

1.0 GENERAL

- 1.1 **PURPOSE:** This standard establishes minimum requirements for protection of those who work in or rescue personnel from confined spaces.
- 1.2 **CONTRACTOR'S PROCEDURE:** Contractor shall prepare and implement a confined space entry procedure which shall meet the requirements of this standard. Contractor shall submit a written description of its confined space entry procedure with its bid.
- 1.2.1 **DISCLAIMER:** This standard shall not be construed as relieving Contractor of its safety responsibility nor as a waiver of Contractor's obligation to establish and maintain safe working conditions.
- 1.3 **CONFINED SPACE DEFINITION:** The term "confined space" shall mean any space, not designed for continuous occupancy by persons, which has limited access and egress for the removal of a disabled person, due to the location and size of the openings, AND which may be subject to the accumulation of toxic or flammable materials, or which may have an oxygen-deficient or oxygen-enriched atmosphere.

Confined spaces include but are not limited to: storage tanks; process vessels; bins; boilers; ventilation, exhaust, and process ducts; manholes; sewers; underground utility vaults; tunnels; pipelines; enclosed conveyors; process ovens; incinerators; and batch rail cars and trucks.

Confined spaces also include open-top spaces more than four feet (4') in depth, where toxic or flammable materials could accumulate, such as pits, tubs, vaults, vessels, and sumps.

- 1.4 **LIMITED ACCESS AND EGRESS DEFINITION:** Use of this term shall indicate that a normal walkway entrance at floor level or via standard stairs is not provided, so that it would be difficult to remove a disabled person.
- 1.5 **ABBREVIATIONS USED IN THIS STANDARD AND THEIR DEFINITIONS:**
- 1.5.1 **LEL:** Lower Explosive Limit - the lowest concentration of flammable vapor in air that will flash when ignited.
- 1.5.2 **NIOSH:** National Institute of Occupational Safety and Health - the safety and health research agency established by the Federal Occupational Safety and Health Act.

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1.5.3 TLV: Threshold Limit Value - airborne concentration of substances to which most people may be exposed day after day without adverse toxic effect. TLV values are established on an 8-hour day/40-hour per week time-weighted average.

(Note: Some people, because of individual susceptibility, may be affected by concentrations below standard TLV values).

1.6 CONFINED SPACE CLASSES: Confined spaces are divided into three (3) classes, the determining factor being the results of atmospheric sampling:

1.6.1 CLASS I: ENTRY IS NOT PERMITTED: Class I confined spaces have limited access and egress and one or both of the following conditions:

- a. ATMOSPHERIC FLAMMABILITY: Greater than 25.0% of LEL.
- b. OXYGEN CONTENT: Greater than 21.5% of confined space atmosphere.

1.6.2 CLASS II: Characterized by having limited access and egress and one or more of the following conditions:

- a. ATMOSPHERIC FLAMMABILITY: Between 1.0% and 24.9% of LEL.
- b. OXYGEN CONTENT: Between 0.0% and 19.4% of confined space atmosphere.
- c. KNOWN TOXICITY: Toxic concentrations at or above TLV levels for substances present in the confined space.
- d. UNKNOWN TOXICITY: Unknown or untested toxicity levels.

1.6.3 CLASS III: Characterized by having limited access and egress and one or both of the following conditions:

- a. ATMOSPHERIC FLAMMABILITY: None.
- b. OXYGEN CONTENT: Normal; that is, between 19.5% and 21.4% of confined space atmosphere.
- c. KNOWN TOXICITY: Toxic concentrations below TLV levels for the substances present in the confined space.
- d. UNKNOWN TOXICITY: None.

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1.7 QUALIFIED PERSON: Contractor shall provide a Qualified Person to classify confined spaces and supervise sampling procedures. A Qualified Person is one who has been trained in and can provide written proof of training in:

1.7.1 INSTRUMENTS: Use and calibration of oxygen analyzers, combustible gas indicators, and carbon monoxide detectors.

1.7.2 CLASSIFICATION: Classifying confined spaces in Classes I, II, and III as defined in Section 1.6 above.

1.7.3 TOXIC SUBSTANCES: Evaluation of toxic substances.

1.8 STANDBY RESCUE PERSONNEL: Contractor shall provide personnel expressly designated, trained, and equipped to enter confined spaces for the purpose of immediately and safely removing disabled personnel.

1.9 TRAINING REQUIREMENTS: Contractor shall ensure that personnel who supervise or perform work in confined spaces and supervise or perform rescue work shall be trained in confined space entry procedures and in the use of applicable sampling equipment, personal protective equipment, and rescue equipment.

Contractor shall submit written proof of such training to Owner's Representative upon request.

1.10 HEALTH AND PHYSICAL CONDITION: Contractor shall ensure that all personnel who enter confined spaces to perform or supervise work or rescue operations shall have sufficient health and physical capabilities to perform required tasks.

Contractor shall submit written proof of such capabilities to Owner's Representative upon request.

2.0 MATERIALS AND EQUIPMENT

2.1 EQUIVALENCY: The trade names and models listed below indicate the required quality and capabilities of equipment.

Contractor may submit written proof of the equivalency of equipment and models not listed to Owner's Representative prior to use. Obtain Owner's Representative's permission prior to use of equipment and models not listed.

2.2 SAMPLING EQUIPMENT CAUTION: Sampling equipment marked with an asterisk (*) may give erroneous readings in the presence of airborne concentrations of silanes, silicones, silicates, and other silicone-containing compounds.

Precautions determined by the equipment manufacturer or by a Qualified Person shall be taken when the presence of silicone-containing compounds is known or suspected.

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2.3 OXYGEN ANALYZERS:

- 2.3.1 MINE SAFETY APPLIANCE (MSA) Model 245R.
- 2.3.2 ENERGETICS SCIENCE - ECOLOYZER Model 60-626.

2.4 COMBUSTIBLE GAS INDICATORS:

- * 2.4.1 MINE SAFETY APPLIANCE (MSA) Model 2A
- * 2.4.2 MINE SAFETY APPLIANCE (MSA) Model 100
- 2.4.3 BACHARACH INSTRUMENTS Model Sentax.
- 2.4.4 BACHARACH INSTRUMENTS Model G-SW Sniffer.

2.5 COMBINATION OXYGEN ANALYZERS/COMBUSTIBLE GAS INDICATORS:

- * 2.5.1 MINE SAFETY APPLIANCE (MSA) Model 260.
- 2.5.2 GAS TECH, INC. Model 1214.
- 2.5.3 ENERGETICS SCIENCE - ECOLOYZER Model 60-400.
- 2.5.4 BACHARACH INSTRUMENTS Model GPK.
- 2.5.5 ENMET Model EGS-10.

2.6 CLASS II ENTRY PERSONAL PROTECTIVE EQUIPMENT:

- 2.6.1 RESPIRATORS: All respirators shall have current inspection tags attached. Both of the following respirator types are permitted:
 - a. AIR LINE RESPIRATORS: NIOSH-approved air line respirator with a five (5) minute escape air bottle. Air bottle shall be full at the start of each confined space entry period.
 - b. SELF-CONTAINED APPARATUS: NIOSH-approved self-contained breathing apparatus. Air reservoir shall be full at the beginning of each confined space entry period.
- 2.6.2 CHEST & BODY HARNESSSES: Harnesses shall have lifelines attached with D-rings above the shoulders to keep unconscious persons upright during rescue.

3.0 EXECUTION

- 3.1 PRE-ENTRY ACTIONS: Prior to entering a confined space, Contractor shall:

- 3.1.1 CLASSIFY CONFINED SPACE: Ensure that Contractor's Qualified Person shall classify the confined space using the classifications defined in 1.6 above.

- 3.1.2 POST WARNING SIGNS: Provide warning signs at all access and exit openings of the confined space. Warning signs shall state:

"CONFINED SPACE ENTRY IN PROGRESS"
"KEEP OPEN LIGHTS AWAY"

or equivalent legends as approved by Owner's Representative.

- 3.1.3 EMPTY CONFINED SPACE: Empty and drain the confined space of its contents to the greatest possible extent.

Disposal of solids, liquids, gasses, and vapors removed from the confined space shall be as directed by Owner's Representative and in accordance with applicable laws and regulations.

- 3.1.4 PURGE CONFINED SPACE: Purge the confined space with air, steam, inert gas, or water. Purging agent choice and disposal shall be as directed by Owner's Representative.

a. ASPHALT-CONTAINING CONFINED SPACES: Neither water nor steam shall be permitted as purging agents for asphalt-containing tanks or other asphalt-containing confined spaces.

- 3.1.5 MEASURE TEMPERATURE: Measure the confined space ambient temperature. If temperature greater than 130F is indicated, either the confined space volume shall be cooled to reduce the ambient temperature below 130F or personnel entering the confined space shall be provided and shall use appropriate protective clothing and equipment.

- 3.1.6 RELIEVE PRESSURE: Release all confined space internal pressure prior to entry. No entry shall be permitted whenever confined space pressure is greater than atmospheric pressure except when positive pressure ventilation is provided expressly for the purpose of confined space purging.

- 3.1.7 LOCKOUT AND TAG: Implement the procedure defined in Section 01118 of the Contract to prevent operation of moving equipment in the confined space and introduction of normal confined space contents or contaminants while people are inside the confined space.

- 3.1.8 CALIBRATE AND CHECK: Calibrate sampling equipment immediately prior to EACH entry period.

Check sample lines for leaks, clean or replace filters, and perform other calibration and service work as recommended by manufacturer or as required by the Qualified Person.

- 3.1.9 CUTTING/WELDING/HOT WORK RESTRICTIONS: Obtain and complete a hot work permit prior to performing cutting, welding, or other hot work within a confined space.

Cutting/welding/hot work permits for work inside the confined space shall not be issued and work authorized by these permits shall be immediately discontinued whenever confined space atmosphere sampling indicates atmosphere levels greater than 10% of IEL.

- 3.2 ENTRY ACTIONS: At and during confined space entry, Contractor shall, at a minimum:

- 3.2.1 CONFINED SPACE ENTRY PERMIT: Obtain a confined space entry permit (see EXHIBIT 1) from Owner's Representative and fill in the information required on the permit form.

Contractor may use its own confined space entry permit in lieu of the Owner's confined space entry permit with Owner's Representative's prior approval.

- 3.2.2 RENEW CONFINED SPACE ENTRY PERMITS: New confined space entry permits shall be obtained and completed whenever personnel are changed, whenever the work lapses for more than thirty (30) minutes, and for each entry period whenever work inside the confined space is performed in separate, non-continuous work shifts or periods.

- 3.2.3 PERIODIC SAMPLING: Sample confined space atmosphere immediately prior to and immediately upon entering a confined space.

Continually sample confined space atmosphere throughout the time people are inside the confined space. Sampling frequency shall be determined by the Qualified Person. Sampling shall be performed under the supervision of the Qualified Person.

- a. MINIMUM SAMPLING REQUIREMENTS: Each sample shall, at a minimum, indicate:

1. ATMOSPHERIC FLAMMABILITY: Per cent of IEL.
2. OXYGEN CONTENT: Per cent of confined space atmosphere.
3. TOXICITY: Substances and per cent of within the confined space.
4. TEMPERATURE: Ambient temperature within the confined space.

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- 3.2.4 **PROVIDE STANDBY RESCUE PERSONNEL:** Ensure that Standby rescue personnel shall be constantly equipped and immediately ready to enter the confined space to effect a rescue.
- 3.2.5 **COMMUNICATIONS:** Ensure constant communication, verbal, visual, or both, between personnel inside the confined space and standby rescue personnel.
- 3.2.6 **ALARM SIGNALS:** Ensure that alarm signals for identifying the need to effect a rescue or the need to evacuate personnel from the confined space have been established, are understood by all personnel, and will work should the need arise. Alarm signals may be verbal, sonic, visual, physical contact, or any combination thereof.
- 3.2.7 **LIGHTING:** Provide temporary or portable lighting inside the confined space and at access points sufficient in quantity and illumination levels to ensure safe work operations and safe rescue operations.
- a. **VOLTAGE:** Lighting inside confined spaces shall be operated at a maximum of twelve (12) volts, per OSHA 29 CFR 1926.401 (j) (4).
 - b. **CONSTRUCTION AND CONDITION:** Cord-supplied lighting systems shall be of heavy-duty construction and in safe working order.
 - c. **CORD ROUTING:** Whenever possible, cords shall be routed through a different access from the access primarily used for personnel access to the confined space.
- 3.2.8 **VENTILATION:** Whenever possible, ensure continuous natural draft and/or forced draft ventilation of the confined space throughout the time people are inside the confined space.
- a. **EXCEPTION:** Ventilation shall not be provided whenever an inert gas purge or blanket is required to minimize fire and explosion hazards.

- 3.3 **CLASS I SPACES ONLY:** Take actions, subject to approval of Owner's Representative, to convert Class I confined spaces into either Class II or Class III confined spaces prior to entry.

ENTRY OF CLASS I CONFINED SPACES IS FORBIDDEN !

- 3.4 **CLASS II CONFINED SPACES ONLY:** In addition to the requirements of Section 3.2 above, Contractor shall, at a minimum:

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- 3.4.1 **EQUIPMENT:** Provide each person who enters or who may be required to enter the confined space with respirators, harnesses, and lifelines as defined above. Provide all other equipment and clothing required to ensure safe working and rescue operations. Provision of hoisting equipment to assist in rescue operations is recommended.

Ensure that all persons entering the confined space wear respirators, harnesses, and lifelines during the entire time they are inside the confined space.

- 3.4.2 **STANDBY RESCUE PERSONNEL:** Station at least one (1) Standby Rescue Person at each access to the confined space throughout the time people are inside the confined space.

Ensure that Standby Rescue Personnel wear respirators, harnesses, and lifelines during the entire time people are inside the confined space.

Respirator faceplates need not be in place on Standby Rescue Personnel as long as Standby Rescue Personnel do not enter the confined space.

- 3.5 **CLASS III CONFINED SPACE ONLY:** In addition to the requirements of Section 3.2 above, Contractor shall, at a minimum:

- 3.5.1 **EVALUATE EQUIPMENT REQUIREMENTS:** Ensure that the Qualified Person shall determine the need, if any, for provision and use of breathing apparatus, harnesses, lifelines, and other personal protective gear and clothing for workers and Standby Rescue Persons.

- 3.5.2 **PROVIDE STANDBY RESCUE PERSONNEL:** Station at least one (1) Standby Rescue Person adjacent to each access to the confined space during the entire time people are inside the confined space.

- 3.6 **POST-ENTRY PROCEDURE:** Whenever confined space work requires more than one entry period, at the end of each entry period, Contractor shall:

- 3.6.1 **VERIFICATION:** Verify that all personnel who entered the confined space have left the confined space and have been accounted for.

- 3.6.2 **PERMIT:** Fill in the entry period completion time and return that entry period confined space entry permit to Owner's Representative.

3.7 WORK COMPLETION PROCEDURE: When all work inside the confined space has been completed, Contractor shall:

- 3.7.1 VERIFICATION: Verify that all personnel and equipment brought into the confined space for the work have been removed and accounted for.
- 3.7.2 RESTORE FUNCTIONALITY: Remove blanks, caps, plugs, and all other means of preventing introduction of normal confined space contents.
- 3.7.3 LOCKOUTS AND TAGGING: Remove locks and tags installed in compliance with Section 01118 of the Contract.
- 3.7.4 WARNING SIGNS: Remove warning signs.
- 3.7.5 PERMIT: Fill in the entry completion time on the final confined space entry permit and return the final permit to Owner's Representative.

END OF TEXT - EXHIBIT FOLLOWS

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CONFINED SPACE ENTRY PERMIT

to be completed by owner's representative

project name _____

contract number _____ contract name _____

confined space location _____

confined space description _____

purpose of entry _____

date & time permit becomes effective

mo. day yr.

☐ AM

☐ PM

THIS PERMIT VOID IF ENTRY DOES NOT OCCUR WITHIN 30 MINUTES OF THIS TIME.
THIS PERMIT VOID IF WORK INSIDE CONFINED SPACE LAPSES FOR 30 MINUTES
OR LONGER.

issued by _____

signature of owner's representative

to be completed by contractor

contractor name _____

qualified person name _____

confined space classification: II-☐ III-☐

- ☐ warning signs provided at all accesses.
- ☐ confined space empty of contents.
- ☐ confined space contents prevented from entering by lockout, caps, plugs.
- ☐ confined space equipment locked-out and tagged.
- ☐ confined space purged.
- ☐ confined space atmosphere temperature measured — result _____ °F.
- ☐ confined space pressure relieved.
- ☐ personnel trained in confined space entry procedures.
- ☐ standby rescue personnel equipped with

yes no n/a

- ☐ ☐ ☐ respirators
- ☐ ☐ ☐ stand-by air supply
- ☐ ☐ ☐ lifelines & harnesses

☐ alarm signals defined and understood by all personnel.

☐ fighting provided inside confined space - describe _____

☐ ventilation provided for confined space - describe _____

signed _____

contractor's confined space entry supervisor

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(over)

