

**VILLAGE OF HEWITT  
and  
HEWITT SANITARY UTILITY**

**CONFINED SPACE ENTRY PROCEDURES**

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## ATTACHMENTS

1. Confined Space Entry Checklist
2. Safety Training Form
3. List of Known Confined Spaces
4. Confined Space Entry Procedure Chart

1. **AUTHORITY**

Pursuant to rules established by the Wisconsin Department of Industry, Labor and Human Relations, these procedures establish minimum safety and health standards for employees who may enter into or work in confined spaces. These standards (procedures and necessary equipment) apply to all municipal employees (or agents acting as municipal employees) and facilities except fire and police personnel engaged in emergency rescue attempts.

2. **PURPOSE**

The Village of Hewitt has identified a number of work functions and activities which require employees to enter confined spaces with limited openings for entry and egress. Some of these functions include (but are not limited to) inspection and maintenance of tanks, wells, manholes, lift stations, and wet wells.

Over the past several years, a number of fatalities have occurred throughout the country when persons have entered confined spaces in which poisonous or combustible gases have accumulated. In order to reduce the chance of similar accidents occurring, the Village of Hewitt has established these safety procedures to be followed when entering or working in a confined space.

The purpose of these procedures are to ensure that workers are properly trained and know the hazards involved in entering confined spaces. It will set up procedures to ensure the worker(s) are adequately protected from these hazards, and steps to be taken should an incident take place or a rescue be necessary.

3. **SCOPE**

These procedures shall apply to all employees (or agents acting as employees) of the Village of Hewitt and to all places of employment within the Village considered to be confined spaces. Additional confined spaces may be created through new construction, renovation or changes in processes or operation. These procedures apply to both public buildings and buildings classified as private, commercial or industrial, and which an employee of the Village might be required to enter because of imminent danger to life and property or natural disaster.

4. **DEFINITIONS**

*COMBUSTIBLE GAS*: - a vapor or gas capable of burning easily, is easily ignited and will readily burn.

*CONFINED SPACE*: - a space or environment which by design or construction has limited openings for entry and escape, unfavorable natural ventilation, which could contain or produce dangerous air contamination and is not intended for continuous

human occupancy. Some obvious examples of confined spaces are storage tanks, process vessels, pits, silos, vats, manholes, wet wells, lift stations, sewers, and tunnels. Depending upon the degree of hazard present in the confined space, it may be classified as either a LEVEL 1 or LEVEL 2 space.

*EMPLOYEE:* - an employee of the Village, or agent acting as an employee. An employee may be part time, full time, or seasonal worker.

*LEVEL 1 SPACE:* - an environment with an oxygen content of 19.5% or more, a hydrogen sulfide content of less than 10 parts per million, a combustible gas content of less than 20% of the lower explosive limit, and an exposure level for any toxic substance determined to be present at or below the threshold limit value for short term exposure. The only source of contamination expected or likely to be present is the employees presence or the employees activities.

#### Summary

- Oxygen content greater than or equal to 19.5%
- Hydrogen sulfide content less than 10 ppm
- Combustible gas content less than 20% of the lower explosive limit
- Toxic substance less than threshold limit value

For example, if a person were performing repairs inside an empty, relatively clean, fiberglass storage tank, the only source likely to effect the environment within the tank is the person and the persons work activities. Therefore, at least initially, the space would be considered a LEVEL 1 space and remain the same with the following conditions:

- the oxygen content remained at 19.5% or more
- the hydrogen sulfide (H<sub>2</sub>S) content remained below 10 ppm
- the combustible gas content was less than 20% of the lower explosive limit
- the threshold limit for any toxic substance present was not exceeded for short term exposure

*LEVEL 2 SPACE:* - an environment which is, or was at some time previously, not within any or all of the air quality limits listed above, and the confined space contains, or may contain, sources of contamination other than the employee or the employees activities which may affect the atmosphere. A LEVEL 1 space which, because of a change in the conditions listed above, becomes reclassified as a LEVEL 2 space is then, and thereafter, to be considered a LEVEL 2 space. These methods and procedures for entry are largely determined by the classification of the confined space.

#### Summary

- Oxygen content less than 19.5%
- Hydrogen sulfide content greater than or equal to 10 ppm

- Combustible gas content greater than or equal to 20% of the lower explosive limit
- Toxic substance greater than or equal to threshold limit value

*LOWER EXPLOSIVE LIMIT (LEL):* - the lower limit of flammability of a gas or vapor at ordinary ambient temperatures expressed as a percentage of the gas or vapor in air (by volume).

*OXYGEN DEFICIENCY:* - normal atmosphere has an oxygen level of 20.5%. When the oxygen level reaches 19.5% or less of the atmosphere, the condition is known as "oxygen deficiency".

*HYDROGEN SULFIDE:* - a colorless, gaseous, poisonous compound having a characteristic odor of rotten eggs.

*STANDBY EMPLOYEE:* - a person trained in emergency rescue procedures and assigned to remain on the outside of the confined area and to be in communication with those working inside.

*SUPERVISOR:* - any employee of the Village who has been given supervisory responsibility and has authority to act independently in directing employee activity.

## 5. **RESPONSIBILITY**

- A. It shall be the responsibility of the Village of Hewitt, through its Village Board action to insure adequate funds are available and that necessary safety equipment is purchased to comply with the provisions of this directive.
- B. It shall be the responsibility of the Village Board to insure that employees assigned to positions requiring that they enter confined spaces are properly trained in the operation of the safety equipment and further that they be trained in rescue procedures. In addition, appropriate records will be kept on all training conducted.
- C. It shall be the responsibility of all supervisors to insure that only properly trained and instructed employees are assigned to positions requiring confined space entry. It shall further be their responsibility to provide reasonable supervision to insure employees are following procedures as outlined in this directive and to furnish employees with a copy of the Confined Space Entry Procedures. Disciplinary guidelines and procedures will be followed when violations occur.
- D. It shall be the responsibility of employees to follow "Confined Space Entry Procedures", to use and follow these procedures, established for their safety and

welfare, and to promptly report to their supervisor any malfunction of testing or safety equipment. They shall be responsible for protecting and safeguarding all equipment from damage, loss or theft.

6. **TRAINING**

A. Each employee assigned duties requiring that they either enter confined spaces or act as a standby employee for others entering confined spaces shall receive the following training;

1. Hazards of entering confined spaces
2. Proper use of monitoring or testing equipment
3. Proper use of self contained positive pressure breathing apparatus or air line respirator
4. Rescue and emergency procedures
5. First Aid and CPR training
6. Proper calibration of monitors or testing equipment
7. Traffic safety procedures
8. Use of proper protective clothing

B. Records will be kept on all training conducted to include dates, times and subjects covered. This information will be recorded on the Safety Training Form.

C. Personnel assigned to duties as dispatchers at the Municipal Garage and Police Department, and having use of two-way radio communications equipment will receive training on the proper notification procedure to follow in the event an emergency occurs or a rescue is necessary.

7. **SAFETY EQUIPMENT**

The following equipment shall comprise standard safety equipment necessary to outfit crew required to enter and/or perform work in a confined space.

A. Required Equipment

1. Oxygen deficiency, combustible gas and hydrogen sulfide sampling meter or tester.
2. Rescue winch unit.
3. Safety harness with waist belt, shoulder straps, leg straps and D rings or shoulder ring attached no lower than the shoulder blades (for each employee).
4. Life lines with safety hooks.

5. Hard Hat, protective clothing and gloves (impervious rubber) for each crew member (Safety shoes also recommended).
6. Self contained positive pressure breathing apparatus or an air line respirator. Air line respirator shall be equipped with an escape air tank.
7. Safety vests.
8. Safety cones and flags.
9. Intrinsically safe flashlight.
10. Barricades and/or men working signs.
11. Manhole pick.
12. Utility rope.
13. Fire extinguisher.
14. First Aid kit.
15. Emergency numbers (Fire and Police).

**B. Optional Equipment**

1. Forced air ventilation system.
2. Five (5) minutes positive pressure breathing apparatus.
3. Safety ladder - chain type.

The above equipment represents a substantial investment and the proper function of this equipment is necessary should it be required to rescue an employee or fellow employee. The equipment should be protected or placed in protective carrying cases, when available, to ensure its continued use and to prevent damage.

**8. AIR QUALITY SAMPLING:**

It is imperative that meters be calibrated before sampling. In the case of combustible gases and hydrogen sulfide, the sampling meter shall be zeroed before each use. Calibration of the meter for oxygen content shall be performed where the air is most likely to contain the natural 20.5% oxygen.

Sampling of the atmosphere throughout the confined space shall be performed before entry. The air quality shall be determined for all levels and all areas of the confined space.

The sampling meter has an audible and visual warning device which simultaneously incorporates tests for oxygen deficiency, combustible gases and hydrogen sulfide without manual switching. This unit will be used to test the atmosphere of the confined space.

When sampling in confined spaces, insure a non-sparking probe is used. Many times sledge hammers or other devices must be used to free a manhole cover from its ring. If explosive gases are present, such activities could initiate a spark and set off an explosion. Therefore, prior to removing the cover, the crew should use the meter to

determine the absence of explosive gases. The meter sampling line should be inserted through the pick hole of the manhole cover. If the initial meter reading indicates no explosive gases, the crew can proceed to remove the manhole cover. In addition, another method to suppress the possibility of sparking is to thoroughly wet the cover and ring prior to removal. (No person is allowed to smoke within 10 feet of the confined space.)

If the manhole cover is loose, the cover can be pried open on the downwind side to allow just enough room for the insertion of the probe.

- (1) Upon testing, if the oxygen content is less than 19.5%, the confined area should not be entered until provisions of inadequate air quality (below) are followed.
- (2) Upon testing, if the combustible gas content on the sampling meter indicates 20% or more of the lower explosive limit (LEL), the confined area will not be entered until provisions of inadequate air quality (below) are followed.
- (3) Upon testing, if the sampling meter indicates 10 ppm or more of hydrogen sulfide, the confined area will not be entered until provisions of inadequate air quality (below) are followed.
- (4) If the odor of other toxic materials are suspected or detected, additional tests shall be conducted to determine the concentrations.

Continuous monitoring of the atmosphere shall be conducted in the employee's immediate area while in the confined space. This can be done by lowering a probe into the confined space and reading the instrument at the surface or by wearing the instrument as the employee enters the confined space. A signal from the monitoring instrument shall indicate to the employee that the air quality in the confined space is inadequate and that the employee should immediately return to a safe area or surface.

## 9. **INADEQUATE AIR QUALITY**

When sampling indicates the confined spaces air quality to be inadequate, forced ventilation shall be provided until air quality measuring devices indicate a safe atmosphere to enter. When using the forced ventilation system, care should be used to position the ventilating unit in such a way that exhaust from the gasoline engine does not enter back into the confined space.

If air quality standards cannot be met by forced ventilation, a self contained positive pressure breathing apparatus or air line respirator should be used when entering the confined space. In addition the employee shall be equipped with the five (5) minute escape air tank in the event of an emergency.

Where inadequate air quality is prevalent in a confined space, employees shall determine if other means are available to accomplish their assigned tasks other than entering the confined space.

A confined space with an atmosphere which is not within the specified limits for combustible gas (combustible gas content less than 20% of lower explosive limit) will not be entered even if a breathing apparatus or respirator is used.

10. **GUARDING STREET OPENINGS**

Entrances to confined spaces which are located in streets must be properly guarded and shall be protected in the following manner:

A. *APPROACHING THE WORK SITE:*

1. A vehicle beacon and 4-way flashers shall be activated upon approach to an entrance to a confined space.
2. Vehicles shall be parked in such a way that traffic will flow in an unobstructed manner, and where possible, the vehicle shall provide protection for the employee(s).
3. Vehicles shall be parked in such a manner that exhaust fumes cannot accumulate in the confined spaces. If this is not possible, the vehicles exhaust stack shall be extended away from the confined space.

B. *CONE PLACEMENT:*

1. Before uncovering a manhole, traffic safety cones shall be placed around the manhole and any vehicle, and shall be visible to traffic in all directions. Cones shall be placed to protect employees and to channel traffic flow. Cones shall be placed at sufficient distances and intervals so as to adequately warn traffic and to prohibit traffic from traveling and weaving between the cones. In areas of high traffic volume, illuminated traffic arrows, barricades, warning signs, or an additional flag person may be appropriate. Traffic safety vests (reflective stripping is recommended) must also be worn at all times when working on the street. If placement of the vehicle results in a situation of having only one lane of traffic in a high traffic volume area, an additional flag person must be present to direct traffic flow.

C. *MANHOLES:*

1. The opening to a confined space (manhole) must be kept free of tools and debris to prevent injuries resulting from falling objects. A manhole will not be left open when unattended unless protected by barricades or a cage. When a manhole will be left unoccupied and unattended for an

extended period of time, cables, ropes, etc., extending into the manhole should, when possible, be threaded through the pick hole of the cover and the cover placed on the manhole casting.

11. **CONFINED SPACE ENTRY**

No person is to enter a confined space until they have received proper training.

A. *LEVEL 1 SPACE:*

The atmosphere within the employees immediate area shall be continuously monitored for oxygen, hydrogen sulfide, combustible gas, and toxic substances while in the confined space.

Signals from the monitoring device shall immediately indicate when the atmosphere falls outside any of the air quality limits for oxygen, hydrogen sulfide, combustible gas, and toxic substances.

While in a confined space, if the air quality falls outside any of the limits specified for oxygen, hydrogen sulfide, combustible gas or toxic substances the employee shall exit the confined space, and the confined space shall be classified as a LEVEL 2 space

Forced ventilation may not be used in lieu of monitoring devices.

As long as only LEVEL 1 spaces are encountered and continuously monitored during the entry (without an alarm registering on the meter) a meter is all the equipment required. However, if an alarm sounds either before or during an entry, a LEVEL 2 condition exists.

B. *LEVEL 2 SPACE:*

Although other spaces may be considered as LEVEL 2 spaces, wet wells, manholes, or similar structures will always be considered a LEVEL 2 space entry and no attempt to enter the enclosure should be made with fewer than 2 persons on the crew. As with a LEVEL 1 entry, the atmosphere within the confined space must continuously be monitored for oxygen, hydrogen sulfide, combustible gas, and toxic substances. If the meter alarms, the person within the space will immediately exit, except if equipped with a self contained breathing apparatus. In all cases, whether equipped with breathing apparatus or not, if the combustible gas warning of the meter alarms, the person should exit immediately and not re-enter until the combustible gas level is at or below 20% of the lower explosive limit. Forced air ventilation is desirable in such enclosures but may not be used in lieu of monitoring air quality.

In the event entry into or work in a LEVEL 2 space is necessary, the Confined Space Check Sheet must be completed and signed in addition to the following:

The employee will be outfitted with protective clothing such as safety shoes or boots, coveralls or work suits, protective gloves and hard hat.

The employee will put on and wear a shoulder harness having a waist belt, shoulder straps, leg straps and a "D" ring or shoulder rings attached no lower than the shoulder blades.

A winch shall be set up over the top entry to the confined space with sufficient safety line to reach the bottom of the confined space. The safety line must be of such size, weight, and strength, to adequately support the weight of the employee, plus equipment, and must be attached to the winch. Safety hooks shall be used when attaching the line to the harness of the employee.

Steps leading into the confined space shall be checked to determine if they are adequate and that they will bear the weight of the employee, plus equipment. Where there is doubt and a safe entry can not be made using the existing steps, a chain ladder will be lowered into the area and used as the entry device.

No employee shall enter a confined space without another employee standing by at the entrance. This person shall not leave the entrance for any reason except to summon help or assistance needed for a rescue. All parts, tools, equipment, supplies, etc., needed by the employee entering the confined space should be laid out adjacent to the entrance so they are in easy reach of the standby employee. A flag person shall not serve as part of this two person entry team.

Lights used in confined space shall be intrinsically safe for use in combustible atmospheres.

Voice communication shall be maintained between the employee entering the confined space and the standby. In unusual circumstances where voice communication would not be adequate, two-way radios may be used, but the employee must insure the units being used are intrinsically safe for use in combustible atmospheres.

A self contained positive pressure breathing apparatus, or an air line respirator, equipped with an escape air tank, shall be available for immediate use in the event of an emergency.

It is imperative that two-way radio communications be established between the confined space entry team and the Municipal Garage and/or Police Department. After normal hours this communications link shall be established with the County Sheriffs Department. In either event, two-way radios must be checked to determine if they are functional, and that personnel are familiar with procedures to follow in summoning help in the event of an emergency.

The atmosphere within the employees immediate area shall be continuously monitored for oxygen, hydrogen sulfide, combustible gas, and toxic substances while in the confined space.

Signals from the monitoring device shall immediately indicate when the atmosphere is not within any of the limits as specified above for oxygen, hydrogen sulfide, combustible gas, and toxic substances while in the confined area.

1. While in the confined space, if the air quality falls outside the limits specified for oxygen, hydrogen sulfide, or toxic substances the employee shall exit the confined space, except if equipped with a self contained positive breathing apparatus or air line respirator.
2. While in a confined space, if the air quality falls outside the limit specified for combustible gas; the employee shall exit the confined space.

Forced ventilation may not be used in lieu of monitoring devices.

Generally stated, the procedure is that one person should enter the enclosure and perform the work, and another should stand topside and tend to the life line. Preferably, a third person should be present topside to fetch necessary equipment, for lowering into the enclosure, and to assist in an emergency. As a rule of thumb, for every person in the confined space, a like number should be stationed topside to assist during an emergency. Any equipment needed to be assembled, started up, or put into operation should be tested before arrival at the work site. Under no circumstances should crew member manning the life line be required to direct traffic, help in the assembly or start up of equipment, while another person is in the confined space.

12. **HORIZONTAL MOVEMENT IN CONFINED SPACES**

An employee making horizontal movement in a confined space will comply with the following additional procedures:

Employees will be equipped with self contained positive pressure breathing apparatus or an air line respirator in the event of an emergency. Where an air line respirator unit is used, the unit must be equipped with an escape air tank.

Employees will have attached to his belt or person a sampling meter or tester to determine air quality. This unit shall have audible and visual warning devices.

A life line need not be attached to the shoulder harness, although the shoulder harness must be worn.

13. **RESCUE**

Any person entering a confined space for the purpose of a rescue attempt shall be provided, and will wear, a self contained positive pressure breathing apparatus or an air line respirator. Where an air line respirator unit is used, the unit must be equipped with an escape air tank.

Communications shall be made for additional help before a rescue attempt is made into a confined space.

When summoning help, the Rescue Personnel should be dispatched to the location of the rescue attempt.

14. **GENERAL**

Smoking shall not be permitted within ten (10) feet of a confined space.

For the safety of the employee or fellow employees, it is necessary for employees entering confined spaces and the stand by employee to be clean shaven. Without being clean shaven, it is impossible to obtain a seal on the self contain breathing apparatus.

Openings to confined spaces shall be kept clear of debris and non-essential tools and equipment.

Test meters, lights and radios used in confined spaces shall be intrinsically safe for use in combustible atmospheres.

First Aid and CPR instructors, fire and rescue personnel, Red Cross, etc., be encouraged to provide needed instruction to Village employees.

15. **SUMMARY OF CONFINED SPACE ENTRY**

Air Concentration Limits, Safe Atmosphere

- Oxygen . . . . . 19.5% or more
- Hydrogen Sulfide . . . . . less than 10 ppm
- Combustible Gas . . . . . less than 20% of LEL
- Toxic Substances . . . . . less than threshold limit value

Continuous air sampling/monitoring (for oxygen deficiency, hydrogen sulfide, combustible gas, toxic substances) is required at all times (LEVEL 1 and LEVEL 2).

Never enter a confined space where combustible gas has been detected.

Confined space where oxygen deficiency, hydrogen sulfide or toxic substances limit exceeded, can be entered with breathing apparatus or air line respirator.

Required for manhole entry with a safe atmosphere

1. Rescue winch
2. Body harness
3. Life lines with safety hooks
4. Protective clothing
5. Self contained breathing apparatus or an air line respirator equipped with an escape air tank
6. Standby employee
7. Means of communication between employee in the confined space and the standby employee
8. Traffic safety equipment
9. Know who to notify and what to do in case of an emergency

# VILLAGE OF HEWITT CONFINED SPACE ENTRY CHECKLIST

LOCATION	DATE OF ENTRY	TIME OF ENTRY
DESCRIPTION OF WORK TO BE DONE		

	YES	NO	NA
1. Has the atmosphere in the space been tested and found to be safe for entry?			
2. Has the space been adequately ventilated?			
3. Have all machinery, pumps, etc., located in the confined space been shut off and locked out?			
4. Does the employee entering the confined space have the proper personal protection equipment?			
5. Does the worker have all of the proper tools for the job?			
6. Has the worker been fitted with a safety harness and life line?			
7. Has adequate and safe lighting been provided?			
8. Has an observer been assigned to watch the worker and has he been told what to do if the worker in the confined space gets into difficulties?			
9. Have all employees involved been instructed on the safe and efficient method of doing this job?			
10. Tested for oxygen level?			
11. Tested for hydrogen sulfide?			
12. Tested for combustible gases?			
13. Tested for other toxic substances			

Protective equipment needed:

Hard Hat	Fire Extinguisher	Respirator	Protective Clothing
Safety Harness	Gas Tester	Gloves	Other (Specify)
Safety Line	Hearing Protection	Goggles	

I have inspected and verified each requirement on this checklist and to the best of my knowledge state that this work can be done safely and in compliance with the Confined Space Entry Procedures of the Village of Hewitt.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_





# CONFINED SPACE ENTRY PROCEDURE CHART

