

4. CHEMICAL AND PHYSICAL INFORMATION

4.1 CHEMICAL IDENTITY

The chemical identity of carbon monoxide is shown in [Table 4-1](#).

4.2 PHYSICAL AND CHEMICAL PROPERTIES

Carbon monoxide is a highly poisonous, odorless, colorless, and tasteless gas. It is very flammable in air over a wide range of concentrations (George 2001) and burns in air with a bright blue flame (O'Neil et al. 2006). It becomes a liquid at 81.62 K (-191.53 °C) and is insoluble in water above 70 °C (George 2001). The physical and chemical properties of carbon monoxide are shown in [Table 4-2](#).

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Table 4-1. Chemical Identity of Carbon Monoxide

Characteristic	Carbon monoxide ^a
Synonym(s)	Carbon oxide, flue gas, monoxide
Registered trade name(s)	
Chemical formula	CO ^b
Chemical structure	:C≡O:
Identification numbers:	
CAS registry	630-08-0 ^b
NIOSH RTECS	FG350000
EPA hazardous waste	No data
OHM/TADS	No data
DOT/UN/NA/IMDG shipping	1016 ^c ; 9202 ^{d,e}
HSDB	903
NCI	No data

^aAll information obtained from HSDB 2009, except where noted.

^bO'Neil 2006

^cCompressed

^dNIOSH 2005

^eCryogenic liquid

CAS = Chemical Abstracts Service; DOT/UN/NA/IMDG = Department of Transportation/United Nations/North America/International Maritime Dangerous Goods Code; EPA = Environmental Protection Agency; HSDB = Hazardous Substances Data Bank; NCI = National Cancer Institute; NIOSH = National Institute for Occupational Safety and Health; OHM/TADS = Oil and Hazardous Materials/Technical Assistance Data System; RTECS = Registry of Toxic Effects of Chemical Substances

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Table 4-2. Physical and Chemical Properties of Carbon Monoxide

Property	Carbon monoxide ^a
Molecular weight	28.01
Color	Colorless
Physical state	Gas
Melting point	-205 °C
Boiling point	-191.5 °C
Density at 25 °C	1.145 g/L at 25 °C and 1 atm ^{3b}
Odor	Odorless
Odor threshold:	
Water	No data
Air	No data
Solubility:	
Water at 20 °C	2.3 mL/100 mL
Organic solvents	Appreciably soluble in ethyl acetate, chloroform, and acetic acid; freely absorbed by a concentrated solution of cuprous chloride in hydrochloric acid or ammonium hydroxide; solubility in methanol and ethanol about 7 times as great as in water; soluble in benzene
Partition coefficients:	
Log K _{ow}	Not applicable
Log K _{oc}	Not applicable
Henry's law constant at 25 °C	57,978.5 atm/mol fraction (~1.04 atm·m ³ /mole) ^c
Autoignition temperature	605 °C ^d
Flashpoint	Flammable gas ^d
Flammability limits	Upper limit 74.2%; lower limit 12.5% ^e
Conversion factors	1 ppm=1.16 mg/m ³ at 20 °C and 1 atm
Explosive limits	No data

^aAll information obtained from HSDB 2009, except where noted.

^cYaws et al. 1999

^bLide 2008

^dIPCS 2008

^eGeorge 2001