NIST National Institute of Standards and Technology • U.S. Department of Commerce

Permit-Required Confined Spaces

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1. PURPOSE

The purpose of this suborder is to establish the safety requirements for identifying, evaluating, and entering permit-required confined spaces (hereafter referred to as "permit spaces") and the organizational roles and responsibilities for ensuring that those requirements are met.

2. BACKGROUND

a. NIST must meet or exceed the requirements established by the Occupational Safety and Health Administration (OSHA) in 29 Code of Federal Regulations (CFR) 1910.146, Permit-Required Confined Spaces. Implementation of this suborder through the requirements in Section 6 and roles and responsibilities in Section 9 fulfills those requirements.

b. This suborder, all supporting suborder-specific directives, including procedures, guidance, and notices, and all required deployment tools, including training, forms, instructions, and information technology applications, constitute the written permit-required confined-space program required by 29 CFR 1910.146(c)(4).

c. This suborder supersedes NIST Health and Safety Instruction (HSI) 9, Work in Confined Spaces, November 1994.

3. APPLICABILITY

a. The provisions of this suborder apply to NIST employees and to contractors who are to enter or potentially be exposed to permit spaces.

4. REFERENCES

a. 29 CFR Part 1910.146, Permit-Required Confined Spaces; and

b. 29 CFR 1910.147, The Control of Hazardous Energy (Lockout/Tagout).

5. APPLICABLE NIST DIRECTIVES

a. NIST S 7101.20: *Work and Worker Authorization Based on Hazard Reviews*

b. NIST S 7101.21: *Personal Protective Equipment*

c. NIST S 7101.56: *Control of Hazardous Energy (LOTO)*

d. NIST S 7101.59: *Chemical Hazard Communication*

e. NIST S 7101.22: *Hazard Signage*

6. REQUIREMENTS[1]

a. Hazard Identification

(1) Determine if confined spaces are present in OU work areas.

b. Hazard Assessment

(1) As part of the hazard review process, assess the hazards in any confined spaces identified to determine if those spaces meet the definition of a permit space.

(2) If an identified confined space meets the definition of a permit space, classify that space as a permit space; otherwise classify it as a non-permit space.

(3) For spaces classified as permit spaces, post danger signs or use other equally effective means to inform potentially exposed workers of the existence and location of, and the danger posed by, the spaces. See Appendix A for an example of appropriate hazard signage.

(4) When changes in the use or configuration of a non-permit space could result in the need to reclassify the non-permit space as permit space, reassess the hazards in the space and, if necessary, reclassify the space as permit space.

(5) If a confined space classified as a permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space, the permit space may be reclassified to a non-permit space for as long as the non-atmospheric hazards remain eliminated.

[1] The requirements of this section apply to workers who enter permit spaces in the conduct of their assigned duties, and their management, i.e., they apply to the OUs.

(6) Note, reference, or include in activity-hazard-review documentation the results of classifications and reclassifications of confined spaces as permit or non-permit spaces.

c. Permit-Space Entry Requirements

One or more of the following set of procedures must be followed for any individual to enter a permit space:

- Procedures for reclassifying a permit space to a non-permit space *for the purpose of entry*; or
- Alternate entry procedures;
- Full-permit entry procedures.

(1) Procedures for Reclassifying a Permit Space to a Non-Permit Space *for the Purpose of Entry*

Non-permit-space entry procedures, i.e., procedures that lie outside the scope of this suborder, may be used to enter a permit space if all of the following conditions are satisfied:

(a) If the permit space poses no actual or potential atmospheric hazards and if **all** hazards within the space are eliminated without entry into the space, the permit space may be reclassified to a non-permit space *for the purpose of entry* for as long as the non-atmospheric hazards remain eliminated.

(b) If it is necessary to enter the permit space to eliminate hazards, such entry shall be performed in accordance with full-permit requirements. If testing and inspection during that entry demonstrate that the hazards within the permit space have been eliminated, the permit space may be reclassified to a non-permit space *for the purpose of entry* for as long as the hazards remain eliminated.

i. Control of atmospheric hazards through forced-air ventilation does not constitute elimination of the hazards. If it can be demonstrated that forced-air ventilation alone will control all hazards in the space, alternate entry procedures may be used, as indicated above.

(c) The OU shall document the basis for determining that all hazards in a permit space have been eliminated, through a written certification that contains the following:

i. Date;

ii. Space location; and

iii. Signature of the person making the determination.

(d) If hazards arise within a permit space that has been reclassified to a non-permit space *for the purpose of entry*, each worker in the space shall exit the space immediately. The space shall then be reevaluated to determine whether it must be reclassified back to a permit space.

(e) Once entry operations have been completed, the permit space that was reclassified to a non-permit space *for the purpose of entry* shall be reclassified back to a permit space.

(2) Alternate Entry Procedures

Alternate entry procedures may be used to enter a permit space if all of the following conditions are satisfied:

(a) It shall be determined that the **only** hazard posed by the permit space is an actual or potential hazardous atmosphere.

(b) It shall be determined that continuous forced-air ventilation alone is sufficient to maintain that the permit space safe for entry.

(c) These determinations shall be supported by documented monitoring and inspection data.

i. If an initial entry of the permit space is necessary to obtain the data required, the entry shall be performed using full-permit procedures.

(d) The determinations and supporting monitoring and inspection data shall be made available to each worker who enters the permit space.

(e) Entry into the permit space shall be performed in accordance with all of the following requirements, as applicable:

i. Any conditions exterior to the permit space to be entered and making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.

ii. When entrance covers to permit spaces that involve vertical entry are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each worker working in the space from foreign objects entering the space.

iii. Before a worker enters the space, the internal atmosphere shall be tested with a calibrated direct-reading instrument for oxygen content and, if applicable, flammable gases/vapors and potential toxic air contaminants, in that order.

(i) Any worker who enters the space shall be provided an opportunity to observe the required pre-entry testing.

(ii) There may be no hazardous atmosphere within the space whenever any worker is inside the space.

(f) Continuous forced-air ventilation shall be used as follows:

i. A worker may not enter the space until the continuous forced-air ventilation has eliminated any hazardous atmosphere.

ii. The continuous forced-air ventilation shall be so directed as to ventilate the immediate areas where a worker is or will be present within the space and shall continue until all workers have left the space.

(i) If the continuous forced-air ventilation stops while entry operations are in progress, all entrants must leave the space immediately.

iii. The air supply for the continuous forced-air ventilation shall be from a clean source and may not increase the hazards in the space.

iv. The atmosphere within the space shall be periodically tested as necessary to ensure that the continuous forced-air ventilation is preventing the accumulation of a hazardous atmosphere.

(i) Any worker who enters the space shall be provided with an opportunity to observe the required periodic testing.

(g) All of the following steps shall be taken if a hazardous atmosphere is detected during entry:

i. Each worker shall leave the space immediately.

ii. The space shall be evaluated to determine how the hazardous atmosphere developed.

iii. Measures shall be implemented to protect workers from the hazardous atmosphere before any subsequent entry takes place.

(h) It shall be verified that the space is safe for entry and that the pre-entry measures required above have been taken through a written certification that:

i. Is prepared prior to entry;

ii. Contains the date, space location; and signature of the person providing the certification; and

iii. Is made available to each worker entering the space.

(3) Full-Permit Entry Procedures

If a permit space cannot be reclassified to a non-permit space *for the purpose of entry* or entered using alternate entry procedures, it must be entered in accordance with the following procedures for full-permit-based entry:

(a) Implement the measures necessary to prevent unauthorized entry;

(b) Evaluate and identify the hazards of the permit space before workers enter it;

(c) Develop and implement the means, procedures, and practices necessary for safe permit space entry operations, including, but is not limited to, the following:

i. Specifying acceptable entry conditions;

ii. Providing each authorized entrant with the opportunity to observe any monitoring or testing of permit spaces;

iii. Isolating the permit space;

iv. Purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards;

v. Providing pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards; and

vi. Verifying that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.

(d) Provide and maintain the following equipment, as necessary to ensure safe entry operations and at no cost to employees, and ensure that workers use it properly:

i. A meter needed to continuously monitor for oxygen, lower explosive limit or combustible gases/vapors, and, toxic gases/vapors potentially present in the permit space;

ii. Ventilating equipment needed to obtain acceptable entry conditions;

iii. Communications equipment;

iv. PPE insofar as feasible engineering controls and work practice controls do not adequately protect workers;[2]

v. Lighting equipment needed to enable workers to see well enough to work safely and to exit the space quickly in an emergency;

vi. Barriers and shields;

vii. Equipment, such as ladders, needed for safe ingress and egress by authorized entrants;

viii. Rescue and emergency equipment; and

ix. Any other equipment necessary for safe entry into and rescue from permit spaces.

(e) Evaluate permit-space conditions as follows when entry operations are conducted:

[2] PPE is only an option if feasible engineering and work practice controls do not adequately protect workers.[3] If multiple spaces are to be monitored by a single attendant, include in the permit program the means and procedures to enable the attendant to respond to an emergency affecting one or more the permit spaces being monitored without distraction from the attendants responsibilities.

i. Test conditions in the permit space to determine if acceptable entry conditions exist before entry is authorized to begin, except that, if isolation of the space is infeasible because the space is large or is part of a continuous system (such as a sewer), pre-entry testing shall be performed to the extent feasible before entry is authorized and, if entry is authorized, entry conditions shall be continuously monitored in the areas where authorized entrants are working;

ii. Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations;

iii. Ensure that atmospheric hazards, if any, are monitored in the following chronological order:

(i) Oxygen;

(ii) Combustible gases and vapors; and

(iii) Toxic gases and vapors;

iv. Provide each authorized entrant an opportunity to observe the pre-entry and any subsequent testing or monitoring of the permit space;

v. Re-evaluate the permit space in the presence of any authorized entrant who requests re-evaluation because the entrant has reason to believe that the evaluation (i.e., testing/monitoring) of that space may not have been adequate; and

vi. Immediately provide each authorized entrant with the results of any testing conducted.

(f) Provide at least one attendant outside the permit space[3] into which entry is authorized for the duration of entry operations;

(g) Designate the person(s) who are to have active roles (as, for example, authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in a permit space) during entry operations, identify the duties of each person, and provide each worker with training;

[3] If multiple spaces are to be monitored by a single attendant, include in the permit program the means and procedures to enable the attendant to respond to an emergency affecting one or more the permit spaces being monitored without distraction from the attendants responsibilities.

(h) Develop and implement procedures for summoning rescue and emergency services for rescuing entrants from the permit space, for providing necessary emergency services to rescued workers, and for preventing unauthorized personnel from attempting a rescue (see Section 6i for additional requirements related to rescue and emergency services);

(i) Develop and implement procedures to coordinate entry operations when workers from more than one OU are working simultaneously as authorized entrants in a permit space, so that workers of one OU do not endanger the workers of another OU;

(j) Develop and implement procedures, such as closing off the permit space, necessary for concluding the entry after entry operations have been completed;

(k) Review entry operations when the OU has reason to believe that the measures taken may not protect workers and correct any deficiencies found in OU planning and implementation of entry operations before subsequent entries are authorized; and

(l) Document that the above requirements for full permit-based entry of the permit space have been met by preparing, issuing, using, and cancelling an entry permit meeting the requirements in Section 6d.

d. Entry-Permit Requirements

(1) Before entry to a permit space is authorized, the OU shall document the completion of measures necessary for entry, as delineated in Section 6c, using an entry permit containing the information specified in 29 CFR 1910.146(f), Entry Permit.

(a) The OUs shall use the entry-permit form provided by OSHE, or an alternative form that has been determined by OSHE to contain the required information.

(2) Before entry begins, the entry supervisor identified on the permit shall sign the entry permit to authorize entry.

(3) So that the entrants can confirm that pre-entry preparations have been completed, the completed permit shall be made available at the time of entry to all authorized entrants by posting it at the entrance to the permit space or by any other equally effective means.

(4) The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit.

(5) The entry supervisor shall terminate entry and cancel the entry permit when:

(a) The entry operations covered by the entry permit have been completed; or

(b) A condition that is not allowed under the entry permit arises in or near the permit space.

(6) Any problems encountered during an entry operation shall be noted on the pertinent permit so that appropriate revisions to OU planning and implementation of entry operations can be made.

e. Review of OU Entry Operations

(1) Review OU entry operations[4] using the canceled permits retained as required by Section 6h within 1 year after each entry and revise the program as necessary, to ensure that workers participating in entry operations are protected from permit-space hazards.

f. Entry Procedures when Working with Contactors

When an OU arranges to have contractors perform work that involves entry to permit spaces, the OU shall:

(1) Inform the contractor that entry to permit spaces is allowed only through compliance with a permit-space program meeting the requirements of 29 CFR 1910.146;

(2) Apprise the contractor of the elements, including the hazards identified and the OU's experience with the spaces, that make the spaces in question permit spaces;

(3) Apprise the contractor of any precautions or procedures that the OU has implemented for the protection of workers in and near the permit spaces where contractor personnel will be working;

(4) Coordinate entry operations with the contractor when both NIST personnel and contractor personnel will be working in or near the permit spaces; and

[4] OUs may perform a single annual review covering all entries performed during a 12-month period. If no entry is performed during a 12-month period, no review is necessary.

(5) Debrief the contractor at the conclusion of entry operations regarding the entry procedures followed and any hazards confronted or created in the permit spaces during entry operations.

g. NIST Employees Entering Permit Spaces at Non-NIST Locations
When NIST employees are to enter or be exposed to permit spaces at non-NIST locations, they shall:

(1) Comply with the requirements of this suborder;

(2) Obtain any available information regarding permit-space hazards and past entry operations from the entity responsible for the non-NIST location;

(3) Coordinate entry operations with the entity responsible for the non-NIST location when both NIST employees and others will be working in or near the permit spaces; and

(4) Inform the other entity of the entry procedures that shall be followed; and

(5) Inform the other entity of any hazards confronted or created in the permit spaces, either through a debriefing or during entry operations.

h. Duties of Individuals Involved in Full-Permit-Entry Operations

(1) Authorized entrants shall:

(a) Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

(b) Properly use equipment as required by this program;

(c) Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space as required by this program;

(d) Alert the attendant whenever:

i. The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or

ii. The entrant detects a prohibited condition;

(e) Exit from the permit space as quickly as possible whenever:

i. An order to evacuate is given by the attendant or the entry supervisor;
ii. The entrant recognizes any warning sign or symptom of exposure to a dangerous situation;

iii. The entrant detects a prohibited condition; or

iv. An evacuation alarm is activated.

(2) Attendants shall:

(a) Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

(b) Remain aware of possible behavioral effects of hazard exposure in authorized entrants;

(c) Continuously maintain an accurate count of authorized entrants in the permit space by name or other means (e.g., through the use of rosters or tracking systems) sufficient to determine quickly and accurately, for the duration the permit, which authorized entrants are in the permit space;

(d) Remain outside the permit space during entry operations until relieved by another attendant;

(e) Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space;

(f) Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and order the authorized entrants to evacuate the permit space immediately if:

i. Any of the following are detected:

(i) A prohibited condition;

(ii) Behavioral effects of exposure of an authorized entrant to a hazard;

(iii) A situation outside the space that could endanger the authorized entrants; or

ii. Any of the duties assigned to them on entry permits cannot be effectively and safely performed;

(g) Summon rescue and other emergency services as soon as they have determined that authorized entrants may need assistance to escape from permit-space hazards;

(h) Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:

i. Warn the unauthorized persons that they must stay away from the permit space;

ii. Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and

iii. Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;

(i) Perform non-entry rescues as specified by the OU's rescue procedure; and

(j) Perform no duties that might interfere with their primary duty to monitor and protect authorized entrants.

(3) Entry supervisors shall:

(a) Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

(b) Verify, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;

(c) Terminate entries and cancel entry permits when:

i. Covered entry operations have been completed; or

ii. A condition that is not allowed under the entry permit arises in or near the permit space.

(d) Verify that rescue services are available and that the means for summoning them are operable;

(e) Remove unauthorized individuals who enter or who attempt to enter permit spaces during entry operations; and

(f) Whenever responsibility for permit-space entry operations is transferred and at intervals dictated by the hazards and operations performed within the space, determine that entry operations remain consistent with the terms of the entry permit and that acceptable entry conditions are maintained.

i. Rescue and Emergency Services

(1) In designating rescue and emergency services in connection with Section 6c(3)(h), OUs shall:

(a) Evaluate a prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazard(s) identified;

(b) Evaluate a prospective rescue service's ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces identified;[5]

(c) Select a rescue team or service from those evaluated that:

i. Has the capability to reach the victim(s) within a time frame that is appropriate for the permit-space hazard(s) identified; and

ii. Is equipped for and proficient in performing the needed rescue services;

(d) Inform each rescue team or service of the hazards they may confront when called on to perform rescue at the site; and

[5] What will be considered timely will vary according to the specific hazards involved in each entry. For example, §1910.134, Respiratory Protection, requires that employers provide a standby person or persons capable of immediate action to rescue employee(s) wearing respiratory protection while in work areas defined as IDLH atmospheres.

(e) Provide the rescue team or service selected with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.

(2) An OU whose workers have been designated to provide permit-space rescue and emergency services shall take the following measures:

(a) Provide affected workers with the PPE needed to conduct permit-space rescues safely and train affected workers so they are proficient in the use of that PPE, at no cost to those employees;

(b) Train affected workers to perform assigned rescue duties, including the training required in Section 6k for Authorized Entrants;

(c) Train affected workers in basic first-aid and cardiopulmonary resuscitation (CPR);

(d) Ensure that at least one member of the rescue team or service holding a current certification in first aid and CPR is available; and

(e) Ensure that affected workers practice making permit-space rescues at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit spaces or from representative permit spaces that simulate the types of permit spaces from which rescue are to be performed with respect to opening size, configuration, and accessibility.

(3) To facilitate non-entry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems shall meet the following requirements:

(a) Each authorized entrant shall use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, above the entrant's head, or at another point which the OU can establish presents a profile small enough for the successful removal of the entrant. Wristlets may be used in lieu of the chest or full body harness if the OU can demonstrate that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative.

(b) The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the

rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve personnel from vertical type permit spaces more than 5 feet (1.52 m) deep.

(4) If an injured entrant is exposed to a substance for which a Material Safety Data Sheet or other similar written information is required to be kept at the worksite, that information shall be made available to the medical facility treating the exposed entrant.

j. Records (Other than Training Records)

(1) OUs shall retain each canceled entry permit for at least 1 year to facilitate the review of entry operations.

k. Training

(1) Training of Individuals Who Are to Reclassify Permit Spaces to a Non-Permit Spaces *for the Purpose of Entry* or Use Alternate Entry Procedures

(a) Such individuals shall complete the following prior to reclassifying permit spaces or engaging in alternate entry operations:

i. The one-time-only training provided by OSHE on the NIST Permit-Required Confined Spaces program; and

ii. The activity-specific training required by hazard reviews applicable to the work to be conducted and sufficient to establish their proficiency to conduct that work.

(b) The activity-specific training for such individuals shall be provided by individuals who have successfully completed training on the NIST Permit-Required Confined Spaces program and who are familiar with entry operations for the activity-specific space or a representative space.

(2) Training of Individuals Who Are to Use Full-Permit Entry Procedures

(a) Authorized Entrants, Attendants, and Entry Supervisors shall complete the following prior to engaging in full-permit entry operations:

i. The one-time-only training provided by OSHE on the Permit-Required Confined Spaces program; and

ii. The activity-specific training required by hazard reviews applicable to the work to be conducted, including training on their respective duties as delineated in Section 6h, and sufficient to establish their proficiency to conduct that work.

(b) The activity-specific training for Authorized Entrants, Attendants, and Entry Supervisors shall be provided by individuals who have successfully completed training on the NIST Permit-Required Confined Spaces program and who have demonstrated their proficiency in entry operations representative of those that the Authorized Entrants, Attendants, and Entry Supervisors are to conduct.

(3) Training of Official First-Level Supervisors of Individuals Involved in Entry Operations, Regardless of the Entry Procedures to be Used

(a) The one-time-only training provided by OSHE on the NIST Permit-Required Confined Spaces program.

(4) Additional Activity-Specific Training of Individuals Involved in Entry Operations, Regardless of the Entry Procedures to be Used

(a) Additional activity-specific training of such individuals must be conducted under the following conditions:

i. Before there is a change in assigned duties;

ii. Whenever there is a change in permit-space operations that presents a hazard about which a worker has not previously been trained; or

iii. Whenever the OU has reason to believe either that there are deviations from permit-space entry procedures or that there are inadequacies in the worker's knowledge or use of these procedures.

(b) The training shall introduce, and establish worker proficiency in, new or revised procedures, as necessary.

(5) Documentation and Recording of Activity-Specific Training

(a) OUs shall document activity-specific training and record its completion by affected employees in accordance with OU procedures.

(b) Training records must, at a minimum, contain the following information and be available for inspection by workers and their authorized representatives:

i. Each worker's name;

ii. Trainer's signature(s); and

iii. Training dates.

l. Employee Participation

(1) OUs shall consult with affected employees and their authorized representatives on the development and implementation of all aspects of the NIST Permit-Required Confined Spaces program.

(2) OUs shall make available to affected employees and their authorized representatives all information required by the NIST Permit-Required Confined Spaces program.

7. DEFINITIONS

a. Acceptable Entry Conditions – The conditions that must exist in a permit space to allow entry and to ensure that workers involved with a permit-space entry can safely enter into and work within the space.

b. Attendant – An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the entry permit.

c. Authorized Entrant – An employee who is authorized by the employer to enter a permit space.

d. Blanking or Blinding – The absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

e. Confined Space – A space that:

(1) Is large enough and so configured that a worker can bodily enter and perform assigned work; and

(2) Has limited or restricted means for entry or exit, as in the case of some tanks, vessels, silos, storage bins, hoppers, vaults, and pits); and

(3) Is not designed for continuous occupancy.

f. Double Block and Bleed – The closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

g. Emergency – Any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

h. Engulfment – The surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

i. Entry – The action by which a person passes through an opening into a permit space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.[6]

j. Entry Operations – The activities that take place in a permit space once that space has been entered.

k. Entry Permit (Permit) – The written or printed document that is provided by the employer to allow and control entry into a permit space and containing the information specified in 29 CFR 1910.146(f), Entry Permit.

l. Entry Supervisor – The person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.[7]

[6] This definition does not apply to spaces that are too small to accommodate an entire body. For example, it would not apply to a hand or fingers breaking the plane to turn a knob if the space were not large enough to accommodate the entire body.

[7] An entry supervisor also may serve as an attendant or as an authorized entrant as long as that person is trained and equipped as required by this suborder for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

m. Hazardous Atmosphere – An atmosphere that may expose workers to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

(1) Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);

(2) Airborne combustible dust at a concentration that meets or exceeds its LFL;[8]

(3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;

(4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, of 29 CFR 1910 and which could result in worker exposure in excess of its dose or permissible exposure limit;[9] and

(5) Any other atmospheric condition that is immediately dangerous to life or health.[10]

n. Hot-Work Permit – The employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

o. Immediately Dangerous to Life or Health (IDLH) – Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.[11]

p. Inerting – The displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible. This procedure produces an IDLH oxygen-deficient atmosphere.

q. Isolation – The process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as blanking

[8] This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52 m) or less.
[9] An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.
[10] For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Material Safety Data Sheets that comply with the Hazard Communication Standard, 29 CFR 1910.1200, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.
[11] Some materials -- hydrogen fluoride gas and cadmium vapor, for example – may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

r. Line Breaking – The intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

s. Non-Permit-Required Confined Space – A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain, any hazard capable of causing death or serious physical harm.

t. Non-Permit Space – See "Non-Permit-Required Confined Space".

u. Oxygen-Deficient Atmosphere – An atmosphere containing less than 19.5 percent oxygen by volume.

v. Oxygen-Enriched Atmosphere – An atmosphere containing more than 23.5 percent oxygen by volume.

w. Permit-Required Confined Space – A confined space that has one or more of the following characteristics:

(1) Contains or has a potential to contain a hazardous atmosphere;

(2) Contains a material that has the potential for engulfing an entrant;

(3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or

(4) Contains any other recognized serious safety or health hazard.

x. Permit Space – See "Permit-Required Confined Space.

y. Prohibited Condition – Any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

z. Rescue Service – The personnel designated to rescue workers from permit spaces.

aa. Retrieval System – The equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

bb. Testing – The process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.[12]

8. ACRONYMS

a. CFR – Code of Federal Regulations

b. CPR – Cardiopulmonary Resuscitation

c. IDLH – Immediately Dangerous Life or Health

d. LFL – Lower Flammable Limit

e. OSH – Occupational Safety and Health

f. OSHA – Occupational Safety and Health Administration

g. OSHE – Office of Safety, Health, and Environment

h. OU – Organizational Unit

i. PPE – Personal Protective Equipment

9. ROLES AND RESPONSIBILITIES

a. The OUs are responsible for ensuring that the requirements in Section 6 are met.

10. AUTHORITIES

There are no authorities specific to this suborder alone.

[12] Testing enables employers both to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to, and during, entry.

11. DIRECTIVE OWNER

Chief Safety Officer

12. APPENDICES

a. Examples of Required Hazard Signage

b. Revision History

Appendix A. Examples of Required Hazard Signage

Appendix B. Revision History

Revision	Date	Responsible Person	Description of Change
1	01/07/2021	April Camenisch	Updated suborder links. Added revision history appendix.