Carrying out work in confined spaces

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Changes compared to previous version

- Instruction transferred to latest template
- Periodic review
- Hatches replaced for openings
- Clarify PPE policy at 1e entry
- Clarification shielding openings
- Addition of requirement unique identification number for confined spaces for rescue purposes
- Clarifying lighting requirements
- Removal of references to F001-020, F001-021 and I001-020

Purpose instruction

Control the specific occupational risks of working in confined spaces.

Related documents

Type of document	Title	Code
Input	Bedienen en bewaken	P033
Input	Maintain installations/ WCM	P080
Input	Instruction Manhole guard	I001-011
Output	Registration form employees in confined spaces	F001-001
Input	Release measurement instruction	I001-020

Terminology & abbreviations	
Abbreviation/term	Meaning
BEI	Operation of Electrical Installations (see also I012- Operation of Electrical Installations)
KKS coding	Kraftwerk-Kennzeichen System, system coding for power plants
LEL	Lower Explosion Limit
LMRA	Last Minute Risk Analysis
Person authorised to measure	Gas measurement expert in possession of certificate SOG (SSVV Training Guide) Gas measurement, see also I001-010 Release measurements
TRA	Task Risk Analysis
Example Confined space warning sign	 Should be hung in front of the opened area in the absence of the manhole guard, signalling that the area is not to be entered.
WBGT index	The WetBulb Globe Temperature index (WBGT) is a measure of heat stress that takes into account: temperature, humidity, wind speed, sun angle and cloud cover. See also I001-009 Working under heat stress

Scope

This instruction applies to any employee who will perform work in a confined space within RWEG-NL.

Live Saving Rule(s):

"I work with a valid work permit"

"I only enter a confined space with proper permission"

Confined space definition

An enclosed or partially open environment with a constricted or uncongested entrance that is not designed for the accommodation of persons and where activities take place that pose risks to safety, health and welfare.

Features

Enclosed spaces often have one or more of the following characteristics:

- Are difficult to reach or access due to their closed nature;
- Communication with and direct view of employees often requires extra attention;
- Are difficult to quickly and safely evacuate or rescue persons from (through e.g. manhole or hatch);
- Has no or poor (natural) ventilation and often lacks direct entry of daylight and/or good installation lighting;
- They often have hazardous substances used or stored in them that can adversely affect the atmosphere.

Overview of confined spaces by location

All enclosed spaces are defined in the overview 'enclosed spaces' by establishment or location.

Should a space not appear on this list, but still meet the above characteristics, it should still be treated as a confined space.

If the risks of the work are not sufficiently controlled in existing instructions, a TRA should be made, see F002-002, TRA decision model. One of these control measures is that, in cooperation with the person authorised to measure, the substances to be measured should be determined before this area is released.

This space should then be completed on the 'confined spaces' chart with the corresponding columns - hazardous substances to be measured.

Preparing to enter confined space

Prior to entering a confined space, the following control measures should be in place:

- The confined space should be delivered product-free. That is, the confined space should be emptied, flushed and aerated. The confined space should be separated from the system by (in order of preference) disconnection, plugging or by double block & bleed, in accordance with I003-000 LOTOTO If it is not possible to separate the system from the process in this way, then the same degree of safety should be obtained through further measures. These additional control measures are recorded in a TRA;
- Mechanical blocking should be provided where necessary to prevent unwanted status or position changes of partitions;
- Where necessary, electrical components and equipment should be unswitched and earthed;

- All openings through which the confined space could be entered should, by whoever opened the opening, be fitted with a confined space warning sign in the opening;
- Only one of the openings may be used as access to the confined space; this access must also be marked as such by means of an access sign;
- Without the presence of a manhole guard, a confined space should never be entered. In the absence of the manhole guard, the warning sign should be reinstalled in the opening. See also instruction I001-011 Manhole Guard for this purpose;
- In preparation, a rescue plan should be drawn up, describing how a person (or several persons) can be rescued from the confined space in the event of an incident. This should indicate what support with knowledge should be available, what auxiliary materials are needed and how transport from the room to the handover point will take place. Drawings and photographs for clarification may be necessary here.

Confined space clearance

Clearance measurements should be carried out in a timely manner by a competent person using appropriate, calibrated and checked measuring equipment. The measurement to be carried out must be laid down in a measurement plan, in which the overview of confined spaces is leading with regard to the hazardous substances to be measured and/or sampled. See also instruction I001-010 Release measurements.

Before entering a confined space, it must have been successively established that:

- The oxygen content in the confined space is between 20 and 21 volume per cent. Any deviation from 20.9 per cent must be able to be examined and explained by the person authorised to measure and/or the work permit issuer. This measurement should be carried out every day by order of the work permit issuer before entering the confined space.
- That no flammable or explosive gas mixtures are present, the measurement of concentration of explosive gases and vapours gives < 10 % LEL (Lower Explosion Limit);
- The concentration of potentially present toxic vapours and gases is lower than the legal or publicly permitted limit;
- In hot conditions, the maximum working and rest times have been determined using the measured WBGT index. See also instruction I001-009 Working under heat stress;
- The room is ventilated and remains to ensure that any remaining gases in dead corners have been expelled.

In consultation between the work permit issuer and holder, the clearance measurements can expire after 5 days if there are no more changes in the composition of the atmosphere and the risk of this occurring has been eliminated. Both work permit issuer and holder must remain alert to changing (work) conditions (e.g. oxidising environment, application of coatings, hot work, etc.). In case of doubt, always stop work and take measurements again before starting work. Instruction I001-010 Release Measurements is leading in this regard.

If there is no certainty that the atmosphere remains unchanged during operations, continuous or frequent measurements are necessary with regard to oxygen content, LEL, toxicity and the WBGT index.

If continuous or starting measurements in a confined space can be omitted, this must be notified in writing to the entrance of the confined space. This document shall show the measurement data of the previous 5 days and this letter shall be signed by the work permit issuer with date. This measurement data should clearly show that there have been no changes in the atmosphere present in the previous 5 days.

This document clearly indicates that it is intended for that particular space by means of a clear system description and KKS coding or confined space number.

Entering a confined space

Depending on possible substances present, additional PPE may be required, e.g. fly ash, chromium-6. Which cannot be determined in the release measurement.

Permission to enter must be clearly displayed at the entrance to the confined space, using a warning sign 'Confined Space', on which the measurement protocol is affixed.

Access to the area without a valid work permit and without the assigned manhole guard present is prohibited. The 'No entry' pictogram will be clearly visible in the absence of the work permit and manhole guard. The valid work permit for the confined space has been discussed by the permit holder with all concerned and with the assigned manhole guard who is in charge of the work permit, during the time people are in the confined space;

If a confined space could be entered via several entrances, the openings, which are open and not designated as entrances, should be provided with warning signs "confined space" with the pictogram "No entry"; these Openings should be clearly visibly screened or cordoned off by netting.

A manhole guard should be constantly present at the entrance, during the time persons are in confined spaces. The manhole guard should always have 'direct contact' with the persons in the confined spaces and be in contact with the providing department. Or through video surveillance where contact and recording is ensured.

Each opening should have a unique identification number. For the purpose of emergency situations.

Requirements equipment, applied, in a confined space

For working in a confined space with electrical equipment, a TRA for this activity should always be drawn up or it should be possible to refer to a standard work instruction for this activity. The proposed working method and control measures always require the involvement and specific consent of a BEI work officer. If all these control measures are not possible then permission for the proposed working method should be sought from the BEI Works Responsible Person of the relevant establishment.

Equipment applied in confined spaces should preferably be air-powered or battery-powered. Electrical equipment should operate at a safe voltage (< 50 V AC, < 120 V DC). In very exceptional cases, electric hand tools (equipment) with a normal mains voltage (220V) may be used. This equipment must then be fitted with so-called double insulation, with each device having its own isolating transformer. The power sources and transformers required for this equipment must be installed outside the room.

Lighting must be battery-powered or 42V DC. Possibly redundant.

Gas and oxygen cylinders used in welding or cutting operations should never be placed in a confined space. Hoses should include hose breakage protection and a flame dover. Couplings are not allowed in the confined space, except for the coupling on the tool.

- During any (prolonged - longer than 10 minutes) work interruption, gas hoses should be moved outside the confined space. Physical disconnection from the gas cylinder is also permitted. The gas cylinders should then always be closed and the hoses depressurised;
- The bottle key should always be present directly at the bottle to allow immediate closure of the bottle in case of a possible emergency;
- All hoses may only be fitted with the so-called hose 'ear clamps';
- All employees who are in an area where work with gas and/or oxygen is carried out must be equipped with a personal LeL/oxygen monitor. (Ex-Ox meter)
- Electrical welding equipment may only be used in confined spaces if the equipment is equipped with protection such that if the welding current is interrupted, the voltage is < 50 V AC or < 120 V DC.

Additional requirements while working in confined spaces

Multiple work permits may be used in one confined space.

There are two options:

A. One access for the entire confined space in which various activities/work orders are then carried out;
B. Multiple entrances for the confined space;

Measures and instructions under option A:

- The work permits, measurement protocol, TRA and LMRA are deposited with the assigned manhole guard at the entrance to the confined space;

- The manhole guard participated in start-up work instructions, TRA explanations and LMRA.

Measures and instructions under option B:

- The work permits, measurement protocols, TRAs and LMRAs are deposited with the assigned manhole guards, at the assigned entrances of the same confined space. The manhole guard assigned to the respective access has all the corresponding work permits, etc. in custody.
- The manhole guard participated in the starting work instruction, TRA explanation and LMRA belonging to those assigned to him.

End of work in a confined space

After checking the workplace and conducting a closure inspection by the work permit issuer and the work permit holder, the confined space in question is closed so that entry is no longer possible and the closure protocol is drawn up.

Annex(es)