Safety Data Sheet



Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier				
Product Name	Methyl Fluoride (EU F	Region Only)		
Synonyms		• Fluoro-; Fluoromethane; Freon 41; Halogenated Aliphatic Hydrocarbon; HFC 41; Methane; Monofluoromethane; R41; Refrigerant Gas R 41		
CAS Number	• 593-53-3	,,		
Product Code	• 80007			
SDS Number	• EL-1001-03976			
EC Number	• 209-796-6			
Molecular Formula	• :C 1:H 3:F 1:			
	d uses of the substance or r		ood agamet	
Relevant identified use(s)	Semiconductor Uses			
Relevant identified use(s)				
Relevant identified use(s) 1.3 Details of the supp	Semiconductor Uses		-	
Relevant identified use(s) 1.3 Details of the supp	 Semiconductor Uses olier of the safety data sheet Air Liquide 2700 Post Oak Blvd. Houston, TX 77056 US www.us.airliquide.com 		 NCEC, Ricardo-AEA The Gemini Building Fermi Avenue Didcot, Oxfordshire 	
Relevant identified use(s) 1.3 Details of the supp Manufacturer	 Semiconductor Uses olier of the safety data sheet Air Liquide 2700 Post Oak Blvd. Houston, TX 77056 US www.us.airliquide.com sds@airliquide.com 	Only Representative	 NCEC, Ricardo-AEA The Gemini Building Fermi Avenue Didcot, Oxfordshire OX11 OQR, UK 	
Relevant identified use(s) 1.3 Details of the supp Manufacturer Telephone (Technical) Telephone (Technical)	 Semiconductor Uses blier of the safety data sheet Air Liquide 2700 Post Oak Blvd. Houston, TX 77056 US www.us.airliquide.com sds@airliquide.com 713-896-2896 800-819-1704 	Only Representative Telephone	 NCEC, Ricardo-AEA The Gemini Building Fermi Avenue Didcot, Oxfordshire OX11 OQR, UK +44 (0) 1235 753654 	
Relevant identified use(s) 1.3 Details of the supp Manufacturer Telephone (Technical)	 Semiconductor Uses blier of the safety data sheet Air Liquide 2700 Post Oak Blvd. Houston, TX 77056 US www.us.airliquide.com sds@airliquide.com 713-896-2896 800-819-1704 	Only Representative Telephone Email	 NCEC, Ricardo-AEA The Gemini Building Fermi Avenue Didcot, Oxfordshire OX11 OQR, UK +44 (0) 1235 753654 	

Section 2: Hazards Identification

EU/EEC

According to Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 453/2010] According to EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

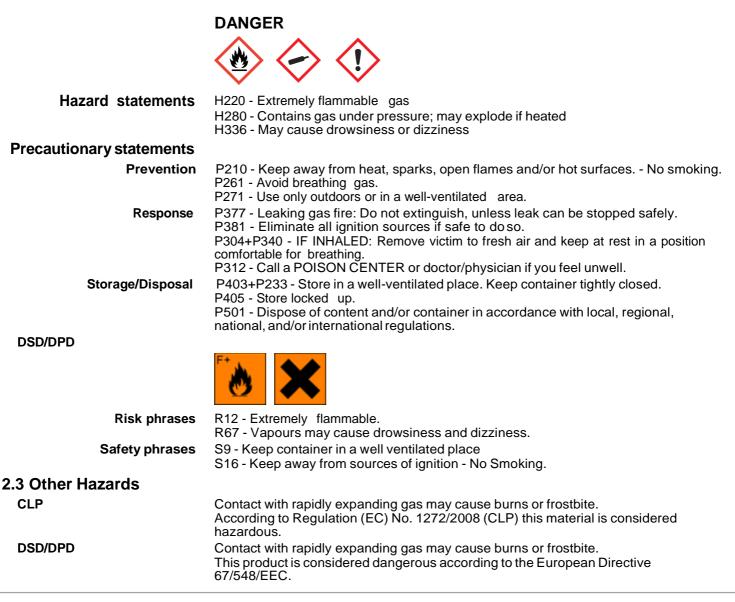
2.1 Classification of the substance or mixture

CLP	Flammable Gases 1 - H220 Liquefied Gas - H280 Specific Target Organ Toxicity Single Exposure 3: Narcotic Effects - H336
DSD/DPD	Extremely Flammable (F+) Harmful (Xn) R12, R67

2.2 Label Elements

Methyl Fluoride

CLP



United States (US) According to OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

Flammable Gases 1 - H220 Liquefied Gas - H280 Specific Target Organ Toxicity Single Exposure 3: Narcotic Effects - H336 Hazards Not Otherwise Classified - Health Hazard - Frostbite

2.2 Label elements OSHA HCS 2012

OSHA HCS 2012

DANGER



Hazard statements

Extremely flammable gas - H220 Contains gas under pressure; may explode if heated - H280

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	May cause drowsiness or dizziness - H336
Precautionary statements	
Prevention	Keep away from heat, sparks, open flames and/or hot surfaces No smoking P210 Avoid breathing gas P261 Use only outdoors or in a well-ventilated area P271
Response	Leaking gas fire: Do not extinguish, unless leak can be stopped safely P377 Eliminate all ignition sources if safe to do so P381 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing P304+P340 Call a POISON CENTER or doctor/physician if you feel unwell P312
Storage/Disposal	Store in a well-ventilated place. Keep container tightly closed P403+P233 Store locked up P405 Dispose of content and/or container in accordance with local, regional, national, and/or international regulations P501
2.3 Other hazards	
OSHA HCS2012	Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada

According to WHMIS

2.1 Classification of the substance or mixture WHMIS Compressed Gas - A

Compressed Gas - A Flammable Gases - B1

2.2 Label elements WHMIS



Compressed Gas - A Flammable Gases - B1

2.3 Other hazards WHMIS

Contact with rapidly expanding gas may cause burns or frostbite. In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

2.4 Other information



Section 3 - Composition/Information on Ingredients

3.1 Substances

Composition				
Chemica I Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive
Methyl Fluorid e	CAS: 593-53-3 EINECS: 209-796- 6	100%	NDA	EU DSD/DPD: Self Classified - F+ R12; Xn R67 EU CLP: Self Classified - Press Gas - Liq., H280; Flam Gas 1, H220; STOT SE 3:Narc., H336 OSHA HCS 2012: Flam. Gas. 1; Press Gas - Liq.; STOT SE 3: Narc.; HNOC - Health - Frostbite

3.2 Mixtures

Material does not meet the criteria of a mixture in accordance with Regulation (EC) No 1272/2008.

Section 4 - First Aid Measures

4.1 Description of first aid measures

	modelite
Inhalation	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.
Skin	If frostbite has occurred, seek medical attention immediately; do NOT rub the affected area(s) or flush them with water. In order to prevent further tissue damage, do NOT attempt to remove frozen clothing from frostbitten areas. If frostbite has not occurred, immediately and thoroughly wash contaminated skin with soap and water.
Еуе	If eye tissue is frozen, seek medical attention immediately; if tissue is notfrozen, immediately and thoroughly flush the eyes with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation, pain, swelling, lacrimation or photophobia persist, get medical attention as soon as possible.
Ingestion	If frostbite has occurred, seek medical attention immediately; do NOT rub the affected area(s) or flush them with water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting.
4.2 Most important sympto	oms and effects, both acute and delayed
	Refer to Section 11 - Toxicological Information.
4.3 Indication of any imme	diate medical attention and special treatment needed
Notes to Physician	All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.
4.4 Other information	
	Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO GASES WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn. Victim(s) who experience any adverse effect after over- exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

Section 5 - Firefighting Measures

5.1 Extinguishing media

Suitable Extinguishing Media	SMALL FIRES: Dry chemical or CO2. LARGE FIRES: Water spray or fog.
Unsuitable Extinguishing	No data available

Media

5.2 Special hazards arising from the substance or mixture		
Unusual Fire and Explosion Hazards	EXTREMELY FLAMMABLE Will form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Cylinders exposed to fire may vent and release flammable gas through pressure relief devices. Containers may explode when heated. Ruptured cylinders may rocket.	
Hazardous Combustion Products	Toxic carbon monoxide may be given off during combustion.	
5.3 Advice for firefighters		
	 Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible. Always wear thermal protective clothing when handling refrigerated/cryogenic liquids. Wear positive pressure self-contained breathing apparatus (SCBA). DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED Move containers from fire area if you can do it without risk. FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions. FIRE INVOLVING TANKS: ALWAYS stay away from tanks engulfed in fire. FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. FIRE INVOLVING TANKS: Cool containers with flooding quantities of water until well after fire is out. FIRE INVOLVING TANKS: Do not direct water at source of leak or safety devices; icing may occur. FIRE INVOLVING TANKS: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. 	

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

•	<i>,</i> , , , ,		
Personal Precautions	personal protective equipment,	y. Do not walk through spilled material. Wear a t, avoid direct contact. Do not touch damaged ing appropriate protective clothing.	
Emergency Procedures	area). As an immediate precau 100 meters (330 feet) in all dire	s (no smoking, flares, sparks or flames in imm utionary measure, isolate spill or leak area fo ections. LARGE SPILL: Consider initial dowr ters (1/2 mile) Keep unauthorized personnel a	r at least wind
6.2 Environmental prec	autions		

Prevent entry into waterways, sewers, basements or confined areas.

6.3 Methods and material for containment and cleaning up

Containment/Clean-up Measures	Stop leak if you can do it without risk. All equipment used when handling the product must be grounded. If possible, turn leaking containers so that gas escapes rather than liquid. Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container. Do not direct water at spill or source of leak. Isolate area until gas has dispersed.
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6.4 Reference to other sections

Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal

Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling	Keep away from heat and ignition sources – No Smoking. Take precautionary measures against static charges. All equipment used when handling the product must be grounded. Use only non-sparking tools. Use only with adequate ventilation. Ventilate closed spaces before entering. Be aware of any signs of dizziness or fatigue, especially if work is done in a poorly ventilated area; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency. Cylinders should be firmly secured to prevent falling or being knocked-over. Use explosion-proof - electrical, ventilating and/or lighting equipment. Do not attempt to repair, adjust, or in any other way modify cylinders. If there is a malfunction or another type of operational problem, contact nearest distributor immediately. Empty containers retain product residue and can be hazardous. Do not cut, weld, puncture or incinerate container.
7.2 Conditions for safe sto	rage, including any incompatibilities
Storage	Cylinders should be stored in dry, well-ventilated areas away from sources of heat, ignition and direct sunlight. Do not allow area where cylinders are stored to exceed 52C (125F). Cylinders must be protected from the environment, and preferably kept at room temperature approximately 21C (70F). Protect cylinders against physical damage. Cylinders should be firmly secured to prevent falling or being knocked-over.
7.3 Specific end use(s)	
	Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

Exposure Limits/Guidelines	Currently there are no applicable exposure limits established for this material.
8.2 Exposure controls	
Engineering Measures/Controls	Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Use explosion-proof - electrical, ventilating and/or lighting equipment.
Personal Protective Equipment	
Respiratory	In case of insufficient ventilation, wear suitable respiratory equipment. Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.
Eye/Face	Wear safety glasses.
Skin/Body	Wear leather gloves when handling cylinders.
Environmental Exposure Controls	Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Section 9 - Physical and Chemical Properties

9.1 Information on Physical and Chemical Properties

Material Description Colorless gas with an odorless or Physical Form Gas Appearance/Description slightly ethereal odor. Format: EU CLP/REACH Language: English (US) Preparation Date: 08/December/2014

Color	Colorless	Odor	Odorless or slightly ethereal.
Odor Threshold	Data lacking		
General Properties		•	•
Boiling Point	Data lacking	Melting Point	Data lacking
Decomposition Temperature	Data lacking	рН	Data lacking
Specific Gravity/Relative Density	Data lacking	Water Solubility	Data lacking
Viscosity	Data lacking	Explosive Properties	Data lacking
Oxidizing Properties:	Data lacking		
Volatility	-		
Vapor Pressure	Data lacking	Vapor Density	1.013 Air=1
Evaporation Rate	Data lacking		
Flammability			
Flash Point	Data lacking	UEL	Data lacking
LEL	Data lacking	Autoignition	Data lacking
Flammability (solid, gas)	Flammable gas.		
Environmental	•	-	·
Octanol/Water Partition coefficient	Data lacking		

9.2 Other Information

No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity

No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

Hazardous polymerization will not occur.

10.4 Conditions to avoid

Excess heat, sparks, open flame.

10.5 Incompatible materials

Although this gas is relatively less reactive than other methyl halide gases, the following materials are not compatible with fluorocarbons, such as this gas: strong acids, sodium, potassium, calcium, zinc, magnesium, powdered aluminum, and other active metals. Incompatible with strong oxidizers.

10.6 Hazardous decomposition products

Hydrogen fluoride, vinylidene fluoride and carbonyl fluoride.

Section 11 - Toxicological Information

11.1 Information on toxicological effects

GHS Properties	Classification	
Acute toxicity	EU/CLP	
	OSHA HCS 2012 • Classification criteria not met	

Aspiration Hazard	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Carcinogenicity	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Germ Cell Mutagenicity	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Skin corrosion/Irritation	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Skin sensitization	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
STOT-RE	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
STOT-SE	EU/CLP •Specific Target Organ Toxicity Single Exposure 3: Narcotic Effects OSHA HCS 2012 • Specific Target Organ Toxicity Single Exposure 3: Narcotic Effects
Toxicity for Reproduction	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Respiratory sensitization	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Serious eye damage/Irritation	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met

Potential Health Effects

Inhalation	
Acute (Immediate)	May affect the central nervous system. Symptoms may include dizziness, drowsiness, lethargy, coma and death.
Chronic (Delayed)	No data available
Skin	
Acute (Immediate)	Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite.
Chronic (Delayed)	No data available
Eye	
Acute (Immediate)	Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite.
Chronic (Delayed)	No data available
Ingestion	
Acute (Immediate)	Ingestion can cause burns similar to frostbite.
Chronic (Delayed)	No data available

Section 12 - Ecological Information

12.1 Toxicity

Material data lacking.

12.2 Persistence and degradability

Material data lacking.

12.3 Bioaccumulative potential

Material data lacking.

12.4 Mobility in Soil

Material data lacking.

12.5 Results of PBT and vPvB assessment

PBT and vPvB assessment has not been conducted for this material.

12.6 Other adverse effects

No studies have been found.

Section 13 - Disposal Considerations

13.1 Waste treatment methods

Product waste

user

Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste

Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	UN2454	Methyl fluoride	2.1	NDA	NDA
TDG	UN2454	METHYL FLUORIDE	2.1	NDA	NDA
IMO/IMDG	UN2454	METHYL FLUORIDE	2.1	NDA	NDA
IATA/ICAO	UN2454	Methyl fluoride	2.1	NDA	NDA

14.6 Special precautions for Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code 14.8 Other information

Not relevant.

This material is forbidden on passenger aircraft.

Section 15 - Regulatory Information

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

SARA Hazard Classifications

Acute, Fire, Pressure(Sudden Release of)

State Right To Know				
Component CAS MA NJ PA				
Methyl Fluoride	593-53-3	No	Yes	No

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	Inventory						
Component	CAS	Canada DSL	Canada NDSL	China	EUEINECS	EU ELNICS	
Methyl Fluoride	593-53-3	No	Yes	Yes	Yes	No	
	Inventory (Con't.)						
Component			CAS	TS	SCA		
Methyl Fluoride		59	3-53-3	Y	es		

Canada

Labor		
Canada - WHMIS - Classifications of Substances		
Methyl Fluoride	593-53-3	A
Canada - WHMIS - Ingredient Disclosure List		
Methyl Fluoride	593-53-3	Not Listed
	595-55-5	NOT LISTED
Canada - CEPA - Priority Substances List		
Methyl Fluoride	593-53-3	Not Listed
· Methyl i idolide	595-55-5	NOT LISTED
China		
⊂ Environment		
China - Ozone Depleting Substances - First Schedule		
Methyl Fluoride	593-53-3	Not Listed
· Werry Friddide	333-33-3	Not Listed
China - Ozone Depleting Substances - Second Schedule		
Methyl Fluoride	593-53-3	Not Listed
China - Ozone Depleting Substances - Third Schedule		
Methyl Fluoride	593-53-3	Not Listed
		Not Elotod
Other]
China - Annex I & II - Controlled Chemicals Lists		
Methyl Fluoride	593-53-3	Not Listed
China - Dangerous Goods List		
Methyl Fluoride	593-53-3	
China - Export Control List - Part I Chemicals		
Methyl Fluoride	593-53-3	Not Listed
	292-22-3	INUL LISLEU

Europe

Other EU - CLP (1272/2008) - Annex VI - Table 3.2 - Classification • Methyl Fluoride	593-53-3	Not Listed
EU - CLP (1272/2008) - Annex VI - Table 3.2 - Concentration Limits • Methyl Fluoride	593-53-3	Not Listed
EU - CLP (1272/2008) - Annex VI - Table 3.2 - Labelling • Methyl Fluoride	593-53-3	Not Listed

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U.S CERCLA/SARA - Hazardous Substances and their Reportable Quantities • Methyl Fluoride	593-53-3	Not Listed	
U.S CERCLA/SARA - Radionuclides and Their Reportable Quantities • Methyl Fluoride	593-53-3	Not Listed	
U.S CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs • Methyl Fluoride	593-53-3	Not Listed	
U.S CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs • Methyl Fluoride	593-53-3	Not Listed	
U.S CERCLA/SARA - Section 313 - Emission Reporting • Methyl Fluoride	593-53-3	Not Listed	
U.S CERCLA/SARA - Section 313 - PBT Chemical Listing Methyl Fluoride 	593-53-3	Not Listed	

United States - California

Environment		
 U.S California - Proposition 65 - Carcinogens List Methyl Fluoride 	593-53-3	Not Listed
U.S California - Proposition 65 - Developmental Toxicity Methyl Fluoride 	593-53-3	Not Listed
U.S California - Proposition 65 - Maximum Allowable Dose Levels (MADL) • Methyl Fluoride	593-53-3	Not Listed
U.S California - Proposition 65 - No Significant Risk Levels (NSRL) Methyl Fluoride 	593-53-3	Not Listed
U.S California - Proposition 65 - Reproductive Toxicity - Female • Methyl Fluoride	593-53-3	Not Listed
U.S California - Proposition 65 - Reproductive Toxicity - Male • Methyl Fluoride	593-53-3	Not Listed

United States - Pennsylvania

Labor U.S Pennsylvania - RTK (Right to Know) - Environmental Hazard List • Methyl Fluoride	593-53-3	Not Listed	
U.S Pennsylvania - RTK (Right to Know) - Special Hazardous Substances Methyl Fluoride 	593-53-3	Not Listed	

15.2 Chemical Safety Assessment

No Chemical Safety Assessment has been carriedout.

Section 16 - Other Information

Preparation Date: 08/December/2014 Revision Date: 08/December/2014

Last Revision Date	08/December/2014
Preparation Date	08/December/2014
Disclaimer/Statement of Liability	To the best of Air Liquide's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.
Koy to obbroviations	

Key to abbreviations NDA = No Data Available