WHAT IS A CONFINED SPACE

A space that:

❖ Is large enough and so configured that an employee can enter bodily and perform work;

❖ Has limited or restricted means of entry or exit;

❖ Is not designed for continuous human occupancy
WHEN IS A PERMIT REQUIRED

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

- Contains or has the potential to contain a hazardous atmosphere;
- Contains a material that has the potential for engulfing an entrant;
- Has an internal configuration such that an entrant could become trapped or asphyxiated; or
- Contains any other serious safety or health hazard
CONFINED SPACE EXAMPLES

- Tanks
- Manholes
- Boilers
- Furnaces
- Sewers
- Silos
- Hoppers

- Vaults
- Pipes
- Trenches
- Tunnels
- Ducts
- Bins
- Pits
ATMOSPHERIC CONFINED SPACE HAZARDS

- Oxygen Deficiency- <19.5% oxygen concentration
  - Oxygen deficiency is the most common cause of death in confined spaces
- Oxygen Enrichment- >23.5% oxygen concentration
- Toxic Atmosphere- any amount of chemical listed above the safe exposure limit, (may be expressed as PEL (permissible exposure limit), TLV (threshold limit value), or TWA (time-weighted average)
- Combustible Atmosphere- any combustible above 10% of the LEL (lower explosive limit) within the space
  - If dust is present which obscures vision within 5 ft., the space should be considered flammable
IDLH

- IDLH means immediately dangerous to life or health
- It is any condition which:
  - poses an immediate threat to the health or life of an entrant
  - causes irreversible adverse health effects
  - interferes with an individual’s ability to escape unaided from a permit space
- Chemicals have established levels which determine if they are IDLH
- An SCBA must be worn in atmospheres that are considered IDLH
CHANGES TO ATMOSPHERIC CONDITIONS

- Any time a limit is exceeded, no matter what the reason, all personnel shall immediately exit the space, and no others shall enter until atmospheric conditions are returned to safe levels.

- There are no exceptions.
PHYSICAL HAZARDS

- Engulfment
- Entrapment
- Slips, trips, falls
- Heat Stress
- Hypothermia
- Falls from Heights

- Noise
- Hazardous chemicals
- Machinery
- Electrocution
- Drowning
- Falling materials
CONFINED SPACE ENTRY

- The act by which a person intentionally passes through an opening into a permit required confined space

- Any part of the body passing through the opening is considered entry
CONFINED SPACE ENTRY PROCEDURES

Prior to anyone entering the space, the following must be completed:

- Isolate the space
- Ventilate the space
- Conduct safety meeting
- Complete permit
- Test the atmosphere
- Enter the space
- Cancel or terminate the entry
ISOLATING THE SPACE

Isolating the space may consist of the following:

- Closing valves using:
  - Double block & bleed procedures
  - Blanking flange

- Emptying the space by:
  - Depressurizing, venting, and draining the space

- Performing lock out/tag out on equipment such as:
  - Electrical sources
  - Rotating/reciprocating parts

- Cleaning residue from the space
VENTILATION

- Ventilation may be accomplished through natural ventilation if there is sufficient air flow.
- Most spaces require mechanical ventilation such as:
  - Fans
  - Venturi air movers (air horns)

- Ventilate at the rate of at least four (4) volumes per hour:
  - Larger spaces require more ventilation.

- Make sure air supply is not contaminated:
  - Ventilation air supply must be from fresh air uncontaminated with flammables, toxins, etc.
CONFINED SPACE PERMIT

Permits must be filled out correctly, completely, and accurately prior to entry to ensure worker safety

Confined space permits:
- Are only valid for up to 12 hours or one shift
- Must be accurately filled out
- Must be signed by the Entry Supervisor for authorization
- Must be posted by the primary entryway of the space

Cancelled or terminated permits must be submitted to the safety department and kept on file for at least one year
ATMOSPHERIC TESTING

Atmospheric testing must be performed:

- Prior to every entry when the space is vacant;
- After a 10 minute ventilation period (if ventilation is necessary);
- At least hourly for permit-required confined spaces;
- More frequently, if conditions or suspicions warrant.

Testing must always be performed at various levels in the space by someone who is properly trained and familiar with the detection equipment.
ATMOSPHERIC TESTING ORDER

Unless a multi-gas monitor is used testing should take place in the following order:

- First check oxygen-content
- Second check for combustibles (most combustible gas detectors will produce inaccurate readings if there is not sufficient oxygen)
- Third check for toxic gases

Air monitoring equipment must be used and calibrated according to the manufacturer’s recommendations. Bump testing should be performed prior to use to ensure accuracy.
DURING ENTRY

- An attendant shall be posted near the entrance for the duration of the work. He/she shall be in constant communication with the entrants while the job is in progress and should not leave for any reason without establishing a replacement.

- All entrants shall sign the sign in log when entering the space and sign out when exiting.

- The attendant shall maintain the permit and sign in log for the duration of the work.
TERMINATING THE ENTRY

When the confined space entry is completed the following procedures must be followed:

- Remove all personnel, tools, and debris from the space. Sign off the log
- Close the space
- Cancel the permit
- Review the job with the host employer (hazards, problems, other employers, etc.)
EMERGENCIES

- A majority of workers who die in confined spaces are would-be rescuers.
- Rescue is the most dangerous activity performed in confined spaces.
- Never enter a confined space to rescue a co-worker unless you have been properly trained in rescue, have the proper equipment and PPE, and there is an attendant on duty.
Levels of Confined Space Training

There are four levels of confined space worker training. The levels include:

- **Entrant** - The employee who will physically enter the confined space to perform the work
- **Attendant** - The employee who remains outside the confined space and monitors the entrants
- **Supervisor** - The employee responsible for coordinating the entry into the confined space, normally a team leader or foreman
- **Rescuer** - The employee who is trained to perform rescue inside the confined space
ENTRANT RESPONSIBILITIES

- To ensure that the space has been adequately ventilated, isolated, emptied, or otherwise made safe for entry
- To immediately exit a space, without question, upon word of the attendant, no matter what the reason
- To follow all safety rules and procedures that apply to the job
- To be familiar with the work to be performed and the procedures that apply to the job
- To use the appropriate PPE whenever necessary
ATTENDANT RESPONSIBILITIES

- Must be trained as an entrant as well as attendant
- Monitor entrants during entry, the job and exit to help ensure their safety
  - The attendant may not abandon their post for any reason
- Monitor atmospheric conditions in the space prior to and during entry and summon emergency assistance as needed
- Do not enter a confined space to perform rescue in an emergency
- Control access to the confined space
- Assess hazards in and around the space, and take action to protect entrants
- Keep records of confined space work, such as air test results, personnel entry/exit, etc.
SUPERVISOR RESPONSIBILITIES

- Be trained as an entrant and attendant
- Assure adequate protection is provided to the entrants by verifying adequate lockout/tagout and that all hazards are securely isolated
- Support the attendant’s authority in controlling access to a confined space
- Verify that all personnel have exited prior to closing the space
- Assure that all personnel involved are aware of the hazards associated with the space
- Assure that rescue services are available prior to entry
RESCUER RESPONSIBILITIES

- Be trained as an entrant and attendant
- Be trained on rescue procedures applicable to the type of space the rescue must be performed within
- Have at least one team member certified in first aid/CPR
- Be familiar with the operation of equipment used for rescue
- Understand and use PPE properly
- Be familiar with the hazards of the space
- Perform simulated rescue at least once a year