



The Steel Company of Canada

Raw Coke Oven Gas Safety Data Sheet (SDS)

Section 1 – Identification

- 1(a) Product Identifier Used on Label:** Raw Coke Oven Gas (COG)
1(b) Other Means of Identification: Sour Coke Oven Gas (COG)
1(c) Recommended Use of the Chemical and Restrictions on Use: Fuel gas or intermediate by-product.
1(d) Name, Address, and Telephone Number:
 Stelco Inc.
 386 Wilcox Street
 Hamilton, ON L8L 8K5
 Phone number: (905) 528-2511 (8:00 am to 5:00 pm)
1(e) Emergency Phone Number: 1-888-CAN-UTEC (226-8832) or 613-996-6666

Section 2 – Hazard(s) Identification

2(a) Classification of the Chemical: Raw COG is considered a hazardous material according to the criteria specified in the federal Hazardous Products Regulations. The categories of Health Hazards as defined in “GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS)” have been evaluated. Refer to Section 3, 8 and 11 for additional information.

2(b) Signal Word, Hazard Statement(s), Symbols and Precautionary Statement(s):

Hazard Symbol	Hazard Classification	Signal Word	Hazard Statement(s)	Precautionary Statement(s):
	Flammable Gases- 1A	Danger	Extremely flammable gas. Toxic if inhaled. May cause genetic defects. May cause cancer.	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
	Acute Toxicity-Inhalation - 3		May damage fertility or the unborn child.	In case of leakage, eliminate all ignition sources. Store in well-ventilated place. Keep container tightly closed. Do not breathe gas. Use only outdoors or with adequate ventilation.
	Germ Cell Mutagenicity - 1B Carcinogenicity -1A Reproductive Toxicity -1A Single Target Organ Toxicity (STOT) Following Single Exposure -2 STOT Repeated Exposure - 1		Causes severe skin burns and serious eye damage. May cause central nervous system depression, respiratory irritation, drowsiness or dizziness and damage to lungs, liver and blood cells.	Wear protective gloves/protective clothing/eye protection/face protection. Wash hands thoroughly after handling. Obtain, read and follow all safety instructions before use.
	Skin Corrosion -1B Eye Irritation - 2A		Causes damage to the heart, blood forming tissues and central nervous system through prolonged or repeated exposure. May displace oxygen and cause rapid suffocation.	Do not eat, drink or smoke when using this product. If exposed, concerned or feel unwell: Get emergency medical help/advice immediately. If in eyes: Immediately rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical help.
None	Simple Asphyxiant			If on skin: Take off immediately all contaminated clothing and wash it before reuse. Immediately rinse with water. Wash contaminated clothes before reuse. If inhaled: Remove person to fresh air and keep comfortable for breathing. Get emergency medical help immediately. If swallowed: Rinse mouth. Do NOT induce vomiting. Store locked up. Dispose of contents in accordance with federal, provincial and local regulations.

2(c) Hazards Not Otherwise Classified: None Known

2(d) Unknown Acute Toxicity Statement (mixture): None Known

Section 3 – Composition/Information on Ingredients

3(a-c) Chemical Name, Common Name (Synonyms), CAS Number and Other Identifiers, and Concentration:

Chemical Name	CAS Number	% weight
Hydrogen	1333-74-0	52-59
Methane	74-82-8	26-33
Nitrogen	7727-37-9	1.9-5.7
Carbon Monoxide	630-08-0	4.5-7.0
Ethylene	74-85-1	2.0-2.8
Carbon Dioxide	124-38-9	1.4-2.1
Hydrogen Sulphide	7783-06-4	0.4-1.2
Hydrogen Cyanide	74-90-8	0-1.2
Ethane	74-84-0	0.7 – 1.1
Ammonia	7664-41-7	0-1.1
Benzene	71-43-2	0 – 1.0
Carbon Disulphide	75-15-0	0-0.3
Toluene	108-88-3	0.1-0.2

CAS- Chemical Abstract Service

Section 4 – First-aid Measures

4(a) Description of Necessary Measures: If exposed concerned or feel unwell: Get medical advice/attention.

- **Inhalation:** Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center or doctor. If eye irritation persists: Get medical advice/attention.
- **Eye Contact:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- **Skin Contact:** This material is a gas under normal atmospheric conditions. If on skin (or hair): Take off immediately all contaminated clothing and wash it before reuse. Rinse skin with water/shower.
- **Ingestion:** This material is a gas under normal atmospheric conditions and ingestion is unlikely. If swallowed: Rinse mouth. Do NOT induce vomiting.

4(b) Most Important Symptoms/Effects, Acute and Delayed (Chronic):

Acute Effects:

- **Inhalation:** Breathing mist and vapors may cause irritation to the respiratory tract. Carbon monoxide, hydrogen cyanide and hydrogen sulphide are fatal if inhaled.
- **Eye:** May cause irritation.
- **Skin:** May cause irritation.
- **Ingestion:** This material is a gas under normal atmospheric conditions and ingestion is unlikely.

Chronic Effects:

- **Inhalation:** Prolonged or repeated exposures may result in respiratory disorders. Chronic obstructive pulmonary disease may also develop from fibrous obstruction of the smaller airways. Repeated exposure may cause chronic cough, bronchitis, asthma, vocal cord dysfunction, reactive airways disease, and lung fibrosis.
- **Eye:** May cause irritation
- **Skin:** Prolonged or repeated exposures may result in irritation and dermatitis.
- **Ingestion:** Repeated or prolonged ingestion of harmful amounts of this product as distributed is unlikely.

4(c) Immediate Medical Attention and Special Treatment: Treat symptomatically.

Section 5 – Fire-fighting Measures

5(a) Suitable (and unsuitable) Extinguishing Media: Leaking gas fire: Do not extinguish unless leak can be stopped safely, or fire is immediately impacting human life. Eliminate all ignition sources if safe to do so. Extinguish with foam, carbon dioxide, dry powder or water fog, once leak is stopped. Do not use a solid stream of water as it may scatter and spread the fire.

5(b) Specific Hazards Arising from the Chemical: Irritating vapors/gas may form in fire. Tactical considerations must be made regarding gas fed fires and if it is safe to fully extinguish visible flame before shut off of the gas is accomplished. Unburned gas may result and seek a source of ignition.

Section 5 – Fire-fighting Measures (continued)

5(c) Special Protective Equipment and Precautions for Fire-fighters: Self-contained NIOSH-approved respiratory protection and full protective clothing should be worn when fumes and/or smoke from fire are present. Firefighters should wear full face-piece self-contained breathing apparatus and chemical protective clothing with thermal protection. Direct water stream will scatter and spread flames and, therefore, should not be used. Evacuate area. Remove pressurized gas cylinders from the immediate vicinity. Cool containers exposed to flames with water until well after the fire is out. Close the valve if no risk is involved. Do not extinguish a leaking gas fire unless leak can be stopped. If leak cannot be stopped and no danger to surrounding area allow the fire to burn out. Fight fire from a protected location. Prevent buildup of vapors or gases to explosive concentrations.

Section 6 - Accidental Release Measures

6(a) Personal Precautions, Protective Equipment and Emergency Procedures: If leakage cannot be stopped, evacuate area. Gas Services to perform testing before entering the area.

6(b) Methods and Materials for Containment and Clean Up: Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, provincial, and local regulations. Follow applicable provincial and federal requirements.

Section 7 - Handling and Storage

7(a) Precautions for Safe Handling: Keep away from heat/sparks/open flames/hot surfaces. No smoking. Eliminate all ignition sources if safe to do so. Practice good housekeeping.

7(b) Conditions for Safe Storage, Including any Incompatibilities: Store in well-ventilated place. If feasible, store locked up.

Section 8 - Exposure Controls/Personal Protection

8(a) Occupational Exposure Limits (OELs): The following exposure limits are offered as reference, for an experienced industrial hygienist to review.

Ingredients	Ontario TWA ¹	ACGIH TLV ²	NIOSH REL ³	IDLH ⁴
Hydrogen	Simple asphyxiant	Simple asphyxiant	NE	NE
Methane	1000 ppm	Simple asphyxiant	NE	NE
Nitrogen	NE	NE	NE	NE
Carbon Monoxide	25 ppm	25 ppm	35 ppm “C” 200 ppm	1,200 ppm
Ethylene	200 ppm	200 ppm	NE	NE
Carbon Dioxide	5000 ppm “STEL” 30,000 ppm	5000 ppm “STEL” 30,000 ppm	5000 ppm “STEL” 30,000 ppm	40,000 ppm
Hydrogen Sulphide	10 ppm “STEL” 15 ppm	1 ppm “STEL” 5 ppm	“C” 10 ppm (10-min)	100 ppm
Hydrogen Cyanide	“C” 4.7 ppm (as CN), skin	“C” 4.7 ppm (as CN), skin	“STEL” 4.7 ppm, skin	50 ppm
Ethane	1000 ppm	Simple asphyxiant	NE	NE
Oxygen	NE	NE	NE	NE
Ammonia	25 ppm “STEL” 35 ppm	25 ppm “STEL” 35 ppm	25 ppm “STEL” 35 ppm	300 ppm
Benzene	0.5 ppm, skin “STEL” 2.5 ppm	0.02 ppm, skin “	0.1 ppm “STEL” 1.0 ppm	500 ppm
Carbon Disulphide	1 ppm, skin	1 ppm, skin	1.0 ppm “STEL” 10 ppm	500 ppm
Toluene	20 ppm	20 ppm	100 ppm “STEL” 150 ppm	500 ppm

NE - None Established

1. Time-Weighted Average (TWA) limits established by the Ontario Ministry of Labour are 8-hour TWA concentrations unless otherwise noted. A Short Term Exposure Limit (STEL) is defined as the maximum concentration to which workers can be exposed for a short period of time (15 minutes) for only four times throughout the day with at least one hour between exposures.
2. Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted. ACGIH TLVs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes. A Short Term Exposure Limit (STEL) is defined as the maximum concentration to which workers can be exposed for a short period of time (15 minutes) for only four times throughout the day with at least one hour between exposures.
3. The National Institute for Occupational Safety and Health Recommended Exposure Limits (NIOSH-REL) Compendium of Policy and Statements. NIOSH, Cincinnati, OH (1992). NIOSH is the U.S. federal agency designated to conduct research relative to occupational safety and health. As is the case with ACGIH TLVs, NIOSH RELs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
4. The “immediately dangerous to life or health air concentration values (IDLHs)” are used by NIOSH as part of the respirator selection criteria and were first developed in the mid-1970's by NIOSH. The Documentation for Immediately Dangerous to Life or Health Concentrations (IDLHs) is a compilation of the rationale and sources of information used by NIOSH during the original determination of 387 IDLHs and their subsequent review and revision in 1994.

Section 8 - Exposure Controls/Personal Protection (continued)

8(b) Appropriate Engineering Controls: Local exhaust ventilation should be used to control the emission of air contaminants. General dilution ventilation may assist with the reduction of air contaminant concentrations. Emergency eye wash stations and deluge safety showers should be available in the work area.

8(c) Individual Protection Measures:

- **Respiratory Protection:** Seek professional advice prior to respirator selection and use. Follow CSA Standard Z94.4-11 "Selection Care and Use of Respirators" for additional information. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. Concentration in air of the various contaminants determines the extent of respiratory protection needed. Use a positive-pressure-demand, full-face, supplied air respirator or SCBA for concentrations above 50 times the exposure limit. If exposure is above the IDLH for any of the constituents, or there is a possibility of an uncontrolled release or exposure levels are unknown, then use a positive-demand, full-face, supplied air respirator with escape bottle or SCBA.

Warning! Air-purifying respirators both negative-pressure, and powered-air do not protect workers in oxygen-deficient atmospheres.

- **Eyes:** Wear appropriate eye protection to prevent eye contact.
- **Skin:** Wear appropriate personal protective clothing to prevent skin contact. This may include fire retardant clothing.
- **Other Protective Equipment:** An eyewash fountain and deluge shower should be readily available in the work area.

Section 9 - Physical and Chemical Properties

9(a) Physical State: Gas	9(j) Decomposition Temperature: ND
9(b) Colour: Yellowish brown	9(k) pH: NA
9(c) Odour: Organic odour	9(l) Kinematic Viscosity: ND
9(d) Melting Point/Freezing Point: NA	9(m) Solubility: Partial
9(e) Initial Boiling Point and Boiling Range: NA	9(n) Partition Coefficient n-octanol/water: NA
9(f) Flammability (solid, gas): Flammable gas	9(o) Vapor Density (Air = 1): 0.39
9(g) Upper/lower Flammability or Explosive Limits: 75%-4%	9(p) Relative Density: 0.589 SG
9(h) Flash Point: NA	9(q) Vapor Pressure: NA
9(i) Auto-ignition Temperature: ND	9(r) Particle Characteristics: NA

NA - Not Applicable

ND - Not Determined for product as a whole

Section 10 - Stability and Reactivity

- 10(a) Reactivity:** May react suddenly with air, oxygen, halogens and with fine dispersed metal dust.
- 10(b) Chemical Stability:** Stable under normal storage and handling conditions.
- 10(c) Possibility of Hazardous Reaction:** No Data Found
- 10(d) Conditions to Avoid:** Static discharge, sparks, open flames and other ignition sources.
- 10(e) Incompatible Materials:** Oxidizing agents, halogens
- 10(f) Hazardous Decomposition Products:** Can produce carbon dioxide and carbon monoxide.

Section 11 - Toxicological Information

11(a-k) Information on Toxicological Effects: The following toxicity data has been determined for **Raw COG** by using the information available for its components applied to the guidance on the preparation of an SDS under the GHS requirements of WHMIS:

Hazard Classifications	Hazard Category	Hazard Symbols	Signal Word	Hazard Statement
Acute Toxicity-Inhalation (covers Categories 1-4)	3 ^a		Danger	Toxic if inhaled.
Skin Corrosion/Irritation (covers Categories 1A, 1B, and 2)	1B ^b		Danger	Causes severe skin burns and eye damage.
Serious Eye Damage/Eye Irritation (covers Categories 1, 2A and 2B)	2A ^c		Warning	Causes serious eye irritation.
Germ Cell Mutagenicity (covers Categories 1A, 1B and 2)	1B ^f		Danger	May cause genetic defects.

Section 11 - Toxicological Information (continued)

11(a-k) Information on Toxicological Effects: (continued)				
Hazard Classifications	Hazard Category	Hazard Symbols	Signal Word	Hazard Statement
Carcinogenicity (covers Categories 1A, 1B and 2)	1A ^g		Danger	May cause cancer.
Reproductive Toxicity (covers Categories 1A, 1B and 2)	1A ^h		Danger	May damage fertility or the unborn child.
Specific Target Organ Toxicity (STOT) Following Single Exposure (covers Categories 1-3)	2 ⁱ		Warning	May cause central nervous system depression, respiratory irritation, drowsiness or dizziness and damage to lungs, liver and blood cells
STOT following Repeated Exposure (covers Categories 1 and 2)	1 ^j		Danger	Causes damage to heart, blood forming tissues and central nervous system through prolonged or repeated exposure
Simple Asphyxiant	Single Category	No Pictogram	Warning	May displace oxygen and cause rapid suffocation

* NR Not Rated - Available data does not meet criteria for classification.

The Toxicological data listed below are presented regardless to classification criteria. Individual hazard classification categories where the toxicological information has met or exceeded a classification criteria threshold are listed above.

a. No LC₅₀ or LD₅₀ has been established for Raw COG. The following data has been determined for the components:

- **Carbon Monoxide:** Rat LD₅₀ = 1300 ppm (REACH)
Mouse LC₅₀ = 2444 ppm
- **Ethylene:** LC₅₀ > 57000 ppm/4hr
- **Hydrogen Sulphide:** Rat LC₅₀ = 444 ppm (REACH)
- **Ammonia:** Rat LC₅₀ = 13770 mg/m³ (REACH)
Rat LC₅₀ = 2000 ppm (IUCLID)
- **Hydrogen Cyanide:** Rat LC₅₀ < 68 mg/m³ Rat LC₅₀ = 144 mg/m³ (REACH)
- **Carbon Dioxide:** Rat LC₅₀ = 30000 – 50000 ppm
- **Benzene:** Rat LD₅₀ 3.8 (2.9-4.8) and 5.6 (4.0-7.8) ml/kg young and old
resp. Rabbit LD₅₀ : > 9.4 ml/kg (abraded skin)
- **Carbon disulphide:** Rat LC₅₀ = 10.35 mg/L (REACH)
Mouse 2 hr LC₅₀ = 10 mg/L (IUCLID)
- **Toluene:** Rat LD₅₀ (rat) > 5000 mg/kg (REACH)
Rabbit LD₅₀ > 5000 mg/kg (REACH)
Rat LC₅₀ > 20 mg/L (REACH) LD₅₀ (rat) i.p. = 1332 mg/kg (IUCLID)

b. No Skin Irritation data available for **Raw COG** as a mixture. The following Skin Irritation information was found for the components:

- **Benzene:** Mild to moderate in rabbits
- **Toluene:** Toluene is irritating to rabbit skin (REACH and IUCLID)
- **Carbon Disulphide:** Highly irritating in rabbits, Human irritation.
- **Ammonia:** Ammonia is irritating to rabbit skin (REACH and IUCLID)

c. No Eye Irritation data available for Raw COG as a mixture. The following Eye Irritation information was found for the components:

- **Benzene:** Moderate to severe irritant; may cause corneal injury.
- **Toluene:** Slight irritation (REACH and IUCLID) Severe Eye Irritant in humans (NLM HSD)
- **Carbon Disulphide:** Highly irritating in Rabbits
- **Hydrogen Sulphide:** 20 – 50 ppm (human)

d. No Skin (Dermal)/Respiratory Sensitization data available for **Raw COG** as a mixture or its individual components.

e. No Aspiration Hazard data available for **Raw COG** as a mixture or its individual components.

f. No Germ Cell Mutagenicity data available for **Raw COG** as a mixture. The following Germ Cell Mutagenicity information was found for the components:

- **Benzene:** Chronic overexposure can cause chromosomal aberrations in animals and humans. Also, may induce sister-chromatid exchange (SCE), and micronuclei both *in vivo* and *in vitro*. Benzene overexposure has been shown to induce aneuploidy in dividing cells. Classified as a potential germ cell mutagen.

g. Carcinogenicity: IARC, NTP, and OSHA do not list **Raw COG** as a carcinogen. The following Carcinogenicity information was found for the components:

- **Benzene:** ACGIH, OSHA, the International Agency for Research on Cancer (IARC), and the National Toxicology Program (NTP) consider Benzene to be a known carcinogen. Case reports and cohort studies have suggested a relationship between overexposures to Benzene and the occurrence of various types of leukemia.

h. No reproductive toxicity data available for **Raw COG** as a mixture. The following Carcinogenicity information was found for the components:

- **Carbon Monoxide:** Reproductive Categories in EU are adopted for GHS because Human Fetal Death has resulted from exposure of CO to mothers bearing children.
- **Hydrogen Sulphide:** Postnatal neurological alterations from prenatal exposure of 20 or 50 ppm (rats).
- **Carbon disulphide:** Results of studies suggest a direct effect on testes with dose-related decrease in plasma testosterone.
- **Toluene:** Low incidence of malformations at doses causing maternal toxicity.

Section 11 - Toxicological Information (continued)

11(a-k) Information on Toxicological Effects (continued):

- i. No Specific Target Organ Toxicity (STOT) following a Single Exposure data available for **Raw COG** as a mixture. The following STOT following Single Exposure information was found for the components:
- **Hydrogen, Methane, Ethane, Nitrogen gas:** May cause dizziness, headache, nausea and unconsciousness, and suffocation.
 - **Carbon Monoxide:** Central Nervous System effects: Headaches; tachypnea; nausea; weakness, dizziness, confusion, hallucinations; cyanosis; depressed ST segment of the ECG; angina; syncope; unconsciousness; death. Blood effects: carboxyhemoglobin formation.
 - **Ethylene:** Central Nervous System effects: Excessive exposures may cause headache, drowsiness, dizziness, loss of coordination, and extreme exposure may cause unconsciousness and death.
 - **Carbon Dioxide:** Lung effects: reduced inhalation and damage (rats). Cardiovascular effects: Decreased blood pressure (dogs). Central Nervous System effects: Headache, drowsiness, dizziness, stinging of the nose and throat, excitation rapid breathing and heart rate, excess salivation, vomiting, and unconsciousness (human).
 - **Hydrogen Cyanide:** Inhibits ATP production in Mitochondria of all cells.
 - **Hydrogen Sulphide:** Lung: In high concentrations (1000 to 3000 ppm) hydrogen sulphide was lethal to dogs. At 3000 ppm, respiration ceased after a few breaths; death occurred within 15 to 20 minutes at 1000 ppm. Central Nervous System effects: In humans: inhalation of 500 ppm/30 min produces headache, dizziness, excitement, staggering, and gastro-enteric disorders, bronchitis or bronchial pneumonia; above 600 ppm can be fatal within 30 minutes through respiratory paralyses.
 - **Benzene:** Mild to moderate respiratory tract irritation expected with breathing vapors.
 - **Carbon disulphide:** Mood changes, dizziness
 - **Toluene:** Headache, dizziness and impaired performance
- j. No Specific Target Organ Toxicity (STOT) following Repeated Exposure data was available for **Raw COG** as a whole. The following STOT following Repeated Exposure data was found for the components:
- **Carbon Monoxide:** Damage to Heart by inhalation (REACH), Rat 72 wk Inhalation LOAEL = 200 ppm cardiac hypertrophy (REACH), Rat 13 wk inhalation NAOEL = 135 ppm
 - **Benzene:** Induced blood dyscrasias in humans were characterized by erythrocytic anisocytosis and poikilocytosis, anemia, decreased hemoglobin, and reduced hematocrit. In addition, benzene is a human carcinogen.
 - **Hydrogen Cyanide:** Rat 90 day drinking water NOAEL 12.5 mg/kg No effects in studies. Rat 13-week drinking water study NOAEL 80 mg/kg based on BW effects at higher dose. Rat dietary study 1 yr LOEL 40 mg/kg based on thyroid weight. Rat dietary 56 days NOAEL >40 mg/kg
 - **Carbon Disulphide:** Neurotoxicity, chronic effects on heart, liver, kidney, Ocular changes and skin (OSHA).
 - **Toluene:** Ataxia, hypothermia, leucocyte decrease in female rats and increase liver and kidney weights.

The above toxicity information was determined from available scientific sources to illustrate the prevailing posture of the scientific community. The scientific resources includes: The American Conference of Governmental Industrial Hygienist (ACGIH) Documentation of the Threshold Limit Values (TLVs) and Biological Exposure indices (BEIs) with Other Worldwide Occupational Exposure Values 2017, The International Agency for Research on Cancer (IARC), The National Toxicology Program (NTP) updated documentation, the World Health Organization (WHO) and other available resources, the International Uniform Chemical Information Database (IUCLID), European Union Risk Assessment Report (EU-RAR), Concise International Chemical Assessment Documents (CICAD), European Union Scientific Committee for Occupational Exposure Limits (EU-SCOEL), Agency for Toxic Substances and Disease Registry (ATSDR), Hazardous Substance Data Bank (HSDB), and International Programme on Chemical Safety (IPCS).

The following health hazard information is provided regardless to classification criteria and is based on the individual component(s):

Acute Effects by component:

- **Hydrogen, Methane, Ethylene, Ethane and Nitrogen:** Simple asphyxiant
- **Carbon Monoxide:** Carbon monoxide reacts with hemoglobin to form carboxyhemoglobin. This form of hemoglobin has a reduced affinity to bind oxygen.
- **Carbon Dioxide:** Carbon dioxide has had lethal effects observed when atmospheric concentrations are increased above normal levels.
- **Hydrogen Sulphide:** Causes serious eye irritation. Fatal if inhaled. Causes damage to the cardiovascular system, central nervous system and respiratory system.
- **Hydrogen Cyanide:** Acute oral and inhalation data show that when administered at a single bolus dose, HCN is extremely toxic at less than 5 mg/kg. Inhibits ATP production in Mitochondria of all cells.
- **Ammonia:** Breathing mist and vapors can cause severe chemical burns and can be extremely destructive to mucous membranes, and upper respiratory tract. Causes chemical burns to the eyes and skin.
- **Benzene:** Excessive exposures may cause irritation to eyes, skin, nose, throat, lungs, and respiratory tract. Central nervous system effects may occur due to excessive exposures. Excessive exposures may result in headaches, nausea, sleep disturbances, excitability, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.
- **Carbon Disulphide:** Excessive quantities of carbon disulphide may be fatal if ingested or inhaled. Serious health hazard, affecting the central nervous system. Carbon disulphide is readily absorbed through the skin. Sufficient material may be absorbed through the skin to be fatal. Excessive exposures may cause reproductive damage, including impairing fertility. Skin irritant.
- **Toluene:** Excessive exposures may cause irritation to eyes, nose, throat, lungs, and respiratory tract. Central nervous system effects may occur. Excessive exposures may result in headaches, nausea dizziness, loss of balance and coordination, unconsciousness, and coma as well as respiratory failure and/or death.

Section 11 - Toxicological Information (continued)

Delayed (chronic) Effects by Component:

- **Hydrogen, Methane, Ethylene, Ethane, Carbon Dioxide and Nitrogen:** Not Reported/Not Classified
- **Carbon Monoxide:** Human Fetal Death has resulted from exposure of CO to mothers bearing children. Causes damage to blood and central nervous system through prolonged or repeated exposure if inhaled.
- **Ammonia:** Prolonged or repeated exposures may result in respiratory disorders. Chronic obstructive pulmonary disease may also develop from fibrous obstruction of the smaller airways. Repeated exposure may cause chronic cough, bronchitis, asthma, vocal cord dysfunction, reactive airways disease, and lung fibrosis. A permanent decrement in pulmonary function has been noted to occur.
- **Benzene:** IARC Group I-Human Cancer Hazard. Early signs and symptoms of chronic overexposure include effects on CNS and the GI tract (headache, loss of appetite, drowsiness, nervousness, and pallor) but the major manifestation of toxicity is aplastic anemia. Bone marrow depression may occur resulting in leucopenia, anemia, or thrombocytopenia (leukemogenic action). With continued overexposure the disease states may progress to pancytopenia resulting from bone marrow aplasia. Evidence has linked benzene in the etiology of leukemia.
- **Carbon Disulphide:** Chronic overexposure to carbon disulphide has resulted primarily in neurological and cardiovascular effects, gastrointestinal and immune insufficiency problems as well as possible risk of impaired fertility and harm to the unborn child have also been reported.
- **Toluene:** Chronic overexposure has been associated with headache, lassitude, and nausea, loss of coordination, memory loss, and loss of appetite along with enlargement of the liver, a moderate decrease in red blood cells, and reduction in white blood cells, as well as palpitations, weakness, and impaired reaction time may occur. The neurological effects of chronic overexposure to high levels of toluene gradually progress to an irreversible state. Besides effects on behavior and intelligence, degeneration of the optic nerve and nerve deafness has also been reported. Dermatitis from repeated contact with the skin may also occur. Overexposure to toluene may cause risk of harm to the unborn child.

Section 12 - Ecological Information

12(a) Ecotoxicity (aquatic & terrestrial): No data available for the product, **Raw COG** as a whole. However, individual components have been found to be toxic to the environment:

- **Ethylene:** EC₅₀ *Daphnia magna* = 53.402 mg/L
- **Hydrogen Sulphide:** LC₅₀/96 h (fresh water fish) = <2 – 7 µg/L; LC₅₀ *Rhombus maeoticus* > 2.4 mg/L; LC₅₀ *Carassius auratus* = 0.09 mg/L; LC₅₀ *Catostomus commersoni* = 0.019 mg/L
- **Carbon disulphide:** LC₅₀ *Western mosquitofish*: 135,000/96H
- **Ammonia:** LC₅₀ *Oncorhynchus mykiss* = 11 – 48 mg/L; LC₅₀ *Lepomis cyanellus* = 0.5 mg/L; LC₅₀ *Daphnia magna* = 101 mg/L
- **Benzene:** LC₅₀ *Lepomis macrochirus* (bluegill sunfish) 20 mg/l/24 to 48 hr /Conditions of bioassay not specified/; LC₅₀ *Salmo trutta* (brown trout yearlings) 12 mg/l/1 hr (static bioassay)
- **Toluene:** LC₅₀ *Pimephales promelas* (fathead minnow) = 34.27 mg/l 96 hr (95% Confidence Limits= 22.83-45.86 mg/l) /Conditions of bioassay not specified; LC₅₀ *Daphnia magna*, (water flea) 313 mg/l 48 hr /Conditions of bioassay not specified.

12(b) Persistence & Degradability: Vapor-phase benzene is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 13 days for benzene.

12(c) Bioaccumulative Potential: No Data Available

12(d) Mobility (in soil): Benzene has been estimated to be moderately to highly mobile in soil. Evaporation is expected to be the primary loss mechanism from water. Benzene is not expected to adsorb to sediment and suspended solids in water. Volatilization half-lives for a model river and model lake have been estimated to be 1 hr and 3.5 days for benzene.

12(e) Other Adverse Effects: None Known

Additional Information:

Hazard Category: Acute 1, Chronic 2

Signal Word: Warning



Hazard Symbol:

Hazard Statement: Toxic to aquatic life with long lasting effects.

Section 13 - Disposal Considerations

Container Cleaning and Disposal: Dispose of contents in accordance with federal, provincial and local regulations. Observe safe handling precautions.

Please note this information is for Raw COG in its original form. Any alterations can void this information.

Raw Coke Oven Gas (COG)

Rev. 8/25

Section 14 - Transport Information

14 (a-g) Transportation Information:

Transport Dangerous Goods (TDG) under federal WHMIS regulates **Raw COG** as a hazardous material. TDG classifies **Raw COG** as **Compressed gas, flammable, n.o.s.** All federal, provincial and local laws and regulations that apply to the transport of this type of material must be adhered to.

Shipping Name: Compressed gas, flammable, n.o.s.

Class/Division: 2.1

Hazard Label (s): Flammable Gas

UN No.: 1954

Excepted Quantities (EQ): E0

ERAP Index: 3000

Packing Group: NA

Special Provisions: 16

Limited Quantities Index: 0.125 L

Passenger Carrying Ship Index
Forbidden

Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index:
Forbidden

ERAP – Emergency Response Assistance Plan

Section 15 - Regulatory Information

Regulatory Information: *The following listing of regulations relating to a Stelco product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.*

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.

Section 16 - Other Information

Prepared By: Stelco Inc.

Revision History:

8/21/2025 – Update to comply with amendments to the Hazardous Products Regulations

6/30/2017 – Update to Stelco

2/10/2013 - Update to OSHA HAZ COM 2012

8/01/1985 – Original issue date

ABBREVIATIONS/ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	NIF	No Information Found
BEIs	Biological Exposure Indices	NIOSH	National Institute for Occupational Safety and Health
CAS	Chemical Abstracts Service	NTP	National Toxicology Program
CNS	Central Nervous System	OSHA	Occupational Safety and Health Administration
GI, GIT	Gastro-Intestinal, Gastro-Intestinal Tract	PEL	Permissible Exposure Limit
IARC	International Agency for Research on Cancer	PPE	Personal Protective Equipment
LC50	Median Lethal Concentration	ppm	parts per million
LD50	Median Lethal Dose	RTECS	Registry of Toxic Effects of Chemical Substances
LD_{Lo}	Lowest Dose to have killed animals or humans	SCBA	Self-contained Breathing Apparatus
LEL	Lower Explosive Limit	STEL	Short-term Exposure Limit
µg/m³	microgram per cubic meter of air	TLV	Threshold Limit Value
mg/m³	milligram per cubic meter of air	TWA	Time-weighted Average
SDS	Safety Data Sheet	UEL	Upper Explosive Limit
MOL	Ontario Ministry of Labour	WHMIS	Workplace Hazardous Materials Information System
NFPA	National Fire Protection Association		

Disclaimer: This information is taken from sources or based upon data believed to be reliable. However, Stelco Inc. makes no warranty as to the absolute correctness or sufficiency of any of the foregoing or that additional or other measures may not be required under particular conditions.



The Steel Company of Canada

Raw Coke Oven Gas

Signal Word: DANGER

Symbols:



HAZARD STATEMENTS:

Extremely flammable gas
May displace oxygen and cause rapid suffocation.
May cause genetic defects.
May cause cancer.
May damage fertility or the unborn child.
Toxic if inhaled.
Causes severe skin burns and serious eye damage.
May cause central nervous system depression, respiratory irritation drowsiness or dizziness and damage to lungs, liver and blood cells.
Causes damage to the heart through prolonged or repeated exposures.
Causes damage to blood forming tissues and central nervous system through prolonged or repeated exposure.

PRECAUTIONARY STATEMENTS

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Leaking gas fire: Do not extinguish unless leak can be stopped safely.
In case of leakage, eliminate all ignition sources.
Store in well-ventilated place. Keep container tightly closed.
Do not breathe gas.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash hands thoroughly after handling. Obtain, read and follow all safety instructions before use.
Do not eat, drink or smoke when using this product.
If exposed, concerned or feel unwell: Get emergency medical help/advice immediately.
If in eyes: Immediately rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue Rinsing. If eye irritation persists: Get medical help.
If on skin: Take off immediately all contaminated clothing and wash it before reuse. Immediately rinse with water. Wash contaminated clothes before reuse.
If inhaled: Remove person to fresh air and keep comfortable for breathing. Get emergency medical help immediately.
If swallowed: Rinse mouth. Do NOT induce vomiting.
Store locked up.
Dispose of contents in accordance with federal, provincial and local regulations.

Stelco Inc.
386 Wilcox Street
Hamilton, ON L8L 8K5
Original Issue Date: 08/01/1985

Phone Number : (905) 528-2511 (8:00 am to 5:00 pm)
Emergency Contact: 1-888-226-8832 (CANUTEC)
Revised: 8/21/2025