

Chapter ILHR 31

CONFINED SPACES

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**ILHR 31.001 Purpose.** This chapter establishes minimum occupational safety and health standards for public employes who may enter into or work in confined spaces.

**History:** Cr. Register, April, 1985, No. 352, eff. 8-1-85.

**ILHR 31.002 Scope.** This chapter applies to all places of employment and public buildings of a public employer.

**History:** Cr. Register, April, 1985, No. 352, eff. 8-1-85.

**ILHR 31.003 Application.** This chapter shall apply to all places of employment and public buildings of a public employer whether existing prior to the effective date of this chapter or subsequently established or built. This chapter shall not apply to emergency rescue attempts performed by fire department personnel or police department personnel.

**History:** Cr. Register, April, 1985, No. 352, eff. 8-1-85.

**ILHR 31.01 Definitions.** In this chapter:

(1) "Agency", as defined in s. 101.055 (2) (a), Stats., means an office, department, independent agency, authority, institution, association, society or other body in state government created or authorized to be created by the constitution or any law, and includes the legislature and the courts.

(2) "Confined space" means an environment which by design or construction has limited openings for entry and egress, has unfavorable natural ventilation, could reasonably be believed by the employer to have dangerous air contaminants or contain materials which may produce dangerous air contaminants, and is not intended for human occupancy. Confined spaces include, but are not limited to, storage tanks, compartments of ships, process vessels, pits, silos, vats, degreasers, reaction vessels, boilers, ventilation and exhaust ducts, manholes, sewers, tunnels, underground utility vaults, and pipelines, but do not include heating system tunnels and vaults.

(3) "Lower explosive limit" or "L.E.L." means 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.

(4) "Place of employment", as defined in s. 101.01 (2) (a), Stats., includes every place, whether indoors or out or underground and the premises appurtenant thereto where either temporarily or permanently any industry, trade or business is carried on, or where any process or operation, directly or indirectly related to any industry, trade or business, is

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carried on, and where any person is, directly or indirectly, employed by another for direct or indirect gain or profit, but does not include any place where persons are employed in private domestic service which does not involve the use of mechanical power or in farming.

(5) "Public employe" or "employe", as defined in s. 101.055 (2) (b), Stats., means any employe of the state, of any state agency or of any political subdivision of the state.

(6) "Public employer" or "employer", as defined in s. 101.055 (2) (d), Stats., means the state, any state agency or any political subdivision of the state.

(7) "Toxic substance" means any substance listed by the American Conference of Governmental Industrial Hygienists in the standard, Threshold Limit Values For Chemical Substances In The Work Environment.

History: Cr. Register, April, 1985, No. 352, eff. 8-1-85.

**ILHR 31.02 General.** No employer may require and employe to enter or work in a confined space, unless it is in accordance with the provisions of this chapter.

History: Cr. Register, April, 1985, No. 352, eff. 8-1-85.

**ILHR 31.03 Sampling.** No person may enter a confined space until the atmosphere of the confined space is sampled and the air quality is determined for all levels and all areas within the space.

(1) The atmosphere of a confined space shall be sampled for:

(a) Oxygen;

(b) Hydrogen sulfide;

(c) Combustible gas; and

(d) Any toxic substance which an employe is expected to work with or likely to be exposed to and which, the employer has reason to believe, may be present.

Note 1: An odor emitting from a confined space may indicate the presence of a toxic substance.

Note 2: Under ss. 101.58 to 101.599, Stats., employers are responsible for informing employes about the toxic substances which the employes are expected to work with or likely to be exposed to. An employe may refuse to work with or be exposed to a toxic substance until such time as an employer supplies the appropriate information required under ss. 101.58 to 101.599, Stats. An employe may not be disciplined for exercising any rights under ss. 101.58 to 101.599, Stats.

(2) A sampling device which can simultaneously test for oxygen, hydrogen sulfide and combustible gas without manual switching shall be used to sample the atmosphere of a confined space.

(a) The sampling device shall be equipped with audible or visible warning devices, or both, which indicate when an atmosphere of a confined space has:

1. An oxygen content less than 19.5%;

2. A hydrogen sulfide content of 10 parts per million or more; or

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3. A combustible gas content 20% or more of the lower explosive limit, L.E.L.

(b) The sampling device shall be calibrated relative to the oxygen content of the ambient air at the time of sampling. Calibration of the sampling device relative to the oxygen content shall be performed where the 20.9% natural content of oxygen in the air is most likely to occur.

(c) 1. A sampling device which has a zero set for combustible gases shall be zeroed before each sampling.

2. Calibration of a sampling device for combustible gases shall be conducted as often as necessary to assure accuracy, but at least once every 6 months, with a standardized combustible gas supply.

(d) 1. A sampling device which has a zero set for hydrogen sulfide shall be zeroed before each use.

2. Calibration of a sampling device for hydrogen sulfide shall be conducted as often as necessary to assure accuracy, but at least once every 6 months.

(e) A nonsparking probe attached to the sampling device or the sampling device shall be used to sample the atmosphere of a confined space. When entry to a confined space is by means of a manhole, the probe shall be inserted through the pick-hole of the manhole cover, or the manhole cover shall be pried open on the downwind side to allow just enough room for insertion of the probe or the device.

(3) The sampling of the atmosphere of a confined space for toxic substances shall be by the use of a multi-gas detector or other testing device capable of detecting and measuring the concentrations of toxic substances likely to be present.

History: Cr. Register, April, 1985, No. 352, eff. 8-1-85.

**ILHR 31.04 Air quality.** (1) Except as provided in sub. (3), a confined space may not be entered, unless the atmosphere of the confined space has:

(a) An oxygen content of 19.5% or more;

(b) A hydrogen sulfide content of less than 10 parts per million;

(c) A combustible gas content less than 20% of the lower explosive limit, L.E.L.; and

(d) An exposure level, for any toxic substance determined to be present, which is at or below the threshold limit values — short term exposure limit for any substance specified by the American Conference of Governmental Industrial Hygienists in the publication entitled "Chemical Substances in the Work Environment".

Note: See s. ILHR 31.08 for adoption of the ACGIH Standard.

(2) A confined space with an atmosphere which is not within any or all of the limits specified in sub. (1) may be ventilated and may be entered when sampling indicates an atmosphere within the limits specified in sub. (1).

(3) A confined space with an atmosphere which cannot be brought within all of the limits specified in sub. (1) (a), (b) or (d) for oxygen,

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hydrogen sulfide or a toxic substance may be entered, if a self-contained positive pressure breathing apparatus or an air line respirator is used.

(4) A confined space with an atmosphere which is not within the limit specified in sub. (1) (c) for combustible gas may not be entered even if a breathing apparatus or respirator is used.

(5) For the purpose of determining the specific entry procedures to be followed, a confined space which may be entered shall be classified as either a level 1 space or a level 2 space based upon the air quality and the sources of possible contamination.

(a) A level 1 space shall be a confined space with an atmosphere within the limits specified in sub. (1) and the only source of contamination expected or likely to affect the atmosphere is the employe's presence or the employe's activities.

(b) A level 2 space shall be a confined space with an atmosphere which falls within one of the following conditions:

1. The air quality is within the limits specified in sub. (1) and the confined space contains sources of contamination, other than the employe or the employe's activities, which may affect the atmosphere; or

2. The air quality is, or was at some time previously, not within any or all of the limits specified in sub. (1).

History: Cr. Register, April, 1985, No. 352, eff. 8-1-85.

**ILHR 31.05 Entry procedures.** (1) **LEVEL 1 SPACES.** Entry into or work in a level 1 space shall be in accordance with this subsection.

(a) The atmosphere within the employe's immediate area shall be continuously monitored for oxygen, hydrogen sulfide and combustible gas while in the confined space.

(b) Signals from the monitoring device shall immediately indicate when the atmosphere falls outside any of the air quality limits specified in s. ILHR 31.04 (1) (a) to (c) for oxygen, hydrogen sulfide and combustible gas.

(c) While in a confined space, if the air quality falls outside any or all of limits specified in s. ILHR 31.04 (1) (a), (b) or (c) for oxygen, hydrogen sulfide or combustible gas the employe shall exit the confined space, and the confined space shall be classified as a level 2 space.

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

(2) **LEVEL 2 SPACES.** Entry into or work in a level 2 space shall be in accordance with this subsection.

(a) The atmosphere within the employe's immediate area shall be continuously monitored for oxygen, hydrogen sulfide and combustible gas while in the confined space.

(b) Signals from the monitoring device shall immediately indicate when the atmosphere is not within any of the limits specified in s. ILHR 31.04 (1) (a) to (c) for oxygen, hydrogen sulfide and combustible gas.

(c) While in the confined space, if the air quality falls outside either or both of the limits specified in s. ILHR 31.04 (1) (a) or (b) for oxygen or

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hydrogen sulfide, the employe shall exit the confined space, except if equipped with a self-contained positive pressure breathing apparatus or air line respirator.

(d) While in a confined space, if the air quality falls outside the limit specified in s. ILHR 31.04 (1) (c) for combustible gas, the employe shall exit the confined space.

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

(f) Except in a rescue attempt under s. ILHR 31.06, no employe may enter a confined space without at least one employe stationed at the entrance of the confined space. A flagman who is directing traffic may not serve as the employe stationed at the entrance.

(g) Where entry to a level 2 confined space is by means of a manhole or a top opening, a winch shall be set up for rescue attempts prior to entry.

(h) While in a level 2 confined space, an employe shall have voice or other means of communication with the employe stationed at the entrance of the confined space.

(i) An employe entering vertically into a confined space shall wear a full body harness secured to a life line. The full body harness shall have a waist belt, shoulder straps, leg straps, and "D" ring or shoulder ring attached no lower than the shoulder blades. The life line shall be attached to the winch drum or secured by some other method.

(j) An employe having to make horizontal movement into a confined space, such as in a sewer, or having to descend in such a manner that renders a winch useless for a rescue attempt, shall:

1. Be equipped with a self-contained positive pressure breathing apparatus or an air line respirator; and

2. Wear a full body harness having a waist belt, shoulder straps, leg straps, and a "D" ring or shoulder rings attached no lower than the shoulder blades.

(k) An employe who is outside of the confined space monitoring employes inside the confined space shall be equipped with at least one self-contained positive pressure breathing apparatus or air line respirator.

(l) Where an air line respirator unit is used, the unit shall be equipped with an escape air tank.

(m) Prior to entering a confined space, procedures shall be established for acquiring additional help in the event of an emergency.

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**ILHR 31.06 Rescue.** (1) An employe entering any confined space for a rescue attempt shall be provided with and wear a full body harness and a self-contained positive pressure breathing apparatus or air line respirator.

(2) Communication shall be made for additional help before a rescue attempt is made into any confined space.

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**ILHR 31.07 General safety requirements.** (1) Employees who are required to enter confined spaces shall be trained and equipped to recognize, understand and control air quality hazards that may be encountered in confined spaces.

(a) An employer shall provide all employees who are required to enter confined spaces a written confined space entry procedure, and the employees shall be trained according to the established procedure.

(b) An employer shall provide a written standard operating procedure on the selection, use and care of the breathing apparatus, with proper employee training and fitting according to s. Ind 1910.134.

(c) An employer shall provide training for all employees who are required to enter confined spaces in multi-media first aid and cardio pulmonary resuscitation.

(d) Safety equipment such as, but not limited to, gloves, hard hats and protective clothing shall be provided by the employer and worn by employees entering a confined space.

(e) No employee may smoke within 10 feet of a confined space.

(f) Openings to confined spaces shall be kept clear of hand tools and debris.

(g) Sampling devices and radios used in confined spaces shall be intrinsically safe for use in combustible atmospheres.

(h) Self-contained positive pressure breathing apparatus to be used in confined spaces shall have at least a 30-minute air supply capacity. The escape air tank for an air line respirator to be used in confined spaces shall have at least a 5-minute air supply capacity.

(2) Entrances to confined spaces which are located in streets shall be guarded in accordance with this subsection.

(a) 1. A vehicle's beacon and 4-way flashers shall be activated upon approach to an entrance to a confined space.

2. A vehicle shall be parked in such a way that traffic flows in an unobstructed manner and where possible, the vehicle shall provide protection for the public employees.

3. A vehicle shall be parked in such a manner that exhaust fumes cannot accumulate in the confined space. If this is not possible, the vehicle's exhaust pipe shall be extended away from the confined space.

(b) 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 the employees and to channel traffic flow. Cones shall be placed at distances and intervals in accordance with local traffic ordinances to adequately warn oncoming traffic.

(c) In areas of high traffic volume or other sites warranting additional warning devices, illuminated traffic arrows, barricades and warning signs shall be used around the entrance and any vehicle.

1. When placement of the vehicle creates a situation of having only one open lane of traffic in high traffic volume areas, a flagman shall be used to direct traffic flow.

2. Traffic safety vests or equivalent shall be worn at all times when working on the street or easement surface in the field.

Note: For further information on traffic control see ANSI D6.1, Manual on Uniform Traffic Control Devices for Streets and Highways. The standard may be obtained from:

Sales Department  
 ANSI  
 1430 Broadway  
 New York, NY 10018

History: Cr. Register, April, 1985, No. 352, eff. 8-1-85.

**ILHR 31.08 Incorporation of standards by reference.** (1) Pursuant to s. 227.025, Stats., the attorney general and the revisor of statutes have consented to the incorporation by reference of the standard adopted in sub. (4).

(2) Copies of the adopted standard are on file in the offices of the department, the secretary of state and the revisor of statutes. Copies also may be purchased through the respective organization specified in Table 31.08.

(3) Interim amendments of the adopted standard shall have no effect in the state until such time as this section is correspondingly revised to reflect the changes.

(4) The standard specified in Table 31.08 is hereby incorporated by reference into this chapter.

Table 31.08

ACGIH	American Conference of Governmental Industrial Hygienists Publications Office 6500 Glenway Avenue Building D-5 Cincinnati, Ohio 45211
	Threshold Limit Values for Chemical Substances in Workroom Air for 1982.

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