



**SAFETY DATA SHEET**  
**RAY4049**  
(US, CN, EU Version for International Trade)

**SECTION 1: PRODUCT AND COMPANY IDENTIFICATION**

**PRODUCT NAME:** Carbon Dioxide **RAY4049**  
**PRODUCT CODES:**

**MANUFACTURER:** Tyco Electronics Corporation, a TE Connectivity Ltd. company  
**DIVISION:** Telecom Networks  
**ADDRESS:** 8000 Purfoy Road  
Fuquay-Varina, NC 27526

**SUPPLIERS** TE Connectivity Telecom OSP  
8000 Purfoy Road  
Fuquay-Varina, NC 27526

**EMERGENCY TELEPHONE NUMBERS:** US: CHEMTREC 1-800-424-9300  
CN: CHEMTREC 1-800-424-9300  
EU and Outside North America: 1-703-527-3887 (Collect calls accepted)

**NON-EMERGENCY HEALTH/SAFETY INFORMATION:** North America: 1- 888-557-8901

**CHEMICAL FAMILY:** Carbon dioxide, compressed gas

**PRODUCT USE:** For Non-Consumer, Industrial use only.

This product is considered a Hazardous Substance, Preparation or Article that is regulated under US-OSHA (2012); CAN-WHMIS (2015 HPR); ISO; UK-CHIP; or EU Directives (1272/2008/EC-Classification, Labelling and Packaging of Substances and Mixtures, 98/24/EC-Chemical Agents at Work, 2001/58/EC-MSDS Content, and 1907/2006/EC-REACH)), and an MSDS/SDS is required for this product considering that when used as recommended or intended, or under ordinary conditions, it may present a health and safety exposure or other hazard.

Additional Information

See Section 10 for temperatures to avoid.

**SECTION 2: HAZARDS IDENTIFICATION**


**GHS Classification:**

<b>Health Hazards</b> Acute Toxicity – 5 Skin Corrosion/Irritation – NL Serious Eye Damage/Irritation - NL Respiratory or Skin Sensitization – NL Germ Cell Mutagenicity – NL Carcinogenicity – NL (not classified by NTP or IARC) Reproductive/Developmental Toxicity – NL	<b>Specific Target Organ Toxicity:</b> • Single Exposure -- NL • Repeated Exposure – NL Aspiration Hazard -- NL  <b>Physical Hazards</b> Flammability – Not applicable Gas Under Pressure	<b>Environmental Hazards</b> Aquatic Toxicity – NL Hazardous to stratospheric ozone -- NL  <b>Other Non-GHS Ratings:</b> NFPA – 1—0—0
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NL: Not listed

**GHS Label: Compressed Gas**

**As required for Finished Goods according to End-Use Products Regulations**

<b>Signal Word:</b>	
<b>Warning</b>	
<b>Symbols:</b>	
	
<b><u>Hazard Statements</u></b>	<b><u>Precautionary Statements</u></b>
H280 Contains gas under pressure; may explode if heated.  H333 May be harmful if inhaled.	P410+P403 Protect from sunlight. Store in a well-ventilated place.  P304+P312 IF INHALED: Call a POISON CENTER or doctor/physician if you feel unwell.

<b>EMERGENCY OVERVIEW:</b>	Contact with pressurized gas may cause skin burns and frostbite. Contact with eyes may cause transient corneal damage. Carbon dioxide can displace oxygen and cause dizziness, disorientation, lack of coordination, excitation, headache and nausea. High concentrations (greater than 10% carbon dioxide) may result in unconsciousness, respiratory failure, coma and death. Prolonged or repeated exposure may cause damage of the retinal ganglion cells, central nervous system and heart. Avoid inhalation of gas. Avoid contact with eyes or skin. In case of eye or skin contact, immediately flush affected area(s) with lukewarm water for 15 minutes. Apply a sterile dry dressing and treat as a burn. Seek medical attention. If inhaled and respiratory symptoms or other symptoms of exposure develop, move victim to fresh air and seek medical attention. If breathing difficulties develop, qualified personnel should administer oxygen. If victim is not breathing, move to fresh air and immediately begin artificial respiration. Keep victim warm and quiet; seek immediate medical attention.
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**POTENTIAL HEALTH EFFECTS:**

- EYES:** Contact with pressurized gas may cause momentary freezing followed by slight swelling and transient corneal damage. Persons with pre-existing eye disorders may be more susceptible to the effects of this product. Contents under high pressure. Rupture or puncture of the container may create projectile hazard.
- SKIN:** Skin absorption of this product is unlikely. Contact with the pressurized gas may cause skin burns and frostbite. Persons with pre-existing skin disorders may be more susceptible to the effects of this material. Contents under high pressure. Rupture or puncture of the container may create projectile hazard.
- INGESTION:** Ingestion of this material is unlikely.
- INHALATION:** The presence of increased levels of carbon dioxide in the immediate area can displace oxygen and cause dizziness, disorientation, and lack of coordination, excitation, headache and nausea. High concentrations (greater than 10% carbon dioxide) may result in unconsciousness, respiratory failure, coma and death. Persons with respiratory or blood disease or whose oxygen carrying capacity is already compromised (e.g., anaemia or smokers) may be more sensitive to the effects of this material.

**ACUTE HEALTH HAZARDS:**

See above.

**CHRONIC HEALTH HAZARDS:**

Prolonged or repeated contact to carbon dioxide may cause damage to the retinal ganglion cells. Long-term exposure to carbon dioxide can alter the acid-base and calcium-phosphorus balance, resulting in metabolic acidosis and calcium deposits in soft tissue. Prolonged or repeated over exposure to carbon dioxide may also cause damage to the retinal ganglion cells, central nervous system and heart diminished contractile force).

**MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:**

Breathing disorders may be aggravated by exposure to this product. Exposure to high levels of carbon dioxide temporarily increases the breathing rate. Persons over 65 and those with a recent history of epilepsy, stroke, fainting, heart disease, respiratory disease, glaucoma, endocrine disease, gastric or duodenal ulcers, or high blood pressure should be excluded from working with high levels of carbon dioxide.



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Additional Information

None.

**SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS**

<b>INGREDIENTS (Chemical/Common Names):</b>	<b>CAS No.:</b>	<b>% by Wt:</b>
Carbon dioxide	124-38-9	100

NA – Not applicable/NE – Not Established/ND – Not determined

Additional Information

None.

**SECTION 4: FIRST AID MEASURES**

- EYE CONTACT:** For cold burns, irrigate with lukewarm water for at least 15 minutes. Apply a sterile dry dressing and treat as a burn. Seek medical attention.
- SKIN CONTACT:** For cold burns, irrigate with lukewarm water for at least 15 minutes. Apply a sterile dry dressing and treat as a burn. Seek medical attention.
- INGESTION:** Ingestion of this material is unlikely.
- INHALATION:** If respiratory symptoms or other symptoms of exposure develop, move victim to fresh air and seek medical attention. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention. If victim is not breathing, move to fresh air and immediately begin artificial respiration. Keep victim warm, quiet and seek immediate medical attention.

Additional Information

Note to Physician: Carbon dioxide is a potent cerebrovascular dilator.

**SECTION 5: FIRE-FIGHTING MEASURES**

**SUITABLE EXTINGUISHING MEDIA:**

Not flammable. Use appropriate extinguishing media for surrounding fire.

**SPECIAL FIRE FIGHTING PROCEDURES & PROTECTIVE EQUIPMENT:**

None Known.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:**

None Known.

**SPECIFIC HAZARDS IN CASE OF FIRE:**

None Known.

Additional Information

None,

**SECTION 6: ACCIDENTAL RELEASE MEASURES**

**PERSONAL PRECAUTIONS:**

Wear appropriate personal protection when responding, as specified under Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION below.

**ENVIRONMENTAL PRECAUTIONS:**

NA

**SPILL CONTAINMENT & CLEANUP METHODS/MATERIALS:**

Evacuate all personnel from affected area. Use self-contained breathing apparatus, if necessary, to enter area. Ventilate area of leak or move leaking container to a well-ventilated area. Take measures to stop the leak at the source.

Additional Information

None.



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**SECTION 7: HANDLING AND STORAGE**

**PRECAUTIONS FOR SAFE HANDLING AND STORAGE:**

**Handling:** Avoid contact with eyes and skin. Carbon dioxide gas reduces the amount of oxygen available for breathing. Keep container closed. Use only with adequate ventilation.

**OTHER PRECAUTIONS (e.g.; Incompatibilities):**

DO NOT enter storage area unless adequately ventilated. Store in a cool, dry, well-ventilated place away from incompatible materials and direct sunlight. Do not store cylinders in temperatures exceeding 120°F. Store carbon dioxide cylinders with the valve end up. Follow normal compressed gas storage recommendations. Protect containers from physical damage.

Additional Information

None.

**SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

**ENGINEERING CONTROLS/SYSTEM DESIGN INFORMATION:**

None required under normal use conditions.

**VENTILATION:**

General dilution ventilation is acceptable.

**RESPIRATORY PROTECTION:**

If ventilation is inadequate to keep airborne concentrations below the established exposure limits (see Exposure Guidelines, below), a NIOSH-approved positive pressure air-supplied respirator is recommended.

**EYE PROTECTION:**

Use safety glasses with side shield or goggles to prevent contact with eyes, as appropriate to the given operation.

**SKIN PROTECTION:**

Avoid contact with skin. Use cryogenic gloves to prevent skin contact, as appropriate to the given operation.

**OTHER PROTECTIVE CLOTHING OR EQUIPMENT:**

None required under normal use conditions.

**EXPOSURE GUIDELINES & LIMITS:**

ACGIH	Threshold Limit Value (TLV)	Carbon dioxide	5000	
	Short-Term Exposure Limit (STEL)	Carbon dioxide	30,000	ppm
Quebec	Permissible Exposure Value (PEV)	Carbon dioxide	5000	
	Short Term Exposure Limit (STEV)	Carbon dioxide	30,000	ppm
Ontario	Occupational Exposure Level (OEL)	Carbon dioxide	5000	
	Short Term Exposure Value	Carbon dioxide	30,000	ppm
U.S.	Permissible Exposure Limit (PEL)	Carbon dioxide	5000	
OSHA	Short-Term Exposure Limit (STEL)	NE	NE	ppm
TWA – 8-Hour Time Weighted Average/ NE – Not Established				

Additional Information

None known.

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

<b>APPEARANCE:</b>	Colourless gas
<b>ODOR:</b>	None
<b>ODOR THRESHOLD:</b>	NA
<b>PHYSICAL STATE:</b>	Gas
<b>pH:</b>	(3.7 for carbonic acid)
<b>BOILING POINT:</b>	-56.6°C at 5.2 atm
<b>MELTING POINT:</b>	NA
<b>FREEZING POINT:</b>	NA
<b>VAPOR PRESSURE (mm Hg):</b>	830 psi at 21° C
<b>VAPOR DENSITY (AIR = 1):</b>	1.52
<b>SPECIFIC GRAVITY (H2O = 1):</b>	NA
<b>EVAPORATION RATE (Butyl acetate=1):</b>	Much greater than 1



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**SOLUBILITY IN WATER:** NA  
**FLASH POINT:** NA  
**AUTO-IGNITION TEMPERATURE:** NA  
**LOWER EXPLOSIVE LIMIT (LEL):** NA  
**UPPER EXPLOSIVE LIMIT (UEL):** NA  
**PARTITION COEFFICIENT:** NA  
**VISCOSITY (centipoise @ 25° C):** NA  
**DECOMPOSITION TEMPERATURE:** 2000° C

**FLAMMABILITY/HMIS HAZARD CLASSIFICATIONS (US/CN/EU):**

HEALTH: 1      FLAMMABILITY: 0      REACTIVITY: 0

Additional Information  
None.

**SECTION 10: STABILITY AND REACTIVITY**

**STABILITY:** This chemical is stable under normal conditions at ambient temperature.  
**INCOMPATIBILITY (MATERIAL TO AVOID):** Avoid contact with alkali metals, alkaline earth metals, metal acetylides, chromium, titanium above 550°C and uranium above 750°C. Moist carbon dioxide can form carbonic acid.  
**HAZARDOUS DECOMPOSITION OR BY-PRODUCTS:** Carbon dioxide is a non-flammable gas. In the presence of an electrical discharge or temperatures in excess of 2000°C, it decomposes to form carbon monoxide and oxygen.  
**HAZARDOUS POLYMERIZATION:** Will not occur  
**CONDITIONS TO AVOID:** Protect containers from sources of heat.

Additional Information  
None.

**SECTION 11: TOXICOLOGICAL INFORMATION**

**ACUTE TOXICITY (Test Results Basis and Comments):**  
LC50 (inhalation, mouse) = 200,000 ppm/2 hours  
TCLo (inhalation, mouse) = 20,000 ppm/10 days – reproductive effects; TCLo (inhalation, rat) = 60,000 ppm/24 hrs – reproductive effects. Note: The reproductive effects were reportedly due to oxygen deprivation.  
**SUBCHRONIC/CHRONIC TOXICITY (Test Results and Comments):**  
Carbon dioxide is not listed by OSHA, NTP, or IARC as a carcinogen.

Additional Information  
None.

**SECTION 12: ECOLOGICAL INFORMATION**

**PERSISTENCE & DEGRADABILITY:**  
No data available on biodegradation.  
**BIO-ACCUMULATIVE POTENTIAL (Including Mobility):**  
No data available on bioaccumulation.  
**AQUATIC TOXICITY (Test Results & Comments):**  
LC<sub>50</sub> (Freshwater fish): NA  
LC<sub>50</sub> (Marine fish): NA

Additional Information

- No known effects on stratospheric ozone depletion.
- Volatile organic compounds: None.
- Water Endangering Class (WGK): NA

**SECTION 13: DISPOSAL CONSIDERATIONS**



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**WASTE DISPOSAL METHOD:**  
**HAZARDOUS WASTE CLASS/CODE:**

Follow local, State/Provincial, and Federal/National regulations applicable to as-used, end-of-life characteristics to be determined by end-user.

US - Not applicable to material as manufactured for distribution into commerce.  
CN - Not applicable to material as manufactured for distribution into commerce.  
EWC - Not applicable to material as manufactured for distribution into commerce.

Additional Information

Not Included - Dispose/Recycle as allowed by local jurisdiction for the end-of-life characteristics as-disposed.

**SECTION 14: TRANSPORT INFORMATION**

**GROUND - US-DOT/CAN-TDG/EU-ADR/APEC-ADR (See Notes 1 and 4):**

Proper Shipping Name	Carbon dioxide	ID Number	UN1013
Hazard Class	2.2	Labels	Non-Flammable Gas
Packing Group	NA		

**AIRCRAFT - ICAO-IATA (see Note 2):**

Proper Shipping Name	Carbon dioxide	ID Number	UN1013
Hazard Class	2.2	Labels	Non-Flammable Gas
Packing Group	NA		

**VESSEL - IMO-IMDG (See Note 3):**

Proper Shipping Name	Carbon dioxide	ID Number	UN1013
Hazard Class	2.2	Labels	Non-Flammable Gas
Packing Group	NA		
Marine pollutant	No		

Additional Information

1. The Transport Canada Limited Quantities Exemption (SOR/2008-34) applies to quantities of Class 2.2 materials at or below 0.125 litres in volume.
2. Maximum amount allowed in passenger aircraft is 75 kg or 150 kg in cargo aircraft.
3. No restrictions regarding stowage on marine vessels (on deck or below deck).
4. European Agreements Concerning the International Carriage of Dangerous Goods by Rail (RID) and by Road (ADR): Hazard ID No.: 20

**SECTION 15: REGULATORY INFORMATION**

**INVENTORY STATUS:**

All components are listed on the TSCA; EINECS/ELINCS; and DSL, unless noted otherwise below.

**U.S. FEDERAL REGULATIONS:**

**TSCA Section 8b - Inventory Status:** All chemicals comprising this product are either exempt or listed on the TSCA Inventory.

**TSCA Section 12b - Export Notification:** If the product contains chemicals subject to TSCA Section 12b export notification they are listed below:

<u>Chemical</u>	<u>CAS #</u>
None	NA

**CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT)**

Chemicals present in the product which could require reporting under the statute:

<u>Chemical</u>	<u>CAS #</u>
None	NA

**SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)**



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If the product contains chemicals subject to the reporting requirements of Section 313 of SARA Title III, they are listed below.

<u>Chemical</u>	<u>CAS #</u>	<u>% wt</u>
None	NA	NA

**CERCLA SECTION 311/312 HAZARD CATEGORIES:** Note that this product is exempt from these regulations.

Fire Hazard	No
Pressure Hazard	No
Reactivity Hazard	No
Immediate Hazard	No
Delayed Hazard	No

**STATE REGULATIONS (US):**

**California Proposition 65**

The following chemicals identified to exist in the product as distributed into commerce are known to the State of California to cause cancer, birth defects, or other reproductive harm:

<u>Chemical</u>	<u>CAS #</u>	<u>% Wt</u>
None	NA	NA

<u>California Consumer Product Volatile Organic Compound Emissions</u>
This product may be regulated as a Consumer Product for purposes of CARB/OTC VOC Regulations, as-sold for the intended purpose and into the industrial/Commercial supply chain (See Section 12 for VOC information).

**INTERNATIONAL REGULATIONS (Non-US):**

**Canadian Domestic Substance List (DSL)**

All ingredients remaining in the product as distributed into commerce are included on the Domestic Substances List.

**WHMIS Classifications**

Class A – Compressed Gas.

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations and the SDS contains all the information required by the Hazardous Products Regulations.

**NPRI and Ontario Regulation 127/01**

This product contains the following chemicals subject to the reporting requirements of Canada NPRI and/or Ont. Reg. 127/01:

<u>Chemical</u>	<u>CAS #</u>	<u>% Wt</u>
None	NA	NA

**European Inventory of Existing Commercial Chemical Substances (EINECS)**

All ingredients remaining in the product as distributed into commerce are exempt from, or included on, the European Inventory of Existing Commercial Chemical Substances.

**European Communities (EC) Hazard Classification according to directives 1272/2008/EC—Classification, Labelling and Packaging of Substances and Mixtures and 98/24/EC—Chemical Agents at Work.**

Please refer to the GHS Classifications and hazard/precaution statements in Section 2.

**Additional Information**

This product may be regulated under additional regulations and laws not identified above, such as for uses other than described or as-designed/as-intended by the manufacturer, or for distribution into specific domestic destinations.

**SECTION 16: OTHER INFORMATION**

**OTHER INFORMATION:**

Distribution into Quebec to follow Canadian Hazardous Product Regulations.

Distribution into the EU to follow applicable Directives to the Use, Import/Export of the product as-sold.

**REFERENCES:**

1. ACGIH (2011), Guide to Occupational Exposure Values, American Conference of Governmental Industrial Hygienists, Cincinnati, Ohio.
2. ACGIH (2015), 2013 TLVs and BEIs Based on the Documentation of the Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, Cincinnati, Ohio.
3. CSST (2015) Laws and Corresponding Regulations of Québec, "Regulation respecting the quality of the work environment, An Act respecting occupational health and safety" (L.R.Q., c. S-2.1, r. 11), La Commission de la Santé





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- et de la Sécurité du Travail du Québec. Updated 1 March 2015.
4. Health Canada (2002), Substances Assessed For Carcinogenicity.
  5. IARC (2015) "Agents Classified by the IARC Monographs, Volumes 1–111," International Agency for Research on Cancer, World Health Organization, Lyon, France. Accessed at <http://monographs.iarc.fr/ENG/Classification/ClassificationsAlphaOrder.pdf>
  6. Ontario Ministry of Labour (2014) "Control of Exposure to Biological or Chemical Agents," R.R.O. 1990, Ontario Regulation 833, as amended by O. Reg. 274/14. Updated 15 December 2014.
  7. U.S. Department of Labor, Occupational Safety and Health Administration (2006), "Air Contaminants," 29 CFR 1910.1000.
  8. WorkSafeBC (2012), "Occupational Health and Safety Regulation, Section R5.48," WorkSafeBC (British Columbia Ministry of Labour), Vancouver, British Columbia.

**MSDS/SDS PREPARATION INFORMATION:**

DATE OF ISSUE: **1 July 2015**

SUPERCEDES: **27 January 2012**

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**END**