

Health and Safety standard: Confined Spaces

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Table of contents

	Page
1. Purpose	3
2. Scope	3
3. Reference documents	3
4. Definitions	3
5. Responsibilities	5
6. Preventive measures	5
7. Measurement of the concentration of oxygen and combustible/toxic gases.	7
8. Actions in the event of emergencies	9
9. List of Appendices	10
Annex 00 Change log	11



Health and Safety standard: Confined Spaces

1. Purpose

The purpose of this Health and Safety Standard is to establish the minimum health and safety precautions and measures for performing work in confined spaces at the Naturgy Group, thereby preventing incidents or accidents that could affect the integrity of workers, of third parties, of facilities or of the environment.

2. Scope

This procedure is applicable to all companies of the Naturgy group, to its collaborating companies (contractors) and to all companies in which it holds operational and/or management control.

In any event, at a minimum, all applicable national legislation and the aspects contemplated in this Health and Safety Standard must be complied with.

3. Reference documents

PG.00043: General Procedure for the Management of Health and Safety Standards.

NT.00043: Health and Safety standard: Work Permits.

NT.00061: Health and safety standard: Explosive atmospheres.

NT.00053: Health and Safety standard: Signposts

4. Definitions

Asphyxia: injury caused to the body due to lack of oxygen.

Chemical product: set of chemical compounds (although sometimes it is only one) designed to carry out a function. The product that carries out the main function is generally a single component, known as the active component.

Classified Zones (ATEX or equivalent): risk areas into which hazardous sites are classified based on the frequency of appearance and on the duration of presence of an explosive atmosphere.

Confined space: any enclosure with limited entrance and exit openings and unfavourable natural ventilation, in which toxic or flammable contaminants could accumulate or in which there could be an oxygen-deficient atmosphere, and it is not designed to be continuously occupied by workers.

Each business must keep an updated list of those installations classified as confined spaces. These installations must have signage that indicates that they are confined spaces.

During work planning, any actions or conditioning factors that could convert a space into a confined space, even though it is not classified as such, must be taken into account.



Health and Safety standard: Confined Spaces

Explosive atmosphere: a mixture of flammable substances with air in the form of gases, vapours, mists or powders in which, after ignition, combustion could propagate towards the unburned mixture.

Hazardous atmosphere: an atmosphere that, due to its composition, could involve the risk of death, incapacitation, injury or serious illness or difficulty for a person to leave the enclosure on their own.

Intoxication: injury to the body caused as a consequence of penetration into the same by a toxic substance.

Lower explosive limit (LEL): the minimum concentration by volume of a combustible in air that allows a mixture to be flammable.

Observer: a person who is designated by the employer and who has the capacity, knowledge and sufficient means to comply with the observation duties. The observer will remain outside the enclosure while work is being performed and may perform tasks that do not hinder his main observation duty.

Safety datasheet: Document prepared by the manufacturer of a hazardous substance or mixture, indicating the particular features and properties of a certain chemical substance or preparation. It contains detailed handling instructions, includes instructions on performing first aid and aims to reduce occupational and environmental risks. It can be known by different names in different geographical areas.

Threshold limit value - short-term exposure limit: it is the limit for short-term exposures to concentrations of environmental pollutants; it sets the limit below which the absence of harm is assumed, even exceeding the threshold limit value - time-weighted average, as long as:

- The duration of the exposure is less than fifteen minutes.
- The time elapsed between one exposure and the next is greater than sixty minutes.
- There are no more than four exposures in one work day.

Threshold limit value - time-weighted average: it is the average concentration of an environmental pollutant, weighted over time for work hours of 8 hours/day and 40 hours/week, to which there can be exposure without adverse effects.

Threshold limit value: the concentration limit of an environmental pollutant above which a worker may not be exposed.

Toxic substance: a substance that, by inhalation, ingestion and/or by skin absorption could involve serious risks, acute or chronic, and even death.

Upper explosive limit (UEL): the maximum concentration by volume of a combustible in air that makes it possible for a mixture to be flammable.



Health and Safety standard: Confined Spaces

5. Responsibilities

They are included within the development of the procedure.

6. Preventive measures

For work in confined spaces and regardless of the type of work to be performed, measures must be adopted to prevent the possible risks of asphyxia, intoxication, fire and/or explosion, in addition to taking into account the general risks of the surrounding area and of access to the confined space.

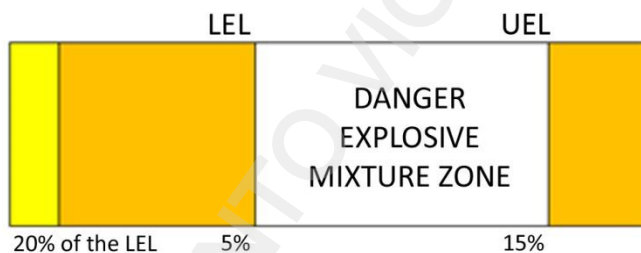
In confined spaces that have an extensive length, such as utility tunnels, etc., the work team in the interior must be composed of at least two people.

For performing work in confined spaces owned by third parties, the owner will be asked to provide information and cooperation.

Personnel who perform activities in confined spaces must have specific training on work in confined spaces, and they must be the object of adequate monitoring of their state of health (medical certificate of aptitude for work in confined spaces issued by a competent medical service).

Regarding concentrations of oxygen and combustible and toxic gases, the safety limits for performing the work are set at the following values:

- The concentration of oxygen must be between 19.5 and 23.5%
- The concentration of a toxic gas must be below its threshold limit value (short term)
- The concentration of a combustible gas must be below 20% LEL.



EXAMPLE OF UPPER AND LOWER EXPLOSIVE LIMITS FOR NATURAL GAS

In general, the following measures must be adopted:

- Before starting work
 - A work permit must have been issued, which must be checked to ensure that it has identified the pollutants to be measured, the preventive measures to be adopted and the access system to the confined space.
 - The on-site work manager must verify that all the conditions indicated in the work permit for performing the work are present.



Health and Safety standard: Confined Spaces

- Access to the space must be previously notified to the control centre that is responsible for the installation or, in default thereof, to the unit that is authorising the work. The control centre (or the authorising unit) will confirm with the work manager that the conditions indicated in the permit are complied with.
- Check the condition and operation of all measurement equipment. Start up gas detectors in a "clean" atmosphere.
- Take environmental measurements from the exterior by connecting a measurement probe to the gas detector if necessary. Record the fact that these measurements have been taken. This measurement will be taken whenever the enclosure is accessed after having left it due to an interruption of the work.
- If an unbreathable atmosphere is detected, do not begin the work until the conditions are suitable.
- If pollutants are expected to be generated while the work is being performed, install forced-air ventilation before starting the work. Combustion engines should not be close by.
- Cordon off the entrance to the confined space. Use fences and/or railings to protect any open accesses that could pose a risk of falls to a different level.
- Do not allow work to be started on roads open to traffic without having set up the appropriate signage.
- During night-time work or under low-visibility conditions, set up the lights established in regulations outside; if the work infringes on the roadway, the lights must be flashing.
- Use the fixed lighting inside the confined space while inside. If there is no fixed lighting, use appropriate portable lighting to guarantee safe conditions (metal enclosures, ATEX, etc.).
- If the confined space is considered as a wet or damp location and/or a conducting enclosure, electricity for lighting and/or the equipment (tools and portable devices) must be supplied with protection against indirect electrical contacts.
- Prevent vehicles or machines with internal combustion engines from parking near the entrance and exit opening(s) to prevent generated gases from entering the interior.
- Establish the resources for controlling the personnel who access the interior of the confined space. In those spaces in which visual control cannot be exercised from the exterior, the observer must keep an entry and exit record.
- If adverse conditions are indicated on the work permit or they are detected, set up a planning for the times during which personnel may remain inside the enclosure, therefore establishing breaks, if applicable, according to the temperature, moisture and the work method.
- Have a rescue and evacuation plan established in the event of an emergency, which must consider the following, at least:



Health and Safety standard: Confined Spaces

- The possible emergencies and how to act in each case.
 - Rescue and evacuation equipment (tripod and connected rescue harness, respiratory equipment for evacuation or escape, lifting and emergency equipment, etc.) depending on the configuration of the space, number of workers and the activity that is performed. Telephone numbers for requesting assistance.
- Rescue and evacuation equipment must be kept in the vicinity of the work zone. Their status shall be checked and the installation point shall be verified to ensure that there are no obstacles that would hinder or obstruct their use.
- **During work:**
 - Maintain observation from the exterior.
 - Keep entry and exit routes clear and free from materials.
 - Workers must keep an oxygen and combustible/toxic gas detector with an alarm permanently operating, under continuous sampling, and they must leave the enclosure if any value outside of the safety limits is reached or in the event of a failure by the detector. In no event must any of the visual or audible signals of the detector be shut off.
 - The observer must be in continuous communication with the personnel in the interior, therefore using an adequate system: visual, audible, oral, radio, etc.
- **Upon completing the work:**
 - Collect all objects and tools and remove the waste generated during the work.
 - .Verify that all personnel executing the works have left the confined space and report the completion of the works to all of them.
 - Report to the control centre or unit that authorises the work that it is complete.

7. Measurement of the concentration of oxygen and combustible/toxic gases.

As a general rule, whenever the environmental conditions in the interior of the space are not suitable (concentration of combustible/toxic gas and/or oxygen outside of the safety limits), the enclosure must not be accessed so long as adequate environmental conditions are not obtained or safety measures that allow having controlled the risks have not been adopted.

Prior to access, the concentrations of oxygen and of possible combustible/toxic gases in the interior will be measured from the exterior of the installation or from a safe area and using the appropriate equipment, taking into account the density of possible contaminants that may be present. If all the space cannot be reached from the exterior, workers will gradually move into the space, always from a controlled zone and while the atmosphere is being permanently monitored.



Health and Safety standard: Confined Spaces

Depending on the envisaged risks, adequate measurement devices will be used (explosimeters, oxygen meters, carbon monoxide meters, hydrogen sulphide meters or others).

Regardless of the measured concentrations of gases and oxygen and prior to performing the work, actions will be taken on all elements that could hinder favourable natural ventilation: by opening doors and covers in the installation, eliminating metal sheets over ditches, etc., without accessing the interior of the enclosure.

In this regard, simultaneous or successive interference with other activities in the surrounding environment must be taken into account: obstruction of ventilation ducts, the emission of combustion gases in the vicinity, leaks, ducts connected to the confined space, jobs using toxic products, etc.

Immediately afterwards, the concentrations of gases and oxygen will be measured again, without closing the ventilation elements, acting as indicated below:

a) If the concentration of combustible gas is equal to or greater than 20% of the LEL and it cannot be reduced with normal ventilation operations

- Personnel will remain outside, and the control centre that is responsible for the installation or, in default thereof, the unit that is authorising the work must be notified.
- The need to cordon off the zone will be analysed.
- In coordination with the control centre or, in default thereof, the unit that is authorising the operation, the following actions will be taken:
 - request authorisation to shut off or reduce the flow of gas to the installation, therefore operating the available gate devices both upstream and downstream from the same.
 - decompress the installation so that the necessary work can subsequently be performed under safe conditions.
- If the adopted measures do not manage to provide a safe atmosphere, before accessing the enclosure the necessary means must be provided to achieve such a safe atmosphere: forced-air ventilation using exhaust fans or air blowing equipment, nitrogen injection equipment, etc. In this latter case, the lack of oxygen that will occur must be kept in mind, wherefore it will be necessary to use a self-contained breathing apparatus or air line breathing systems.

b) If the concentration of combustible gas is below 20% of the LEL and the oxygen concentration remains between 19.5% and 23.5%

- It must be checked that the concentration of flammable or toxic substances remains within the admissible limits before entering and while work is being performed.
- The enclosure can be accessed while maintaining the general precautions defined in the explosive atmospheres standard NT.00061. (not generating sources of



Health and Safety standard: Confined Spaces

ignition, etc.) in order to locate the cause of the gas concentration. The assigned operations can be performed, and any incidents that may occur must be notified, if applicable.

c) If the concentration of gas is below 20% of the LEL and the oxygen concentration is below 19.5%

- If, despite facilitating ventilation of the enclosure, the oxygen levels remain below 19.5%, the measures described in the preceding case will be taken, but the interior of the enclosure may only be accessed using a self-contained breathing apparatus or air line breathing systems.

In any event and in general

- When the oxygen concentration is greater than 19.5% but less than 21%, said atmosphere could contain gases that might be toxic and/or that displace oxygen (special attention must be given to the accumulation of sludge and other decomposing organic matter), wherefore the potential risks thereof must be taken into account and the corresponding preventive measures must be adopted.
- Regarding air line breathing systems or air blower ventilation systems, it must be ensured that the intake source is not affected by internal combustion engines from vehicles, compressors, motor-pumps, etc. or by the air exhausted from the enclosure during ventilation. Air will be exhausted to a safe area.
- If forced-air ventilation equipment is used in classified zones (ATEX or the equivalent), this equipment must be certified for the use thereof in those zones.
- Whenever it may be feasible that hazardous substances could be generated while performing the work in the interior, pollutants will be eliminated by localised exhaust or by diffusion, with the former preferable if there are occasional sources of pollution.
- If the supplied air comes from a compressor, a filtering system at the outlet from the same will be used, thereby guaranteeing the non-presence of particles, oils and gaseous contaminants.
- Whenever activities involving the use of chemical products are performed, the specifications on the safety data sheets of those products will be followed, which indicate the risks and the necessary control measures.

8. Actions in the event of emergencies

Workers who perform activities in a confined space must be observed by another, qualified worker on the exterior, who must know the rescue and evacuation plan and must be equipped with the necessary elements to be able to provide help in the event of an emergency, according to the prior analysis conducted.



Health and Safety standard: Confined Spaces

The personnel in the interior of the space must have the required personal protective equipment. The observer will have a communications system that allows him to request help.

Initially, attending to an emergency is the observer's responsibility. His actions must be governed, in chronological order, by the basic rules of protect, alert and assist (PAS):

- **Protect:** the rescuer must first guarantee his own safety and that of the personnel located in the interior. Under this premise and if necessary, he must ensure that the installation is put in safe mode.

Regarding this point and before any work is performed, it is important to identify valves and/or auxiliary elements used to shut off gas/power to the affected zone, if necessary.

- **Alert:** the control centre or, in default thereof, an outside means of assistance must then be notified, for both rescue and medical care, therefore reporting the circumstances of the emergency. The possibility that a worker needs to receive fresh air and medical assistance as soon as possible must be kept in mind.

As a general rule, outside assistance and rescue services should be notified whenever situations that involve the rescue of personnel present in a confined space occur. All the aforementioned is without prejudice to the activities performed for such purpose by the exterior observer personnel.

- **Assist:** after fulfilling the preceding stages and whenever possible according to the rescue and evacuation plan, the victim will be assisted. In any event, rescue must, if necessary, be quick but not hasty or unsafe.

Emergency simulations must be conducted annually, including the rescue of and assistance for victims, if applicable.

9. List of Appendices

Health and Safety standard: Confined Spaces



Annex 00 Change log

Version	Date	Reason for the version and/or summary of changes
1	06/06/2014	Newly created document. Requires the cancellation or revision of standards on other safety measures for working in confined spaces, such as PE.03262.ES-TR.PRL, PE.02874.CO-TR, PE.03128.BR-TR.PT-12, PE.02908.MX-TR and PE.03323.IT-TR.PRL.
2	07/01/2020	Format adaptation. Approved by the confined spaces Competence Centre and validated by the EHS Operating Committee. Inclusion of new reference documents, chemical product definitions and safety datasheet. 6. Inclusion of new preventive measures. 7. Adjustments to the text.