 2.0

Revision Date 04/01/2015

Ref. 130000000132

% Volatile : 100 %

SECTION 10. STABILITY AND REACTIVITY

Reactivity	: No applicable data available.
Chemical stability	: Stable under recommended storage conditions.
Possibility of hazardous reactions	: Polymerization will not occur.
Conditions to avoid	: Avoid open flames and high temperatures.
Incompatible materials	: Alkali metals Alkaline earth metals, Powdered metals, Powdered metal salts
Hazardous decomposition products	: Decomposition products are hazardous., This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid and possibly carbonyl fluoride., These materials are toxic and irritating., Avoid contact with decomposition products

SECTION 11. TOXICOLOGICAL INFORMATION
1,1,1,2-Tetrafluoroethane (HFC-134a)

Inhalation 4 h LC50	: > 567000 ppm , Rat
Inhalation No Observed Adverse Effect Concentration	: 40000 ppm , Dog Cardiac sensitization
Inhalation Low Observed Adverse Effect Concentration (LOAEC)	: 80000 ppm , Dog Cardiac sensitization
Skin irritation	: No skin irritation, Rabbit
Eye irritation	: No eye irritation, Rabbit
Skin sensitization	: Does not cause skin sensitisation., Guinea pig Does not cause respiratory sensitisation., Rat
Repeated dose toxicity	: Inhalation Rat - gas NOAEL: 50000,


DuPont™ ISCEON® MO59 (R-417A) Refrigerant

Version 2.0

Revision Date 04/01/2015

Ref. 130000000132

No toxicologically significant effects were found.

- Carcinogenicity** : Not classifiable as a human carcinogen.
Overall weight of evidence indicates that the substance is not carcinogenic.
- Mutagenicity** : Animal testing did not show any mutagenic effects.
Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
- Reproductive toxicity** : No toxicity to reproduction
No effects on or via lactation
Animal testing showed no reproductive toxicity.
- Teratogenicity** : Animal testing showed no developmental toxicity.
- Further information** : Cardiac sensitisation threshold limit : 334000 mg/m3

Pentafluoroethane (HFC-125)

- Inhalation 4 h LC50** : > 800000 ppm , Rat
- Inhalation No Observed Adverse Effect Concentration** : 100000 ppm , Dog
Cardiac sensitization
- Inhalation Low Observed Adverse Effect Concentration (LOAEC)** : 75000 ppm , Dog
Cardiac sensitization
- Skin sensitization** : Does not cause respiratory sensitisation., human
- Repeated dose toxicity** : Inhalation
Rat
-
gas
NOAEL: > 50000,
No toxicologically significant effects were found.
- Carcinogenicity** : Not classifiable as a human carcinogen.
Overall weight of evidence indicates that the substance is not carcinogenic.
- Mutagenicity** : Animal testing did not show any mutagenic effects.
Evidence suggests this substance does not cause genetic damage in cultured mammalian cells.
Did not cause genetic damage in cultured bacterial cells.

**DuPont™ ISCEON® MO59 (R-417A) Refrigerant**

Version 2.0

Revision Date 04/01/2015

Ref. 130000000132

Reproductive toxicity : No toxicity to reproduction
Animal testing showed no reproductive toxicity.

Teratogenicity : Animal testing showed no developmental toxicity.

Further information : Cardiac sensitisation threshold limit : 490000 mg/m3

n-Butane (HC-600)

Inhalation 4 h LC50 : 277018 ppm , Rat
Target Organs: Respiratory Tract, Central nervous system
Irritating to respiratory system.
Central nervous system depression
narcosis

Dermal : Not applicable

Oral : Not applicable

Skin irritation : No skin irritation, Not tested on animals
Not expected to cause skin irritation based on expert review of the
properties of the substance.

Eye irritation : No eye irritation, Not tested on animals
Not expected to cause eye irritation based on expert review of the
properties of the substance.

Skin sensitization : Not tested on animals
There are no reports of human skin sensitization. Not expected to
cause sensitization based on expert review of the properties of the
substance.

Repeated dose toxicity : Inhalation
multiple species
-
No toxicologically significant effects were found.

Mutagenicity : Animal testing did not show any mutagenic effects.

Carcinogenicity

The carcinogenicity classifications for this product and/or its ingredients have been determined according to HazCom 2012, Appendix A.6. The classifications may differ from those listed in the National Toxicology


DuPont™ ISCEON® MO59 (R-417A) Refrigerant

Version 2.0

Revision Date 04/01/2015

Ref. 130000000132

Program (NTP) Report on Carcinogens (latest edition) or those found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest edition).

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA, as a carcinogen.

SECTION 12. ECOLOGICAL INFORMATION
Aquatic Toxicity
1,1,1,2-Tetrafluoroethane (HFC-134a)

- | | | |
|------------|---|---|
| 96 h LC50 | : | Oncorhynchus mykiss (rainbow trout) 450 mg/l |
| 96 h ErC50 | : | Algae 142 mg/l
Information given is based on data obtained from similar substances. |
| 72 h NOEC | : | Pseudokirchneriella subcapitata (green algae) 13.2 mg/l
Information given is based on data obtained from similar substances. |
| 48 h EC50 | : | Daphnia magna (Water flea) 980 mg/l |

Pentafluoroethane (HFC-125)

- | | | |
|------------|---|---|
| 96 h LC50 | : | Oncorhynchus mykiss (rainbow trout) 450 mg/l
Information given is based on data obtained from similar substances. |
| 96 h ErC50 | : | Algae 142 mg/l
Information given is based on data obtained from similar substances. |
| 72 h NOEC | : | Pseudokirchneriella subcapitata (green algae) 13.2 mg/l
Information given is based on data obtained from similar substances. |
| 48 h EC50 | : | Daphnia magna (Water flea) 980 mg/l
Information given is based on data obtained from similar substances. |

n-Butane (HC-600)

- | | | |
|-----------|---|---|
| 96 h LC50 | : | Fish (unspecified species) > 1,000 mg/l |
|-----------|---|---|

Environmental Fate
n-Butane (HC-600)

- | | | |
|------------------|---|--------------------------------|
| Biodegradability | : | 100 %
Readily biodegradable |
|------------------|---|--------------------------------|


DuPont™ ISCEON® MO59 (R-417A) Refrigerant

Version 2.0

Revision Date 04/01/2015

Ref. 130000000132

SECTION 13. DISPOSAL CONSIDERATIONS

Waste disposal methods - Product : Can be used after re-conditioning. Recover by distillation or remove to a permitted waste disposal facility. Comply with applicable Federal, State/Provincial and Local Regulations.

Contaminated packaging : Empty pressure vessels should be returned to the supplier.

SECTION 14. TRANSPORT INFORMATION

DOT	UN number	: 1078
	Proper shipping name	: Refrigerant gases, n.o.s. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
	Class	: 2.2
	Labelling No.	: 2.2
IATA_C	UN number	: 1078
	Proper shipping name	: Refrigerant gas, n.o.s. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
	Class	: 2.2
	Labelling No.	: 2.2
IMDG	UN number	: 1078
	Proper shipping name	: REFRIGERANT GAS, N.O.S. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
	Class	: 2.2
	Labelling No.	: 2.2

SECTION 15. REGULATORY INFORMATION

SARA 313 Regulated Chemical(s) : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

PA Right to Know : Substances on the Pennsylvania Hazardous Substances List present at a

**DuPont™ ISCEON® MO59 (R-417A) Refrigerant**

Version 2.0

Revision Date 04/01/2015

Ref. 130000000132

Regulated Chemical(s)	concentration of 1% or more (0.01% for Special Hazardous Substances): Butane (<0.1% butadiene)
NJ Right to Know Regulated Chemical(s)	: Substances on the New Jersey Workplace Hazardous Substance List present at a concentration of 1% or more (0.1% for substances identified as carcinogens, mutagens or teratogens): Butane (<0.1% butadiene)
California Prop. 65	: Chemicals known to the State of California to cause cancer, birth defects or any other harm: none known

SECTION 16. OTHER INFORMATION

ISCEON is a registered trademark of E. I. du Pont de Nemours and Company

® DuPont's registered trademark

Before use read DuPont's safety information.

For further information contact the local DuPont office or DuPont's nominated distributors.

Revision Date : 04/01/2015

The information provided in this 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.

Significant change from previous version is denoted with a double bar.

**DuPont™ ISCEON® MO59 refrigerant**

Version 2.0

Revision Date 01/28/2011

Ref. 130000000132

This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	DuPont™ ISCEON® MO59 refrigerant
Product Grade/Type	:	ASHRAE Refrigerant number designation: R-417A
Tradename/Synonym	:	Isceon® MO59 R-417A MO59
MSDS Number	:	130000000132
Product Use	:	Refrigerant
Manufacturer	:	DuPont 1007 Market Street Wilmington, DE 19898
Product Information	:	1-800-441-7515 (outside the U.S. 1-302-774-1000)
Medical Emergency	:	1-800-441-3637 (outside the U.S. 1-302-774-1139)
Transport Emergency	:	CHEMTREC: 1-800-424-9300 (outside the U.S. 1-703-527-3887)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Misuse or intentional inhalation abuse may lead to death without warning.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Rapid evaporation of the liquid may cause frostbite.

Potential Health Effects

Skin : Contact with liquid or refrigerated gas can cause cold burns and frostbite.
May cause skin irritation.
May cause: Discomfort, itching, redness, or swelling.


DuPont™ ISCEON® MO59 refrigerant

Version 2.0

Revision Date 01/28/2011

Ref. 130000000132

Eyes : Contact with liquid or refrigerated gas can cause cold burns and frostbite.
May cause eye irritation.
May cause: tearing, Redness, Discomfort.

Inhalation : Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects.
Other symptoms potentially related to misuse or inhalation abuse are: Anaesthetic effects, Light-headedness, dizziness, confusion, incoordination, drowsiness, or unconsciousness, irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Irritating to respiratory system. May cause:, Cough, sneezing, runny nose, sore throat, or shortness of breath..
Vapours may cause drowsiness and dizziness. May cause:, narcosis, Central nervous system depression.

Repeated exposure
Butane : Adverse effects from repeated inhalation may include: Altered respiratory rate

Carcinogenicity
None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA, as a carcinogen.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
1,1,1,2-Tetrafluoroethane (HFC-134a)	811-97-2	51 %
Pentafluoroethane (HFC-125)	354-33-6	46.7 %
Butane	106-97-8	3.4 %

**DuPont™ ISCEON® MO59 refrigerant**

Version 2.0

Revision Date 01/28/2011

Ref. 13000000132

SECTION 4. FIRST AID MEASURES

- Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Take off all contaminated clothing immediately. Consult a physician. Wash contaminated clothing before re-use. Treat for frostbite if necessary by gently warming affected area.
- Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Consult a physician if necessary.
- Inhalation : Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician.
- Ingestion : Is not considered a potential route of exposure.
- General advice : Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt seek medical advice.
- Notes to physician : Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution.

SECTION 5. FIRE-FIGHTING MEASURES

- Flammable Properties
- Flash point : does not flash
- Lower explosion limit : Method : None per ASTM E681
- Upper explosion limit : Method : None per ASTM E681
- Fire and Explosion Hazard : Cylinders are equipped with pressure and temperature relief devices, but may still rupture under fire conditions. Decomposition may occur. Contact of welding or soldering torch flame with high concentrations of refrigerant can result in visible changes in the size and colour of the torch flame. This flame effect will only occur in concentrations of product well above the recommended exposure limit. Therefore stop all work and ventilate to disperse refrigerant vapors from the work area before using any open flames.

**DuPont™ ISCEON® MO59 refrigerant**

Version 2.0

Revision Date 01/28/2011

Ref. 13000000132

This substance is not flammable in air at temperatures up to 100 deg. C (212 deg. F) at atmospheric pressure. However, mixtures of this substance with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. This substance can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing this substance and air, or this substance in an oxygen enriched atmosphere become combustible depends on the inter-relationship of 1) the temperature 2) the pressure, and 3) the proportion of oxygen in the mixture. In general, this substance should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example this substance should NOT be mixed with air under pressure for leak testing or other purposes. Experimental data have also been reported which indicate combustibility of this substance in the presence of certain concentrations of chlorine.

Firefighting Instructions : In the event of fire, wear self-contained breathing apparatus. Wear neoprene gloves during cleaning up work after a fire. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Cool containers / tanks with water spray.

SECTION 6. ACCIDENTAL RELEASE MEASURES

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Safeguards (Personnel) : Evacuate personnel to safe areas.

Spill Cleanup : Ventilate area using forced ventilation, especially low or enclosed places where heavy vapors might collect. Recover free liquid for reuse or reclamation.

Accidental Release Measures : Prevent material from entering sewers, waterways, or low areas. Avoid open flames and high temperatures. Self-contained breathing apparatus (SCBA) is required if a large release occurs.

SECTION 7. HANDLING AND STORAGE


DuPont™ ISCEON® MO59 refrigerant

Version 2.0

Revision Date 01/28/2011

Ref. 13000000132

- Handling (Personnel) : Avoid breathing vapours or mist. Avoid contact with skin, eyes and clothing. Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8.
Handle in accordance with good industrial hygiene and safety practice.
- Storage : Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point.
Do not drag, slide or roll cylinders. Never attempt to lift cylinder by its cap. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over.
Separate full containers from empty containers. Keep at temperature not exceeding 52°C. Do not store near combustible materials. Keep container tightly closed in a dry and well-ventilated place. Store in original container. Protect from contamination.
- Storage temperature : < 52 °C (< 126 °F)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- Engineering controls : Ensure adequate ventilation, especially in confined areas. Local exhaust should be used when large amounts are released.
- Personal protective equipment
Respiratory protection : For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
- Hand protection : Additional protection: Impervious gloves
- Eye protection : Wear safety glasses or coverall chemical splash goggles. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.
- Protective measures : Self-contained breathing apparatus (SCBA) is required if a large release occurs.

Exposure Guidelines
Exposure Limit Values

1,1,1,2-Tetrafluoroethane

AEL *

(DUPONT) 1,000 ppm 8 & 12 hr. TWA


DuPont™ ISCEON® MO59 refrigerant

Version 2.0

Revision Date 01/28/2011

Ref. 130000000132

Pentafluoroethane AEL *	(DUPONT)	1,000 ppm	8 & 12 hr. TWA
Butane PEL:	(OSHA)	800 ppm1,900 mg/m3	8 hr. TWA
TLV	(ACGIH)	1,000 ppm	TWA

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Form	: Liquefied gas
Color	: colourless
Odor	: slight, ether-like
pH	: neutral
Boiling point	: -39 °C (-38 °F) at 1,013 hPa
% Volatile	: 100 %
Vapour Pressure	: 9,720 hPa at 25 °C (77 °F)
Density	: at 25 °C (77 °F) (as liquid)
Specific Gravity	: 1.15 at 25 °C (77 °F)
Water solubility	: 1.2 g/l at 25 °C (77 °F)
Vapour density	: 3.8 at 25°C (77°F) and 1,013 hPa (Air=1.0)

SECTION 10. STABILITY AND REACTIVITY

Stability	: Stable under recommended storage conditions.
Conditions to avoid	: The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air or oxygen, the mixture may become flammable. Certain mixtures of HCFCs or HFCs with chlorine may become flammable or reactive under certain conditions.
Incompatibility	: Alkali metals Alkaline earth metals, Powdered metals, Powdered metal salts


DuPont™ ISCEON® MO59 refrigerant

Version 2.0

Revision Date 01/28/2011

Ref. 130000000132

Hazardous decomposition products : Hazardous thermal decomposition products:: Carbon oxides, Hydrogen fluoride, Carbonyl fluoride

SECTION 11. TOXICOLOGICAL INFORMATION
1,1,1,2-Tetrafluoroethane (HFC-134a)

- Dermal : not applicable
- Oral : not applicable
- Inhalation 4 h LC50 : 567000 ppm , rat
- Inhalation : dog
Cardiac sensitization
- Skin irritation : slight irritation, rabbit
Not expected to cause skin irritation based on expert review of the properties of the substance.

No skin irritation, human
- Eye irritation : slight irritation, rabbit
Not expected to cause eye irritation based on expert review of the properties of the substance.

No eye irritation, human
- Skin sensitization : Did not cause sensitization on laboratory animals., guinea pig
Not expected to cause sensitization based on expert review of the properties of the substance.

Did not cause sensitization on laboratory animals. There are no reports of human respiratory sensitization.
- Repeated dose toxicity : Inhalation
rat
No toxicologically significant effects were found.
- Carcinogenicity : Overall weight of evidence indicates that the substance is not carcinogenic.
An increased incidence of benign tumours was observed in laboratory animals.

**DuPont™ ISCEON® MO59 refrigerant**

Version 2.0

Revision Date 01/28/2011

Ref. 13000000132

Mutagenicity	:	Did not cause genetic damage in animals. Did not cause genetic damage in cultured mammalian cells. Did not cause genetic damage in cultured bacterial cells.
Reproductive toxicity	:	Animal testing showed no reproductive toxicity.
Teratogenicity	:	Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity.
Further information	:	Cardiac sensitisation threshold limit : 312975 mg/m3
Pentafluoroethane (HFC-125)		
Dermal	:	not applicable
Oral	:	not applicable
Inhalation 4 h LC50	:	> 800000 ppm , rat
Inhalation	:	dog Cardiac sensitization
Skin irritation	:	No skin irritation, Not tested on animals Not expected to cause skin irritation based on expert review of the properties of the substance.
Eye irritation	:	No eye irritation, Not tested on animals Not expected to cause eye irritation based on expert review of the properties of the substance.
Skin sensitization	:	Does not cause skin sensitization., Not tested on animals Not expected to cause sensitization based on expert review of the properties of the substance. There are no reports of human respiratory sensitization.
Repeated dose toxicity	:	Inhalation rat No toxicologically significant effects were found.
Carcinogenicity	:	Overall weight of evidence indicates that the substance is not carcinogenic.


DuPont™ ISCEON® MO59 refrigerant

Version 2.0

Revision Date 01/28/2011

Ref. 130000000132

- Mutagenicity : Did not cause genetic damage in animals.
Did not cause genetic damage in cultured mammalian cells.
Did not cause genetic damage in cultured bacterial cells.
- Reproductive toxicity : Animal testing showed no reproductive toxicity.
Information given is based on data obtained from similar substances.
- Teratogenicity : Animal testing showed no developmental toxicity.
- Further information : Cardiac sensitisation threshold limit : 490000 mg/m3

Butane

- Dermal : not applicable
- Oral : not applicable
- Inhalation 4 h LC50 : 277018 ppm , rat
Irritating to respiratory system.
narcosis
- Skin irritation : No skin irritation, Not tested on animals
Not expected to cause skin irritation based on expert review of the properties of the substance.
- Eye irritation : No eye irritation, Not tested on animals
Not expected to cause eye irritation based on expert review of the properties of the substance.
- Skin sensitization : Not tested on animals
There are no reports of human skin sensitization. Not expected to cause sensitization based on expert review of the properties of the substance.
- Repeated dose toxicity : Inhalation
multiple species
Reduced respiratory rate, No toxicologically significant effects were found.
- Mutagenicity : Did not cause genetic damage in animals.
Did not cause genetic damage in cultured bacterial cells.


DuPont™ ISCEON® MO59 refrigerant

Version 2.0

Revision Date 01/28/2011

Ref. 130000000132

SECTION 12. ECOLOGICAL INFORMATION
Aquatic Toxicity
1,1,1,2-Tetrafluoroethane (HFC-134a)

- 96 h LC50 : Oncorhynchus mykiss (rainbow trout) 450 mg/l
- 72 h EC50 : Algae > 118 mg/l
Information given is based on data obtained from similar substances.
- 48 h EC50 : Daphnia magna (Water flea) 980 mg/l

Pentafluoroethane (HFC-125)

- 96 h LC50 : Oncorhynchus mykiss (rainbow trout) > 81.8 mg/l
Information given is based on data obtained from similar substances.
- 96 h LC50 : Danio rerio (zebra fish) > 200 mg/l
Information given is based on data obtained from similar substances.
- 96 h LC50 : Oncorhynchus mykiss (rainbow trout) 450 mg/l
Information given is based on data obtained from similar substances.
- 72 h EC50 : Pseudokirchneriella subcapitata (green algae) > 118 mg/l
Information given is based on data obtained from similar substances.
- 72 h EC50 : Pseudokirchneriella subcapitata (green algae) > 114 mg/l
Information given is based on data obtained from similar substances.
- 96 h EC50 : Algae 142 mg/l
Information given is based on data obtained from similar substances.
- 48 h EC50 : Daphnia magna (Water flea) > 200 mg/l
Information given is based on data obtained from similar substances.
- 48 h EC50 : Daphnia magna (Water flea) > 97.9 mg/l
Information given is based on data obtained from similar substances.

Butane

- 96 h LC50 : Fish (unspecified species) > 1,000 mg/l

**DuPont™ ISCEON® MO59 refrigerant**

Version 2.0

Revision Date 01/28/2011

Ref. 130000000132

SECTION 13. DISPOSAL CONSIDERATIONS

- Waste Disposal : Can be used after re-conditioning. Recover by distillation or remove to a permitted waste disposal facility. Comply with applicable Federal, State/Provincial and Local Regulations.
- Environmental Hazards : Empty pressure vessels should be returned to the supplier.

SECTION 14. TRANSPORT INFORMATION

- DOT UN number : 1078
- Proper shipping name : Refrigerant gas, n.o.s. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
- Class : 2.2
- Labelling No. : 2.2
- Reportable Quantity : 100 lbs Butane
- IATA_C UN number : 1078
- Proper shipping name : Refrigerant gas, n.o.s. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
- Class : 2.2
- Labelling No. : 2.2
- IMDG UN number : 1078
- Proper shipping name : Refrigerant gas, n.o.s. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
- Class : 2.2
- Labelling No. : 2.2

SECTION 15. REGULATORY INFORMATION

- SARA 313 Regulated Chemical(s) : SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels



DuPont™ ISCEON® MO59 refrigerant

Version 2.0

Revision Date 01/28/2011

Ref. 130000000132

established by SARA Title III, Section 313.

CERCLA Reportable Quantity : 2,886 lbs
Based on the percentage composition of this chemical in the product.:
Butane

California Prop. 65 : Chemicals known to the State of California to cause cancer, birth defects or any other harm: none known

PA Right to Know Regulated Chemical(s) : Substances on the Pennsylvania Hazardous Substances List present at a concentration of 1% or more (0.01% for Special Hazardous Substances): Butane

NJ Right to Know Regulated Chemical(s) : Substances on the New Jersey Workplace Hazardous Substance List present at a concentration of 1% or more (0.1% for substances identified as carcinogens, mutagens or teratogens): Butane

SECTION 16. OTHER INFORMATION

HMIS

Health	:	1
Flammability	:	0
Reactivity/Physical hazard	:	1
PPE	:	Personal Protection rating to be supplied by user depending on use conditions.

ISCEON is a registered trademark of E. I. du Pont de Nemours and Company
Before use read DuPont's safety information.
For further information contact the local DuPont office or DuPont's nominated distributors.
® DuPont's registered trademark

The information provided in this 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.

Significant change from previous version is denoted with a double bar.



DuPont™ ISCEON® MO59 refrigerant

Version 2.0

Revision Date 01/28/2011

Ref. 130000000132