

MATERIAL SAFETY DATA SHEET

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1. CHEMICAL PRODUCT

PRODUCT NAME: CARBON MONOXIDE

SYNONYMS: Carbonic oxide, exhaust gas

2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	Exposure Limits (PPM)			
				ACGIH TLV	OSHA PEL	MAC	Other STEL
CARBON MONOXIDE	CO	630-08-0	99+%	25	50	30	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIAN

3. HAZARD IDENTIFICATION

*** EMERGENCY OVERVIEW ***

Poisonous, flammable, odorless, high pressure gas.
Acts on blood causing damage to central nervous system.
Can be fatal even with adequate oxygen.
Can form explosive mixtures with air.

POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation

ACUTE EFFECTS: Carbon monoxide is highly toxic by the reduction of blood's oxygen carrying capacity resulting in oxygen starvation of body cells. Symptoms include shortness of breath, headache, confusion, nausea, dizziness, and unconsciousness.

CHRONIC EFFECTS: Cardiovascular problems.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None known

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US ONLY):

NTP - No

IARC MONOGRAPHS - No

OSHA REGULATED - No

4. FIRST AID MEASURES

INHALATION: Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

EYE CONTACT: None

SKIN CONTACT: None

INGESTION: None

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: Treat aggressively with 100% oxygen. Use non-rebreather mask.

5. FIRE FIGHTING MEASURES

FLASH POINT: Gas

AUTOIGNITION TEMPERATURE: 700 deg.C

FLAMMABLE LIMITS: In air @ 1 atm

LOWER: 12.5%

UPPER: 74%

EXTINGUISHING MEDIA: Carbon monoxide is very flammable. For small fires, let burn unless leak can be stopped. For large fires, use water spray, fog, or regular foam.

SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT: Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray. If possible, stop the product flow or let it burn itself out.

HAZARDOUS COMBUSTION PRODUCTS: None

UNUSUAL FIRE AND EXPLOSION HAZARDS: Cylinder rupture may occur under fire conditions. Severe when exposed to heat or flame. May form explosive mixture in air. A potential explosion hazard exists if a CO fire is extinguished without turning off the CO source due to the possibility of reignition.

6. ACCIDENTAL RELEASE MEASURES

CLEAN UP PROCEDURES: Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor area. Shut off source if possible and remove source of heat.

SPECIALIZED EQUIPMENT: None

7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use. Store away from heat, flame, and sparks.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

EYE / FACE PROTECTION: Safety glasses

SKIN PROTECTION: None

RESPIRATORY PROTECTION: In case of leakage, use self-contained breathing apparatus.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Odorless

PHYSICAL PRESSURE: Gas

VAPOR PRESSURE: @20 deg.C: >760 mm Hg

VAPOR DENSITY (AIR=1): 0.968

BOILING POINT (C): -191.5

SOLUBILITY IN WATER: Insoluble

SPECIFIC GRAVITY (H₂O=1): N/Ap

EVAPORATION RATE: Gas

ODOR THRESHOLD: N/Ap

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas. Storage near a heat source.

MATERIALS TO AVOID: Reacts with noncorrosive oxidizing materials, BrF₃, CS₂O, ClF₃, IF₇, NF₃, O₂, OF₂, and Ag₂O.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: None

11. TOXICOLOGICAL INFORMATION

LETHAL CONCENTRATION (LC₅₀): 3760 ppm, rat 1 hour.

LETHAL DOSE 50 (LD₅₀): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

12. ECOLOGICAL INFORMATION

No adverse ecological effects are expected.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Waste material may be burned in a controlled manner in an approved incinerator. The cylinder can be placed in a pit to burn CO to CO₂ under controlled conditions. Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.

14. TRANSPORT INFORMATION

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Carbon monoxide, compressed
HAZARD CLASS: 2.3 (poison), Hazard Zone D
IDENTIFICATION NUMBER: UN1016
REPORTABLE QUANTITIES: None
LABELING: POISON GAS, FLAMMABLE GAS

ADR / RID (EU Only): Class 2, 1tf

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 211-128-3

NUMBER IN ANNEX 1 OF DIR 67/548: Material is listed in annex 1.

EU CLASSIFICATION: N/Av

R: 12,23

S: 9,23

16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable, N/Av - Not Available, NE - None Established

Use proper connections; do not use adapters. Do not force fit!!

DISCLAIMER

The information and recommendations in this Material Safety Data Sheet relate only to the specific material mentioned herein and do not relate to use otherwise ie.in combination with any other material or in any process.

The information and recommendations herein are taken from our extensive experiences and the data contained in recognized references and believed by us to be true. Refrigeration group of companies make no warranties either expressed or implied with respect there to and assume no liability in connection with the use of such information and recommendation.