13. Safety Data Sheets

Material Data Sheet

Product: **Nitrogen (refrigerated)**

MDS Nr: 089B/en Version: 2.70 Date: 01 / 07 / 2004

Replaces version dated: 01 / 01 / 2003

1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

	MDS Nr	089B/en
	Product name	Nitrogen (refrigerated)
	Chemical formula	N_2
(*)	Company identification	Air Liquide Deutschland GmbH
	Telephone	02151/379-0
	Telefax	02151/379-9115
	Street	Fütingsweg 34
	Cip code/City	47805 Krefeld
	Emergency phone numbers	02151/398668

2 COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Preparation: Substance.

Components/Impurities
Contains no other components or impurities which will influence the classification of the product.

CAS Nr	7727-37-9
EEC Nr (from EINECS)	231-783-9

3 HAZARDS IDENTIFICATION

Hazards identification
Refrigerated liquefied gas. Contact with product may cause cold burns or frostbite. In high concentrations may cause asphyxiation.

4 FIRST AID MEASURES

Inhalation
In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Skin/eye contact
Immediately flush eyes thoroughly with water for at least 15 minutes. In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.

Ingestion
Ingestion is not considered a potential route of exposure.

5 FIRE FIGHTING MEASURES

Specific hazards
Exposure to fire may cause containers to rupture/explode. Non flammable.

Hazardous combustion products
None

Suitable extinguishing media
All known extinguishants can be used.

Specific methods
If possible, stop flow of product. Move container away or cool with water from a protected position. If leaking do not spray water onto container. Water surrounding area (from protected position) to contain fire. Special protective equipment for fire fighters. In confined space use self-contained breathing apparatus.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions
Evacuate area. Use protective clothing. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation.

Environmental precautions
Try to stop release. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

Clean up methods
Ventilate area.

7 HANDLING AND STORAGE

Handling and storage
Suck back of water into the container must be prevented. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Refer to supplier's container handling instructions. Keep container below 50 °C in a well ventilated place.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal protection
Ensure adequate ventilation. Protect eyes, face and skin from liquid splashes.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Colour	Colourless liquid
Odour	No odour warning properties.
Molecular weight	28
Melting point	-210 °C
Boiling point	-196 °C
Critical temperature	-147 °C
Relative density, gas	0.97 (air=1)
Vapour Pressure 20°C	Not applicable.
Solubility mg/l water	20 mg/l

10 STABILITY AND REACTIVITY

Stability and reactivity
Stable under normal conditions. Liquid spillages can cause embrittlement of structural materials.

11 TOXICOLOGICAL INFORMATION

General
No known toxicological effects from this product.

12 ECOLOGICAL INFORMATION

General
Can cause frost damage to vegetation.

13 DISPOSAL CONSIDERATIONS

General
Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required.

14 TRANSPORT INFORMATION

Land transport

• *ADR/RID:*

Class:	2
Classification-code:	3A
Hazard identification No:	22
UN-Nr.:	1977
Label:	2.2
Description of the goods:	Nitrogen, refrigerated liquid

Sea transport

• *IMDG:*

	Class:	2.2
	UN-Nr.:	1977
	Label:	2.2
(*)	EmS:	F-C, S-V
	Description of the goods:	Nitrogen, refrigerated liquid

Air transport

• *ICAO/IATA-DGR:*

Class:	2.2
UN/ID-Nr.:	UN 1977
Label:	2.2
Description of the goods:	Nitrogen, refrigerated liquid

Other transport information
Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured and:
- there is adequate ventilation.
- compliance with applicable regulations.

15 REGULATORY INFORMATION

Number in Annex I of Dir 67/548
Not included in Annex I.

EC Classification
Proposed by the industry
Not classified as dangerous substance.

-Symbols	none
-R Phrases	none
-S Phrases	9-23-36

-Risk phrases
none

-Safety phrases
S9 Keep container in well ventilated place.
S23 Do not breathe the gas.
S36 Wear suitable protective clothing.

16 OTHER INFORMATION

Ensure all national/local regulations are observed. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Details given in this document are believed to be correct at the time of going to press. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

Alterations or supplements compared to previons editions are marked by (*)

Material Data Sheet

Product: **Argon (refrigerated)**

MDS Nr: 003B/en Version: 2.70 Date: 01 / 07 / 2004

Replaces version dated: 01 / 01 / 2003

1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

MDS Nr	003B/en
Product name	Argon (refrigerated)
Chemical formula	Ar
(*) Company identification	Air Liquide Deutschland GmbH
Telephone	02151/379-0
Telefax	02151/379-9115
Street	Fütingsweg 34
Cip code/City	47805 Krefeld
Emergency phone numbers	02151/398668

2 COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Preparation: Substance.

Components/Impurities
Contains no other components or impurities which will influence the classification of the product.

CAS Nr	7440-37-1
EEC Nr (from EINECS)	231-147-0

3 HAZARDS IDENTIFICATION

Hazards identification
Refrigerated liquefied gas. Contact with product may cause cold burns or frostbite. In high concentrations may cause asphyxiation.

4 FIRST AID MEASURES

Inhalation
In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Skin/eye contact
Immediately flush eyes thoroughly with water for at least 15 minutes. In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.

Ingestion
Ingestion is not considered a potential route of exposure.

5 FIRE FIGHTING MEASURES

Specific hazards
Exposure to fire may cause containers to rupture/explode. Non flammable

Hazardous combustion products
None

Suitable extinguishing media
All known extinguishants can be used.

Specific methods
If possible, stop flow of product. Move container away or cool with water from a protected position. If leaking do not spray water onto container. Water surrounding area (from protected position) to contain fire.

Special protective equipment for fire fighters
In confined space use self-contained breathing apparatus.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions
Evacuate area. Use protective clothing. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation.

Environmental precautions
Try to stop release. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

Clean up methods
Ventilate area.

7 HANDLING AND STORAGE

Handling and storage
Suck back of water into the container must be prevented. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Refer to supplier's container handling instructions. Keep container below 50 °C in a well ventilated place.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal protection
Ensure adequate ventilation. Protect eyes, face and skin from liquid splashes.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Colour	Colourless liquid
Odour	No odour warning properties.
Molecular weight	40
Melting point	-189 °C
Boiling point	-186 °C
Critical temperature	-122 °C
Relative density, gas	1.38 (air=1)
Vapour Pressure 20°C	Not applicable.
Solubility mg/l water	67 mg/l
Flammability range	Non flammable.

Other data
Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

10 STABILITY AND REACTIVITY

Stability and reactivity
Stable under normal conditions. Liquid spillages can cause embrittlement of structural materials.

11 TOXICOLOGICAL INFORMATION

General
No known toxicological effects from this product.

12 ECOLOGICAL INFORMATION

General
Can cause frost damage to vegetation.

13 DISPOSAL CONSIDERATIONS

General
Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required.

14 TRANSPORT INFORMATION

Land transport
• *ADR/RID:*

Class:	2
Classification-code:	3A
Hazard identification No:	22
UN-Nr.:	1951
Label:	2.2
Description of the goods:	Argon, refrigerated liquid

Sea transport
• *IMDG:*

	Class:	2.2
	UN-Nr.:	1951
	Label:	2.2
(*)	EmS:	F-D, S-V
	Description of the goods:	Argon, refrigerated liquid

Air transport
• *ICAO/IATA-DGR:*

Class:	2.2
UN/ID-Nr.:	UN 1951
Label:	2.2
Description of the goods:	Argon, refrigerated liquid

Other transport information
Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured and:
- there is adequate ventilation.
- compliance with applicable regulations.

15 REGULATORY INFORMATION

Number in Annex I of Dir 67/548
Not included in Annex I.

EC Classification
Proposed by the industry
Not classified as dangerous substance.

-Symbols	none
-R Phrases	none
-S Phrases	9-23-36

-Risk phrases
none

-Safety phrases
S9 Keep container in well ventilated place.
S23 Do not breathe the gas.
S36 Wear suitable protective clothing.

16 OTHER INFORMATION

Ensure all national/local regulations are observed. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
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Safety Data Sheet

Product : **Oxygen**

MSDS Nr.: 097A/en Version : 1.60 Date: 01.07.2004

Replaces version dated: 01.01.2003

1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

MSDS Nr	097A/en
Product name	Oxygen
Chemical formula	O_2
(*) Company identification	Air Liquide Deutschland GmbH
Telephone	02151/379-0
Telefax	02151/379-9115
Street	Fütingsweg 34
Cip code/City	47805 Krefeld
Emergency phone numbers	02151/398668

2 COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Preparation Substance.

Components/Impurities
Contains no other components or impurities which will influence the classification of the product.

CAS Nr	7782-44-7
EEC Nr (from EINECS)	231-956-9

3 HAZARDS IDENTIFICATION

Hazards identification
Compressed gas. Oxidant. Strongly supports combustion. May react violently with combustible materials.

4 FIRST AID MEASURES

Inhalation
Continuous inhalation of concentrations higher than 75% may cause nausea, dizziness, respiratory difficulty and convulsion.

Ingestion
Ingestion is not considered a potential route of exposure.

5 FIRE FIGHTING MEASURES

Specific hazards
Supports combustion. Exposure to fire may cause containers to rupture/explode. Non flammable.

Hazardous combustion products
None

Suitable extinguishing media
All known extinguishants can be used.

Specific methods
If possible, stop flow of product. Move container away or cool with water from a protected position.

Special protective equipment for fire fighters
None.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions
Evacuate area. Ensure adequate air ventilation. Eliminate ignition sources.

Environmental precautions
Try to stop release. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

Clean up methods
Ventilate area.

7 HANDLING AND STORAGE

Handling and storage
Use no oil or grease. Open valve slowly to avoid pressure shock. Segregate from flammable gases and other flammable materials in store. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Keep away from ignition sources (including static discharges). Refer to supplier's container handling instructions. Keep container below 50 °C in a well ventilated place. Secure gas cylinder against overturnling.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal protection
Do not smoke while handling product. Wear suitable hand, body and head protection. Wear goggles with suitable filter lenses when use is cutting/welding. Avoid oxygen rich (>21%) atmospheres. Ensure adequate ventilation.

9 PHYSICAL AND CHEMICAL PROPERTIES

Molecular weight	32
Melting point	-219 °C
Boiling point	-183 °C
Critical temperature	-118 °C
Relative density, gas	1.1 (air=1)
Vapour Pressure 20°C	Not applicable.
Solubility mg/l water	39 mg/l
Appearance/Colour	Colourless gas
Odour	No odour warning properties.
Autoignition temperature	Not applicable
Flammability range	Oxidiser.

Other data
Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

10 STABILITY AND REACTIVITY

Stability and reactivity
May react violently with combustible materials. May react violently with reducing agents. Violently oxidises organic material.

11 TOXICOLOGICAL INFORMATION

General
No toxicological effects from this product.

12 ECOLOGICAL INFORMATION

General
No ecological damage caused by this product.

13 DISPOSAL CONSIDERATIONS

General
To atmosphere in a well ventilated place. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required.

code of waste (EWC)
16 05 04 gases in pressure containers (including halons) containing dangerous substances

14 TRANSPORT INFORMATION

Land transport

- *ADR/RID:*

Class:	2
Classification-code:	1 O
Hazard identification No:	25
UN-Nr.:	1072
Label:	2.2 + 5.1
Description of the goods:	Oxygen, compressed

for pressure can

Class:	2
Classification code:	5 O
Label:	2.2 + 5.1
UN-No.:	2037
Description of the goods:	Receptacles, small, containing gas (Gas cartridges)

Sea transport

- *IMDG:*

	Class:	2.2
	UN-Nr.:	1072
	Label:	2.2 + 5.1
(*)	EmS:	F-C, S-W
	Description of the goods:	Oxygen, compressed

Air transport

- *ICAO/IATA-DGR:*

Class:	2.2
UN/ID-Nr.:	UN 1072
Label:	2.2 + 5.1
Description of the goods:	Oxygen, compressed

Other transport information
Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured and:
- cylinder valve is closed and not leaking
- valve outlet cap nut or plug (where provided) is correctly fitted
- valve protection device (where provided) is correctly fitted
- there is adequate ventilation.
- compliance with applicable regulations.

15 REGULATORY INFORMATION

Number in Annex I of Dir 67/548
008-001-00-8.

EC Classification
O;R8

-Symbols	O: Oxidising
-R Phrases	8
-S Phrases	(2)-17

-Risk phrases
R8 Contact with combustible material may cause fire.

-Safety phrases
S9 Keep container in well ventilated place.
S17Keep away from combustible material.

16 OTHER INFORMATION

Ensure all national/local regulations are observed. Ensure operators understand the hazard of oxygen enrichment. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
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Alterations or supplements compared to previons editions are marked by **(*)**.

Material Data Sheet

Product: **Argon** Seite: 1/2

MDS Nr: 003A/en Version: 2.70 Date: 01 / 07 / 2004

Replaces version dated: 01 / 01 / 2003

1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

MDS Nr	003A/en
Product name	Argon
Chemical formula	Ar
(*) Company identification	Air Liquide Deutschland GmbH
Telephone	02151/379-0
Telefax	02151/379-9115
Street	Fütingsweg 34
Cip code/City	47805 Krefeld
Emergency phone numbers	02151/398668

2 COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Preparation Substance.

Components/Impurities
Contains no other components or impurities which will influence the classification of the product.

CAS Nr	7440-37-1
EEC Nr (from EINECS)	231-147-0

3 HAZARDS IDENTIFICATION

Hazards identification
Compressed gas. In high concentrations may cause asphyxiation.

4 FIRST AID MEASURES

Inhalation
In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Ingestion
Ingestion is not considered a potential route of exposure.

5 FIRE FIGHTING MEASURES

Specific hazards
Exposure to fire may cause containers to rupture/explode. Non flammable.

Hazardous combustion products
None

Suitable extinguishing media
All known extinguishants can be used.

Specific methods
If possible, stop flow of product. Move container away or cool with water from a protected position.

Special protective equipment for fire fighters
In confined space use self-contained breathing apparatus.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions
Evacuate area. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation.

Environmental precautions
Try to stop release. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

Clean up methods
Ventilate area.

7 HANDLING AND STORAGE

Handling and storage
Suck back of water into the container must be prevented. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Refer to supplier's container handling instructions. Keep container below 50 °C in a well ventilated place. Secure gas cylinder against overturnling.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal protection
Ensure adequate ventilation.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Colour	Colourless gas
Odour	No odour warning properties.
Molecular weight	40
Melting point	-189 °C
Boiling point	-186 °C
Critical temperature	-122 °C
Relative density, gas	1.38 (air=1)
Vapour Pressure 20°C	Not applicable.
Solubility mg/l water	61 mg/l

Other data
Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

10 STABILITY AND REACTIVITY

Stability and reactivity
Stable under normal conditions.

11 TOXICOLOGICAL INFORMATION

General
No known toxicological effects from this product.

12 ECOLOGICAL INFORMATION

General
No known ecological damage caused by this product.

13 DISPOSAL CONSIDERATIONS

General
Do not discharge into any place where its accumulation could be dangerous. To atmosphere in a well ventilated place. Contact supplier if guidance is required.

code of waste (EWC)
16 05 05 gases in pressure containers other than those mentioned in 16 05 04

14 TRANSPORT INFORMATION

Land transport

• *ADR/RID:*

Class:	2
Classification-code:	1A
Hazard identification No:	20
UN-Nr.:	1006
Label:	2.2
Description of the goods:	Argon, compressed

for pressure can

Class:	2
Classification code:	5 A
Label:	2.2
UN-No.:	2037
Description of the goods:	Receptacles, small, containing gas (Gas cartridges)

Sea transport

• *IMDG:*

Class:	2.2
UN-Nr.:	1006
Label:	2.2
(*) EmS:	F-C, S-V
Description of the goods:	Argon, compressed

Air transport

• *ICAO/IATA-DGR:*

Class:	2.2
UN/ID-Nr.:	UN 1006
Label:	2.2
Description of the goods:	Argon, compressed

Other transport information
Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured and:
- cylinder valve is closed and not leaking
- valve outlet cap nut or plug (where provided) is correctly fitted
- valve protection device (where provided) is correctly fitted
- there is adequate ventilation.
- compliance with applicable regulations.

15 REGULATORY INFORMATION

Number in Annex I of Dir 67/548
Not included in Annex I.

EC Classification
Proposed by the industry.
Not classified as dangerous substance.

-Symbols	none
-R Phrases	none
-S Phrases	9-23

-Risk phrases
none

-Safety phrases
S9 Keep container in well ventilated place.
S23 Do not breathe the gas.

16 OTHER INFORMATION

Ensure all national/local regulations are observed. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
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Material Data Sheet

Product: **Nitrogen** Page: 1/2

MDS Nr: 089A/en Version: 2.70 Date: 01 / 07 / 2004

Replaces version dated: 01 / 01 / 2003

1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

MDS Nr	089A/en
Product name	Nitrogen
Chemical formula	N_2
(*) Company identification	Air Liquide Deutschland GmbH
Telephone	02151/379-0
Telefax	02151/379-9115
Street	Fütingsweg 34
Cip code/City	47805 Krefeld
Emergency phone numbers	02151/398668

2 COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Preparation Substance.

Components/Impurities
Contains no other components or impurities which will influence the classification of the product.

CAS Nr	7727-37-9
EEC Nr (from EINECS)	231-783-9

3 HAZARDS IDENTIFICATION

Hazards identification
Compressed gas. In high concentrations may cause asphyxiation.

4 FIRST AID MEASURES

Inhalation
In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Ingestion
Ingestion is not considered a potential route of exposure.

5 FIRE FIGHTING MEASURES

Specific hazards
Exposure to fire may cause containers to rupture/explode. Non flammable.

Hazardous combustion products
None

Suitable extinguishing media
All known extinguishants can be used.

Specific methods
If possible, stop flow of product. Move container away or cool with water from a protected position.

Special protective equipment for fire fighters
In confined space use self-contained breathing apparatus.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions
Evacuate area. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation.

Environmental precautions
Try to stop release.

Clean up methods
Ventilate area.

7 HANDLING AND STORAGE

Handling
Suck back of water into the container must be prevented. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Refer to supplier's container handling instructions. Secure gas cylinder against overturnling.

Storage
Keep container below 50 °C in a well ventilated place. Secure gas cylinder against overturnling.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal protection
Ensure adequate ventilation.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Colour	Colourless gas
Odour	No odour warning properties.
Molecular weight	28
Melting point	-210 °C
Boiling point	-196 °C
Critical temperature	-147 °C
Relative density, gas	0.97 (air=1)
Vapour Pressure 20°C	Not applicable.
Solubility mg/l water	20 mg/l

10 STABILITY AND REACTIVITY

Stability and reactivity
Stable under normal conditions.

11 TOXICOLOGICAL INFORMATION

General
No known toxicological effects from this product.

12 ECOLOGICAL INFORMATION

General
No ecological damage caused by this product.

13 DISPOSAL CONSIDERATIONS

General
Do not discharge into any place where its accumulation could be dangerous. To atmosphere in a well ventilated place. Contact supplier if guidance is required.

code of waste (EWC)
16 05 05 gases in pressure containers other than those mentioned in 16 05 04

14 TRANSPORT INFORMATION

Land transport

- ADR/RID:

Class:	2
Classification-code:	1A
Hazard identification No:	20
UN-Nr.:	1066
Label:	2.2
Description of the goods:	Nitrogen, compressed

for pressure can

Class:	2
Classification code:	5 A
Label:	2.2
UN-No.:	2037
Description of the goods:	Receptacles, small, containing gas (Gas cartridges)

Sea transport

- IMDG:

Class:	2.2
UN-Nr.:	1066
Label:	2.2
(*) EmS:	F-C, S-V
Description of the goods:	Nitrogen, compressed

Air transport

- ICAO/IATA-DGR:

Class:	2.2
UN/ID-Nr.:	UN 1066
Label:	2.2
Description of the goods:	Nitrogen, compressed

Other transport information
Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured and:
- cylinder valve is closed and not leaking
- valve outlet cap nut or plug (where provided) is correctly fitted
- valve protection device (where provided) is correctly fitted
- there is adequate ventilation.
- compliance with applicable regulations.

15 REGULATORY INFORMATION

Number in Annex I of Dir 67/548
Not included in Annex I.

EC Classification
Proposed by the industry. Not classified as dangerous substance.

-Symbols	none
R- phrases	none
S- phrases	9-23

-Risk phrases
none

-Safety phrases
S9 Keep container in well ventilated place.
S23 Do not breathe the gas.

16 OTHER INFORMATION

Ensure all national/local regulations are observed. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Details given in this document are believed to be correct at the time of going to press. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

Alterations or supplements compared to previons editions are marked by **(*)**

Safety Data Sheet

Product : **Oxygen (refrigerated)**

MSDS Nr.: 097B/en Version : 1.60 Date: 01.07.2004

Replaces version dated: 01.01.2003

1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

	MSDS Nr	097B/en
	Product name	Oxygen (refrigerated)
	Chemical formula	O_2
(*)	Company identification	Air Liquide Deutschland GmbH
	Telephone	02151/379-0
	Telefax	02151/379-9115
	Street	Fütingsweg 34
	Cip code/City	47805 Krefeld
	Emergency phone numbers	02151/398668

2 COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Preparation Substance.

Components/Impurities
Contains no other components or impurities which will influence the classification of the product.

CAS Nr	7782-44-7
EEC Nr (from EINECS)	231-956-9

3 HAZARDS IDENTIFICATION

Hazards identification
Refrigerated liquefied gas. Contact with product may cause cold burns or frostbite. Oxidant. Strongly supports combustion. May react violently with combustible materials.

4 FIRST AID MEASURES

Inhalation
Continuous inhalation of concentrations higher than 75% may cause nausea, dizziness, respiratory difficulty and convulsion.

Skin/eye contact
Immediately flush eyes thoroughly with water for at least 15 minutes. In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.

Ingestion
Ingestion is not considered a potential route of exposure.

5 FIRE FIGHTING MEASURES

Specific hazards
Supports combustion. Exposure to fire may cause containers to rupture/explode. Non flammable.

Hazardous combustion products
None

Suitable extinguishing media
All known extinguishants can be used.

Specific methods
If possible, stop flow of product. Move container away or cool with water from a protected position. If leaking do not spray water onto container. Water surrounding area (from protected position) to contain fire.

Special protective equipment for fire fighters
None.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions
Evacuate area. Ensure adequate air ventilation. Eliminate ignition sources. Use protective clothing.

Environmental precautions
Try to stop release. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

Clean up methods
Ventilate area. Keep area evacuated and free from ignition sources until any spilled liquid has evaporated. (Ground free from frost).

7 HANDLING AND STORAGE

Handling and storage
Use no oil or grease. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Keep away from ignition sources (including static discharges). Refer to supplier's container handling instructions. Keep container below 50 °C in a well ventilated place. Open valve slowly to avoid pressure shock. Storage Segregate from flammable gases and other flammable materials in store. Keep container below 50 °C in a well ventilated place.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal protection
Do not smoke while handling product. Ensure adequate ventilation. Protect eyes, face and skin from liquid splashes. Avoid oxygen rich (>21%) atmospheres.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Colour	Bluish liquid
Odour	No odour warning properties.
Molecular weight	32
Melting point	-219 °C
Boiling point	-183 °C
Critical temperature	-118 °C
Relative density, gas	1.1 (air=1)
Vapour Pressure 20°C	Not applicable.
Solubility mg/l water	39 mg/l
Autoignition temperature	Not applicable
Flammability range	Oxidiser.

Other data
Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

10 STABILITY AND REACTIVITY

Stability and reactivity
May react violently with combustible materials. May react violently with reducing agents. Violently oxidises organic material. Liquid spillages can cause embrittlement of

structural materials. Risk of explosion if spilt on organic structural materials (eg wood or asphalt).

11 TOXICOLOGICAL INFORMATION

General
No toxicological effects from this product.

12 ECOLOGICAL INFORMATION

General
Can cause frost damage to vegetation.

13 DISPOSAL CONSIDERATIONS

General
To atmosphere in a well ventilated place. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required.

14 TRANSPORT INFORMATION

Land transport

- *ADR/RID:*

Class:	2
Classification-code:	3 O
Hazard identification No:	225
UN-Nr.:	1073
Label:	2.2 + 5.1
Description of the goods:	Oxygen, refrigerated liquid

Sea transport

- *IMDG:*

	Class:	2.2
	UN-Nr.:	1016
	Label:	2.2 + 5.1
(*)	EmS:	F-C, S-W
	Description of the goods:	Oxygen, refrigerated liquid

Air transport

- *ICAO/IATA-DGR:*

Class:	2.2
UN/ID-Nr.:	UN 1016
Label:	2.2 + 5.1
Description of the goods:	Oxygen, refrigerated liquid

Other transport information
Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured and:
- there is adequate ventilation.
- compliance with applicable regulations.

15 REGULATORY INFORMATION

Number in Annex I of Dir 67/548
008-001-00-8.

EC Classification
O; R8

-Symbols	O: Oxidising
-R Phrases	8
-S Phrases	(2)-17

-Risk phrases
R8 Contact with combustible material may cause fire.

-Safety phrases
S17 Keep away from combustible material.

16 OTHER INFORMATION

Ensure all national/local regulations are observed. Ensure operators understand the hazard of oxygen enrichment. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Details given in this document are believed to be correct at the time of going to press. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

Alterations or supplements compared to previons editions are marked by **(*)**.