

# Safety Data Sheet:

## Gas Mixture O2 (0-20% Vol.) + C4 (0-20% Vol.) + CO2 (Rest)

**Trade Name:** Gas Mixture: 0 – 20 Vol.-% 2,3,3,3 – Tetrafluoro – 2 – (Trifluoromethyl) Propanenitrile / Rest Carbon Dioxide



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### Section 1 – Chemical Product and Company Information

<b>Company:</b>  DILO Company Inc. & DILO Direct 11642 Pyramid Drive Odessa FL, 33556 TEL: 727-376-5593 <a href="http://www.dilo.com">www.dilo.com</a> <a href="http://www.dilodirect.com">www.dilodirect.com</a>	<b>Substance Name:</b>  <b>Gas Mixture:</b> 0 – 20 Vol.-% 2,3,3,3 – Tetrafluoro – 2 – (Trifluoromethyl) Propanenitrile / Rest Carbon Dioxide <b>Product Use:</b> Industrial Chemical <b>CAS No.:</b> See Section 3 <b>EC.No.:</b> See Section 3 <b>REACH No.:</b> See Section 3
Emergency: CHEMTREC 1-800-262-8200 / <a href="mailto:chemtrec@chemtrec.com">chemtrec@chemtrec.com</a> / <a href="http://www.chemtrec.com">http://www.chemtrec.com</a> / (DILO Cust#: 6701)	

### Section 2 – Hazards Identification

<b>Classification (GHS-US)</b>  Liquefied gas H280 Full text of H-phrases: see section 16	<b>OSHA / Hazard Classification Status:</b>  Not classified as hazardous according to OSHA Hazard Communication Standard, 29 CFR 1910.1200.
<b>Classification of the Substance or Mixture</b>  Gases Under Pressure - Liquefied Gas	<b>GHS Label Elements: Hazard Pictograms</b>  
<b>Signal Word (GHS – USA)</b>  Warning	<b>Hazard Pictograms Code:</b> GHS04 <b>Signal Word:</b> Danger <b>Hazard Statements:</b> H280: Contains gas under pressure; may explode if heated. <b>Precautionary Statements / Storage:</b> P403: Store in a well-ventilated place. P410: Protect from sunlight
<b>Precautionary Statements (GHS – USA)</b>  General: Read and follow all Safety Data Sheets (SDS) before use. Read the label before use. Keep out of reach of children. If medical advice is needed, have a product container or label at hand. Close the valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open the valve until connected to the equipment prepared for use. Use a back-flow preventative device in the piping. Use only equipment of compatible materials for construction. Always keep the container in an upright position.	<b>Hazard Statements (GHS – USA)</b>  Contains gas under pressure; may explode if heated. Asphyxiant in high concentrations. <b>Storage</b>  Protect from sunlight. Store in a well-ventilated location.

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<b>Response</b>	<b>Prevention</b>
Not Applicable	Use and store only outdoors or in a well-ventilated location.
<b>Hazards Not Otherwise Classified</b>	
In addition to any other important health or physical hazards, this product may cause Asphyxiation in high concentrations.	

### Section 3 – Composition / Information on Ingredients

<b>Substance Mixture</b>	<b>Chemical Name</b>				
This product is a mixture.	Gas Mixture:0 – 20 Vol.-% 2,3,3,3 – Tetrafluoro – 2 – (Trifluoromethyl) Propanenitrile / Rest Carbon Dioxide				
<b>Mixtures</b>					
Name	CAS Number	EC Number	Reach Number	Concentration (Vol. - %)	Classification according to Regulation (EC) No 1272/2008 [CLP]
Carbon Dioxide	124-38-9	204-696-9	*	> 80%	Press. Gas (Liq.), H280
2,3,3,3-Tetrafluoro-2-(Trifluoromethyl)Propanenitrile	42532-60-5	806-451-7	01-2120046668-46-0000	0% – 20%	Press. Gas (Liq.), H280; Acute Tox. 4 (Inhalation: gas), H332

Full text of H-statements sees chapter 16.

\*Listed in Annex IV / V REACH, exempt from registration.

### Section 4 – First aid measures

<b>Skin Contact</b>	<b>Inhalation</b>
For cold burns, wash off with water. If symptoms persist consult a doctor.	In case of difficulty in breathing, the victim should be brought to fresh air using a self-contained breathing apparatus. Keep the affected person warm and still. If symptoms persist consult a doctor. If breathing is irregular or stopped, administer artificial respiration.
<b>Eye Contact</b>	<b>Ingestion</b>
Thoroughly rinse your eyes with plenty of water. In case of eye irritation consult an ophthalmologist.	Ingestion is not considered a potential route of exposure.
<b>Most important symptoms and effects, both acute and delayed</b>	<b>Indication of any immediate medical attention and special treatment needed</b>
High concentrations may cause asphyxiation or respiration problems. Symptoms may include loss of mobility/consciousness. The victim may not be aware of asphyxiation.	<b>Notes for the doctor:</b> None.



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### Section 5 – Fire-fighting measures

<b>Suitable Extinguishing Media</b>	<b>Unsuitable Extinguishing Media</b>
Coordinate fire-fighting measures to the fire surroundings.	None known.
<b>Specific Hazards Arising from The Chemical.</b>	<b>Hazardous Thermal Decomposition Products</b>
Exposure to fire may cause containers to rupture/explode. Hazardous decomposition products may occur in case of fire.	Carbon Monoxide (CO) Hydrogen Fluoride (HF)
<b>Advice For Fire-Fighters in Case of Fire:</b>	<b>Special protective actions for fire-fighters</b>
Eliminate leaks and stop gas leakage. Use suitable breathing apparatus. Special protective equipment for firefighters. Wear a self-contained breathing apparatus and chemical protective clothing.	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact the supplier immediately for specialist advice. Move containers from the fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

### Section 6 – Accidental Release Measures

<b>For non-emergency personnel:</b>	<b>For emergency responders:</b>
Use personal protection equipment. Provide adequate ventilation. Bring people to safety. Be aware that gases can spread at ground level (heavier than air) and pay attention to the direction of the wind.	Personal protection equipment. Use appropriate respiratory protection.
<b>Environmental Precautions:</b>	<b>Methods And Material for Containment and Cleaning Up:</b>
Attempt to stop leaks.	Ventilate area.
<b>Reference To Other Sections:</b>	
See also sections 8 and 13.	

### Section 7 – Handling and Storage

<b>Precautions For Safe Handling</b>
<b>Protective Measures:</b> Handling of the substance per general occupational safety measures and instructions. Only experienced and properly instructed people should handle gases under pressure. Provide safety valve(s) in gas units. Ensure the entire gas system is checked for leaks before use (and periodically thereafter). When using do not smoke. Use only properly specified equipment that is suitable for this product, its supply pressure, and temperature. Contact your gas supplier if in doubt. Do not inhale the gas. Avoid products from being released into the atmosphere. Keep valve connection of vessels clean and free from contaminants, particularly oil, and water. Never use flames or electric heaters to increase the pressure in the tank. Never attempt to transfer gases from one cylinder/container to another.

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### Conditions For Safe Storage, Including Any Incompatibilities:

Observe all regulations and local requirements regarding the storage of containers. Containers should not be stored in conditions likely to cause corrosion. Do not allow back feed into the container. Containers should be stored in a vertical position and properly secured to prevent toppling. Keep the container below 50 °C in a well-ventilated place. Store containers in locations free from fire risk and away from heat and ignition sources. Protect from direct sunlight. Keep away from combustible materials.

### Section 8 – Exposure Controls / Personal Protection

Substance identity		Occupational exposure limits (AGW; 8h)		Source
Name	CAS Number	ml/m3 (ppm)	mg/m3	
Carbon Dioxide	124-38-9	5000	9100	TRGS 900, 25.02.2022
2,3,3,3-Tetrafluoro-2-(Trifluoromethyl)Propanenitrile	42532-60-5	TWA: 65ppm		Manufacturer Determined

DNEL (Derived no-effect level): No information available.

PNEC (Predicted No Effect Concentration): No information available.

<b>Appropriate Engineering Controls:</b> Observe all national/local regulations. Ensure adequate ventilation. Systems under pressure should be regularly checked for leakages. Ensure exposure is below occupational exposure limits (where available). Oxygen detectors should be used when asphyxiating gases may be released. Consider a work permit system, e.g., for maintenance activities. Before the product is used in any new process or trial, a careful study of material compatibility and safety should be made.	<b>Personal Protective Equipment:</b>  A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk.
<b>Eye / Face Protection:</b> Protect eyes, face, and skin from liquid splashes. Wear safety goggles with side shields. Wear full safety goggles and face shield when refilling or attaching and closing operations are performed.	<b>Skin / Hand Protection:</b>  When handling pressure vessels, wear working gloves, safety shoes, and, if necessary, face shields.
<b>Respiratory Protection:</b> Self-contained breathing apparatus (SCBA) within closed rooms /with insufficient oxygen supply /with significant release.	<b>Thermal Hazards:</b>  Cold-insulating gloves are used during transfer work or on and off work. Environmental exposure controls: Not available



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### Section 9 – Physical and Chemical Properties

Information on Basic Physical and Chemical Properties	
<b>Appearance</b>	
<b>Physical State:</b>	Gaseous.
<b>Odor:</b>	Odorless.
<b>Odor Threshold:</b>	The odor threshold is subjective and inadequate to warn for overexposure
<b>pH-Value:</b>	Not applicable for gas mixtures.
<b>Melting Point/Freezing Point:</b>	Not applicable for gas mixtures.
<b>Initial Boiling Point/Boiling Range:</b>	Not applicable for gas mixtures.
<b>Flashpoint:</b>	Not applicable for gas mixtures.
<b>Evaporation Rate:</b>	Not applicable for gas mixtures.
<b>Flammability:</b>	Non-flammable.
<b>Vapor Pressure [20 °C]:</b>	2,3,3,3-tetrafluoro-2-(trifluoromethyl) propanenitrile: 250 kPa CO2: 5730 kPa.
<b>Vapor Density:</b>	2,3,3,3-tetrafluoro-2-(trifluoromethyl) propanenitrile: 8.1 kg/m3 CO2: 1.8 kg/m3.
<b>Relative density (Air = 1):</b>	Heavier Than Air.
<b>Solubility (Water):</b>	2,3,3,3-tetrafluoro-2-(trifluoromethyl) propanenitrile: 0.272 ppm CO2: 2000 ppm.
<b>Partition coefficient noctanol/water:</b>	Not applicable for gas mixtures.
<b>Auto-ignition temperature:</b>	Non-flammable.
<b>Decomposition temperature:</b>	Not applicable.
<b>Viscosity:</b>	Not applicable.
<b>Explosive properties:</b>	Not applicable.
<b>Oxidizing properties:</b>	Not applicable.
<b>Other information</b>	Gas/vapors are heavier than air. May accumulate in confined spaces, particularly at or below ground level.

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### Section 10 – Stability and Reactivity

<b>Reactivity:</b>	No reactivity hazard other than the effects described in the sub-sections below.
<b>Chemical Stability:</b>	The individual components are stable at low temperatures.
<b>Possibility Of Hazardous Reactions:</b>	None.
<b>Conditions To Avoid:</b>	Stable under recommended storage and handling conditions (see section 7).
<b>Incompatible materials:</b>	No further relevant information was available.
<b>Hazardous Decomposition Products:</b>	For hazardous combustion decomposition products see section 5.2. Hydrogen fluoride and toxic fumes can be released at high temperatures.

### 11 – Toxicological Information

Information On Toxicological Effects	
<b>Acute Toxicity</b>	2,3,3,3-tetrafluoro-2-(trifluoromethyl) propanenitrile: LC50 inhalation rate (4h): > 10000 ppm Carbon dioxide: not classified.
<b>Skin Corrosion/Irritation:</b>	No known effects from this product.
<b>Eye Damage/Irritation:</b>	No known effects from this product.
<b>Sensitization To the Respiratory Tract/Skin:</b>	No known effects from this product.
<b>Germ Cell Mutagenicity:</b>	No known effects from this product.
<b>Carcinogenicity:</b>	No known effects from this product.
<b>Reproductive Toxicity:</b>	No known effects from this product.
<b>Specific Target Organ Toxicity (Single Exposure):</b>	2,3,3,3-tetrafluoro-2-(trifluoromethyl)propanenitrile NOAEL inhalation (rat, 28 d) = 516 ppm.
<b>Specific Target Organ Toxicity (Repeated Exposure)</b>	2,3,3,3-tetrafluoro-2-(trifluoromethyl)propanenitrile NOAEL inhalation (rat, 28 d) = 1512 ppm.
<b>Aspiration Hazard:</b>	Not applicable for gases and gas mixtures.

### 12 – Ecological Information

<b>Toxicity:</b>	No data available.
<b>Persistence And Degradability:</b>	No data available.
<b>Bioaccumulative Potential:</b>	No data available.
<b>Mobility In Soil:</b>	No data available.
<b>Results of PBT and vPvB assessment:</b>	Not classified as PBT or vPvB.
<b>Other Adverse Effects:</b>	Global warming potential (GWP): 2,3,3,3-tetrafluoro-2-(trifluoromethyl) propanenitrile: 2100 (100 years).

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### 13 – Disposal Considerations

<b>Waste Treatment Methods:</b>	When disposing, observe all international / national / local regulations. Do not discharge into drains, basements, work pits, and similar places where the accumulation of gas could be dangerous.
<b>Product / Packing Disposal:</b>	16 05 05 - gases in pressure container other than those mentioned in 16 05 04.

### 14 – Transport Information - In Accordance with DOT

<b>Road Transport</b>	
<b>UN-Number:</b>	UN 3163
<b>UN Proper Shipping Name:</b>	LIQUEFIED GAS, N.O.S. (2,3,3,3-tetrafluoro-2-(trifluoromethyl)propanenitrile, carbon dioxide)
<b>Transport Hazard Class(es):</b>	2
<b>Classification Code:</b>	2A
<b>Hazard Label(s):</b>	2.2 
<b>Tunnel Restriction Code:</b>	C/E
<b>Packing Group:</b>	-
<b>Environmental Hazards:</b>	-
<b>Special Precautions for User:</b>	P200
<b>IATA / Air Transport</b>	
<b>UN-Number:</b>	UN 3163
<b>UN Proper Shipping Name:</b>	LIQUEFIED GAS, N.O.S. (2,3,3,3-tetrafluoro-2-(trifluoromethyl)propanenitrile, carbon dioxide)
<b>Transport Hazard Class(es):</b>	2
<b>Hazard Label(s):</b>	2.2 
<b>Packing Group:</b>	-
<b>Environmental Hazards:</b>	-
<b>Special Precautions for User:</b>	Passenger and cargo aircraft 200 Cargo aircraft only 200





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<b>SEA Transport.</b>	
<b>UN-Number:</b>	UN 3163
<b>UN Proper Shipping Name:</b>	LIQUEFIED GAS, N.O.S. (2,3,3,3-tetrafluoro-2-(trifluoromethyl)propanenitrile, carbon dioxide)
<b>Transport Hazard Class(es):</b>	
<b>Hazard Label(s):</b>	2.2
<b>Emergency plan (EmS) - fire</b>	F - C
<b>Emergency plan (EmS) - leakage</b>	S - V
<b>Packing Group:</b>	-
<b>Environmental Hazards:</b>	-
<b>Special Precautions for User:</b>	P200
<b>Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code</b>	Not applicable



### 15 – Regulatory Information

<b>Safety, Health, and Environmental Regulations / Legislation Specific for The Substance or Mixture</b>	
<b>US Federal Regulations:</b>	TSCA 8(a) CDR Exempt/Partial exemption: Not Determined
<b>Canada Regulations</b>	N/A
<b>US State Regulations</b>	California - Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm
<b>State or Local Regulations</b>	Massachusetts – This material is not listed. New Jersey – This material is not listed. Pennsylvania – This material is not listed
<b>CEPA Requirements</b>	The components of this product are following the new substance notifications.
<b>This SDS has been prepared to meet the U.S. / OSHA Hazard Communication Standard, 29 CFR 1910.1200</b>	

### 16 – Other Information

<b>Full Text of H-phrases:</b>	Liquefied gas - Gases under pressure Liquefied gas.
<b>Full Text of H-phrases (Number and Full Text)</b>	H280: Contains gas under pressure; may explode if heated. H332: Harmful if inhaled. P403: Store in a well-ventilated place. P410: Protect from sunlight.



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**Key Literature References and Sources for Data** Toxicological and ecological data are based on the safety data sheets of the individual components of this mixture.

DILO recommends to all users of this product study this SDS to become aware of the product hazards and safety information. To promote the safe use of this product, all users and their management should advise, train and notify all employees, agents, and contractors of the information in this SDS document and of any other known product hazards and safety information. It is also recommended that all users and their management should furnish this information to each purchaser of the product and instruct each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of DILO. DILO believes that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of DILO, it is the user's obligation to determine the conditions for the safe use of the product. Finally, any revisions or edits made to this SDS should be provided by DILO. Any changes, edits, or revisions made outside of DILO should be validated with the corresponding agencies, authorities, and experts of the product.

<b>NFPA Health Hazard:</b> 3 <b>NFPA Flammability:</b> 1 <b>NFPA Instability:</b> 0 <b>NFPA Special Hazards:</b> None	
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<b>HMIS III Rating</b> <b>Health:</b> 2 <b>Flammability:</b> 1 <b>Physical Hazard:</b> 0 <b>Personal Protection:</b> X - See PPE section	<table border="1"><tr><td colspan="2">Perfluoroisobutyronitrile</td></tr><tr><td>HEALTH</td><td>2</td></tr><tr><td>FLAMMABILITY</td><td>1</td></tr><tr><td>Physical Hazard</td><td>0</td></tr><tr><td>PERSONAL PROTECTION</td><td>X</td></tr><tr><td colspan="2">HEALTH HAZARDS:</td></tr></table>	Perfluoroisobutyronitrile		HEALTH	2	FLAMMABILITY	1	Physical Hazard	0	PERSONAL PROTECTION	X	HEALTH HAZARDS:	
Perfluoroisobutyronitrile													
HEALTH	2												
FLAMMABILITY	1												
Physical Hazard	0												
PERSONAL PROTECTION	X												
HEALTH HAZARDS:													

**NOTE:** To the best of our knowledge, the information contained herein is accurate. Information contained in this material safety data sheet is offered without charge for use by technically qualified personnel at their discretion and risk.

All statements, technical information, and recommendations contained herein are based on tests and data which we believe to be reliable, but the accuracy or completeness thereof is not guaranteed, and no warranty of any kind is made with respect thereto.

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