

## Table of Contents

<b>Section I</b>	1
Introduction	2
Policy Statement	3
List of Terms	4
<b>Section II – General Provisions</b>	7
1.0 Training & Recordkeeping Requirements	8
2.0 Responsibilities	9
3.0 Confined Spaces	13
4.0 Evaluating Confined Spaces	14
5.0 Confined Space Hazards	17
6.0 Permit-Required Confined Space Entry Requirements	19
7.0 Conducting Pre-Entry Training/”Dry-Run”	23
8.0 Preparing the Confined Space For Entry	26
9.0 Planning For Emergencies	28
10.0 What To Do When Work Ceases	29
11.0 Heat Stress	30
12.0 Monitoring Multiple Permit Required Confined Spaces	31
<b>Appendix</b>	33
Appendix A – Cutting/Welding – Hot Work Permit	34
Appendix B – Confined Space Training Certification Form	36
Appendix C – Duties of Authorized Entrants, Attendants, Supervisors	37
Appendix D – Confined Spaces Inventory Form	38
Appendix E – Atmospheric Testing Procedures	39
Appendix F – Confined Space Profile Form	40
Appendix G – Confined Space Entry Permit	42
Appendix G – Confined Space Entry Log	43
Appendix H – Confined Space Program Elements Form	44
Appendix I – Hot Work in a Confined Space	45
Appendix J – Confined Space Entry Checklist	46
Appendix K – What Is A Confined Space?	47
Appendix L – Power Tool Safety	48
Appendix M – Safe Work Permit	49

# **Section I**

## **Introduction**

## Introduction

*Confined Spaces* are located throughout many new construction work-sites as well as existing structure work-sites. Due to the diversity of our work-sites, the hazards associated with confined spaces are variable and need to be constantly reviewed with processes and procedures altered and/or updated accordingly.

This document has been developed to ensure the safety of all personnel required to enter and conduct work in confined spaces. This safety program outlines reasonable and necessary policies and procedures for any Hilscher-Clarke Electric Co. employees, contractors, and vendors (regardless of status) who are associated with confined space entry operations.

This safety policy and procedure provides guidelines for:

- ❑ Provisions for training;
- ❑ Areas of responsibility for the Safety Manager, Supervisory Personnel, Employees, Entrants, Attendants, Entry Supervisors, Qualified Person(s), and assigned Human Resources representatives;
- ❑ Recordkeeping requirements;
- ❑ Discussion on the criteria Hilscher-Clarke utilizes to defines a confined space;
- ❑ Identifying confined spaces;
- ❑ Evaluating confined spaces;
- ❑ Entry into confined spaces;
- ❑ Details on the hazards of confined spaces;
- ❑ Requirements for permit-required confined space entry

This program and all parts of General Industry Standard 29 CFR 1910.146 shall apply to all confined space entry operations as conducted at any and Hilscher-Clarke permanent facilities and work-site locations.

Hilscher-Clarke requires conformance with the safety standards set herein. A site-specific program may be utilized, providing it meets or exceeds the requirements set forth in this manual.

## Policy Statement

It is the policy of Hilscher-Clarke Electric Co. to provide a place of employment that is free from recognized hazards that cause or are likely to cause death or serious physical harm to employees or the public. Therefore, at each Hilscher-Clarke facility and/or jobsite, confined spaces shall be:

- ❑ Identified, and as applicable;
- ❑ Permitted and posted with warning signs.

When confined space hazards exist that cannot be eliminated, then:

- ❑ Engineering practices;
- ❑ Administrative practices;
- ❑ Safe work practices;
- ❑ Personal Protective Equipment (PPE), and;

Proper training regarding Confined Space Entry will be implemented. These measures will be implemented to minimize those hazards to ensure the safety of employees and the public.

Only employees trained and equipped as outlined in this policy and procedures can enter confined spaces.

## List of Terms

This section provides applicable definitions of terms used in this policy and procedure:

**Attendant** – An employee designated to remain outside the confined space and maintain constant communication with those inside. This person shall be trained in First Aid, CPR and in all confined space procedures, and have emergency phone numbers immediately available.

**Atmospheric Testing Equipment** – Used to monitor levels of oxygen, and flammable, combustible and toxic gases prior to and during work in confined space.

**Authorized Entrant/Employee** – A person who is approved or assigned by the Project Foreman, in charge of the entry, to perform a specific type of duty or duties or to be at a specific location at the job site.

**Body Harness** – Part of a fall protection system to distribute the impact of a fall over a large area of the body. It has adjustable leg and shoulder straps and a D ring in the back for attaching a lifeline. It can be used to pull an unconscious or disabled employee from a confined space.

**Confined Space** – A confined space by design has limited openings for entry and exit, may lack adequate ventilation, and may contain or produce dangerous air contamination.

Confined Space Classification Table: For the purpose of this plan, all confined spaces will be classified as follows:

Parameters	Class A	Class B	Class C
<b>Characteristics</b>	<b>Immediately dangerous to life.</b> Rescue procedures require the entry of more than one individual fully equipped with life support equipment. Maintenance of communication requires an additional standby person stationed within the confined space.	<b>Dangerous, but not immediately life threatening.</b> Rescue procedures require the entry of no more than one individual fully equipped with life support equipment. Indirect visual or auditory communication with workers.	<b>Potential hazard.</b> Requires no modification of work procedures. Standard rescue procedures. Direct communication with workers from outside the confined space.
<b>% of Oxygen Present</b>	Less than 19.5%, or greater than 23.5%.	Less than 19.5%, or greater than 23.5%.	19.5% to 23.5%
<b>Flammability Characteristics</b>	10% or greater of LEL (Lower Explosive Limit)	10% or greater LEL (Lower Explosive Limit)	10% or less of LEL (Lower Explosive Limit)
<b>Toxicity</b>	Immediately Dangerous to Life or Health (IDLH)	Greater than contamination level listed in OSHA Standard 1910 Subpart Z, less than IDLH level, but more than the permissible level.	Less than P.E.L. listed in OSHA Standard 1910, Subpart Z.

**Entrant** – An employee who is authorized by the employer to enter a permitted space.

## List of Terms – Cont.

**Entry** – The action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

**Entry Permit** – The written or printed document that is provided by the employer to allow and control entry into a permit space and that contains the information specified by this program.

**Entry Supervisor** – Designated representative (such as the Competent Person) 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 program.

NOTE: 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 program 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 entry operation.

**Hazardous Atmosphere** – An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is escape unaided from a permit space), injury or acute illness.

**Hot Work** – Any work involving burning, welding or similar fire-producing operations. Also, any work that produces a source of ignition, such as grinding, drilling, or heating.

**Hot Work Permit** – A permit allowing employees to perform work involving welding, cutting, riveting, or any task that would deplete oxygen, create toxic fumes and vapors, or create potential for fire or explosion. (See Appendix A).

**Immediately Dangerous to Life or Health** – An atmosphere that poses an immediate threat of loss of life; may result in irreversible or immediate severe health effects; may result in eye damage/irritation; or other condition that could impair escape from a confined space.

**Lower Explosive Limit (LEL)** – The minimum concentration of a combustible/flammable gas or vapor in air that will ignite if an ignition source is present.

**Lifeline** – Line attached to the employee in a confined space to remove him or her if unconscious or disabled.

**Manlift** – Portable tripod with winch and lifeline to raise, lower, and position the employee in the confined space.

**Non-Permit Required Confined Space** – A confined space that does not contain, nor has the potential to contain, any hazard capable of causing death or serious physical harm (with respect to atmospheric hazards).

**Oxygen Deficient Atmosphere/ Oxygen Deficiency** – An atmosphere containing oxygen at a concentration of less than 19.5% by volume as measured by an oxygen-measuring device.

**Oxygen Enriched Atmosphere/ Oxygen Maximum** – An atmosphere containing oxygen at a concentration of more than 23.5% by volume as measured by an oxygen measuring device.

**PEL–Permissible Exposure Level** – Concentration of a substance to which an individual may be exposed repeatedly without adverse effects.

**PPE – Personal Protective Equipment** – Any devices or clothing worn by the worker to protect against hazards in the environment (i.e., respirators, gloves, and chemical splash goggles).

## List of Terms – Cont.

**Permit Required Confined Space** – 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 restricted entry or exit;
- Requires the use of hands or contortion of the body to enter or exit;
- 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; or
- Contains any other recognized serious safety or health hazard.

**Purging** – The removal of gases or vapors from a confined space by the process of displacement.

**Qualified Person/Employee** – A person who has been trained and authorized to perform atmospheric testing.

**Standby Person** – A person designated by the Safety Manger, or the Project Foreman in charge of entry, to remain outside the confined space and to be in constant communication with the personnel working inside the confined space.

**Upper Explosive Limit (UEL)** – The maximum concentration of a combustible/flammable gas or vapor in air before its saturation point that will ignite if an ignition source is present.

# **Section II**

## **General Provisions**

## 1.0 Training & Recordkeeping Requirements

- 1.1** The formal written confined space training program is to provide employees with the necessary understanding, skills, and knowledge to safely perform their jobs. The components of this formal written training program include instruction on:
- Types of confined spaces
  - Confined space hazards
  - Atmospheric testing of confined spaces
  - Cleaning and ventilation
  - Lockout of confined spaces
  - Personal Protective Equipment (PPE)
  - Respirator use and care
  - Buddy systems and emergency procedures
  - Communication procedures
  - Emergency rescue and procedures
  - Hot work
- 1.2** Initial and refresher training are to be provided to employees. Refresher training must be conducted whenever:
- An employees duties change;
  - Whenever hazards in the confined space change; or
  - An evaluation of the confined space entry program identifies inadequacies in the employee's knowledge.
- 1.3** Employees designated to enter confined space work areas will be trained in the following areas (this includes entrant, attendant and rescue team):
- Emergency entry and exit procedures;
  - Applicable respirators;
  - First Aid and CPR;
  - Lockout barriers at worksites;
  - Safety equipment use;
  - Rescue equipment;
  - Permit system;
  - Work practices
- 1.4** Qualified Persons shall be trained in:
- Atmospheric testing methods;
  - Meter calibration;
  - Atmospheric behaviors of oxygen, combustible, and toxic gases.
- 1.4.1** Qualified persons shall receive initial and refresher training.
- 1.5** Appendix B presents a training certification form to document the affected employees' training on confined spaces.
- 1.6** Recordkeeping requirements shall include, but not be limited to:
- 1.6.1** Retaining each cancelled permit for at least one year to facilitate review of Permit-Required Confined Spaces program.
- 1.6.2** Noting problems encountered during entry on permit to facilitate revisions to this program and policies.
- 1.6.3** Certification of training with name, identity of trainers and training dates.
- 1.6.4** Reclassification from permit to non-permit space certification with date, location, and signature of person making determination.

## 2.0 Responsibilities

- 2.1** The *President* shall be responsible for the following:
- 2.1.1** Review and update of Hilscher-Clarke's Confined Space Entry Program to conform to current CFR standards.
  - 2.1.2** Perform a single annual review covering all entries performed during a 12-month period to ensure employees participating in entry operations are protected from permit space hazards.
  - 2.1.3** Work with the Human Resources Representative to establish standard operating procedures for record retention and maintenance.
  - 2.1.4** The President may delegate the responsibility of various aspects of the Confined Space Entry Program to a Qualified Organization. However, the President's ultimate responsibility for his/her aspects of the program cannot be delegated.
- 2.2** The *Safety Manager* shall be responsible for the following:
- 2.2.1** Assisting Supervisory Personnel with:
    - Providing training as set forth in the program and policies;
    - Identification of confined spaces;
    - Identifying spaces that require a permit for entry;
    - Labeling Permit-Required Confined Spaces.
  - 2.2.2** Insure compliance with standards set forth in this program and policies by periodic inspection of entry sites and canceling permits where unsafe conditions are present.
  - 2.2.3** Identifying confined spaces within existing facilities and on construction work-sites, or existing Hilscher-Clarke permanent facilities.
  - 2.2.4** Identifying hazards within a confined space under Hilscher-Clarke's control.
  - 2.2.5** Documenting that all training requirements for a specific confined space entry have been met by signing the pre-entry authorization space on the entry permit.
  - 2.2.6** Insuring that the required atmospheric tests are performed at the confined space and results recorded on the permit prior to entry authorization.
  - 2.2.7** Obtaining and maintaining all equipment necessary to complete the confined-space entry project.
  - 2.2.8** Authorize entry by signing the Entry Authorization space on the entry permit after all conditions for a safe entry has been met.
  - 2.2.9** Terminating the entry and canceling the permit when:
    - Entry operations covered by the entry permit have been completed;
    - A condition that is not allowed under the entry permit arises in or near the permit space.
  - 2.2.10** Determining, 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.
  - 2.2.11** With the approval of the President, the Safety Manager may delegate the responsibility of various aspects of the Confined Space Entry Program to a Qualified Organization (as approved by the President). However, the Safety Manager's ultimate responsibility for his/her aspects of the program cannot be delegated.

## 2.0 Responsibilities (cont.)

### 2.3 *Supervisory Personnel* shall be responsible for the following:

- 2.3.1 Supervisory Personnel will not allow any employee, who has not received the required training, to perform any of the tasks or activities associated with this safety policy and procedure.
- 2.3.2 Communicating appropriate needs to the Safety Manager.
- 2.3.3 Knowing where confined and permit-required confined spaces are located at their worksite/existing structure.
- 2.3.4 Ensuring permit-required confined spaces are posted with warning signs.
- 2.3.5 Ensuring that all employees are provided with ANSI and NIOSH approved PPE as necessary for their job and received the appropriate training for the assigned PPE.
- 2.3.6 Ensuring that only employees trained and qualified will operate material handling equipment.
- 2.3.7 Obtaining and maintaining all equipment necessary to complete the confined-space entry project.
- 2.3.8 Authorize entry by signing the Entry Authorization space on the entry permit after all conditions for a safe entry has been met.
- 2.3.9 Terminating the entry and canceling the permit when:
  - Entry operations covered by the entry permit have been completed;
  - A condition that is not allowed under the entry permit arises in or near the permit space.
- 2.3.10 With the approval of the Safety Manager, the Project Foreman may delegate the responsibility of various aspects of the Confined Space Entry Program to another Qualified Person, Competent Person, or Qualified Organization (as approved by the Safety Manager). However, the Supervisor's ultimate responsibility for his/her aspects of the program cannot be delegated.

### 2.4 **Employees** shall be responsible for the following:

- 2.4.1 Complying with all applicable guidelines contained in this safety policy and procedure.
- 2.4.2 Follow all instructions pertaining to confined spaces.
- 2.4.3 Never enter confined spaces unless authorized by training and job duties.

### 2.5 Responsibilities of “**Authorized Entrants**” (individuals trained to enter a confined space):

- 2.5.1 Knowledge of the hazards that may be faced during the entry, including, the modes, signs or symptoms, and consequences of the exposure;
- 2.5.2 Proper use of the equipment, which includes:
  - Atmospheric testing and monitoring equipment.
  - Ventilating equipment needed to obtain acceptable entry conditions.
  - Communication equipment necessary to maintain contact with standby person.
  - Personal protective equipment as needed.
  - Lighting equipment as needed.
  - Barriers and shields as needed.
  - Equipment, such as ladders, needed for safe ingress and egress.
  - Rescue and emergency equipment as needed.
  - Any other equipment necessary for safe entry into and rescue from permit spaces.

## 2.0 Responsibilities (cont.)

### “Authorized Entrants” (cont.)

**2.5.3** Communication 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 if required.

**2.5.4** Alert the attendant (standby person) whenever:

- The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or;
- The entrant detects a prohibited condition.

**2.5.5** Exiting the permit space as quickly as possible whenever:

- An order to evacuate has been given by the attendant or the entry supervisor;
- The entrant recognizes any warning sign or symptom of exposure to a dangerous situation;
- The entrant detects a prohibited condition; or
- An evacuation alarm is activated.

### 2.6 Responsibilities of “Attendants” (Standby Persons):

**2.6.1** Knowledge of the hazards that may be faced during the entry, including, the modes, signs or symptoms, and consequences of the exposure;

**2.6.2** Knowledge of possible behavioral effects of hazard exposure in authorized entrants.

**2.6.3** Continuously maintaining an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants accurately identifies who is in the permit space.

**2.6.4** Remains outside the permit space during entry operations until relieved by another attendant.

**2.6.5** Attempting non-entry rescue if proper equipment is in place and the rescue attempt will not present further hazards to entrant or attendant.

**2.6.6** Communicating with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space when conditions warrant.

**2.6.7** Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and ordering the authorized entrants to evacuate the permit space immediately under any of the following conditions:

- If the attendant detects a prohibited condition;
- If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;
- If the attendant detects a situation outside the space that could endanger the authorized entrants;
- If the attendant cannot effectively and safely perform all the duties required by this program.

**2.6.8** Summoning the rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards.

**2.6.9** Taking the following actions when unauthorized person(s) approach or enter a permit space while entry is underway:

- Warn the unauthorized person(s) that they must stay away from the permit space;

## 2.0 Responsibilities (cont.)

### “Attendants” (Standby Persons) (cont.):

- Advise the unauthorized person(s) that they must exit immediately if they have entered the permit space;
- Inform the unauthorized entrant(s) and the entry supervisor if unauthorized persons have entered the permit space.

**2.6.10** Performs no duties that might interfere with the attendant’s primary duty to monitor and protect the authorized entrants.

**2.6.11** When monitoring multiple spaces at one time, the assigned attendant shall consult and follow the established guidelines developed and outlined in Section 12.0 of this policy and procedure. If all aspects of the established guidelines cannot be met by the attendant then said attendant shall report the situation to his/her assigned Project Foreman and not allow entry into the space until all said guidelines and requirements can be met.

### 2.7 Responsibilities of the **Entry Supervisor** (Person reviewing and authorizing the permits):

**2.7.1** Ensuring that only employees who are trained are allowed to enter confined spaces.

**2.7.2** Ensuring proper permits and safety procedures are followed closely at the jobsite.

**2.7.3** Must be familiar with all hazards associated with the entry operation.

**2.7.4** Ensuring that all safety precautions, rescue procedures, and safety equipment needed for the operation are in place and functional at the time of the entry into the confined space.

### 2.8 **Qualified Person/Competent Person/Qualified Organization** is responsible for:

**2.8.1** Checking the atmosphere of a confined space and correctly reading and using the gas detection instruments.

**2.8.2** Documenting all confined space measurements.

**2.9** See Appendix C for specific “Confined Space Entry Team” Responsibilities.

## 3.0 Confined Spaces

- 3.1** *At Hilscher-Clarke all Confined Spaces shall be considered potentially dangerous and therefore “Permit-Required” until pre-entry procedures demonstrate otherwise.*
- 3.2** A Confined Space is any space that has the following characteristics:
- 3.2.1** Large enough or so configured that an employee can bodily enter and perform assigned work.
  - 3.2.2** *Has limited or restricted means for entry or exit.* Confined Space openings are limited primarily by size and location. Openings may be small in size and may be difficult to move through easily. However, in some cases openings may be very large; i.e., open-topped spaces such as pits or excavations. Entrance and exit may be required from top, bottom, or side. Size or location may make rescue efforts difficult.
  - 3.2.3** *Is not designed for continuous employee occupancy.* Most confined spaces are not designed for employees to enter and work on a routine basis. They may be designed to store a product, enclose materials and process, or transport products or substances. Therefore, occasional employee entry for inspection, maintenance, repair, cleanup, or similar tasks, is often difficult and dangerous. The danger associated with entry may come from chemical or physical hazards within the space.
- 3.3** Non-Permit Confined Space means a confined space that does not contain, nor has the potential to contain, any hazard capable of causing death or serious physical harm (with respect to atmospheric hazards).
- 3.4** Permit Required Confined Space (Permit Space) means a confined space that has one or more of the following characteristics:
- 3.4.1** Contains or has a potential to contain a hazardous atmosphere.
  - 3.4.2** Contains a material that has the potential for engulfing an entrant.
  - 3.4.3** Requires the use of hands or contortion of the body to enter or exit;
  - 3.4.4** 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; or
  - 3.4.5** Contains any other recognized serious safety or health hazard.
- 3.5** Based on the definition, many types of spaces may be considered “confined” and therefore hazardous. Some examples of confined spaces might be sewers, manhole, trenches, electrical vaults, tunnel, or other similar confined spaces.
- 3.6** It is the responsibility of the Safety Manager to evaluate potentially hazardous spaces at the construction site(s) or areas under his/her control and ensure that the proper precautions are taken for safety. This responsibility may be delegated to a competent person as defined in this program and policy.
- 3.7** All work space meeting the confined spaces criteria will be inventoried on the “Confined Spaces Inventory” form (Appendix D).

## 4.0 Evaluating Confined Spaces

- 4.1** Once all confined spaces have been identified, then those confined spaces must be evaluated to determine the hazards that may be present. Hazardous atmospheres and general safety hazards must be evaluated for all confined spaces.
- 4.2** A hazardous atmospheric evaluation must be performed by conducting atmospheric testing to assess the conditions in the confined space. Appendix E presents atmospheric testing procedures that should be followed by a “Qualified” person. Results of the atmospheric testing should be documented for later use.
- 4.2.1 Atmospheric Hazards** affect the air in the space and can be flammable, toxic, corrosive, or asphyxiating. The table below identifies common atmospheric hazards, describes how they occur, and highlights why you should be concerned about them.

<b>Common Atmospheric Hazards</b>		
<b>Hazard</b>	<b>How It Occurs</b>	<b>Why you should be concerned</b>
<b>Oxygen deficiency (less than 19.5% oxygen)</b>	Chemical or biological reactions consume oxygen.	Oxygen-deficient atmospheres affect heart rate, muscle coordination, and breathing. Eventually, they lead to death.  Oxygen-enriched atmospheres increase the risk of fire or explosions.
<b>Oxygen enrichment (greater than 23.5%)</b>	Results from welding tasks and from the improper use of oxygen for breathing air.	
<b>Flammable Atmospheres</b>	Fuel, oxygen, and a source of ignition cause fires and explosions.	Flammable gasses such as acetylene, butane, propane, hydrogen, and methane are common in permit spaces.  Grain, nitrated fertilizers, and ground chemicals can produce combustible dusts.
<b>Toxic Atmospheres</b>	Accumulates through some manufacturing, biological, or chemical reactions.  Released during work or tasks such as welding and cleaning.	Many manufacturing processes, stored materials, and work tasks produce toxic gases, vapors, or dusts.
<b>Corrosive Atmospheres</b>	Accumulates from some manufacturing processes, biological or chemical reactions.	Corrosive substances destroy living tissue.  Some cause immediate damage to skin and eyes; some have no immediate effect, but cause cancer with prolonged exposure.

Always check atmospheric hazards in the following order: oxygen deficiencies or displacement, flammable atmospheres, toxic atmospheres, and corrosive atmospheres.

## 4.0 Evaluating Confined Spaces (cont.)

4.3 General safety hazards should be assessed by physical observation. This physical observation should include a visual assessment of the following hazards (*the table below identifies common non-atmospheric hazards, describes how they occur, and explains why you should be concerned about them*):

<b>Common Non-Atmospheric Hazards</b>		
<b>Hazard</b>	<b>How It Occurs</b>	<b>Why you should be concerned</b>
<b>Engulfment</b>	Loose materials drawn from the bottoms of storage bins can suffocate or bury an entrant.  Liquids or materials are suddenly released into the space.	Liquid or loose materials can trap or bury a worker in seconds.
<b>Mechanical &amp; Hydraulic Energy</b>	Mechanical and hydraulic equipment start or move unexpectedly.	Entrants servicing mechanical and hydraulic equipment can be seriously injured or killed if the energy isn't properly controlled.
<b>Noise</b>	Permit spaces amplify sounds produced by tools and equipment.	Noise interferes with essential communication between entrants and attendants.
<b>Falling Objects</b>	Objects fall into the space because topside openings are unguarded or improperly guarded.	
<b>Extreme Temperatures</b>	The permit space's location and the equipment it contains make it very hot or very cold.	Hot environments put workers at risk for heat stress, especially if they're doing strenuous work or wearing protective clothing – cold environments make tasks more difficult to accomplish.
<b>Slippery Surfaces</b>	Leaks, spills, and condensation make walking and working surfaces slippery.	Wet surfaces are usually slippery. They increase the risk of falls.
<b>Corrosive Chemicals</b>	Corrosive chemicals are stored in the space, or entrants use them to do tasks.	Corrosive chemicals can cause severe eye or skin irritation if exposed workers are not wearing the proper protective clothing.
<b>Access Problems</b>	Confined spaces are often difficult to enter or exit.	In an emergency, entrants may not be able to exit quickly.
<b>Illumination Problems</b>	Most permit spaces are dark places.	Poor lighting makes it difficult for workers to enter, exit, and work in a permit space.

4.4 The Assessment should be based on knowing the existing conditions and use of the confined space along with the actual and potential hazards posed by materials and substances in the confined space. Appendix F, a “Confined Space Evaluation” form should be utilized.

## 4.0 Evaluating Confined Spaces (cont.)

- 4.5 If any of the questions posed on the “Confined Space Evaluation” form are answered yes, then the confined space is a permit-required confined space.
- 4.6 If a change in use or configuration of a non-permit-required confined space increases hazards to entrants, then the space must be reevaluated for possible reclassification to a permit-required confined space.
- 4.7 A permit-required confined space may be reclassified to a non-permit-required confined space if:
  - 4.7.1 The permit-required confined space poses no atmospheric hazards and all non-atmospheric hazards are eliminated without entry.
  - 4.7.2 Entry is necessary to eliminate hazards and such entry is performed in accordance with the confined space entry program, and testing and inspection during entry indicate that hazards have been eliminated.
  - 4.7.3 The basis for determining that all hazards are eliminated is documented and certified.
  - 4.7.4 Reclassification is effective **as long as the hazards remain eliminated.**

## 5.0 Confined Space Hazards

Confined Spaces present many hazards to employees due to the nature of the space's shape, size, lack of ventilation, proximity to toxic gases, and other contributing substances. Every confined space must be evaluated for these four types of hazards:

- Oxygen-Deficient Atmospheres
- Flammable Atmospheres
- Toxic Atmospheres
- Mechanical and Physical Hazards.

The three types of atmospheric hazards are often the most difficult to identify since they are normally invisible.

**5.1 Oxygen-Deficient Atmospheres:** The normal atmosphere is composed of approximately 21% oxygen and 79% nitrogen. An atmosphere containing less than 19.5% oxygen shall be considered oxygen-deficient. The oxygen level inside a confined space may be decreased as the result of either consumption or displacement. Some of the processes that consume oxygen in a confined space include:

**5.1.1** Combustion of flammable materials, as in welding, cutting, or brazing;

**5.1.2** The number of people working in a confined space and the amount of physical activity.

**5.2 Oxygen-enriched atmospheres** are those atmospheres that contain an oxygen concentration greater than 23.5%. An oxygen-enriched atmosphere will cause flammable materials such as clothing and hair to burn violently when ignited.

**5.3 Flammable Atmospheres** are generally the result of flammable gases, vapors, dust mixed in certain concentrations with air.

**5.3.1** Combustible gases or vapors can accumulate within a confined space when there is inadequate ventilation. Gases that are heavier than air will accumulate in the lower levels of a confined space. Therefore, it is especially important that atmospheric tests be conducted near the bottom of all confined spaces. Gases that are lighter than air would naturally be found towards the top of the confined space, therefore testing should be performed at 3 levels within the confined space (See Appendix E).

**5.3.2** The work being conducted in a confined space can generate a flammable atmosphere. Work such as spray-painting, coating, or the use of flammable solvents for cleaning can result in the formation of an explosive atmosphere. Welding or cutting with oxyacetylene equipment can also be the cause of an explosion in a confined space and shall not be allowed without a hot work permit (Appendix A). Oxygen and acetylene hoses may have small leaks in them, which could generate an explosive atmosphere and, therefore, should be removed when not in use. The atmosphere shall be tested continuously while any "hot work" is being conducted within a confined space.

**5.4 Toxic Atmospheres** may be present within a confined space as the result of one or more of the following:

**5.4.1** *The product stored in the confined space.* When a product is stored in a confined space, the product can be absorbed by the walls and give off toxic vapors when removed or when cleaning the residual material. The product can also produce toxic vapors that will remain in the atmosphere due to poor ventilation.

## 5.0 Confined Space Hazards (cont.)

- 5.4.2** *The work being conducted in the confined space.* Toxic atmospheres can be generated as the result of work being conducted inside the confined space. Examples of such work include: Welding or brazing with metals capable of producing toxic vapors, painting, scraping, sanding, etc. Many of the solvents used for cleaning and/or degreasing produce highly toxic vapors.
- 5.4.3** *Areas adjacent to the confined space.* Toxic fumes produced by processes near the confined space may enter and accumulate in the confined space. For example, if the confined space is lower than the adjacent area and the toxic fume is heavier than air, the toxic fume may “settle” into the confined space.
- 5.5** Mechanical and physical hazards. Problems such as rotating or moving mechanical parts or energy sources can create hazards within a confined space. All rotating or moving equipment such as pumps, process lines, electrical sources, etc., within a confined space must be identified.
- 5.6** Physical factors such as heat, cold, noise, vibration, and fatigue can contribute to accidents. These factors must be evaluated for all confined spaces.
- 5.7** Excavations could present the possibility of engulfment. Employees shall be protected from cave-ins by sloping, benching, or shoring systems when the depth of the excavation is more than four feet, in accordance with 29 CFR 1926.652.

## 6.0 Permit-Required Confined Space Entry Requirements

Once all permit-required confined spaces have been identified, no employee can enter that space until several requirements are met. They are as follows:

**6.1 *Establishing the permit system.*** The permit system for each worksite/structure shall include a listing of all permit-required confined spaces, a warning sign/label at each permit-required confined space, and permit issuance by authorized Hilscher-Clarke's Project Foreman, Safety Manager, or Hilscher-Clarke's site specific designated safety professional.

**6.1.1** Once all permit-required confined spaces are identified they will be marked with a sign (see below) advising personnel and the general public as to the dangers involved. Where practical, all permit-required confined spaces will be locked or blocked to prevent entry.



**6.1.2** A qualified person (as outlined in this plan) must authorize entry, prepare and sign written permits, order corrective measures if necessary, and cancel permits when work is completed.

**6.1.3** The entry permit is completed and posted in a conspicuous location near the entrance.

**6.1.4** Permits must be available to all permit space entrants at the time of entry and should be extended only for the duration of the task.

**6.1.5** Cancelled Permits must be retained for a year to facilitate the annual review of Hilscher-Clarke's confined space program.

**6.1.6** Appendix G represents a Confined Space Entry Permit. This permit must be completed prior to a permit-required confined space entrance.

**6.1.7** Appendix H presents a Confined Space Entry Program Element Contact List.

**6.1.8** Appendixes G&H will be maintained at each worksite/structure by the individual charged with administering the Confined Space Permit Program.

**6.1.9** If welding is to be performed in the confined space (permit-required or non permit required), a hot work permit (Appendix A) must also be obtained, completed and posted at the entry to the applicable confined space.

**6.2 *Pre-entry atmospheric testing*** for the confined space shall be performed by the Entry Supervisor or otherwise company designated "Qualified Person" prior to the opening of any covers.

**6.2.1** See Appendix E for atmospheric testing procedures.

**6.2.2** If a toxic substance is determined to be in the confined space during testing by the Qualified Person, the Safety Manager will be contacted to provide help in obtaining a Material Safety Data Sheet or other chemical information to determine what type of personal protective equipment is required, the potential health effects, the Permissible Exposure Limits, and any other information needed to safely conduct the work.

## 6.0 Permit-Required Confined Space Entry Requirements (cont.)

**6.3 *Isolating Energy Sources (Lockout/Tagout).*** Energy sources will be completely isolated by physical disconnection, double blocking, bleeding, or by lockout/tagout procedures. Hilscher-Clarke has developed and implemented a Hazardous Energy Control Plan to meet the letter and intent of 29 CFR Part 1910.147. Reference Hilscher-Clarke's Hazardous Energy Control Plan for the approved processes and procedures isolating energy sources.

**6.3.1** Reference Hilscher-Clarke's Hazardous Energy Control Policy for Lockout procedures.

**6.3.2** Tagout Only – Some devices cannot be physically locked out, or must remain energized (to some extent) while the work is being performed. In cases such as this Hilscher-Clarke's Project Foreman, or otherwise designated "Qualified" person shall complete a "Safe Work Permit" (see Appendix M) in accordance with Hilscher-Clarke's Hazardous Energy Control Plan.

- This Safe Work Permit shall be reviewed with all Affected employees (in regards to the specific confined space)
- All requirements of the Safe Work Permit are to be met (and documented) prior to entry into the confined space (as described in the Safe Work Permit).
- The Safe Work Permit shall be conspicuously posted at the designated confined space at all times.
- Record retention of the Safe Work Permit shall be in accordance with the requirements of Hilscher-Clarke's Hazardous Energy Control Plan.

**6.4 *Ventilating and cleaning the confined space.*** Ventilation and cleaning shall be performed to empty, flush, or purge spaces from the outside if feasible.

**6.4.1 Hilscher-Clarke still requires testing and monitoring of all confined spaces, even if documentation (i.e., Gas Free Certificate) is issued indicating that the space has been purged or cleaned. Such certifications should only be taken as an indication that a unit or space has been cleaned and should not be taken as a guarantee that the internal atmosphere will continue to be safe.**

**6.4.2** Indicate whether mechanical or natural ventilation will be used. Describe the procedures to be used.

- Efficiency of ventilation shall be checked by re-testing the atmosphere (as outlined on the permit) prior to entry.
- Where ventilation is used to improve the air in a confined space, Hilscher-Clarke shall ensure that the toxic or flammable gases or vapors (i.e., bad air) removed from the space do not pose a risk to other workers. "Bad Air" should not be discharged into another work area or near an ignition source.
- In the case of explosive gases or vapors, mechanical ventilators should be bonded to the confined space or explosion-proof fans and/or ventilators utilized (specially designed fans operated by electricity or compressed air).
- The ventilation equipment should be capable of providing an air change every 15 seconds and easily dilute or displace most dangerous atmospheres.

## 6.0 Permit-Required Confined Space Entry Requirements (cont.)

**6.4.3** When a hazardous atmosphere is detected, ventilation will continue until:

- The space has no harmful concentration of toxic gases or vapors and acceptable oxygen concentrations have been obtained.

**6.4.4** Entry into the Confined Space will not be permitted until the atmosphere is tested 3 times and safe levels are maintained.

**6.5 Material Safety Data Sheet Access** – Using hazardous materials during a confined space entry necessitates that Material Safety Data Sheets (MSDSs) for the hazardous materials are made available to Attendants, Entrants, Rescuers and Supervisors prior to entry.

- Employees shall be trained by Hilscher-Clarke on the hazards of those materials to be used. The training shall include signs and symptoms of exposure, measures employees must take to protect themselves from the hazards during the entry.

**6.6 *Having appropriate Personal Protective Equipment.*** The appropriate PPE should be worn based on the hazard(s) of the space and include:

- ✓ Eye and Face Protection
- ✓ Head Protection
- ✓ Foot and Leg Protection
- ✓ Body Protection
- ✓ Hearing Protection
- ✓ Respiratory Protection
- ✓ Hand and Arm Protection
- ✓ Harness, Safety Belts, and Lifelines

**6.6.1** Required Personal Protective Equipment will be furnished to all employees, contractors, and confined space participants (permit required and non-permit required) at no cost to the individual(s).

**6.7 *Hand and Portable Power Tools.*** Appropriate equipment and tools must be in place and in good condition.

**6.8 *Having Attendants in place.*** A trained and qualified (according to the guidelines established by Hilscher-Clarke's policy and procedures) "Outside" Attendant is mandatory for entry into any confined space. The attendant shall be stationed immediately outside permit-required confined spaces and shall:

- Remain outside the confined space at all times;
- Wear a reflective vest (hunter orange or fluorescent green) to easily and readily identify them as the Attendant on duty;
- Be within sight, or call, of all entrants unless other means of approved communication have been established, approved and outlined on the permit;
- Assure that all personnel entering and leaving the confined space sign in and out in the space provided on the back of the confined space entry permit.
- Have ultimate authority to stop work and evacuate the space if conditions change during the life of the permit (i.e., vapor cloud develops or a suspicious odor is detected) or entrants fail to meet the requirements of the permit (i.e., failure to wear assigned PPE).
- Have means to summon assistance;
- Have safety and rescue equipment on hand.

## 6.0 Permit-Required Confined Space Entry Requirements (cont.)

**6.8.1** The attendant shall be physically capable of assisting any employee inside the confined space in the event of an emergency. This individual will be responsible for alerting others that a rescue is in progress and for taking appropriate measures to ensure the safety of all co-workers in the area.

**6.8.2** *No employee (other than the company Authorized Rescue Team) is to enter a confined space if another employee goes down!* The attendant shall always seek assistance as outlined in this plan and established on the permit.

**6.8.3** Appropriate communications should be established such as radios or walkie-talkies if the employee gets out of “Line-of-Sight” or earshot.

**6.9** *Having Rescue Teams in place.* Rescue teams must be available for permit-required confined spaces. The Rescue Team is responsible for rescuing any Confined Space Entrant, if necessary. (See section 9.0 of this policy and procedure for further clarification on “Planning For Emergencies”)

Rescue Teams will:

**6.9.1** Always follow company procedures;

**6.9.2** Have the same level of training as Entrants;

**6.9.3** Know and have current certification in First Aid/CPR;

**6.9.4** Be able to use all necessary rescue equipment and rescue techniques;

- A Self Contained Breathing Apparatus (SCBA) must be used.
- Where practical all personnel entering a confined space should be equipped with a retrieval line secured at one end to the entrant by a full-body harness with its other end secured to a tripod lifting hoist.
- Have a basket or stretcher readily available.

**6.8.5** Be able to understand the information given to Entrants. Rescue Team members will be required to participate in the pre-entry training and in preparing the confined space for entry. This applies to any and all employees, contractors, and vendors regardless of status.

## 7.0 Conducting Pre-Entry Training/"Dry-Run"

Once the entry into a confined space has been planned, the Project Foreman, or his designated representative(s), must train and conduct a "dry-run" involving all employees who will be involved in the confined space entry. The "dry-run" should be conducted no earlier than 24 hours before the entry is to be made. The training session will include, but not be limited to:

**7.1 Clearly identifying the confined space to all participants and the specific reason(s) for the entry into the designated confined space.**

**7.2 Identify the work detail:**

**7.1.1** Assign each employee/contractor the job(s) he/she is to perform in the entry project (Entrant, Attendant, etc.) *see Appendix C.*

**7.1.2** If an employee/contractor is required to use a piece of equipment, have said individual(s) demonstrate the use of the equipment to assure that he/she is capable of using the equipment properly and that the equipment is in proper working order.

**7.1.3** Inform all Affected Participants that no one is to enter the confined space unless the Attendant is present at the work site and all requirements of the permit have been met.

**7.3 Inform Attendants, Entrants, and Rescuers (hereby referred to as "Affected Participants") of all known or suspected hazards.**

**7.3.1** Inform and review with all Affected Participants any access or exit problems. Reviewing visually and verbally.

**7.3.2** Inform Affected Participants of all equipment that must be locked out or tagged out.

**7.3.3** Inform and review with all Affected Participants (in the event of utilization of Hilscher-Clarke's Tagout Only Policy – as outlined in Hilscher-Clarke's Hazardous Energy Control Policy) of the requirements of the Safe Work Permit and its specific requirements.

**7.3.4** Inform Affected Participants of the contents of the confined space, supplying copies of the appropriate MSDS(s).

**7.3.5** Inform Affected Participants of all atmospheric levels that must be maintained before entering, and while working in the confined space.

**7.3.6** If a toxic atmosphere or substance is present or could become present, the following Respiratory Protection training must be completed:

- If respiratory protection is not going to be used, inform personnel of the maximum permissible exposure level (PEL) that can exist within the confined space, and the method used to monitor the PEL.
- Inform personnel of the potential health effects of exposure to the toxic atmosphere or substance.
- Inform personnel of the signs and symptoms of exposure to the toxic fume/vapor/particulates.
- Inform personnel of any respiratory protection equipment that they will be required to wear prior to entering and while performing work within the confined space. These requirements shall be clearly listed on the Confined Space Permit.

**7.3.7** Persons should not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment.

- An approved Licensed Health Care Professional (as outlined in Hilscher-Clarke's Respiratory Protection Plan) shall determine what health and physical conditions are pertinent. The respirator user's medical status should be reviewed as per Hilscher-Clarke's Respiratory Protection Plan.
- Documentation of these requirements shall be maintained at the work site.

### 7.4 Identify isolation procedures.

7.4.1 Inform the Affected Participants responsible for the lockout/tagout of all equipment that must be isolated.

7.4.2 Supply and inform the Affected Participants, responsible for the performing of Lockout/Tagout with a copy of Hilscher-Clarke's Hazardous Energy Control plan and its requirements.

### 7.5 Identify purging and/or ventilation procedures.

7.5.1 Inform all Affected Participants responsible for performing this function of the methods to be used.

### 7.6 Identify all equipment needed.

7.6.1 Inform Affected Participants involved in the project of all equipment that will be necessary to complete the project.

7.6.2 Make sure all Affected Participants are capable of using their assigned equipment properly.

### 7.7 Determine necessary Personal Protective Equipment.

7.7.1 Consult Material Safety Data Sheets (MSDSs).

7.7.2 Inform Affected Participants of all PPE that must be used to ensure their safety.

7.7.3 Inform Affected Participants that required PPE will be furnished at no cost to them.

- Inform personnel of the personal protective equipment (PPE) that they will be required to wear prior to entering and while performing work within the confined space. These requirements shall be clearly listed on the Confined Space Permit.
- If entrants are unaware of the proper use, limitations, cleaning, storage, and disposal of the PPE, they must be trained with the training being properly documented. (Reference Hilscher-Clarke's Personal Protective Equipment and Hazard Assessment and Analysis policies and procedures).
- Failure to comply with, and continued compliance with, PPE requirements clearly listed on the applicable confined space permit shall result in prevention of entry or the immediate evacuation of the confined space until all requirements of the permit have been fulfilled.

7.7.4 Make sure that all personnel required to use PPE are trained in the proper use, limitations, storage and disposal of the equipment.

7.7.5 All PPE must be ANSI or NIOSH approved.

### 7.8 Establish communication.

The ability to communicate between those in and outside the confined space is an important part of Hilscher-Clarke's confined space permitting system. A dependable system is necessary to communicate everything from status reports to requests for assistance if the entrants are in trouble. The Confined Space Supervisor will decide on the means of communication, to be utilized by the Affected Participants, and clearly outline the method(s) of communication on the applicable Confined Space Entry Permit.

7.8.1 Inform all entrants that they are required to maintain communication with the Attendant.

7.8.2 Inform Attendant that he/she must maintain constant communication with all entrants.

## 7.0 Conducting Pre-Entry Training/"Dry-Run" (cont.)

**7.8.3** Inform, and if applicable train, the Affected Participants of the type of communication to be utilized during the confined space entry.

**7.8.4** Demonstrate the proper use of the communication equipment.

### **7.9 Protect from external hazards.**

**7.9.1** Inform personnel where signs and barriers will be placed to prevent unauthorized entry and protect entrants from external hazards.

### **7.10 Pre-plan rescue procedures.**

**7.10.1** The designated attendant should be informed of the rescue procedures to be followed. In the event of an emergency the standby person should:

- Immediately summon emergency services by dialing 911. If 911 is not to be utilized, supply the employee /contractor with a card displaying the number to be dialed in the event of an emergency.
- Attempt to remove the victim by use of the retrieval line from outside the confined space if this can be accomplished without creating further hazard for the Entrant or the Attendant.
- If the Attendant is able to remove the victim with the retrieval line, he/she should administer aid within the limits of his/her training until emergency medical services (EMS) arrive.
- If the Attendant is unable to remove the victim by using the retrieval line, he or she must wait for help to arrive. The Attendant is not to enter the confined space for any reason.
- Give EMS personnel any information they request.

**7.10.2** The Attendant should be informed that he/she can have no other duty but to maintain contact with personnel inside the confined space.

**7.10.3** Inform the Attendant that they must not enter the confined space under any circumstances.

### **7.11 Place the confined space back into service.**

**7.11.1** Inform personnel of the steps to be taken to place the confined space back into service.

## 8.0 Preparing the Confined Space For Entry

Once the entry has been planned and personnel/contractors have been trained and placed through a “dry-run”, the next step is to prepare the confined space for entry. The following steps are to be followed when preparing the confined space for entry.

- 8.1** If warning signs or barriers are to be used to prevent unauthorized entry or to protect entrants from external hazards, they should be placed on or around the confined space as planned and discussed in the “dry-run”.
- 8.2** Place all tools, safety equipment, monitoring equipment, etc., near the confined space.
- 8.3** Isolate all mechanical and/or electrical hazards as planned and discussed in the “dry-run”.
- 8.4** Purge/ventilate the confined space as planned and discussed in the “dry-run”.
- 8.5** The entry supervisor will test the atmosphere as discussed in the “dry-run” as outlined in this plan.
  - 8.5.1** All testing equipment shall be calibrated by a Competent Person as instructed by the manufacturer. All of the manufacturer’s operating instructions must be followed.
  - 8.5.2** The test equipment should be tested in a known clean/acceptable atmosphere to insure its accuracy.
  - 8.5.3** Initially ventilation equipment must be shut off prior to conducting any atmospheric pre-entry testing.
  - 8.5.4** The atmosphere must be tested at the bottom, top, and middle of all confined spaces.
  - 8.5.5** The atmosphere must be continuously monitored while work is being conducted in the confined space.
  - 8.5.6** If the confined space is left for any reason, the atmosphere must be re-tested before re-entering the space.
  - 8.5.7** If oxygen content is less than 19.5% or greater than 23.5%, perform additional ventilation.
  - 8.5.8** If oxygen content is between 19.5% and 23.5%, continue entry preparation.
- 8.6** The Entry Supervisor will test for flammable gas level as planned and discussed in the “dry-run” and outlined in this plan.
  - 8.6.1** If the meter reading is less than 10% of the lower explosive limit (LEL), continue entry preparations.
  - 8.6.2** If the meter reading is above 10% of the LEL, continue ventilation of the confined space.
  - 8.6.3** If the meter reading is still above 10% of the LEL, the confined space must be cleaned before entry is permitted.
    - An assessment of the Confined Space must be performed by the Competent Person who will determine what additional control measures need to be taken.
  - 8.6.4** Cleaning the Confined Space from the outside should always be the preferred method in Confined Spaces that have an LEL of above 10%. However, if the confined space must be entered for cleaning purposes, the criteria outlined below must be followed by any employees and/or subcontractors.
    - All entrants must be equipped with designated safety equipment;
    - All entrants must be equipped with a SCBA;
    - No spark-producing tools will be allowed for use.

## 8.0 Preparing the Confined Space For Entry (cont.)

- 8.7 The Entry Supervisor will determine the toxicity of the atmosphere as planned and discussed in training. If a toxic atmosphere is present, no person should be permitted to enter the confined space at a level exceeding the Permissible Exposure Limit (PEL) and/or the Time Weighted Average (TWA) without proper Personal Protective Equipment. The Project Foreman or Safety Manager should be contacted to assist in identifying proper precautions and the protective measures to be taken.
- 8.8 Assemble all personnel involved and conduct a simulated rescue drill.
- 8.9 The Entry Supervisor will then add any needed information, then complete and sign the permit. All personnel/contractors will be showed the permit and informed of any additions, changes, etc.

## 9.0 Planning For Emergencies

Before authorizing workers to enter a permit space, you must be sure that experienced emergency responders will be available if an Entrant needs help. Responders must be able to reach the worksite promptly and know how to deal with the emergency effectively. ***Most fire departments are not equipped to respond to permit-space emergencies.***

You can choose either an on-site or an off-site responder. The responder must meet and adhere to all requirements outlined in sections 6.0 and 7.0 of this policy and procedure. The following table is a guide for determination in choosing an Off-Site Emergency Responder:

Choosing an Emergency Responder	
<b><i>Identify needs.</i></b>	Do you anticipate emergencies requiring immediate action (i.e., if ventilation fails)? Or less-than-immediate action (if the most serious accident would cause a fracture or abrasion).
<b><i>Interview them.</i></b>	Meet with the responders to find out if they can provide the emergency service you need. Posting an emergency response number "911" for example isn't enough.
<b><i>How quickly can they reach the work site?</i></b>	The response time must be appropriate to the type of potential injury; responders must be standing by when employees are working under potential IDLH ( <i>immediately dangerous to life and health</i> ) conditions.
<b><i>Will they be available when needed?</i></b>	The responders must be available any time workers need to enter a permit space.
<b><i>How will you contact the responders?</i></b>	Is there a way for an authorized attendant or an entry supervisor to reach responders immediately?
<b><i>Can they do technical rescues?</i></b>	Do they have the technical knowledge and equipment to perform rope work or elevated-rescue work?
<b><i>Can they do medical evacuations?</i></b>	Do the responders have the skills and equipment for medical evacuation?
<b><i>Are they trained as permit-space entrants?</i></b>	Can the responders recognize the signs, symptoms, and consequences of exposure to a hazardous atmosphere in a permit space at the work site.
<b><i>Do they know how to test the atmosphere in a permit space?</i></b>	Do they know how to determine whether the atmosphere is IDLH ( <i>immediately dangerous to life and health</i> )?
<b><i>Will they understand the information on the entry permit?</i></b>	Will responders understand the ventilation and atmospheric testing data on the entry permit?

## 10.0 What To Do When Work Ceases

When work ceases for breaks or end of shift, all sources of potential hazard must be removed from the space and the area rendered safe.

- 10.1** Equipment such as spray painting guns or potentially hazardous products such as paints or surface treatments must be removed.
- 10.2** Gas lines for cutting and welding equipment must be turned off and removed.
- 10.3** Electrical supplies shall be turned off. However, during short breaks the low voltage electricity may be maintained for lighting, as would any equipment for the monitoring of the internal atmosphere.
- 10.4** Upon completion of the confined space work, it is necessary for all personnel to be accounted for and entry permits to be signed off and submitted to the Project Foreman and/or Safety Manager.

## 11.0 Heat Stress

- 11.1** Heat stress must be considered as a potential hazard associated with a confined space. Steam lines, equipment, etc. located in confined spaces may increase the ambient heat load of that confined space. Personal Protective Equipment (PPE) worn by Entrants may also increase the likelihood of heat stress by trapping body heat. The level of activity required by Entrants, worker acclimatization to heat, and individual physical condition will also affect potential for development of heat-related disorders.
- Heat stress symptoms may include reddening of the skin, profuse sweating, fatigue and sometimes nausea. Entrants should exit the confined space, remove personal protective equipment/clothing, and drink cool liquids if symptoms of heat stress are experienced.
  - If not treated, heat stress can progress to heat exhaustion. Symptoms of heat exhaustion include moist and clammy skin, accompanied by a feeling of giddiness, fatigue, nausea, headache and a pale or mottled/flushed look. The next stage of heat stress is heat stroke.
  - Heat Stroke – The individual’s skin becomes hot and dry, with a mottled or bluish color. Mental confusion and a rapidly rising core body temperature will be noted. Heat stroke can be fatal without rapid medical attention.
  - If symptoms of heat exhaustion or heat stroke are experienced by a member of the entry team, contact emergency response.
- 11.2** Personnel who must work in hot environments should exit the confined space at regular intervals for short rest breaks including water or an electrolyte replacement drink. Liquids should be cool but not cold. The Safety Manager will assist entry teams in assessing the heat stress potential of a confined space prior to entry.

## 12.0 Monitoring Multiple Permit Required Confined Spaces

It is not recommended that a Confined Space Attendant be responsible for monitoring more than one Permit Space at a time. However, if multiple spaces are required to be monitored by a single Confined Space Attendant, then Hilscher-Clarke has adopted the following guidelines.

Full compliance with these guidelines must be met prior to any entry being made into the Permit Spaces. If at any time during the entry compliance cannot be maintained then the Confined Space Attendant shall issue an order for all entrants to evacuate their spaces until such time as full compliance can be re-established.

- 12.1** The Confined Space Permit(s) shall be annotated to provide the means and procedures by which the Confined Space Attendant is to respond to an emergency affecting one or more of the permit spaces being monitored at any given time and in every conceivable emergency without affecting the Confined Space Attendant's monitoring of the remaining spaces.
  - 12.1.1** These methods and procedures must be reviewed with, and receive full approval of, not only the Confined Space Supervisor but by all Confined Space Entrants involved in the multiple spaces the Attendant is responsible for monitoring.
  - 12.1.2** A radio, pull rope, whistle, horn, or some other means of approved communication (by the Confined Space Supervisor) must be established and in place for each space to notify the Attendant of a problem.
  - 12.1.3** If an emergency, or any other situation arises that would require the full attention of the Attendant (i.e., outside rescue of an Entrant by the Attendant), the Attendant shall instruct all Entrants of all spaces to exit immediately.
- 12.2** If multiple permit-required confined spaces are monitored by one Attendant, the Attendant must be able to perform (at a minimum) the duties described below at each of the sites and entry points being monitored.
  - 12.2.1** Removing unauthorized individuals who enter or who attempt to enter the permit-required confined space during entry operations.
  - 12.2.2** Ensuring that employees under their supervision have received appropriate training.
  - 12.2.3** Ensuring that entry operations remain consistent with terms of the entry permit whenever responsibility for a permit-required confined space entry operation is transferred, and at intervals dictated by the hazards and operations performed within the space, and that acceptable entry conditions are maintained.
  - 12.2.4** Ensuring that rescue services are available and that the means for summoning them are operable. And that unauthorized personnel do not attempt a rescue.
  - 12.2.5** Ensuring that employees are provided with and utilize the appropriate safety equipment for entry into the confined space (as listed on the permit).
  - 12.2.6** Ensuring that acceptable entry conditions for all spaces being monitored are acceptable according to the guidelines of the permit and the Confined Space Supervisor.
  - 12.2.7** Ensuring barriers are in place and adequate to protect all Entrants in all spaces being monitored from external hazards (i.e., vehicle traffic).

**12.2.8** Verify that conditions in all confined spaces being monitored are safe throughout entry operations. This can be accomplished by:

- Constant testing and monitoring equipment to characterize employee exposure.
- Ensuring any ventilation equipment is functional throughout entry into the spaces described on the permit(s).
- Ensuring through periodic checks with Entrants that the ascribed means of communication (i.e., radio, pull rope, whistle, etc.) is in place and completely functional especially as the environment of the permit space changes throughout the progression of work.
- Rescue and emergency equipment, except to the extent that the equipment is provided by outside rescue services is in place and functional at entrances to all the spaces being monitored.
- Ensuring retrieval systems used for non-entry rescue of person from the permit-required confined space(s) is in place at each space and fully functional. See section 7.0 of this policy and procedure.

**12.3** At no time shall an Attendant allow any individual (regardless of status) to attempt a rescue of a person from the permit-required confined spaces they are monitoring. If the Attendant cannot prevent the unauthorized entry via verbal means they are to contact the emergency number and/or personnel listed on the Confined Space Entry Permit, describe the situation and request immediate assistance. Again all spaces must be vacated during this interaction with the unauthorized entrant.

# Appendix

## Hot Work Permit (page 1 of 2)

This Hot Work Permit is required for any operation involving open flames or producing heat and/or sparks and must be completed by a Competent Hot Work Supervisor and posted at the site. Hot work includes but is not limited to: Brazing, Torch Cutting, Grinding, Soldering, and Welding.

**If the required precautions cannot be met, and maintained, Hot Work is not permitted.**

<b>This permit is good for this shift only.</b>	
<b>Date Issued:</b> _____	<b>From:</b> _____ Time
	<b>To:</b> _____ Time
<b>Work to be done:</b> _____ _____ _____	
<b>Work Performed by:</b>	
_____ Name	_____ Name
_____ Name	_____ Name
<b>Fire Watcher(s) assigned? Yes <input type="checkbox"/> No <input type="checkbox"/></b>	
<b>Name of Fire Watcher(s):</b> _____	
<b>Safety Checklist</b>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Available sprinklers, hose streams, &amp; extinguishers are in service/operable.</li> <li><input type="checkbox"/> Hot work equipment in good repair.</li> </ul> <p><b>Requirements within 35 ft. of work</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Flammable liquids, dust, lint and oil deposits removed.</li> <li><input type="checkbox"/> Explosive atmosphere in area eliminated.</li> <li><input type="checkbox"/> Floors swept clean of combustibles.</li> <li><input type="checkbox"/> Combustible floors wet down, covered with damp sand or fire resistant sheets.</li> <li><input type="checkbox"/> Remove other combustibles where possible. Otherwise protect with fire-resistant tarpaulins, screens or shields.</li> <li><input type="checkbox"/> All wall and floor openings covered.</li> <li><input type="checkbox"/> Fire resistant tarpaulins suspended beneath elevated hot work.</li> </ul> <p><b>Work on walls, ceilings or enclosed equipment</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Construction is noncombustible and without combustible covering or insulation.</li> <li><input type="checkbox"/> Combustibles on other side of walls moved away.</li> <li><input type="checkbox"/> No danger exists by conduction of heat into another room or area.</li> <li><input type="checkbox"/> Enclosed equipment cleaned of all combustibles.</li> <li><input type="checkbox"/> Containers purged of flammable liquids and vapors.</li> </ul>	<p><b>Fire Watch/Hot work area monitoring</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Fire watch will be provided during and continuously for 30 minutes after work, including during any work breaks.</li> <li><input type="checkbox"/> Fire watch is supplied with suitable extinguishers.</li> <li><input type="checkbox"/> Fire watch is trained in use of this assigned equipment and in sounding alarm.</li> <li><input type="checkbox"/> Fire watch may be required for adjoining areas, above and below.</li> <li><input type="checkbox"/> Hot work area inspected 30 minutes after job is completed.</li> </ul> <p><b>Other precautions taken</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Confined space entry permit required.</li> <li><input type="checkbox"/> Area is protected with smoke or heat detection.</li> <li><input type="checkbox"/> Ample ventilation to remove smoke/vapor from work area.</li> <li><input type="checkbox"/> First Aid equipment readily available at work site.</li> <li><input type="checkbox"/> Lockout/Tagout required.</li> <li><input type="checkbox"/> Respiratory protection required.</li> <li><input type="checkbox"/> Comments:</li> </ul>

**Hot Work Permit (page 2 of 2)**

**Signatures Required Before Beginning Work** (all employees involved in the performing of work, as identified on page one of this form must sign):

I have been instructed and I understand the hazards as well as the precautions necessary to do this work safely.

\_\_\_\_\_  
Signature of person performing work

\_\_\_\_\_  
Signature of person performing work

\_\_\_\_\_  
Signature of person performing work

\_\_\_\_\_  
Signature of person performing work

**Signatures Required After Completing Work** (all employees involved in the performing of work, as identified on page one of this form must sign):

This work was completed: \_\_\_\_\_  am  pm  
Date Time

\_\_\_\_\_  
Signature of person performing work

\_\_\_\_\_  
Signature of person performing work

\_\_\_\_\_  
Signature of person performing work

\_\_\_\_\_  
Signature of person performing work

I have personally inspected the worksite after completion of the work and find the area to be in safe condition.

\_\_\_\_\_  
Signature of Supervisor

\_\_\_\_\_  
Date

\_\_\_\_\_  
Time  am  pm

## Confined Space Training Certification Record

<b>Location</b> _____
<b>Instructor</b> _____ <b>Title</b> _____
<b>Employee Name</b> _____ <b>SS#</b> _____

### Has the OSHA required training been completed in the following categories?

Topic	Completion Date	Instructor's Signature	Employee's Initials
Types of Confined Spaces			
Confined Space Hazards			
Atmospheric Testing of Confined Spaces			
Cleaning and Ventilation			
Lockout of Confined Spaces			
Personal Protective Equipment (PPE)			
Respirator Use & Care			
Buddy Systems & Emergency Procedures			
Communication Procedures			
Emergency Rescue			

### Employees designated to enter confined spaces (includes entrants, attendants, & rescue team) shall also be trained in the following topics.

Topic	Completion Date	Instructor's Signature	Employee's Initials
Emergency Entry & Exit Procedures			
Applicable Respirators			
First Aid/CPR			
Hazard Control Measures at Worksites			
Safety Equipment at Worksites			
Rescue Equipment			
Permit System			
Work Practices			

## Appendix C – Duties of Authorized Entrants, Attendants, & Supervisors

Working in confined spaces is a team effort involving authorized entrants, attendants, and supervisors. Their duties and responsibilities are as follows:

Duty/Responsibility	Entrant	Attendant	Supervisor
Keep unauthorized entrants away from the space.		X	X
Remove unauthorized individuals who enter or who attempt to enter the permit space.			X
Communicate with entrants, monitor their status, and tell them when to evacuate.		X	
Inform the entrants and the entry supervisor if unauthorized persons enter the permit space.		X	
Communicate with the attendant regularly.	X		
Remain outside the space during entry operations until relieved by another trained and authorized attendant.		X	
Know the number and identity of authorized entrants.		X	
Use all equipment properly.	X		
Determine that acceptable entry conditions are maintained.			X
Exit from the permit space immediately given an order to evacuate, an alarm warning, or a sign of a hazardous condition.	X		
Know permit-space hazards, including the mode, symptoms, and consequences of exposure.	X	X	X
Notify the attendant of any signs or symptoms of exposure to a hazardous condition.	X		
Terminate the entry and cancel the permit when entry operations are finished or if a prohibited condition arises.		X	
Verify that entry conditions are acceptable before signing the permit and allowing entry.			X
Perform non-entry rescues if necessary.		X	
Verify that rescue services are available and the means for summoning them are effective.			X
Summon emergency responders when entrants need their services.		X	

**Worksite** \_\_\_\_\_

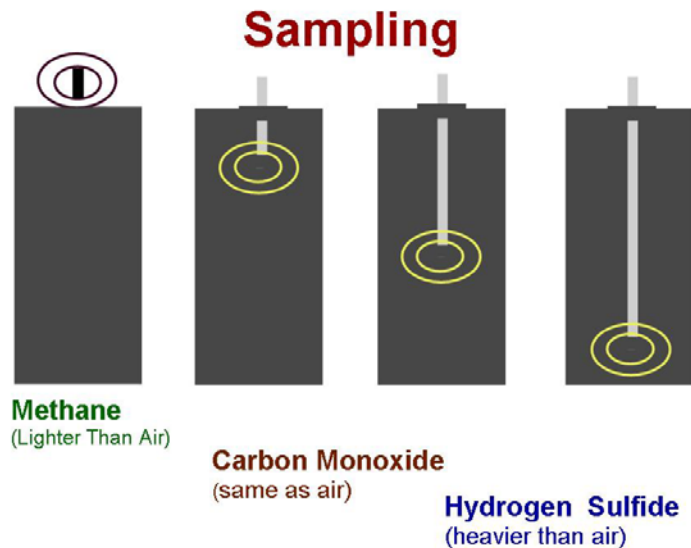
A survey of the worksite/workplace has identified the following permit spaces, the hazards in the spaces, and the method(s) necessary to control the hazards. This inventory must be kept up to date. All operational changes should always be evaluated for its impact on this worksite/existing facility.

A Permit Required Confined Spaces shall be posted with signs stating it is a permit-required.				
Location of Space	Hazard(s)	Method of Controlling Hazard(s)	Permit Req'd	Rescue Method

## Appendix E – Atmospheric Testing Procedures

A qualified person shall test spaces a minimum of 3 times at all levels immediately prior to entry. Using direct reading instruments with remote sampling capacity, the qualified person shall test for:

- Oxygen level (19.5 percent minimum/maximum 23.5 percent).
- Potential flammable hazard, not to exceed (10 percent LEL) Flammable Limit (LFL).
- Toxic materials known or expected to be present (Hydrogen sulfide 10 ppm Maximum – other gases must be less than the known TWA for that gas.)
- The Competent Person needs to verify that the testing instrument accurately tests for the toxic agent expected to be encountered (i.e., correct sensor, color metric tubing, ph paper, litmus paper, etc.)



The qualified person shall record all atmospheric test results on the permit (Appendix G). A qualified person shall perform atmospheric testing during occupancy:

- At intervals depending on changing conditions;
- No less frequently than hourly;
- Continuously.

Each testing instrument shall be:

- Calibrated per manufacturer's instructions (instruments out of calibration or that fail field checks cannot be used until calibrated).
  - At least annually calibrated by the manufacturer.
  - Field checked immediately prior to use. This field check shall include checking with a test gas at least monthly.
- In larger confined spaces, or where movement of air is likely, it is necessary to test the atmosphere at extremities or in connecting areas if they cannot be isolated.
- A common mistake by workers about to enter confined spaces is to test the atmosphere only at the point of entry. Another common mistake is to test at point of entry and then enter to test extremities without appropriate precautions being taken. This can cause them to actually find the hazardous atmosphere for which they are testing but not to be prepared or protected when they encounter it. This is especially true where heavier than air gases collect at the bottom and extremeities of enclosed areas.
- It is vital that where there is any possibility of encountering a hazardous atmosphere then full protective measures, such as airline respirators that can guarantee a safe supply of respirable air, must be used until the atmosphere is proven to be safe.

<b>Hilscher-Clarke Electric Co.</b> <b>Confined Space Profile Form page 1 of 2</b>	Prepared by:
---	--------------

Existing Facility/Worksite:	Date:	Job #
-----------------------------	-------	-------

Number:	Location:	Function:
---------	-----------	-----------

Space Dimensions (Internal):	Portal Dimensions, Locations & Elevations:
------------------------------	--

Type of Entry Required:	Type of Space:
<input type="checkbox"/> Vertical <input type="checkbox"/> Horizontal	<input type="checkbox"/> Permit Space <input type="checkbox"/> Non-Permit Space

General Information:

Equipment within space including energy sources:

Hazards:

**Hilscher-Clarke Electric Co.**  
**Confined Space Profile Form page 2 of 2**

**Existing Hazards/Potential Hazards**

<input type="checkbox"/>	<b>Potential hazardous atmosphere</b> O <sub>2</sub> < 19.5%; > PEL for toxics/corrosives, > 10% LEL	<input type="checkbox"/>	<b>Cold sufficient to cause hypothermia or injury</b> _____
<input type="checkbox"/>	<b>Material that may engulf an entrant or be aspirated</b> _____	<input type="checkbox"/>	<b>Heat sufficient to cause heat exhaustion or injury</b> _____
<input type="checkbox"/>	<b>Low-lying region that may collect exhaust gas, vapor</b> _____	<input type="checkbox"/>	<b>Mechanical hazard with crushing potential, rotating blades, etc.</b> _____
<input type="checkbox"/>	<b>Oxidation (i.e., from decaying of organic matter as in a vault)</b> _____	<input type="checkbox"/>	<b>Electrical hazard from high voltage, water hazards, etc.</b> _____
<input type="checkbox"/>	<b>Configuration that may entrap or asphyxiate an entrant</b> _____	<input type="checkbox"/>	<b>Other airborne materials ; specify</b> _____
<input type="checkbox"/>	<b>Pressurized fluids or gases present in space</b> _____	<input type="checkbox"/>	<b>Toxic or hazardous liquids present</b> _____
<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<b>Other features of space</b>	<input type="checkbox"/> Remote or elevated location <input type="checkbox"/> High noise area <input type="checkbox"/> Poor visibility, lighting <input type="checkbox"/> Fall Hazard <input type="checkbox"/> Other (describe)		<b>Purpose of entry</b> <input type="checkbox"/> Maintenance/repair <input type="checkbox"/> Inspection <input type="checkbox"/> Custodial <input type="checkbox"/> Contractor access only <input type="checkbox"/> Other (describe)

Hilscher-Clarke is required to follow 29 CFR 1910.146 (at a minimum). This profile is intended to aid in compliance and should be viewed and treated as a "tool". This profile lists the features, hazards and potential hazards in and around this confined space so that a permit and procedures can be effectively and accurately completed. It does not cover hazards that may be brought into this space. Spaces will be reviewed by the Attendant and the Supervisor immediately prior to entry for re-evaluation.

## Confined Space Entry Permit

Space To Be Entered (i.e., Equip #, building located, etc.):	Date:	Time:
--	-------	-------

Purpose Of Entry:

Air Quality Test	Fill in appropriate time frequency: Test Frequency: every _____ min(s) or _____ hr(s)										
Type Test	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Tester (i.e., initials)											
Time of Sample											
Oxygen 19.5% – 23.5%											
Flammables < 10% of LEL/LFL											
Carbon Monoxide < 50 ppm											
Hydrogen Sulfide (Max – 10 ppm)											
Airborne Combustible Dust Vision > 5 Feet or = or > LFL											

Hazards	Y	N	N/A		Y	N	N/A
Oxygen Deficient				Heat Stress			
Oxygen Enriched				Entrapment			
Flammables				Corrosive Materials			
Combustible Dust				Physical Hazards in Space			
Toxic Gases/Vapors				Mechanical Hazards			
Engulfment				Other			
Electrical Shock				Other			
Skin Hazards				Other			

Anti-Hazard Methods	Y	N	N/A		Y	N	N/A
Barriers				Continuous Air Monitoring			
Rescue Equipment				Forced Ventilation			
Safety Glasses/Goggles				Ground Fault Circuit Interrupters			
Appropriate Gloves				Artificial Lighting – Low Voltage			
Safety Shoes/Boots				Mechanical Lift			
Safety Harness				Welding/Cutting Tools Outside Unless in Use			
Hearing Protection				Adequate Work Platform			
Hard Hat				Face Shields			
Scott Air Packs				Rubber Boots			
Fire Extinguisher				Safety Coveralls			
Respirator/Type:				Other:			

Permits	Y	N	N/A		Y	N	N/A
Lockout				Hot Work			

Method of Communication	Y	N	N/A		Y	N	N/A
Line of Sight				Radio			

**Authorization By Entry Coordinator** – I certify that all required precautions have been taken and necessary equipment is provided for safe entry and work in this confined space.

Printed Name	Signature	Company	Time

**Emergency Dial** \_\_\_\_\_



## Confined Space Program Elements Form

<b>Existing Facility/Worksite</b> _____ <b>Space</b> _____ <b>Space Location</b> _____ <b>Date</b> _____ <b>Evaluator</b> _____
---

<b>Program Element</b>	<b>Contact Person</b>
Hazard Identification	
Hazard Control	
Written Permit Person	
Posting Confined Spaces	
Training	
Special Safety Equipment	
Written Rescue Plan and Procedures	
External Hazard Protection	
Contractor Notification	
Communication Equipment	
Notes	

# Hot Work and Confined Spaces

Many different places require welding, cutting, and heating work. Some of these places lack room and become "confined spaces." Confined Spaces have the following characteristics:

- Limited space, entry, or exit;
- Poor ventilation - lack of safe breathing air and possible buildup of hazardous gases, fumes, and particles.

## Examples of confined spaces are:

- |                              |             |                               |
|------------------------------|-------------|-------------------------------|
| ➤ Process vessels            | ➤ Pits      | ➤ Tunn                        |
| ➤ Storage Tanks              | ➤ Furnaces  | ➤ Boilers                     |
| ➤ Underground Utility Vaults | ➤ Pipelines | ➤ Ventilation & Exhaust Ducts |

**When hot work activities such as welding, cutting and heating are done in a confined space, the dangers are increased. It's important to follow all confined space safety regulations and guidelines to help reduce the risk of**

- Obtain entry and hot work permits for your confined space.
- "Hot work permit" means the employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.
- Test the confined space's atmosphere for combustible gases and liquids. If flammable gas, vapor, or mist in excess of ten percent (10%) of its lower flammable limit (LFL) is found, have them removed entirely and then retest the site.
- Have emergency rescue equipment and personnel in place outside the confined space.
- Do not allow equipment to block exit or possible rescue efforts.
- Have appropriate charged fire extinguisher within 20 feet of the confined space opening.
- Ventilate the confined space continually with fresh air.
- Use air-line respirators when there's not enough ventilation.
- A worker outside the space must stay in constant communication with the workers inside the space in case of an emergency.
- Avoid taking cylinders containing oxygen, acetylene or other fuel gases into confined spaces.
- Immediately remove open-end fuel-gas and oxygen hoses from a confined space when they're disconnected from a torch or other gas-consuming device.
- When torches are not in use, close torch valves and remove the torches from the confined space.
- Constant air monitoring should be performed for the duration of any hot work within a confined space, because the hot work can actually liberate a toxic gas (i.e., oxides of nitrogen, ozone, and carbon monoxide) into the atmosphere of the confined space.



## Confined Space Entry Checklist

Existing Facility/Worksite:	Space To Be Entered (i.e., Equip #, building located, etc.):	Date:		
		Yes	No	N/A
Are confined spaces thoroughly emptied of any corrosive or hazardous substances, such as acids, caustics or asbestos before entry?				
Are all lines to a confined space, containing inert, toxic, flammable, or corrosive materials valved off and blanked or disconnected and separated before entry?				
Are all impellers, agitators, or other moving parts and equipment inside confined spaces locked-out if they present a hazard?				
Is either natural or mechanical ventilation provided prior to confined space entry?				
Are appropriate atmospheric tests performed to check for oxygen deficiency, toxic substances and explosive concentrations in the confined space before entry?				
Is adequate illumination provided for the work to be performed in the confined space?				
Is the atmosphere inside the confined space frequently tested or continuously monitored during conduct of work? Is there an assigned safety standby employee outside of the confined space when required, whose sole responsibility is to watch the work in progress, sound an alarm if necessary, and render assistance?				
Is the standby employee appropriately trained and equipped to handle an emergency?				
Is the standby employee or other employees prohibited from entering the confined space without lifelines and respiratory equipment if there is any question as to the cause of an emergency?				
Is approved respiratory equipment required if the atmosphere inside the confined space cannot be made acceptable?				
Is all portable electrical equipment used inside confined spaces either grounded and insulated, or equipped with GFCI ground fault protection?				
Before gas welding or burning is started in a confined space, are hoses checked for leaks, compressed gas bottles forbidden inside of the confined space, torches lighted only outside of the confined area and the confined area tested for an explosive atmosphere each time before a lighted torch is to be taken into the confined space?				
If employees will be using oxygen-consuming equipment-such as salamanders, torches, and furnaces in a confined space, is sufficient air provided to assure combustion without reducing the oxygen concentration of the atmosphere below 19.5 percent by volume?				
Whenever combustion-type equipment is used in a confined space, are provisions made to ensure the exhaust gases are vented outside of the enclosure?				
Has the confined space been checked for decaying vegetative or animal matter which may produce methane?				
Is the confined space checked for possible industrial waste which could contain toxic properties?				
If the confined space is below the ground and near areas where motor vehicles will be operating, is it possible for vehicle exhaust or carbon monoxide to enter the space?				
Do you know the location of the nearest campus phone?				
Is the confined space checked for possible industrial waste which could contain toxic properties?				
Are confined space entrants wearing proper personal protective equipment?				
Have the means of communication been verified and tested?				

## What is a Confined Space ?

A confined space can be any space having a limited means of exit where an oxygen-deficient, toxic, or flammable environment may exist. They're spaces that aren't designed for normal human occupancy.

Confined spaces can include:

- > tunnels
- > trenches
- > pipelines
- > sewers
- > vaults
- > underground utility vaults
- > ventilation & exhaust ducts
- > tubs
- > tanks
- > boilers
- > storage bins
- > manholes
- > silos
- > vats
- > pits

### Confined Spaces - Know Your Role

When it comes to confined spaces, it's especially important to know the role you play. Each role - entrant, attendant, supervisor and rescue team member - is critical and each has a carefully defined set of responsibilities.

**Entrant** - Person who goes into the space to do the work.

- Follow company procedures at all times.
- Know the hazards of the space.
- Know how to use equipment for entry & work in the space.
- Perform assigned work in a safe efficient manner.
- Stay in communication with the confined space attendant.
- Wear protective clothing & equipment such as harnesses, retrieval lines and respirators.
- Alert the attendant to any danger.
- Evacuate the space when ordered to do so.
- Lockout/Tagout all energy sources.
- Make sure the area is tested and well ventilated.

**Attendant** - Observes, assists & calls for rescue in case of emergency.

- Follow company procedures.
- Know all emergency procedures.
- Monitor the conditions in the space.
- Know hazards of the space.
- Stay in contact with workers in space.
- Assist the entrant as required.
- Recognize signs of danger or hazards.
- Prevent unauthorized people from entering the space.
- Be prepared to order an evacuation.
- Never go inside to rescue anyone.

**Supervisor** - Responsible in planning & completion of confined space entry.

- Follow company procedures at all times.
- Know the hazards of the space.
- Remove unauthorized personnel from the space.
- Authorize the beginning and end of the entry permit.
- Decide on all control measures such as lockout/tagout, isolation & ventilation & make sure that they've been completed.
- Arrange for rescue services.
- Ensure rescue equipment is set up & ready to use.

**Rescue Team** - Responsible for rescuing the Entrant if necessary.

- Always follow company procedures.
- Have the same level of training as entrants.
- Be able to use all necessary rescue equipment and rescue techniques.
- Be able to understand the information given to entrants.

### Be Prepared For A Confined Space Emergency

Each year approximately 54 workers die in confined spaces. Nearly two-thirds of these deaths result from people attempting to rescue workers in a confined space. Use the following guidelines when planning for confined space emergencies:

- Establish written emergency plans for each type of confined space site and activity.
- Put together and thoroughly train a confined space emergency rescue team.
- Review the emergency plans with workers and make sure each worker understands his or her role during an emergency.
- Whenever a worker is inside a confined space, make sure at least one trained attendant (certified in first aid, CPR, and rescue procedures) is on site and in constant communication with the confined worker. The attendant should communicate by radio, field telephone or sight.
- Have emergency rescue equipment such as a self-contained breathing apparatus, (SCBA), a safety harness and line (preferably a full-body harness and a lifeline attached to a block and tackle) or a basket stretcher readily available.

# Power Tool Safety Tips

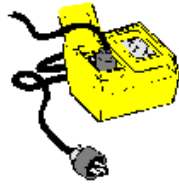
Portable power tools present greater accident hazards than hand tools. Nearly all power tool accidents are caused by improper handling and poor maintenance. Power tools should be used only after becoming thoroughly familiar with their controls, safety requirements and operating procedures. The categories which most power tools fall under are electric power tools, fuel-powered tools, powder-actuated tools, pneumatic power tools and hydraulic power tools.

- Wear the proper personal protective equipment for the job.
- Before you use it, inspect the tool for broken parts, loose bolts, defective or broken cord insulation, plugs or switches, or improper connections.
- Only use equipment that's in good condition.
- Test the tool before you use it. For example, for a cutting tool, test its sharpness with a piece of wood, not your fingers.
- To prevent shock, make sure your tool is properly grounded and double-insulated.
- Keep power cords away from heat, sharp objects and chemicals that could damage their insulation.
- Be sure to keep your work area dry.
- Never use electrical equipment when your hands are wet or any part of you is touching water.
- If you must work in a wet area, keep the power cord clear of wet surfaces and use a ground fault circuit interrupter (GFCI).



- Keep your work area free of debris.

Power Tools.pub © 2001 Safety Resources Company of Ohio, Inc.



- Use tools in well-lit areas.
- Never use electric tools where flammable vapors or gases are present.
- Report unsafe conditions, such as defective cord insulation, poor connections to terminals, broken switches or plugs, sparking or overheating equipment, and outlets without GFCI's in damp areas.
- Never carry a power tool by the cord or hose.
- Disconnect tools before changing accessories, such as blades, bits or cutters, and before servicing or inspecting them.
- Secure your work material with clamps or a vise if possible.
- Avoid wearing clothing or jewelry that may become caught in a tool.
- Report equipment as unsafe if it has insulation defects, if it sparks or if you feel any shock or tingling when using it.
- Start and end from "off." Make sure the power switch is off before plugging in equipment. When you're finished, turn the equipment off before unplugging it to protect yourself and the next user.

- When you turn off a tool, let it stop completely before putting it down in a safe place.
- Never horseplay around power tools.
- Avoid kinking, cutting or crushing any electrical cord.
- If equipment has a three-prong plug, use a three-slot outlet or extension cord.
- Avoid overstraining equipment by using it improperly.
- Service Equipment regularly and repair or replace it as needed.
- Pay attention to the direction of the tool's rotation. You're responsible for seeing that no one is in the path of flying objects.
- Use the switch lock only when the tool is in a stand or jig.
- Make sure you have good footing when you're using heavy tools or working at an awkward angle, such as overhead.
- Portable electric saws usually include the necessary guards to protect the operator. Never operate electric power saws with guards that are not functioning properly or are missing.





## General Safe Work Permit

**(Permits are site/activity specific. Blanket permits shall not be issued.)**

### **Permit Issuer (Hilscher-Clarke Safety Manager and Authorized Staff):**

1. Issue Safe Work Permits in accordance with the requirements of this program.
2. Coordinate the hazard assessment process with the necessary subject matter experts to establish controls necessary to maintain an acceptable level of risk.
3. Periodically inspect the work area(s) and activities covered by the Safe Work Permit to determine if the controls specified in the permit are being properly maintained.
4. Stop work if it is determined that the controls established in the Safe Work Permit are not properly implemented or appear ineffective. Work shall not proceed until appropriate controls are established to maintain an acceptable level of risk.
5. Revise the Safe Work Permit as needed to incorporate changes in the scope of work, permit duration, hazards and/or established controls.