



## DuPont™ ISCEON® MO79 (R-422A) Refrigerant

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

This Safety Data Sheet adheres to the standards and regulatory requirements of Great Britain and may not meet the regulatory requirements in other countries.

### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1. Product identifier

Product name : DuPont™ ISCEON® MO79 (R-422A) Refrigerant

Types : ASHRAE Refrigerant number designation: R-422A

Synonyms : ISCEON® MO79  
R-422A  
MO79

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

Use of the Substance/Mixture : Refrigerant, For professional users only.

#### 1.3. Details of the supplier of the safety data sheet

Company : Du Pont de Nemours (Nederland) B.V.  
Baanhoekweg 22  
NL-3313 LA Dordrecht  
Netherlands

Telephone : +31-(0)-78-630-1011

E-mail address : sds-support@che.dupont.com

#### 1.4. Emergency telephone number

Emergency telephone number : +(44)-870-8200418

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

Gases under pressure, H280: Contains gas under pressure; may explode if heated.  
Liquefied gas

Not a hazardous substance or mixture according to EC-directives 67/548/EEC or 1999/45/EC.

#### 2.2. Label elements



**DuPont™ ISCEON® MO79 (R-422A) Refrigerant**

Version 3.1 (replaces: Version 3.0)  
Revision Date 16.05.2015

Ref. 130000027388



**Warning**

- H280 Contains gas under pressure; may explode if heated.
- Special labelling of certain substances and mixtures Kyoto: Contains fluorinated greenhouse gas covered by the Kyoto Protocol.,HFC-134a,HFC-125,
- P410 + P403 Protect from sunlight. Store in a well-ventilated place.

Not a hazardous substance or mixture according to EC-directives 67/548/EEC or 1999/45/EC.

**2.3. Other hazards**

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

**SECTION 3: Composition/information on ingredients**

**3.1. Substances**

Not applicable

**3.2. Mixtures**

Registration number	Classification according to Directive 67/548/EEC	Classification according to Regulation (EU) 1272/2008 (CLP)	Concentration (% w/w)
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**1,1,1,2-Tetrafluoroethane (CAS-No.811-97-2) (EC-No.212-377-0)**

01-2119459374-33		Press. Gas Liquefied gas; H280	11.5 %
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**Pentafluoroethane (CAS-No.354-33-6) (EC-No.206-557-8)**

01-2119485636-25		Press. Gas Liquefied gas; H280	85.1 %
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**Isobutane (<0.1% butadiene) (CAS-No.75-28-5) (EC-No.200-857-2)**

	F+;R12	Flam. Gas 1; H220	3.4 %
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**DuPont™ ISCEON® MO79 (R-422A) Refrigerant**

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

	R67	Press. Gas STOT SE 3; H336	
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The above products are compliant to REACH registration obligations; Registration number(s) may not be provided because substance(s) are exempted, not yet registered under REACH or are registered under another regulatory process (biocide uses, plant protection products), etc.

For the full text of the R-phrases mentioned in this Section, see Section 16.  
For the full text of the H-Statements mentioned in this Section, see Section 16.

**SECTION 4: First aid measures**

**4.1. Description of first aid measures**

- General advice : If unconscious place in recovery position and seek medical advice. Never give anything by mouth to an unconscious person. If breathing is irregular or stopped, administer artificial respiration.
- : First aider needs to protect himself.
- : If symptoms persist, call a physician.
- 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 : Take off contaminated clothing and shoes immediately. Flush area with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.
- Eye contact : Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Get medical attention.
- Ingestion : Is not considered a potential route of exposure.

**4.2. Most important symptoms and effects, both acute and delayed**

- Symptoms : 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, Drowsiness, narcosis
- : Skin contact may provoke the following symptoms:, Frostbite, Irritation, Discomfort, Itching, Redness, Swelling of tissue
- : Eye contact may provoke the following symptoms:, Frostbite, Irritation, Tearing, redness, or discomfort.

**4.3. Indication of any immediate medical attention and special treatment needed**



**DuPont™ ISCEON® MO79 (R-422A) Refrigerant**

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

Treatment : Do not give adrenaline or similar drugs.

**SECTION 5: Firefighting measures**

**5.1. Extinguishing media**

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**5.2. Special hazards arising from the substance or mixture**

Specific hazards during firefighting : Pressure build-up. Fire or intense heat may cause violent rupture of packages.

: Hazardous thermal decomposition products:

: Carbon oxides

: Hydrogen fluoride

: Fluorinated compounds

: Exposure to decomposition products may be a hazard to health.

**5.3. Advice for firefighters**

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.

**SECTION 6: Accidental release measures**

**6.1. Personal precautions, protective equipment and emergency procedures**

Personal precautions : Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where heavy vapours might collect. Refer to protective measures listed in sections 7 and 8.

**6.2. Environmental precautions**

Environmental precautions : Should not be released into the environment.

In accordance with local and national regulations.

**6.3. Methods and materials for containment and cleaning up**

Methods for cleaning up : Evaporates.

**6.4. Reference to other sections**

For disposal instructions see section 13.



**DuPont™ ISCEON® MO79 (R-422A) Refrigerant**

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

**SECTION 7: Handling and storage**

**7.1. Precautions for safe handling**

Advice on safe handling : 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.

Vapours are heavier than air and may spread along floors.

Advice on protection against fire and explosion : 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.

**7.2. Conditions for safe storage, including any incompatibilities**

Requirements for storage areas and containers : 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. Keep at temperature not exceeding 52°C. Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from contamination. Protect cylinders from damage. Keep away from direct sunlight. Store only in approved containers.

Advice on common storage : No materials to be especially mentioned.

For further information see Section 10 of the safety data sheet.

Storage period : > 10 yr

Storage temperature : < 52 °C

**7.3. Specific end use(s)**

no data available

**SECTION 8: Exposure controls/personal protection**

**8.1. Control parameters**

If sub-section is empty then no values are applicable.

**Components with workplace control parameters**

Type Form of exposure	Control parameters	Update	Regulatory basis	Remarks
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**1,1,1,2-Tetrafluoroethane (CAS-No. 811-97-2)**

Time Weighted Average (TWA):	4,240 mg/m3 1,000 ppm	2007	UK. EH40 Workplace Exposure Limits (WELs)	
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**Derived No Effect Level (DNEL)**



**DuPont™ ISCEON® MO79 (R-422A) Refrigerant**

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

- 1,1,1,2-Tetrafluoroethane : Type of Application (Use): Workers  
Exposure routes: Inhalation  
Health Effect: Chronic effects, Systemic toxicity  
Value: 13936 mg/m<sup>3</sup>  
  
: Type of Application (Use): Consumers  
Exposure routes: Inhalation  
Health Effect: Chronic effects, Systemic toxicity  
Value: 2476 mg/m<sup>3</sup>
- Pentafluoroethane : Type of Application (Use): Workers  
Exposure routes: Inhalation  
Health Effect: Chronic effects, Systemic toxicity  
Value: 16444 mg/m<sup>3</sup>  
  
: Type of Application (Use): Consumers  
Exposure routes: Inhalation  
Health Effect: Chronic effects, Systemic toxicity  
Value: 1753 mg/m<sup>3</sup>

**Predicted No Effect Concentration (PNEC)**

- 1,1,1,2-Tetrafluoroethane : Value: 0.1 mg/l  
Compartment: Fresh water  
  
: Value: 0.01 mg/l  
Compartment: Marine water  
  
: Value: 1 mg/l  
Compartment: Water  
Remarks: Intermittent use/release  
  
: Value: 0.75 mg/kg dry weight (d.w.)  
Compartment: Fresh water sediment  
  
: Value: 73 mg/l  
Compartment: Water  
Remarks: Sewage treatment plants
- Pentafluoroethane : Value: 0.1 mg/l  
Compartment: Fresh water  
  
: Value: 1 mg/l  
Compartment: Water  
Remarks: Intermittent use/release  
  
: Value: 0.6 mg/kg  
Compartment: Fresh water sediment

**8.2. Exposure controls**

Engineering measures : Ensure adequate ventilation, especially in confined areas.



**DuPont™ ISCEON® MO79 (R-422A) Refrigerant**

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

Local exhaust should be used when large amounts are released.

Eye protection : Wear safety glasses or coverall chemical splash goggles. Eye protection complying with EN 166. or ANSI Z87.1 Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.

Hand protection : Material: Leather gloves  
The suitability for a specific workplace should be discussed with the producers of the protective gloves.

: Material: Low temperature resistant gloves

:  
Protective gloves complying with EN 374. or US OSHA guidelines

:  
The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.

Skin and body protection : Wear suitable protective equipment. Wear as appropriate: impervious clothing

Protective measures : Self-contained breathing apparatus (SCBA) is required if a large release occurs.

The type of protective equipment must be selected according to the concentration and amount of the substance at the specific workplace.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.

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.

Respiratory protection complying with EN 137.

**SECTION 9: Physical and chemical properties**

**9.1. Information on basic physical and chemical properties**

Form : Liquefied gas

Colour : colourless

Odour : slight, ether-like

pH : neutral

Melting point/range : Not available for this mixture.



**DuPont™ ISCEON® MO79 (R-422A) Refrigerant**

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

Boiling point/boiling range	: -46.2 - -41.5 °C at 1,013 hPa
Flash point	: Not applicable
Flammability (solid, gas)	: Not applicable
Lower explosion limit/ lower flammability limit	: Method: ASTM E681, None.
Upper explosion limit/ upper flammability limit	: Method: ASTM E681, None.
Vapour pressure	: 12,757 hPa at 25 °C
Relative density	: 1.14 at 25 °C (1,013 hPa)
Water solubility	: slightly soluble

**9.2. Other information**

no data available

**SECTION 10: Stability and reactivity**

<b>10.1. Reactivity</b>	: Decomposes on heating.
<b>10.2. Chemical stability</b>	: The product is chemically stable.
<b>10.3. Possibility of hazardous reactions</b>	: Polymerization will not occur. Stable under recommended storage conditions.
<b>10.4. Conditions to avoid</b>	: Avoid open flames and high temperatures. 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. Pressurized container: Do not pierce or burn, even after use. Keep at temperature not exceeding 52°C.
<b>10.5. Incompatible materials</b>	: Alkali metals Alkaline earth metals Powdered metals Powdered metal salts
<b>10.6. Hazardous decomposition products</b>	: Hazardous thermal decomposition products may include: Hydrogen fluoride Carbon oxides Fluorocarbons Carbonyl fluoride

**SECTION 11: Toxicological information**

**11.1. Information on toxicological effects**





**DuPont™ ISCEON® MO79 (R-422A) Refrigerant**

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

Acute oral toxicity

- Isobutane (<0.1% butadiene)  
Not applicable

Acute inhalation toxicity

- 1,1,1,2-Tetrafluoroethane  
LC50 / 4 h Rat :> 567000 ppm

No Observed Adverse Effect Concentration / Dog :40000 ppm  
Cardiac sensitization

Low Observed Adverse Effect Concentration (LOAEC) / Dog :80000 ppm  
Cardiac sensitization

- Pentafluoroethane  
LC50 / 4 h Rat :> 800000 ppm  
Method: OECD Test Guideline 403

No Observed Adverse Effect Concentration / Dog :75000 ppm  
Cardiac sensitization

Low Observed Adverse Effect Concentration (LOAEC) / Dog :100000 ppm  
Cardiac sensitization

- Isobutane (<0.1% butadiene)  
LC50 / 4 h Rat :276808 ppm  
The toxicological data has been taken from products of similar composition.

LC50 / 4 h Rat : > 31 mg/l

Low Observed Adverse Effect Concentration (LOAEC) / Dog :50000 ppm  
Cardiac sensitization

No Observed Adverse Effect Concentration / Dog :25000 ppm  
Cardiac sensitization

Acute dermal toxicity

- Isobutane (<0.1% butadiene)  
Not applicable

Skin irritation

- 1,1,1,2-Tetrafluoroethane  
Rabbit  
Classification: Not classified as irritant  
Result: No skin irritation

- Isobutane (<0.1% butadiene)  
Not tested on animals



**DuPont™ ISCEON® MO79 (R-422A) Refrigerant**

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

Classification: Not classified as irritant

Result: No skin irritation

Not expected to cause skin irritation based on expert review of the properties of the substance.

Eye irritation

- 1,1,1,2-Tetrafluoroethane

Rabbit

Classification: Not classified as irritant

Result: No eye irritation

- Isobutane (<0.1% butadiene)

Not tested on animals

Classification: Not classified as irritant

Result: No eye irritation

Not expected to cause eye irritation based on expert review of the properties of the substance.

Sensitisation

- 1,1,1,2-Tetrafluoroethane

Guinea pig

Classification: Does not cause skin sensitisation.

Result: Does not cause skin sensitisation.

Rat

Classification: Does not cause respiratory sensitisation.

Result: Does not cause respiratory sensitisation.

- Pentafluoroethane

human

Classification: Does not cause respiratory sensitisation.

Result: Does not cause respiratory sensitisation.

- Isobutane (<0.1% butadiene)

Not tested on animals

Classification: Not a skin sensitizer.

Not expected to cause sensitization based on expert review of the properties of the substance.

Repeated dose toxicity

- 1,1,1,2-Tetrafluoroethane

Inhalation Rat

No toxicologically significant effects were found.

- Pentafluoroethane

Inhalation Rat

No toxicologically significant effects were found.

- Isobutane (<0.1% butadiene)

Inhalation Rat

No toxicologically significant effects were found.

Mutagenicity assessment



**DuPont™ ISCEON® MO79 (R-422A) Refrigerant**

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

- 1,1,1,2-Tetrafluoroethane  
Animal testing did not show any mutagenic effects. Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
- Pentafluoroethane  
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.
- Isobutane (<0.1% butadiene)  
Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Animal testing did not show any mutagenic effects.

Carcinogenicity assessment

- 1,1,1,2-Tetrafluoroethane  
Not classifiable as a human carcinogen. Overall weight of evidence indicates that the substance is not carcinogenic.
- Pentafluoroethane  
Not classifiable as a human carcinogen. Overall weight of evidence indicates that the substance is not carcinogenic.

Toxicity to reproduction assessment

- 1,1,1,2-Tetrafluoroethane  
No toxicity to reproduction No effects on or via lactation Animal testing showed no reproductive toxicity.
- Pentafluoroethane  
No toxicity to reproduction Animal testing showed no reproductive toxicity.
- Isobutane (<0.1% butadiene)  
No toxicity to reproduction Animal testing showed no reproductive toxicity.

Assessment teratogenicity

- 1,1,1,2-Tetrafluoroethane  
Animal testing showed no developmental toxicity.
- Pentafluoroethane  
Animal testing showed no developmental toxicity.
- Isobutane (<0.1% butadiene)  
Animal testing showed no developmental toxicity.

Further information

Avoid skin contact with leaking liquid (danger of frostbite).

**SECTION 12: Ecological information**

**12.1. Toxicity**



## DuPont™ ISCEON® MO79 (R-422A) Refrigerant

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

### Toxicity to fish

- 1,1,1,2-Tetrafluoroethane  
LC50 / 96 h / Oncorhynchus mykiss (rainbow trout): 450 mg/l
- Pentafluoroethane  
LC50 / 96 h / Oncorhynchus mykiss (rainbow trout): 450 mg/l  
Information given is based on data obtained from similar substances.
- Isobutane (<0.1% butadiene)  
LC50 / 96 h / Fish: 24.11 mg/l

### Toxicity to aquatic plants

- 1,1,1,2-Tetrafluoroethane  
ErC50 / 96 h / Algae: 142 mg/l  
Information given is based on data obtained from similar substances.  
  
NOEC / 72 h / Pseudokirchneriella subcapitata (green algae): 13.2 mg/l  
Information given is based on data obtained from similar substances.
- Pentafluoroethane  
ErC50 / 96 h / Algae: 142 mg/l  
Information given is based on data obtained from similar substances.  
  
NOEC / 72 h / Pseudokirchneriella subcapitata (green algae): 13.2 mg/l  
Information given is based on data obtained from similar substances.
- Isobutane (<0.1% butadiene)  
EC50 / 72 h / Algae: 7.71 mg/l

### Toxicity to aquatic invertebrates

- 1,1,1,2-Tetrafluoroethane  
EC50 / 48 h / Daphnia magna (Water flea): 980 mg/l
- Pentafluoroethane  
EC50 / 48 h / Daphnia magna (Water flea): 980 mg/l  
Information given is based on data obtained from similar substances.
- Isobutane (<0.1% butadiene)  
EC50 / 48 h / Daphnia (water flea): 14.22 mg/l

## 12.2. Persistence and degradability

### Biodegradability

- 1,1,1,2-Tetrafluoroethane  
Not biodegradable
- Pentafluoroethane  
Not rapidly biodegradable



**DuPont™ ISCEON® MO79 (R-422A) Refrigerant**

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

- Isobutane (<0.1% butadiene)  
Readily biodegradable

**12.3. Bioaccumulative potential**

no data available

**12.4. Mobility in soil**

no data available

**12.5. Results of PBT and vPvB assessment**

no data available

**12.6. Other adverse effects**

Ozone depletion potential

0

Global warming potential (GWP)

3143

**Additional ecological information**

IPCC - AR4 (Fourth Assessment Report of the Intergovernmental Panel on Climate Change) - 2007

**SECTION 13: Disposal considerations**

**13.1. Waste treatment methods**

Product : Can be used after re-conditioning. If re-conditioning is not practicable, dispose of in compliance with local regulations.

Contaminated packaging : Empty pressure vessels should be returned to the supplier.  
If recycling is not practicable, dispose of in compliance with local regulations.

**SECTION 14: Transport information**

**ADR**

- 14.1. UN number: 1078  
14.2. UN proper shipping name: REFRIGERANT GAS, N.O.S. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane)  
14.3. Transport hazard class(es): 2  
14.4. Packing group: Not applicable  
14.5. Environmental hazards: For further information see Section 12.  
14.6. Special precautions for user:  
Tunnel restriction code: (C/E)

**RID**



**DuPont™ ISCEON® MO79 (R-422A) Refrigerant**

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

14.1. UN number: 1078  
14.2. UN proper shipping name: REFRIGERANT GAS, N.O.S.  
14.3. Transport hazard class(es): 2  
14.4. Packing group: Not applicable  
14.5. Environmental hazards: For further information see Section 12.  
14.6. Special precautions for user: no data available

**IATA\_C**

14.1. UN number: 1078  
14.2. UN proper shipping name: Refrigerant gas, n.o.s. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane)  
14.3. Transport hazard class(es): 2.2  
14.4. Packing group: Not applicable  
14.5. Environmental hazards : For further information see Section 12.  
14.6. Special precautions for user: no data available

**IMDG**

14.1. UN number: 1078  
14.2. UN proper shipping name: REFRIGERANT GAS, N.O.S. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane)  
14.3. Transport hazard class(es): 2.2  
14.4. Packing group: Not applicable  
14.5. Environmental hazards : For further information see Section 12.  
14.6. Special precautions for user: no data available

**14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**  
Not applicable

**SECTION 15: Regulatory information**

**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

Other regulations : Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

**EU. REACH, Annex XVII, Marketing and Use Restrictions (Regulation 1907/2006/EC)**

Listed Substance : Isobutane (<0.1% butadiene) (CAS-No.75-28-5) (EC-No.200-857-2)  
List number: : 40

For information on uses please refer to Section 1.  
For further information please refer to the list number in the regulation and relevant amendments.

**15.2. Chemical Safety Assessment**

No Chemical Safety Assessment has been carried out for this mixture.

**SECTION 16: Other information**

**Text of R-phrases mentioned in Section 3**



**DuPont™ ISCEON® MO79 (R-422A) Refrigerant**

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

R12 Extremely flammable.  
R67 Vapours may cause drowsiness and dizziness.

**Full text of H-Statements referred to under section 3.**

H220 Extremely flammable gas.  
H280 Contains gas under pressure; may explode if heated.  
H336 May cause drowsiness or dizziness.

**Abbreviations and acronyms**

ADR European Agreement concerning the International Carriage of Dangerous Goods by Road  
ATE Acute toxicity estimate  
CAS-No. Chemical Abstracts Service number  
CLP Classification, Labelling and Packaging  
EbC50 Concentration at which 50% reduction of biomass is observed  
EC50 Median effective concentration  
EN European Norm  
EPA Environmental Protection Agency  
ErC50 Concentration at which a 50% inhibition of growth rate is observed  
EyC50 Concentration at which 50 % inhibition of yield is observed  
IATA\_C International Air Transport Association (Cargo)  
IBC International Bulk Chemical Code  
ICAO International Civil Aviation Organization  
ISO International Standard Organization  
IMDG International Maritime Dangerous Goods  
LC50 Median Lethal Concentration  
LD50 Median Lethal Dose  
LOEC Lowest Observed Effect Concentration  
LOEL Lowest observed effect level  
MARPOL International Convention for the Prevention of Marine Pollution from Ships  
n.o.s. Not Otherwise Specified  
NOAEC No Observed Adverse Effect Concentration  
NOAEL No observed adverse effect level  
NOEC No Observed Effect Concentration  
NOEL No Observed Effect Level  
OECD Organisation for Economic Co-operation and Development  
OPPTS Office of Prevention, Pesticides and Toxic Substances  
PBT Persistent, Bioaccumulative and Toxic  
STEL Short term exposure limit  
TWA Time Weighted Average (TWA):  
vPvB very Persistent and very Bioaccumulative

**Further information**

® DuPont's registered trademark, Before use read DuPont's safety information., For further information contact the local DuPont office or DuPont's nominated distributors.  
Based on the physico-chemical hazard assessment of this mixture, it was decided to include inside the main body of the safety data sheet all the relevant information coming from the exposure scenario of the lead/priority substances. Please refer to the safety data sheet of the individual components for additional information on exposure scenario.

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



**DuPont™ ISCEON® MO79 (R-422A) Refrigerant**

Version 3.1 (replaces: Version 3.0)

Revision Date 16.05.2015

Ref. 130000027388

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 guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The above information relates only to the specific material(s) designated herein and may not be valid for such material(s) used in combination with any other materials or in any process or if the material is altered or processed, unless specified in the text.