



SECTION 4 CHAPTER 1

ENTERING A CONFINED SPACE

Purpose

The Company has a policy against any employee entering a confined space unless all requirements of OSHA 1910.146 are complied with. This chapter is to make all employees aware of the definitions, hazards and the requirements of confined spaces. Employees will encounter confined spaces and other contractors working in a confined space and need to have knowledge of the hazards involved and the process of addressing those hazards.

Scope

These policies apply to all Company employees.

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General Guidelines

Purpose

This document defines the procedures for:

- obtaining and posting a permit
 - marking and barricading a confined space
-

Identifying confined spaces

A **confined space** is an area that:

- is large enough and configured so that an employee can enter and perform assigned work
- has limited or restricted means for entry or exit
- is not designed for continuous employee occupancy

A **permit-required confined space** has:

- known or potential hazards that cannot be eliminated **OR**
- hazardous atmosphere that cannot be maintained in a safe condition through continuous forced air ventilation

A **non-permit required confined space** has:

- no known or potential hazards **OR**
- known or potential hazards that can be eliminated **OR**
- hazardous atmosphere that can be maintained in a safe condition through continuous forced air ventilation

Confined space entry is the process of the worker's face or body passing through the opening to a confined space.

Obtaining an entry permit

IF the space requires a permit, **THEN** obtain a confined space/vessel entry permit.

A new permit shall be issued, or the original permit will be reissued if possible, whenever changing work conditions or work activities introduce new hazards into the confined space. The program administrator shall retain each canceled entry permit for at least one (1) year to facilitate the review of the Confined Space Entry Program. Any problems encountered during an entry operation shall be noted on the respective permit(s) so that appropriate revisions to the confined space permit program can be made.

Posting an entry permit

An entry permit must be posted prior to entering any confined space:

- at the job site
- in the control rooms
- pump house
- or appropriate field locations

Entry permits are valid for:

- the time specified on the permit **OR**
 - 8 hours **OR**
 - Note: If the time specified on the permit or 12 hours is not a sufficient length of time to complete the job, an additional permit must be completed.
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**Marking
confined space**

The Supervisor must:

- mark the confined space as soon as it is opened to prevent entry by unauthorized personnel
- place a warning sign over the entry point reading “DANGER—PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER”

The signs must remain in place until the confined space is no longer accessible.

**Barricading
confined space**

In order to prevent accidental falls through openings, foreign objects from entering the space, pedestrians and other vehicles to come into contact with the space; place railings, covers, or other temporary barriers over openings.

**Multiple
employer**

Gravity Oilfield Services’ policy for multiple employer worksites is to take complete control of the permit space and procedures. Exception: If they receive written documentation from a certified company or organization requesting the release of the permit space control and procedure to coordinate entry operations when employees of more than one employer are working simultaneously as authorized entrants in a permit space, so that employees of one employer do not endanger the employees of any other employer.

Hazards

Purpose This section describes common hazards in confined spaces and the responsibilities of employees in dealing with them.

Types of hazards You may encounter these types of hazards in a confined space:

- hazardous atmospheres or substances
 - temperature extremes
 - hazardous energy sources
 - physical hazards
-

Entry supervisor's responsibilities The entry supervisor must:

- establish detailed procedures to guard against exposure hazards
- ensure that all employees and contractor's representatives understand the safety procedures
- supervise work procedures closely
- sign off and complete the confined space permit to indicate the work performed is complete
- terminate the entry and cancel the confined space permit when the work is completed, a prohibited condition arises in the space, or an evacuation of the space is ordered.
- re-evaluate the space before issuing a new confined space permit if the permit was terminated and work was not completed.

Attendant

The Attendant must be familiar with possible exposure hazards, including:

- oxygen-enriched or deficient atmospheres
- signs and symptoms of over-exposed personnel
- mechanical and electrical hazards in the confined space
- MSDS of the liquid, gas, or substance in the confined space

The Attendant must also ensure:

- PPE requirements of all personnel
 - emergency response notification, if necessary
 - supervision outside the confined space for the duration of entry operations
 - A single Attendant must not supervise more than one confined space during emergencies. Additional Attendants must be available if two or more confined spaces exist during emergency situations.
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Entrant’s responsibilities

Entrants must utilize necessary PPE and be familiar with possible exposure hazards, including:

- oxygen enriched or deficient atmosphere
- toxic gases or vapors
- engulfment consequences
- dust and fumes
- respiratory hazards
- mechanical hazards
- electrical hazards
- environmental hazards

Hazardous atmospheres

Confined spaces may contain the following hazardous atmospheres:

- oxygen-enriched or oxygen-deficient
- toxic
- flammable

See the *Respiratory Protection* in this manual for information on protecting yourself in these atmospheres.

Temperature extremes

This table shows the warning signs of extreme temperature situations.

Situation	Warning Signs
extreme cold	frostbite or hypothermia

extreme heat	heat stroke or heat exhaustion
hot equipment	burns or scalding

Hazardous energy sources

You may encounter these types of hazardous energy sources while in a confined space:

- mechanical
 - hydraulic
 - pneumatic
 - electrical:
 - portable lights
 - tools
 - associated electrical equipment
 - thermal
-

Physical hazards

You may encounter these types of physical hazards while in a confined space:

- poor communications
- inadequate light
- poor visibility
- difficult to exit
- pressure vacuum
- sharp objects
- falling objects
- slick surfaces

Protecting against hazards

This table lists measures to protect against hazards in confined spaces.

IF there is a possibility of...	THEN...
contact with hazardous chemicals,	provide a charged water line with spray nozzle and wear the appropriate chemical resistant PPE
fire,	provide adequate fire protection at the opening
burning or welding operations,	reduce the number of entrants to the minimum required to do the job
dangers to the respiratory system,	provide proper breathing equipment and a body harness with a life line attached of adequate strength



Isolating the Confined Space

Purpose This document describes the procedure for isolating the confined space.

Isolating the space through lockout/tagout

The entry supervisor must make sure that:

- the confined space is completely isolated from all other systems and equipment
- adequate measures are taken to prevent harmful material (solid, liquid, gas, vapor) from contaminating the space after entrants are inside

Follow the procedures in *Performing a Lockout/Tagout*

The entrant must keep the keys to the locks used in the lock-out/tag-out procedure. Only the entrant is authorized to unlock and remove tags after completing the job.

IF there is more than one entrant, **THEN** each entrant must place his/her own lock on each switch and keep the keys.

Alternate procedure

IF a lock-out procedure is not possible, **THEN** have an electrician pull the line fuses in electrical circuits.

Only the person who pulled the fuses may replace them when authorized by the persons working in the confined space.

Cleaning the Space Before Entry

Purpose This document describes the procedures for cleaning the confined space.

Precautions Protective clothing and respiratory equipment are **not** a substitute for cleaning and ventilating.

IF a confined space has not been cleaned or ventilated, **THEN** do **not** enter without provisions to escape in case of respiratory equipment failure.

IF decontamination involves flammable liquids, vapors, gases, or dust, **THEN** eliminate all sources of ignition.

Preparing confined space for entry This table shows the procedure for preparing confined spaces for entry. Do **not** enter the space during this procedure.

Step	Action
1	Empty the confined space of all residual oil, sludge or product.
2	Wash the tank or vessels to further remove potentially hazardous materials.
3	Install proper ventilation.
4	Prepare for atmospheric testing.

**Entering
confined space
for cleaning and
venting**

IF cleaning or venting requires entry into a confined space, **THEN do not** enter without a permit. Follow permit-required procedures prior to entering the confined space.

Testing the Atmosphere

Purpose This document describes the appropriate times to test the atmosphere of a confined space.

Supervisor's responsibilities The entry supervisor will test the atmosphere prior to entry and at regular intervals. See the chapter on *Respiratory Protection* for more information.

When to test **Testing must be done prior to any entry if the confined space:**

- has held any flammable or harmful product before cleaning
- contains any residue or sludge which may release flammable or harmful vapors or gases
- is suspected to be or could be oxygen deficient or abundant (Minimum 19.5 – Maximum 23.5)

Testing must be done if:

- employees request additional monitoring (They are entitled to additional monitoring at any time and must be provided the opportunity to review calibrated air monitoring data before entry)

Using respiratory protective equipment **IF** there is any possibility of harmful air contamination or of oxygen deficiency while entrants are in a confined space, **THEN** entrants must wear an air mask.

For more information see "Wearing Personal Protective Equipment" on p. 15 of this Chapter.



Planning the Entry

Purpose

This document describes the procedures for:

- surveying for hazards
 - holding a pre-entry safety meeting (JSA)
 - coordinating operations
 - developing an emergency response plan
-

Surveying for hazards

Entry supervisors must survey the confined space for hazards:

- before entry, testing the atmosphere for flammability and oxygen levels
- at intervals dictated by the hazards and operations performed within the space
- whenever responsibility is transferred

IF IDLH hazards are determined from the survey, **THEN** employees must shut down the operation and call their HSE Coordinator. It is recommended to use third party contractors for all jobs where *IDLA* hazards exist.

Holding pre-entry safety meeting

The entry supervisor must conduct a pre-entry safety meeting (JSA) to discuss specific responsibilities and job duties with employees and contractors.

The entry supervisor must use an approved Confined Space Entry permit as a checklist for proper procedures.

Developing an emergency response plan for rescue

The entry supervisor must formulate the emergency rescue plan **before** authorizing entry into the space.

The entry supervisor must ensure that:

- unauthorized personnel shall not attempt rescue
- appropriate rescue and first aid services are available
- if utilizing outside rescue services, examine site, practice rescue and ensure service can be provided in a timely manner
- the means for summoning them are operable
- if utilizing company employees for rescue, rescue efforts must be agreed on and communicated in contract language, PPE must be company provided (No cost to employee), and must have training and practice rescues at least every 12 months. IDLH conditions require trained rescue on site while work is being performed

IF the attendant cannot remove a victim without entering the confined space due to the shape, size, and location of the opening, **THEN** the entry supervisor must develop a specific procedure for the rescue of personnel in the planning stage of the entry work.

Ventilating the Confined Space

Purpose This document describes the procedures for ventilating a confined space.

Policy Confined spaces must be ventilated in order to:

- attain 0% of the Lower Flammable Limit (LFL)
- reduce concentrations of toxic materials below Permissible Exposure Limits (PEL)
- provide relief from heat

Note: There may be areas which are confined spaces by definition, but which may not require forced air ventilation, such as wide, shallow excavations. The location entry supervisor must call their safety representative or safety manager to determine if the ventilation rule can be waived.

Using continuous forced air ventilation Continuous forced air ventilation by means of mechanical exhaust fan must be maintained for the duration of the permit. The air supply for the forced air ventilation must be from a clean source and must not increase the hazards in the space.

When ventilating a space:

- direct the forced air to ventilate the areas where the entrant(s) work
 - keep ventilation going until all employees have left the space
-

**Avoiding
hazards while
ventilating**

To avoid the buildup of static electricity, electrically bond all steam lines and sand blast nozzles to the vessel being cleaned or ventilated.

Entering the Space

Purpose

This document outlines the responsibilities for personnel working in confined spaces.

Entry supervisor's responsibilities

IF entry conditions are acceptable, **THEN** the supervisor will:

- authorize entry into the confined space
 - remove unauthorized individuals who attempt to enter the space during entry operations
 - keep sign in/out sheets on file for one year
-

Attendant responsibilities

The attendant must:

- be stationed at the opening of the assigned confined space at all times while it is occupied
- hold the free end of the life line or secure it to a fixed object outside the enclosure
- ensure proper PPE is used
- keep in constant communication with personnel inside the confined space
- maintain a sign-in/out sheet
- return sign-in/out sheet after the permit has expired to the entry supervisor
- assure that unauthorized persons do not enter the confined space

IF there is an emergency, **THEN** the attendant must:

- summon aid immediately. Do **not** enter the space
- attempt to remove the victim by use of the life line
- perform all other necessary rescue functions from outside if trained and equipped for rescue operations

Evacuate entrants if:

- anyone detects an unsafe condition that could affect the entrants or attendant
 - the attendant or entrant detects behavioral effects of hazard exposure
 - the attendant cannot effectively or safely perform his/her duties
-

Entrant's responsibilities

Entrant must exit from the permit space as quickly as possible whenever:

- the attendant **OR** entry supervisor gives an order to evacuate
 - the entrant recognizes any symptom of hazard exposure
 - the entrant detects a prohibited condition
 - an evacuation alarm is activated
-

Using Equipment in Confined Spaces

Purpose This document describes the precautions for using various types of equipment in a confined space.

Using electrical tools Ground all electrical tools by using a GFCI.

IF a confined space has a flammable atmosphere, **THEN** use only:

- explosion-proof equipment rated for Class 1, Div. 1
 - air-operated power tools
-

Using ladders in a confined space **IF** you use ladders, **THEN**:

- place to prevent slipping
- latch at the top and bottom
- See *Elevated Surfaces* for more information.

Welding in a confined space

Entrants who perform electrical welding in metal enclosures must use appropriate personal protective equipment and have adequate ventilation in the confined space. See the chapter on *Performing Welding Operations* for more information.

In order to minimize the possibility of stray arcing, attach the ground wire from the arc welding machine to the equipment being welded.

Do **not** take arc welding equipment or welding and cutting torches into the confined space until needed. Remove immediately after use.

Compressed gas cylinders

Do **not** take compressed gas cylinders into confined spaces. Store all cylinders outside the confined space.

Compressed gas cylinders must be turned off at the cylinder valve and secured when not in use.

Using Required Personal Protective Equipment

Purpose This document ensures that entrants and attendants wear proper personal protective equipment.

Safety Department's responsibilities Safety Personnel for your area will specify what types of personal protective equipment entrants and attendants must use for each confined space operation.

Entry supervisor's responsibilities The entry supervisor must ensure that:

- entrants and attendants are trained on and use the appropriate personal protective and respiratory equipment
- equipment is functional
- equipment is properly maintained
- See the chapter on *Personal Protective Equipment* for more information.

Attendant's responsibilities The attendant must be familiar with all safety equipment required for entrants.

Rescue equipment

The entry supervisor must ensure that the attendant keeps the following nearby at all times:

- at least one unit of self-contained breathing equipment
 - 5 minute escape unit
 - harness
 - rope
 - other emergency equipment as may be indicated
-

Communication equipment

To communicate with entrant, attendants can use:

- air horn
 - verbal communication
 - hand signals
-

Required rescue equipment

Rescuers who enter an IDLH atmosphere confined space must:

- use a lifeline
- wear a harness
- use proper respiratory equipment
- have training in rescue for that type space

See the chapter on *Personal Protective Equipment* for more information.

Respiratory protection

IF there is any possibility of harmful air contamination or of oxygen deficiency while entrants are in a confined space, **THEN** entrants must wear an air mask.

This table outlines the basic requirements for respiratory protection. For more information, see the chapter on *Respiratory Protection*.

IF...	THEN...
oxygen content is less than 19.5%,	wear a supplied air breathing apparatus (e.g. a self-contained breathing apparatus [SCBA] or Air Line Respirator with egress system)
oxygen content is 23.5% or greater,	wear a supplied air breathing apparatus (e.g. a self-contained breathing apparatus [SCBA] or Air Line Respirator with egress system)
gas concentrations are above 0 %,	do not enter until the levels are zero

Training Requirements

Purpose

This document ensures that all employees will receive awareness training in confined space entry. The Company, at its discretion, may elect to certify certain individuals in compliance with the Confined Space Standard. Gravity Oilfield Services will certify that the required training has been accomplished. The certification shall include the employee name, trainer signature/initials, dates of training, and must be made available to employees.

Who requires training

The training must include all employees whose work could be affected by the confined space procedure. Each affected employee must be trained prior to the initial assignment, prior to a change in assigned duties, if a new hazard has been created, or special deviations have occurred.

Training items

The facility management must ensure that:

- entrants and attendants are trained on and the use of appropriate personal protective and respiratory equipment
- annual reviews be conducted covering all entries performed during a 12-month period to determine if any revisions in the program are needed
- confined space definitions are covered in training, ie.:
 - confined space and permit required confined space
 - attendant
 - authorized entrant
 - entry
 - IDLH conditions
 - hazardous atmospheres
 - flammable gas limits (lel/uel)
 - oxygen deficient atmosphere
 - oxygen enriched atmosphere
 - difference in a confined space and a permit required confined space
 - methods of isolation of equipment (LO/TO)
 - ventilation
 - basics of filling out a permit for confined space work
 - procedures for concluding the entry after entry operations
 - hazards associated with confined space, i.e. atmospheric/physical
 - evacuation procedures
 - duties of the attendant, entrant and supervisor
 - working in a confined space, i.e. welding, grinding etc.



See the chapters on *Personal Protective Equipment*; *Hot Work*; and *Grinding Operations* for more information.