

# Chapter 6

## Confined Space

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# 1 Overview

The purpose of the confined space program is to ensure personnel work safely in and around *confined spaces*. A confined space is classified as either a *non-permit-required confined space* (NPRCS) or a *permit-required confined space* (PRCS), depending on the number and type of hazards present.

Confined space program requirements include training that supports accurate identification and mitigation of hazards posed by both the confined space and the work that will be performed in it. Every entry must be documented. Certain PRCSSs may be temporarily declassified or entered under an alternate procedure by eliminating hazards prior to entry. The required form or permit provides guidance and serves to keep the confined space inventory up-to-date.

## 1.1 Hazards / Impacts

Spaces classified as a PRCSS may pose the potential for

- *A hazardous atmosphere*
- *Oxygen-deficient atmosphere*
- *Engulfment*
- Proximity to electrical equipment, which poses a risk for electric shock
- Proximity to a mechanical device with exposed moving parts, which poses a risk for injury
- Due to the small size of the work area, all confined spaces pose a risk for such injuries as bumps, scrapes, and lacerations

Certain types of hazards pose more than one type risk. For example, the presence of gasoline vapor poses two types of risk because it is both flammable and toxic.

*Note* The potential for an injury fall is not a factor in classifying a confined space. This hazard is addressed in [Chapter 45, "Fall Protection"](#).

## 2 Scope

Confined space program requirements apply to all personnel who are involved in the entry of a confined space at SLAC.

## 3 Implementation

The requirements of this chapter take effect May 19, 2010.

## 4 Requirements

### 4.1 General

#### 4.1.1 Confined Space Inventory

##### 4.1.1.1 Inventory Maintenance

The confined space program manager will maintain the [confined space inventory](#), which includes all identified confined spaces and provides the basis for entry method selection.

Each confined space profile is compiled by the confined space program manager with the help of a knowledgeable *confined space entry supervisor* and includes

- A profile (confined space owner, dimensions, location, and description)
- Hazards and controls
- Classification (PRCS or NPRCS)

The program manager must keep the inventory current by

- Reviewing forms and permits for all confined space entries
- Annually soliciting information from confined space owners, who must verify the accuracy of the profile for their confined spaces or report changed conditions

##### 4.1.1.2 New Confined Spaces

Upon creation or discovery of a new or suspected confined space

- The building or area manager designates a confined space owner and notifies the confined space program manager
- The confined space program manager evaluates the confined space and adds it to the confined space inventory

- The confined space owner identifies the confined space with the posting appropriate to the space classification (see [Confined Space: Posting Requirements](#))

## 4.1.2 Confined Space Entry

### 4.1.2.1 Entry Method Selection

The four possible methods of confined space entry are non-permit required and three variants for spaces classified as a PRCS: alternate entry, temporary declassification, and permit required. The required method depends on the confined space classification (NPRCS or PRCS), identified hazards listed in the confined space inventory, and hazards introduced by the work to be done.

- For a summary of methods, see [Confined Space: Entry Method Selection Flow Chart](#)
- Each type of entry requires a specific procedure and a form or permit as described below and in [Confined Space: Entry Procedures](#)

### 4.1.2.2 Non-permit-required Confined Space Entry

NPRCS entry applies when no hazards are present. This is established by completion of the Confined Space: Non-permit Required Confined Space Entry Form ([pdf](#) or [Word](#)) (or equivalent subcontractor's SLAC-approved form), which requires that a confined space entry supervisor or confined space program manager confirms that no hazards exist and none will be introduced.

*Note* The NPRCS entry form reviewer may reclassify the entry if hazardous materials or activities are involved.

### 4.1.2.3 Permit-required Confined Space Entry

A PRCS entry applies when hazards are present. The applicable form or permit requires that all hazards are listed and it specifies the required controls that mitigate or eliminate each hazard.

Entry into a confined space classified as a PRCS may qualify for an alternate procedure or a temporary declassification if hazards can be eliminated as described below. If hazards exceed the stated conditions, a permit is required.

#### Alternate Entry

A PRCS for which the only identified hazard is an actual or potential hazardous atmosphere qualifies for the alternate entry procedure if it can be demonstrated by air monitoring that continuous forced air ventilation alone is sufficient to remove the hazardous atmosphere and maintain the space safe for entry. A confined space entry supervisor must complete the Confined Space: Alternate Entry Form ([pdf](#) or [Word](#)) (or equivalent subcontractor's SLAC-approved form) to verify these conditions. The form must be posted at the work site.

#### Temporary Declassification

A PRCS may be temporarily declassified if both conditions apply:

- No actual or potential atmospheric hazards are present
- All hazards within the space can be eliminated from outside the space for the duration of the entry

A confined space entry supervisor or the confined space program manager temporarily declassifies a PRCS by signing a completed Confined Space: Temporary Declassification Form ([pdf](#) or [Word](#)) (or equivalent subcontractor's SLAC-approved form). All hazards must remain completely eliminated for the duration of the entry. Evacuation and reassessment is mandatory if any change in conditions introduces a hazard.

#### Permit Required

If entry conditions do not qualify for the alternate entry or a temporary declassification, entry into the PRCS must follow the entry procedure for PRCS in [Confined Space: Entry Procedures](#) and be controlled by a Confined Space: Entry Permit ([pdf](#) or [Word](#)) (or equivalent subcontractor's SLAC-approved permit) that is administered and carried out by a confined space entry supervisor.

#### 4.1.2.4 Rescue

All permit-required entries must have a *non-entry rescue* plan and *retrieval system* in place prior to entry. No entry for which entry rescue is required will be authorized, as there is no active confined space entry rescue team at SLAC. All permit-required confined spaces currently identified in the SLAC confined space inventory qualify for temporary declassification or alternate entry or are suitable for non-entry rescue.

#### 4.1.3 Preventing Unauthorized Entry

Confined space owners must post an identifying sign at the entrance of each confined space as specified in [Confined Space: Posting Requirements](#).

The following are additional measures that can be taken to prevent unauthorized persons from entering a PRCS:

- Engineering controls such as
  - Locking or bolting the entrance
  - Making access to the entrance difficult without the use of tools, heavy equipment, or several workers
  - Welding the entrance shut
- Administrative controls such as ensuring personnel are trained to recognize hazards or PRCS conditions

#### 4.1.4 Personnel

All confined space entries must follow the *two-person rule* and must be carried out by qualified persons as follows:

- For NPRCS entries, the minimum qualification is that both workers are current in the training required at the attendant or entrant level.
- All PRCS entries must be supervised by a *confined space entry supervisor* and carried out by workers who are current in the training required at the attendant or entrant level.

### 4.1.5 Equipment

Owners of equipment used for confined space entry – such as air monitors, full body harnesses, lifelines, tripods, hoists, respirators, and any other types of personal protective equipment (PPE) – will develop and follow a maintenance schedule, and the equipment will carry inspection and calibration information when appropriate.

### 4.1.6 Recordkeeping

The confined space program manager will compile all closed permits and all completed non-permit required confined space entry, alternate entry, and temporary declassification entry forms and retain them for a minimum of one year for use in program assessments.

## 4.2 Procedures and Specific Requirements

### 4.2.1 Entry Method Selection

The entry method is based on the confined space classification (NPRCS or PRCS), hazards listed in the [confined space inventory](#), and hazards that will be introduced by the work to be conducted. For a summary of entry methods and required forms and permits, see the [Confined Space: Entry Method Selection Flow Chart](#).

Select the appropriate form from the list below (or from the subcontractor's SLAC-approved confined space program) based on entry and work conditions:

- Confined Space: Non-permit Required Confined Space Entry Form ([pdf](#) or [Word](#))
- Confined Space: Alternate Entry Form ([pdf](#) or [Word](#))
- Confined Space: Temporary Declassification Form ([Word](#) or [pdf](#))
- Confined Space: Entry Permit ([pdf](#) or [Word](#))

### 4.2.2 Entry Procedures

For procedures, see [Confined Space: Entry Procedures](#).

*Note* A signed and approved [hot work permit](#) is required for any spark or flame-producing activities to be done in the space. Proper lock out/tag out procedures must be in place where applicable, and must be performed by properly trained persons as described in [Chapter 51, "Control of Hazardous Energy"](#).

### 4.2.3 Posting Requirements

Confined space owners must post each confined space as described in [Confined Space: Posting Requirements](#).

## 4.3 Training

### 4.3.1 Entrants and Attendants

Entrants and attendants must complete the following courses before performing any confined space work and must retake them once every 36 months to remain qualified:

- ESH Course 144, Permit Required Confined Space ([ESH Course 144](#))
- ESH Course 144PRA, Permit Required Confined Space ([ESH Course 144PRA](#))

### 4.3.2 Confined Space Entry Supervisors

To become eligible to be a confined space entry supervisor the following courses must first be completed and then retaken once every 36 months to remain qualified:

- ESH Course 144, Permit Required Confined Space ([ESH Course 144](#))
- ESH Course 144PRA, Permit Required Confined Space ([ESH Course 144PRA](#))
- ESH Course 146, Confined Space Entry Supervisor ([ESH Course 146](#))

### 4.3.3 ESH Coordinators or Line Managers

No course is required for ESH coordinators, line managers, or anyone who provides safety oversight without performing work in a permit-required confined space. The following course is recommended, however, to establish hazard awareness:

- ESH Course 144, Permit Required Confined Space ([ESH Course 144](#))

## 4.4 Roles and Responsibilities

### 4.4.1 Confined Space Program Manager

The confined space program manager

- Develops program requirements and training
- Along with confined space entry supervisors, surveys and profiles confined spaces to determine classification (NPRCS or PRCS), hazards, and controls
- Advises confined space entry supervisors
- Maintains the confined space inventory
- Retains completed forms and closed permits for one year
- Reviews subcontractor programs submitted to the Field Safety and Building Inspection Office to ensure their programs are OSHA or Cal/OSHA compliant

### 4.4.2 Managers and Supervisors

Line management must

- Designate confined space entry supervisors
- Ensure that training remains current
- Provide all required equipment for confined space entry

#### 4.4.3 Building and Area Managers

Building and area managers designate confined space owners.

#### 4.4.4 Confined Space Owners

Confined space owners must

- Ensure confined spaces are properly posted
- Report any changes in the confined space profile to the confined space program manager
- Respond to the program manager's annual request for information to update the confined space inventory

#### 4.4.5 Confined Space Entry Supervisors

A confined space entry supervisor will

- Be current in required training
- For all NPRCS, temporary declassification and alternate entries, reviews the entry form and confirms that conditions qualify, if valid
- Together with the confined space program manager, profile newly discovered or created confined spaces
- For all permit entries, supervise confined space entries as follows
  - Identifies hazards that may occur during a specific entry and signs, symptoms, and consequences of a potential exposure
  - Verifies, 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 signing the permit's pre-entry certification and allowing entry
  - Verifies that non-entry rescue procedures are in place
  - Ensures that atmospheric test equipment is adequate for the anticipated hazards and has been properly calibrated
  - Remains outside the space during entry operation until relieved by another confined space entry supervisor
  - Terminates the entry and close the permit when the entry operations covered by the entry permit have been completed or a condition that is not allowed under the entry permit arises in or near the permit space
  - Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations



- Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that *acceptable entry conditions* are maintained
- Debriefs entrants and attendants
- Forward all closed permits to the confined space program manager

#### 4.4.6 Attendants

Attendants will

- Be current in required training
- Know hazards that may be encountered during the entry, as well as behavioral/physiological symptoms and health effects if overexposure occurs
- Monitor activities inside and outside the space to determine if it is safe for entrants to remain
- Maintain an accurate account of entrants in the permit-required space
- Maintain communication with entrants to monitor work activities and sound the alert if evacuation becomes necessary
- Remain outside the space during the entry operation until relieved by another attendant
- Perform no other activities that may interfere with the primary job of monitoring safety and condition of entrants currently in the confined space
- Perform non-entry rescue, if necessary
- Forward completed entry forms to the confined space program manager

#### 4.4.7 Entrants

Entrants will

- Be current in required training
- Know the hazards that may be encountered during the entry, as well as symptoms and health effects if overexposure occurs
- Operate any equipment required for the safety of the entry operation
- Maintain communication with the attendant
- Notify the attendant of any indication of a dangerous situation or *prohibited condition* and exit immediately
- Exit the confined space as quickly as possible as instructed by the attendant or the confined space entry supervisor
- Forward completed entry forms to the confined space program manager

#### 4.4.8 University Technical Representatives

University technical representatives must

- Make information in the confined space inventory available to subcontractors
- Submit completed forms from subcontractor confined space entries to the confined space program manager

## 5 Definitions

*Acceptable entry condition.* Condition that must exist in a permit space to ensure that work can be conducted safely within the space

*Air monitoring.* The process by which the atmospheric hazards that may confront entrants of a permit space are identified and evaluated

*Attendant.* Person designated to remain outside the confined space to monitor conditions for any health or safety impacts and perform any attendant's duties specified on a form or permit

*Confined space.* A space with all of these three characteristics:

1. It is large enough and so configured that a person can bodily enter and perform assigned work
2. It has limited or restricted means for entry or exit
3. It is not designed for continuous human occupancy

Confined spaces are divided into two categories based on their inherent hazard potential. See *Non-permit-required confined space (NPRCS)* and *Permit-required confined space (PRCS)*.

*Confined space entry supervisor.* The person responsible for determining if acceptable entry conditions are present for entry, for authorizing entry, overseeing entry operations, and closing any permit-required confined space operations

*Confined space owner.* A building or area manager, or a person designated by such, responsible for placing the required posting and reporting a change in confined space conditions

*Confined space inventory.* An inventory that includes profiles and hazard information for all identified confined spaces

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

*Entrant.* A person who has been determined to be physically capable to perform work in a confined space and has the appropriate training for that entry

*Entry (into a confined space).* When any part of a person's body passes through the plane of the opening of the space

*Entry permit.* The document that specifies authorized personnel, required equipment, and air monitoring data for entry into a permit-required confined space

*Forced air ventilation.* Introduction of air into a confined space before and during entry (See *purging*). Certain circumstances may require local exhaust ventilation to remove contaminants from the space generated at a point source, such as removing fumes from welding in a confined space.

*Hazardous atmosphere, potentially hazardous atmosphere.* An atmosphere that has the potential to cause death, incapacitation, impairment of ability for self-rescue, acute illness, delayed illness, or effects that can result in injury

*Hot work.* Any work that involves burning, welding, riveting, or similar fire-producing operations, as well as work that produces a source of ignition, such as drilling, abrasive blasting, and space heating

*Non-entry rescue.* Rescue/retrieval of an entrant from a confined space that is achieved without entry into the space by rescuers. This involves the use of equipment such as a retrieval line, a full-body harness, and a lifting device or anchor (usually a tripod with mechanical advantage winch).

*Non-permit-required confined space (NPRCS).* A confined space that does not contain or have the potential to contain any atmospheric or other hazard capable of causing death or physical harm. A non-permit-required confined space may become a permit-required confined space if hazardous materials are brought into the space or if hazardous activities are conducted in the space.

*Oxygen concentration.* Normal ambient air contains 20.9 percent oxygen by volume. Deviations – both below this concentration, called deficiency, and above it, called enrichment – constitute a hazard to worker safety. Deviant oxygen conditions include

- *Oxygen-deficient atmosphere.* Atmosphere in which the oxygen by volume is below 19.5 percent
- *Oxygen deficiency.* Any measured oxygen concentration less than what is present in normal ambient air. It can be due to the intrusion of an unknown material that dilutes or displaces the available oxygen or by the presence of an oxygen-consuming process such as oxidation (rust), chemical reactions (including combustion), absorption (on wet activated carbon), or biological action
- *Oxygen enrichment.* Any measured oxygen concentration that is greater than what is present in normal ambient air. If the concentration exceeds 20.9 percent, check for an oxygen source inside the confined space such as a leaking welding hose or a chemical reaction.
- *Oxygen-rich atmosphere.* An oxygen concentration in the space of greater than 23.5 percent oxygen by volume

*Permit-required confined space (PRCS).* A confined space that has one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere
- Contains a material that has the potential for engulfing an entrant
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section
- Contains any other recognized serious safety or health hazard

*Prohibited condition.* Any condition in permit-required confined space that is not allowed by the permit during the period when the entry is authorized

*Retrieval system.* System for conducting non-entry rescue of persons from confined spaces. This system includes mechanical retrieval or extraction devices (a rated tripod, davit, or other anchorage plus winch)

and full body harness. Wristlets may be used to aid in a difficult extraction but should not be used to support a person's weight.

*Two-person rule.* Rule that people must work in teams of two in defined situations; also known as the buddy system

## 6 References

### 6.1 Program Documents

The following are procedures, forms, and other documents required for the implementation of this program:

- [Confined Space: Entry Method Selection Flow Chart](#) (SLAC-I-730-0A21S-050)
- [Confined Space: Entry Procedures](#) (SLAC-I-730-0A21C-007)
- Confined Space: Entry Permit (SLAC-I-730-0A21J-002) [pdf](#) or [Word](#)
- Confined Space: Alternate Entry Form (SLAC-I-730-0A21J-010) [pdf](#) or [Word](#)
- Confined Space: Non-permit Required Confined Space Entry Form (SLAC-I-730-0A21J-006) [pdf](#) or [Word](#)
- Confined Space: Temporary Declassification Form (SLAC-I-730-0A21J-009) [pdf](#) or [Word](#)
- [Confined Space: Posting Requirements](#) (SLAC-I-730-0A21S-051)
- [Confined Space Inventory](#)

### 6.2 Standards

The following is the standard adopted by this program:

- Title 29, *Code of Federal Regulations*, Part 1910.146, "Permit-Required Confined Spaces" ([29 CFR 1910.146](#))

### 6.3 Related Documents

The following are additional related documents cited as resources for this program:

[SLAC Environment, Safety, and Health Manual](#) (SLAC-I-720-0A29Z-001)

- [Chapter 12, "Fire and Life Safety"](#)
- [Chapter 19, "Personal Protective Equipment"](#)
- [Chapter 29, "Respiratory Protection"](#)
- [Chapter 45, "Fall Protection"](#)
- [Chapter 51, "Control of Hazardous Energy"](#)

Other SLAC Documents

- [“Hot Work Permit-Fire System”](#)

## 7 Document Information

Title: Confined Space

URL: <http://www-group.slac.stanford.edu/esh/eshmanual/pdfs/ESHch06.pdf>

Revision Record: <https://www-internal.slac.stanford.edu/esh/docreview/reports/revisions.asp?ProductID=15>

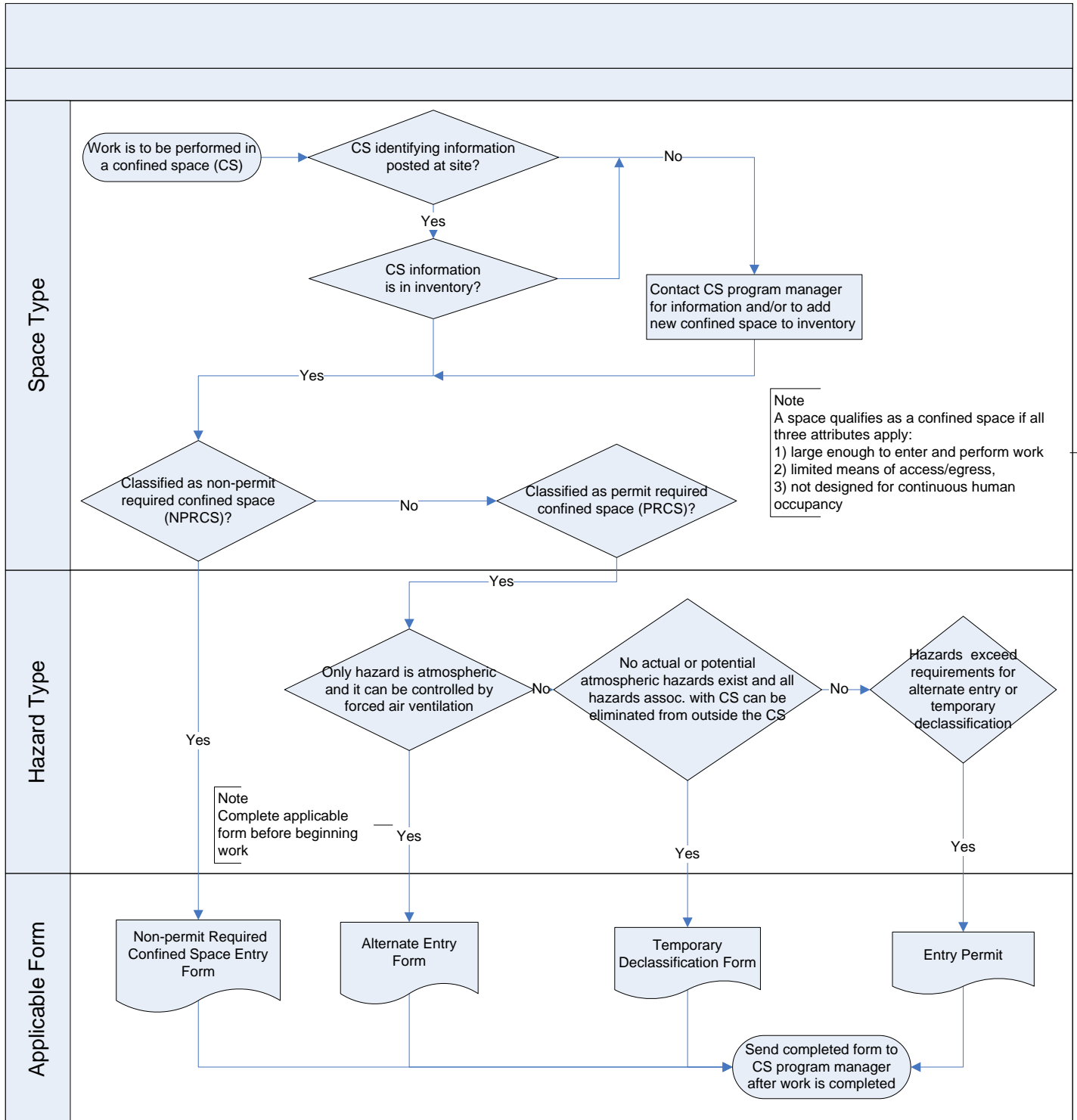
Department: Field Safety and Building Inspection Office

Program: Confined Space

Date Effective: 19 May 2010



# Entry Method Selection Flow Chart







# Confined Space: Entry Procedures

URL: <http://www-group.slac.stanford.edu/esh/eshmanual/references/confinedProcedEntry.pdf>

Revision Record: [https://www-](https://www-internal.slac.stanford.edu/esh/docreview/reports/revisions.asp?ProductID=155)

[internal.slac.stanford.edu/esh/docreview/reports/revisions.asp?ProductID=155](https://www-internal.slac.stanford.edu/esh/docreview/reports/revisions.asp?ProductID=155)

Department: Field Safety and Building Inspection Office

Program: Confined Space

Authority: [ESH Manual, Chapter 6, Confined Space](#)

Date Effective: 15 October 2009

## 1 Purpose

The purpose of this procedure is to ensure that entry into any confined space is planned and documented as required in order to identify and control hazards.

## 2 Scope

This procedure covers the entry method selection, planning, and documentation of entry into confined spaces of both classifications: non-permit required confined space (NPRCS) and permit-required confined space (PRCS).

## 3 Applicability

These procedures apply to all confined space entries and to anyone entering a confined space at SLAC.

## 4 Prerequisites

The two-person rule applies to all confined space entries; that is, every confined space entry requires the presence of at least two qualified persons. Entrants and attendants must complete the following courses before conducting any work in a confined space:

- ESH Course 144, Permit Required Confined Space ([ESH Course 144](#))
- ESH Course 144PRA, Permit Required Confined Space ([ESH Course 144PRA](#))

The confined space entry supervisor must complete ESH Courses 144 and 144PRA, listed above, and also

- ESH Course 146, Confined Space Entry Supervisor ([ESH Course 146](#))

Subcontractor employees involved in confined space entries must be trained in accordance with their company's Cal/OSHA compliant confined space entry program.

## 5 Procedures

Requirements for entering a confined space depend on the hazards present as determined by information in the confined space inventory and by observation.

The first step is to determine the applicable entry method as described in Section 5.1. All entries must be reviewed and confirmed as described below and in the required form or permit.

Anyone may terminate an entry and initiate a new evaluation for potential hazards if work operations or conditions change that increase a hazard or if new hazards are identified.

*Note* A signed and approved [hot work permit](#) is required for any spark or flame-producing activities to be done in the space. Proper lock out/tag out procedures must be in place where applicable, and must be performed by authorized persons properly trained as described in [Chapter 51, "Control of Hazardous Energy"](#).

### 5.1 Determining the Applicable Entry Method

#### 5.1.1 Overview

Currently identified confined spaces are characterized in the [confined space inventory](#).

*Note* The following locations are generally not considered confined spaces because they are designed and equipped for continuous human occupancy. (They may, however, contain confined spaces.)

- Collider Injector Development (CID)
- Damping ring vaults
- Linac
- Positron vault
- Beam Switchyard (BSY)
- Inactive sites such as SLAC Linear Collider (SLC) arcs and Positron-Electron Project (PEP-II) ring
- Collider Experiment Hall (CEH) pit
- End Station A (ESA)
- Stanford Positron-Electron Asymmetric Ring (SPEAR) Ring and Injector/ Booster

### 5.1.2 Confined Space Entry Method Selection Procedure

Step	Person	Action
1.	Confined space entry supervisor / entrant / attendant or, for work involving subcontractors: university technical representative (UTR)	<p>If the confined space is identified with a posting: uses identifying information to check the <a href="#">confined space inventory</a> for profile information.</p> <p>If the space is listed in the inventory but not posted: contacts the listed confined space owner to request that a posting with identifying information is put in place.</p> <p>If the work space is not posted and not listed: determines if this is a new confined space – it is large enough to enter and perform work, have limited means of access/egress, and is not designed for continuous human occupancy? If all three attributes apply, a profile must be created: contact the confined space program manager.</p>
2.	Confined space entry supervisor	<p>Determines or confirms applicable entry method (For an overview, see <a href="#">Confined Space: Entry Method Selection Flow Chart</a>)</p> <ul style="list-style-type: none"> <li>▪ If the listed classification is NPRCS <b>and</b> no new hazards are identified in the space or from the work to be performed: the procedure in Section 5.2 applies. If new hazards associated with the space are identified, contact the confined space program manager to reclassify the space.</li> <li>▪ If the listed classification is PRCS and if the hazards are atmospheric only and it can be controlled by forced air ventilation: the procedure in Section 5.4 applies</li> <li>▪ If the listed classification is PRCS and hazards other than atmospheric are present, determines if a temporary declassification applies.<sup>1</sup> If so, the procedure in Section 5.4 applies</li> <li>▪ If none of the above apply, use the procedure in Section 5.4</li> </ul>
3.	Confined space program manager	Updates confined space inventory when new confined spaces or hazards are reported
4.	Confined space owner	Ensures that identifying information is available at the confined space location as described in <a href="#">Confined Space: Posting Requirements</a>

1 29 CFR 1910.146, paragraph (c)(7), states that if all hazards associated with a permit-required confined space can be eliminated prior to entry, then the space can be reclassified as a non-permit required confined space (NPRCS) for the time necessary to accomplish the work and the hazards remain eliminated.

## 5.2 Entry Procedure for Non-permit Required Confined Space (NPRCS)

Step	Person	Action
1.	Entrant / attendant	Completes <a href="#">Confined Space: Non-permit Required Confined Space Entry Form</a> (or equivalent subcontractor's SLAC-approved form) to establish that the confined space still qualifies as non-permit required and that no hazardous work <sup>1</sup> will be performed.
2.	Confined space entry supervisor / confined space program manager	Before any confined space work is begun, confirms NPRCS entry conditions by signing the form or determines that another entry method applies
3.	Entrant / attendant	Takes precautions, as necessary <ul style="list-style-type: none"> <li>▪ Installs vehicular and pedestrian traffic controls as needed</li> <li>▪ Posts warning signs and any required permit at the work location</li> <li>▪ Takes measures to prevent hazards near the confined space</li> <li>▪ Dons any required personal protective equipment</li> </ul>
4.	Entrant / attendant	Performs authorized work <ul style="list-style-type: none"> <li>▪ It is recommended that one person remain outside the confined space</li> <li>▪ If a hazardous condition is encountered, evacuates immediately and reports to supervisor</li> </ul>
5.	Entrant / attendant	Sends entry form to the confined space program manager (Mailstop 84) once work is completed
6.	Confined space program manager	Reviews form, updates confined space inventory as necessary, and keeps form on file for a minimum of one year

1 Hazardous work includes painting, cleaning with acids or solvents, welding, brazing, torch cutting, sanding with power tools, sandblasting, breaking utility lines, using cryogenic gases, conducting work that involves reduction-oxidation reactions, or operating valves capable of releasing material, such as water or gas, in a quantity sufficient to engulf a person or cause a hazardous atmosphere.

## 5.3 Entry Procedure for Alternate Entry and Temporarily Declassified Confined Spaces

Step	Person	Action
1.	Confined space entry supervisor	<p>Confirms that entry conditions qualify for the selected entry method (as determined in Section 5.1) by signing the applicable form (or equivalent subcontractor's SLAC-approved form):</p> <ul style="list-style-type: none"> <li>▪ <a href="#">Confined Space: Alternate Entry Form</a></li> <li>▪ <a href="#">Confined Space: Temporary Declassification Form</a></li> </ul>
2.	Confined space entry supervisor	Ensures that hazards and controls are understood by the entrant(s) and attendant(s)
3.	Entrant / attendant	<p>Secures the work site</p> <ul style="list-style-type: none"> <li>▪ Installs barriers and/or controls vehicular and pedestrian traffic as needed</li> <li>▪ Posts warning signs and any required permits at the work location</li> <li>▪ Takes measures to prevent hazards near the confined space</li> </ul>
4.	Entrant / attendant	<p>Ensures hazard is controlled before entry</p> <ul style="list-style-type: none"> <li>▪ For alternate entry, ensures atmospheric testing is conducted as necessary to determine that entry conditions remain acceptable, and ensures forced air ventilation is in place if required (see completed form)</li> <li>▪ For temporary declassification, ensures hazards are eliminated as specified on completed form<sup>1</sup></li> </ul>
5.	Entrant / attendant	<p>Performs work as long as hazards are controlled as specified on the form</p> <ul style="list-style-type: none"> <li>▪ Any change that introduces hazards requires that the space be vacated</li> <li>▪ New hazards must be re-assessed and a new entry method may apply; no entry is allowed until all hazards are eliminated</li> </ul>
6.	Entrant / attendant	Sends completed form to the confined space program manager (Mailstop 84) once the work is finished
7.	Confined space program manager	Reviews form, updates confined space inventory as necessary, and keeps form on file for a minimum of one year

▪ 1 Specified hazard elimination activities may include but are not limited to

- Flushing chemicals
- Verifying a safe pH
- Isolating incoming fluid or gas lines
- Removing or locking out any exposed mechanical and electrical energies

## 5.4 Entry Procedure for Permit-Required Confined Space (PRCS)

Step	Person	Action
Planning		
1.	Confined space entry supervisor	Determines if non-entry rescue can be performed. If it cannot, entry is prohibited; contacts the confined space program manager
2.	Confined space entry supervisor	Determines control measures for hazards associated with the confined space entry
3.	Confined space entry supervisor	Verifies that all required equipment, attendants, and entrants are available
Pre-entry		
4.	Confined space entry supervisor	Documents the pre-entry process with the <a href="#">Confined Space: Entry Permit</a> (or equivalent subcontractor's SLAC-approved permit)
5.	Confined space entry supervisor	<p>Ensures that the confined space's atmosphere is ventilated as necessary and tested prior to entry using properly calibrated monitoring equipment. (For assistance with obtaining monitoring equipment, contact the confined space program manager or ESH coordinator.)</p> <p>Results for the following must be recorded on the permit</p> <ul style="list-style-type: none"> <li>▪ Oxygen</li> <li>▪ Flammability (percent of lower explosive limit)</li> <li>▪ Hydrogen sulfide</li> <li>▪ Carbon monoxide</li> <li>▪ Any other suspected or known atmospheric hazard</li> </ul> <p>If at any time the oxygen concentration falls below 19.5 percent, the cause of the deficiency must be determined and controls must be in place before entry is allowed. If entry is necessary to correct the deficiency, self-contained breathing apparatus must be worn.</p> <p>Note: The entrant has the right to witness atmospheric testing.</p>
6.	Confined space entry supervisor	<p>Secures the work site as appropriate</p> <ul style="list-style-type: none"> <li>▪ Installs barriers and/or controls vehicular and pedestrian traffic as needed</li> <li>▪ Posts warning signs and any required permit(s) at the work location</li> <li>▪ Takes measures to prevent hazards near the confined space</li> </ul>
7.	Confined space entry supervisor	<p>Conducts pre-entry briefing for all personnel involved in the entry that includes at minimum these topics</p> <ul style="list-style-type: none"> <li>▪ Work to be performed</li> <li>▪ Anticipated hazards, including signs, symptoms and consequences of exposure</li> <li>▪ Hazard control measures</li> <li>▪ <i>Prohibited conditions</i> (specified in the permit)</li> <li>▪ Non-entry rescue procedures; generally these involve using a full-body harness with a retrieval line attached to a mechanical device or fixed point. (Wristlets may be used to aid in a difficult extraction; however, wristlets should not be used to support the person's weight.)</li> </ul>

Confined Space: Entry Procedures

Step	Person	Action
8.	Confined space entry supervisor	Verifies that <ul style="list-style-type: none"> <li>▪ All control measures, procedures, and equipment specified by the permit are in place</li> <li>▪ Entry conditions are acceptable</li> </ul>
9.	Confined space entry supervisor	Signs the pre-entry certification section of the permit
Confined space entry		
10.	Entrant	Enters the permit-required confined space only if <ul style="list-style-type: none"> <li>▪ Listed on the permit</li> <li>▪ Entry conditions are acceptable</li> <li>▪ All control measures and specified non-entry rescue provisions are implemented</li> </ul>
11.	Confined space entry supervisor	Verifies that acceptable entry conditions are maintained and that entry operations remain consistent with terms of the permit and the hazards associated with the planned work
12.	Attendant	<ul style="list-style-type: none"> <li>▪ Maintains communication with the entrant(s) and performs no other duties that might interfere with his or her ability to observe and protect the entrant(s)</li> <li>▪ Controls entry by remaining at the work site and keeping an accurate accounting of entrants on the permit</li> <li>▪ Does not become an entrant unless he/she is both listed as an entrant and has been replaced by a qualified attendant.</li> </ul>
13.	Entrant	Maintains communication with the attendant. Maintains readiness to exit if ordered by attendant.
14.	Attendant	Orders entrant(s) to evacuate the space if one or more of the following occurs: <ul style="list-style-type: none"> <li>▪ Detects a <i>prohibited condition</i></li> <li>▪ Observes any behavioral effects of exposure to any hazard</li> <li>▪ Identifies a nearby situation that may endanger the entrant(s)</li> <li>▪ Becomes unable to effectively and safely perform all required duties</li> </ul>
Post-entry / documentation		
15.	Confined space entry supervisor	Conducts a post-entry debriefing with entrants and attendants
16.	Confined space entry supervisor	Closes the permit by signing the permit closure section of the permit as warranted <ul style="list-style-type: none"> <li>▪ At the completion of the job</li> <li>▪ At the end of the work shift</li> <li>▪ When a change occurs in work conditions or methods that requires additional controls</li> <li>▪ When a changes occurs that affects acceptable entry conditions</li> </ul> If the permit is closed due to a new hazardous condition, a new permit is required.
17.	Confined space entry supervisor	Forwards the permit to the confined space program manager at Mailstop 84
18.	Confined space program manager	Reviews the closed permit, updates the confined space inventory if necessary, and maintains permits for at least one year from date of entry

## 6 References

- *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), [Chapter 6, “Confined Space”](#)
- [Confined Space: Entry Method Selection Flow Chart](#) (SLAC-I-730-0A21S-050)
- Confined Space: Entry Permit (SLAC-I-730-0A21J-002) [pdf](#) or [Word](#)
- Confined Space: Alternate Entry Form (SLAC-I-730-0A21J-010) [pdf](#) or [Word](#)
- Confined Space: Non-permit Required Confined Space Entry Form (SLAC-I-730-0A21J-006) [pdf](#) or [Word](#)
- Confined Space: Temporary Declassification Form (SLAC-I-730-0A21J-009) [pdf](#) or [Word](#)
- [Confined Space: Posting Requirements](#) (SLAC-I-730-0A21S-051)
- [Confined Space Inventory](#)
- [Chapter 29, “Respiratory Protection”](#)
- [Chapter 51, “Control of Hazardous Energy”](#)
- [“Hot Work Permit-Fire System”](#)





Chapter 6: Confined Space  
**Entry Permit**

Product ID: [163](#) | Revision ID: 1164 | Date Published: 29 March 2010 | Date Effective: 29 March 2010  
 URL: <http://www-group.slac.stanford.edu/esh/eshmanual/references/confinedPermit.pdf>

**ENVIRONMENT, SAFETY & HEALTH DIVISION**

**Applicability:** This permit establishes that all hazards have been identified and controlled and it lists the confined space (CS) entry supervisor and authorized entrants and attendants. For more information, see [Confined Space: Entry Procedures](#).

**Instructions:** This form (or equivalent subcontractor's SLAC-approved form) must be signed by the CS entry supervisor (Section 6) before entry and it must be kept in the Work Planning and Control (WPC) work folder during the entry. Once the work is completed, the CS entry supervisor must close the permit by signing Section 7 and sending it to the CS program manager (M/S 84).

**1. Permit Conditions**

Reason for entry:	Entry date: Permit expiration <i>(date and time)</i> :
Entrant:	Acceptable entry conditions:
Entrant:	
Entrant:	
Attendant:	
Attendant:	
See the <a href="#">confined space inventory</a> for the following information	
Tracking number:	
Description:	Location:
Known and potential hazards:	
Additional required permits <i>(for example hot work, radiological work permit, penetration permit)</i> :	

**2. Requirements Checklist** *(check all that apply)*

Equipment	Personal protective equipment and personal monitors
Non-entry rescue equipment <input type="checkbox"/> Full body harness <input type="checkbox"/> Tripod / hoist <input type="checkbox"/> Lifeline	Gloves: <input type="checkbox"/> Leather <input type="checkbox"/> Impervious <input type="checkbox"/> Chemical resistant <input type="checkbox"/> Other:
Area security: <input type="checkbox"/> Warning signs <input type="checkbox"/> Barricades <input type="checkbox"/> Ladder <input type="checkbox"/> Fall protection equipment <input type="checkbox"/> Ventilation fan or blower <input type="checkbox"/> Fire extinguisher <input type="checkbox"/> Self-contained breathing apparatus (SCBA) <input type="checkbox"/> Air purifying respirator: specify cartridge type: <input type="checkbox"/> Other:	Face / eye protection: <input type="checkbox"/> Face shield <input type="checkbox"/> Goggles <input type="checkbox"/> Other: <input type="checkbox"/> Footwear <input type="checkbox"/> Coveralls <input type="checkbox"/> Head protection <input type="checkbox"/> Radiation dosimeter(s) <input type="checkbox"/> Pocket ion chamber (PIC) <input type="checkbox"/> Other: <input type="checkbox"/> Other:

**3. Pre-entry Checklist**

<input type="checkbox"/> Verify adequate confined space training <input type="checkbox"/> Pre-entry briefing on specific hazards and control methods <input type="checkbox"/> Notify subcontractors of permit and hazard conditions <input type="checkbox"/> Non-entry rescue and procedure in place <input type="checkbox"/> Notify affected departments and persons of service interruption <input type="checkbox"/> Lines blocked or broken <input type="checkbox"/> Drain space <input type="checkbox"/> Other:	Control of hazardous energy: <input type="checkbox"/> Lockout / tagout (LOTO) <input type="checkbox"/> Zero-voltage verification (ZVV) <input type="checkbox"/> Other: Communication: <input type="checkbox"/> Radio <input type="checkbox"/> Rope signals <input type="checkbox"/> Hand signals <input type="checkbox"/> Verbal Lighting: <input type="checkbox"/> Hazardous location rated <input type="checkbox"/> Standard Air flush: <input type="checkbox"/> Preliminary <input type="checkbox"/> Continuous <input type="checkbox"/> Other:
--	---

**4. Personnel Entry and Exit Record** *(to be completed as needed before and during work)*

	Entrant name:	Attendant name:	Entrant name:	Attendant name:	Entrant name:	Attendant name:
Time in						
Time out						
Time in						
Time out						
Time in						
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Notes:

**5. Air Monitoring Results (to be completed as needed before and during work)**

Attendant will sample air <input type="checkbox"/> Continuously <input type="checkbox"/> Every _____ minutes <input type="checkbox"/> No sampling required because:							
Device	Sequence or serial number	Calibration due date	Pre-use check performed by	Notes			
Date:							
Time	Sampled by	<input type="checkbox"/> O <sub>2</sub> (19.5–23.5%)	<input type="checkbox"/> (LEL/LFL <10%)	<input type="checkbox"/> CO (<25 ppm)	<input type="checkbox"/> H <sub>2</sub> S (<10 ppm)	<input type="checkbox"/> Stratification	<input type="checkbox"/> Other:

**6. Pre-entry Certification (must be signed by the confined space entry supervisor before entry)**

I hereby certify that all required hazard controls are in place, that air monitoring is being conducted as required and results show that the atmosphere is acceptable for entry, and that all required information is documented on this permit.	
Confined space entry supervisor for this entry:	
Signature:	Date:

**7. Permit Closure (must be signed by the confined space entry supervisor after work is completed)**

The work was done in accordance with this permit. A copy of this permit will be forwarded to the confined space program manager (Mailstop 84).	
Name:	
Signature:	Date:





Chapter 6: Confined Space  
**Alternate Entry Form**

Product ID: [162](#) | Revision ID: 1163 | Date Published: 29 March 2010 | Date Effective: 29 March 2010  
 URL: <http://www-group.slac.stanford.edu/esh/eshmanual/references/confinedFormAlt.pdf>

**ENVIRONMENT, SAFETY & HEALTH DIVISION**

**Applicability:** This form applies to the entry of a permit-required confined space (PRCS) in which **the only hazard is atmospheric** and this hazard can be controlled and the space maintained safe for entry with continuous forced air ventilation (per 29 CFR 1910.146, c, 5). If conditions do not meet these requirements or for more information, see [Confined Space: Entry Procedures](#).

**Instructions:** This completed form (or equivalent subcontractor's SLAC-approved form) must be kept in the Work Planning and Control (WPC) work folder during the entry and sent to the confined space program manager (M/S 84) once work is completed.

**Hazard Elimination**

Reason for entry: \_\_\_\_\_ Entry date: \_\_\_\_\_  
 End date: \_\_\_\_\_

See the [confined space inventory](#) for the following information.

Tracking number: \_\_\_\_\_ Location: \_\_\_\_\_  
 Date of last survey: \_\_\_\_\_ Space description: \_\_\_\_\_

Modification to space since last survey?  No  Yes *(if yes, describe):*

List all known atmospheric hazards associated with the confined space:

List all potential atmospheric hazards that will be introduced by the planned work:

Forced air ventilation required?  yes  no

**Monitoring results:** verify that atmospheric hazards remain eliminated with an atmospheric monitor as often as necessary

Time	Sampled by	O <sub>2</sub> (19.5–23.5%)	(LEL/LFL <10%)	CO (<25 ppm)	H <sub>2</sub> S (<10 ppm)	Stratification	Other:

**Entrants / Attendants** *(a minimum of two workers is required)*

	Entrant	Attendant
<i>Print name:</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Print name:</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Print name:</i>	<input type="checkbox"/>	<input type="checkbox"/>

**Confirmation** *(must be signed before work begins)*

I confirm that the named PRCS and the planned work qualify for alternate entry.  
*Print name:* \_\_\_\_\_  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 I am the *(check one)*:  Confined space entry supervisor  Confined space program manager



# Confined Space: Non-permit Required Confined Space Entry Form

URL: <http://www-group.slac.stanford.edu/esh/eshmanual/references/confinedFormNPRCS.pdf> or [Word](#)

Revision Record: <https://www-internal.slac.stanford.edu/esh/docreview/reports/revisions.asp?ProductID=158>

Department: Field Safety and Building Inspection Office

Program: Confined Space

Authority: [ESH Manual, Chapter 6, Confined Space](#)

Date Effective: 15 October 2009

This form applies to spaces that are listed as a non-permit required confined space (NPRCS) in the confined space inventory. It establishes that there are no existing hazards associated with this confined space and that the planned work will not introduce any. The form (or equivalent subcontractor's SLAC-approved form) must be completed before anyone enters the space and it must be submitted to the confined space program manager (M/S 84) once the work is done. If entry conditions do not meet requirements or for more information, see [Confined Space: Entry Procedures](#).

## Hazard Assessment

Reason for entry ( <i>please specify</i> ):	Start date: End date:
See the <a href="#">confined space inventory</a> for the following information	
The classification in the inventory is NPRCS <input type="checkbox"/> No <input type="checkbox"/> Yes	
Tracking number:	Date of last hazard evaluation:
Description:	Any new hazards since last evaluation?
Location:	<input type="checkbox"/> No <input type="checkbox"/> Yes ( <i>list</i> ):
Evaluate if new hazards will be created by the planned work	
<input type="checkbox"/> No <input type="checkbox"/> Yes	Will any activities that could create a hazard be conducted inside the confined space, such as welding or breaking a line?
<input type="checkbox"/> No <input type="checkbox"/> Yes	Will any chemicals that could create a hazard be brought into the space? Examples include solvents and adhesives. If yes, specify:
<input type="checkbox"/> No <input type="checkbox"/> Yes	Are there any conditions in or around this space that could adversely affect anyone who enters it?
Note: A NPRCS entry requires that conditions must be such that the answer to all three questions is "no".	

## Entrants and Attendants (*Minimum of two workers is required*)

	Entrant	Attendant
<i>Print name:</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Print name:</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Print name:</i>	<input type="checkbox"/>	<input type="checkbox"/>

## Confirmation (*must be signed before work begins*)

I confirm that the named confined space and planned work meet the required conditions of an NPRCS entry.	
<i>Print name:</i>	
Signature:	Date:
I am the ( <i>check one</i> ): <input type="checkbox"/> Confined space entry supervisor <input type="checkbox"/> Confined space program manager	







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# Temporary Declassification Form

Product ID: [161](#) | Revision ID: 1162 | Date Published: 29 March 2010 | Date Effective: 29 March 2010

URL: <http://www-group.slac.stanford.edu/esh/eshmanual/references/confinedFormDeclass.pdf>

**ENVIRONMENT, SAFETY & HEALTH DIVISION**

**Applicability:** A permit-required confined space (PRCS) qualifies for temporary declassification only if both of these conditions are met: a) no actual or potential **atmospheric** hazards exist and b) **all hazards associated with the confined space** can be eliminated from outside the space for the duration of the entry (per 29 CFR 1910.146, (c), 7). If these conditions are not met by the planned confined space entry, or for more information, see [Confined Space: Entry Procedures](#).

**Instructions:** This form (or equivalent subcontractor's SLAC-approved form) must be completed and kept in the Work Planning and Control (WPC) work folder during entry and sent to the confined space program manager (M/S 84) once work is completed.

### Confined Space

Reason for entry:	Date of entry: End date:
See the <a href="#">confined space inventory</a> for the following information	
Tracking number:	Location:
Date of last survey:	Space description:
Modification to space since last survey? <input type="checkbox"/> No <input type="checkbox"/> Yes <i>(describe)</i> :	

### Hazard Elimination

List all known and potential hazards	Describe how each hazard will be eliminated
-associated with the space:	
-introduced by planned work:	
-chemical:	

### Entrants / Attendants *(a minimum of two workers is required)*

	Entrant	Attendant
<i>Print name:</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Print name:</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Print name:</i>	<input type="checkbox"/>	<input type="checkbox"/>

### Confirmation *(must be signed before work begins)*

I confirm that the named PRCS and the planned work qualify for temporary declassification.	
<i>Print name:</i>	
Signature:	Date:
I am the <i>(check one)</i> : <input type="checkbox"/> Confined space entry supervisor <input type="checkbox"/> Confined space program manager	



# Confined Space: Posting Requirements

URL: <http://www-group.slac.stanford.edu/esh/eshmanual/references/confinedReqPost.pdf>

Revision Record: [https://www-](https://www-internal.slac.stanford.edu/esh/docreview/reports/revisions.asp?ProductID=466)

[internal.slac.stanford.edu/esh/docreview/reports/revisions.asp?ProductID=466](https://www-internal.slac.stanford.edu/esh/docreview/reports/revisions.asp?ProductID=466)

Department: Field Safety and Building Inspection Office

Program: Confined Space

Authority: [ESH Manual, Chapter 6, Confined Space](#)

Date Effective: 15 October 2009

## 1 Purpose

The purpose of these requirements is to ensure that workers are alerted to the potential hazards of a *confined space* before any work is conducted in it.

## 2 Scope

These requirements cover the posting of new and existing confined spaces.

## 3 Applicability



These requirements apply to building managers, and area managers, and confined space owners and all confined spaces at SLAC.

## 4 Requirements

The confined space owner is responsible for posting a confined space warning appropriate to the space's classification: non-permit required confined space (NPRCS) and permit-required confined space (PRCS). Requirements and recommendations are listed in Table 1.

A listing of all identified confined spaces is in the [confined space inventory](#). If a new confined space is identified, contact the confined space program manager.

**Table 1** Confined Space Posting Requirements and Recommendations

Classification	Example Posting (use this or a similar sign)	Required	Recommended
Non-permit required (NPRCS)		<ul style="list-style-type: none"> <li>Include a warning in standard colors (DANGER in red and black on a white background)</li> <li>Include requirements, such as permit or procedure</li> </ul>	<ul style="list-style-type: none"> <li>Include the confined space number on, adjacent to, or above the warning sign; check the inventory or contact the confined space program manager to verify the space number</li> </ul>
Permit-required (PRCS)		<ul style="list-style-type: none"> <li>The posting must be placed on or near the confined space entrance and be clearly visible and no smaller than 3.5 by 5 inches</li> </ul>	

## 5 References

- *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), [Chapter 6, “Confined Space”](#)
- [Confined Space Inventory](#)