

# Carbon Monoxide Monitoring & Prevention

Guy's Construction

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29 CFR 1926.55 / 1910.1000 Table Z-1

Effective Date: June 08, 2026

**SAMPLE DOCUMENT - NOT FOR COMPLIANCE USE**

## 1.0 PURPOSE AND SCOPE

This program addresses the monitoring, prevention, and emergency response for carbon monoxide (CO) exposure on Guy's Construction projects. CO is an odorless, colorless gas produced by combustion engines, heaters, generators, and welding operations.

1926.55

**CO is the leading cause of poisoning death in the United States. It is undetectable without instruments. Every enclosed or partially enclosed work area with combustion sources requires CO monitoring.**

## 2.0 EXPOSURE LIMITS

Standard	Limit	Duration	Notes
OSHA PEL	50 ppm	8-hr TWA	29 CFR 1926.55 Table 1
OSHA Ceiling	200 ppm	Not to exceed	Supplementary exposure limits
NIOSH REL	35 ppm	8-hr TWA	More protective than OSHA
NIOSH Ceiling	200 ppm	Not to exceed	
ACGIH TLV	25 ppm	8-hr TWA	Current recommended limit
IDLH	1,200 ppm	Immediate	Immediately dangerous to life/health

- less than 25 ppm
- lethal hydrogen fluoride (HF), carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), and electrolyte vapors during thermal runaway; BESS containers are PRCS by default

NFPA 855 / UL 9540A testing data

- IC engine forklifts (Class IV/V) produce carbon monoxide in enclosed warehouses; CO monitoring program required under general duty clause; consider switching to electric

OSHA general duty clause

- carbon monoxide monitoring program; CO buildup in enclosed warehouses is a recognized hazard cited under general duty clause

29 CFR 1910.178 / OSHA general duty clause

### 3.0 CO SOURCES ON CONSTRUCTION SITES

- Gasoline/diesel generators operating inside or near enclosed spaces
- Concrete saws, cut-off saws, and power trowels (gasoline-powered)
- Propane/natural gas heaters and salamanders in enclosed spaces
- Vehicles idling in or near enclosed structures
- Welding operations (CO is a byproduct of some welding processes)
- Concrete curing with CO<sub>2</sub> (displacement of O<sub>2</sub> can concentrate CO in low areas)
- Fire damage or smoldering materials

### 4.0 MONITORING REQUIREMENTS

- Direct-reading CO monitor required in any enclosed or partially enclosed space where combustion equipment operates
- Monitor at breathing zone height (4-6 feet)
- Continuous monitoring preferred; spot checks at minimum every 2 hours
- Alarm setpoints: low alarm at 25 ppm (NIOSH REL); high alarm at 50 ppm (OSHA PEL)
- Calibrate per manufacturer (typically monthly); bump test daily before use

### 5.0 ENGINEERING CONTROLS

- Ventilation: mechanical ventilation exhausting combustion gases to the exterior
- Substitute: electric equipment instead of gasoline-powered where feasible
- Generator placement: outside the structure, exhaust directed away from openings
- Vehicle idling: no idling inside structures or within 25 feet of building openings
- Catalytic converters on propane equipment used indoors

## 6.0 ACTION LEVELS AND RESPONSE

CO Level	Action Required	Who
0-24 ppm	Normal operations. Continue monitoring.	All personnel
25-49 ppm	Increase ventilation. Identify source. Reduce exposure time. Monitor closely.	Competent person
50-99 ppm	Evacuate non-essential personnel. Increase ventilation to maximum. Identify and correct source.	Competent person + superintendent
100-199 ppm	Evacuate area immediately. Do not re-enter until levels are below 50 ppm.	Superintendent + safety
200+ ppm	Emergency evacuation. Call 911 if anyone shows symptoms. SCBA required for re-entry.	Emergency response

## 7.0 SYMPTOMS OF CO POISONING

Symptoms progress with exposure level and duration:

- Mild (headache, dizziness, nausea): move to fresh air immediately
- Moderate (confusion, impaired judgment, chest pain, shortness of breath): move to fresh air, administer O2 if available, call 911
- Severe (loss of consciousness, seizures, cardiac arrest): call 911 immediately, begin CPR if needed, do not re-enter the space without SCBA

**CO poisoning mimics flu symptoms. If multiple workers report headaches in the same area, suspect CO. Monitor immediately.**

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## 8.0 TRAINING

- All workers in enclosed spaces with combustion sources: CO hazards, symptoms, monitor alarms, evacuation procedures
- Competent person: CO monitor operation, calibration, ventilation assessment, action levels
- First aid responders: CO poisoning recognition and response

## 9.0 RECORDKEEPING

Record	Retention	Notes
CO monitoring logs	Project duration + 1 year	Per monitoring event
Monitor calibration records	Life of instrument	Per calibration
Incident reports (CO exposure)	5 years	Per event
Training records	Duration of employment	All personnel

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## Minnesota STATE-SPECIFIC REQUIREMENTS

### Minnesota has additional CO/ventilation requirements:

- Continuous carbon monoxide monitoring is required in areas where internal combustion engines are operated indoors
- environmental exposure of employees to carbon monoxide whenever internal combustion engines discharge engine exhaust gases indoors or unvented space heaters are operated indoors
- asphyxiation and carbon monoxide poisoning
- carbon monoxide gas from the entire garage
- carbon monoxide poisoning, central nervous system depression, and cancer risk
- handling or use of hazardous chemicals in which all of the following conditions are met: chemical manipulations are carried out on a laboratory scale where the containers used for reactions, transfers
- requirements in paragraph (b) in lieu of maintaining a monitoring system capable of detecting a criticality as described in 10 CFR 70.24
- for Class I, Division 2 Hazardous Locations
- Table H-16 or H-17, and subdivisions (ii) and (iv) of this subparagraph
- as recommended by the manufacturer
- during initial operation, at least quarterly thereafter, and during highest usage periods

*MN Rule 5207.0310*

- CO air monitoring during initial operation and quarterly thereafter during highest usage periods

*MN Rules 5207.0310*

- mandatory CO monitoring for indoor engines - no federal equivalent

*MN Rule 5207.0310*

- hearing conservation program including monitoring and audiometric testing
- high visibility outer garment
- Cores from nearby wells may be accepted if the owner or operator can demonstrate that core retrieval is not possible and that such cores are representative
- 60 days before the anniversary date of the establishment of the financial instrument(s)
- reassessment by ICDA or SCCDA following requirements in Subparagraph 1.c
- an application for permit transfer at least 30 days before the proposed permit transfer date
- 3 foot-candles minimum illumination
- Mechanical ventilation systems must be installed to maintain carbon monoxide concentrations below 50 ppm and provide at least 4 air changes per hour
- spray paint vapors from the enclosures to the outside air by means of either mechanical exhaust or window ventilation
- specified ventilation requirements
- Minnesota-specific indoor workplace temperature and ventilation requirements. Minimum temperatures for indoor workplaces during winter.

*MN Rules indoor ventilation/temperature*

- standards in places of employment
- 20 percent efficiency factor (or lower factor as determined by the Regional Administrator)
- located in bodies of water being actively navigated

- all spacing indicated is measured center to center
- paragraph (q)(11)
- locking in both directions on the lifeline
- air velocities exceeding 200 feet per minute on workers
- minimum air temperature of 60°F
- reduced air temperature affecting worker safety and performance
- WBGT index combining air temperature, speed, humidity, and radiation
- selection of appropriate respiratory protection
- any loaded trip, empty trip, or supply trip
- all records, data, and information concerning the design, permitting, construction, workovers, tests, and operation of the well and cavern
- the first request by an applicant for a continuance of any matter three (3) business days before the scheduled hearing, provided that a protest has not been filed
- effective 8-1-19
- edition of ASTM E 185 current on the issue date of the ASME Code to which the reactor vessel was purchased

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