

# IVR TECHNICAL LEAFLET



## ENTERING OF CONFINED SPACES ON INLAND VESSELS

Every year a number of seafarers, shoreside workers, surveyors and stevedores are killed or seriously injured in enclosed spaces on vessels. No enclosed space should be entered without proper procedures and this means that training and continuous awareness is essential.

Investigations into enclosed space incidents have identified that in most cases the vessel's crew have insufficient knowledge of, or disregard for, the right precautions to take. Furthermore, approximately 50% of enclosed space casualties are a result of crew members attempting to rescue colleagues without understanding the risk.

### WHAT IS A CONFINED SPACE?

A confined space can be any space of an enclosed nature where there is a risk of death or serious injury from hazardous substances or dangerous conditions such as reduced oxygen levels. Some confined spaces on inland vessels are fairly easy to identify, for example, enclosures with limited openings:



Cargo tanks



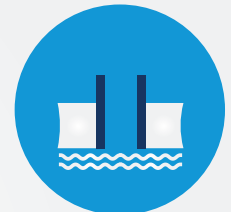
Fuel oil bunker tanks



Water ballast tanks



Fore- and aft peak



Cofferdams

OTHERS MAY BE LESS OBVIOUS BUT CAN BE EQUALLY DANGEROUS, FOR EXAMPLE:

Cargo holds with a lack of oxygen due to the properties of the current cargo | Ductwork | Unventilated or poorly ventilated rooms/spaces

## WHAT ARE THE

### DANGERS OF CONFINED SPACES?

Major risks of entering confined spaces on inland vessels are:



Failure to recognise an enclosed space



Complacent attitude



Not understanding the risks/danger



Attempt to save a co-worker



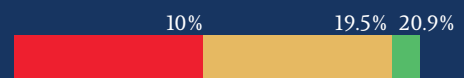
Failure to use the appropriate protective equipment



Insufficient or improper measuring equipment or the use of a defective measuring device

### COMMON DANGERS WITHIN A CONFINED SPACE.

The majority of deadly accidents in confined spaces are the result of low oxygen levels. Air typically contains 20.9% oxygen. However, when the oxygen level reduces below 19.5% it can quickly become fatal. An enclosed space with less than 10% oxygen can cause a person to become unconscious without any warning, resulting in brain damage and ultimately death. Be on your guard in case the level of oxygen is below 20.9% as other gasses might be present.



Other conditions that can lead to a dangerous situation are:

- ▶ Poisonous gas, fume or vapour;
- ▶ Liquids and solids which can suddenly fill the space, or release gases into it;
- ▶ Fire and explosions (flammable vapours, excess oxygen etc);
- ▶ Residues left in tanks or remaining on internal surfaces, which can give off gas, fume or vapour

## GOOD PRACTICE WHEN WORKING IN CONFINED SPACES IS REQUIRED

When entering/working in confined spaces, the hazards should be assessed to determine the risks and what precautions should be taken.

**A risk assessment should be completed which takes into account the following:**

- ▶ Is it possible to avoid entry to confined spaces, e.g. by doing the work from outside;
- ▶ If entry to a confined space is unavoidable, follow a safe system of work; and
- ▶ Put in place adequate emergency arrangements before the work starts.

## RECOMMENDATIONS FOR SAFE SYSTEMS OF WORK

If entry into a confined space cannot be avoided, make sure a safe system for working inside the space is developed and put into practice. Everyone involved will need to be properly instructed to make sure they know the risks involved and how to remain safe



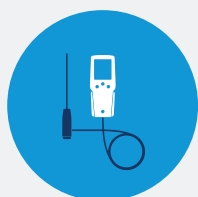
### ENTERING A CONFINED SPACE

Never enter a confined space alone. Make sure that crew members and or third party workers are aware that confined space works are being conducted. A crew member should be positioned outside to keep in contact with those inside, in order to raise the alarm in the event of an incident and take charge of rescue procedures.



### ISOLATION

Mechanical and electrical isolation of equipment is essential if it could otherwise operate, or be operated, inadvertently. If gas, fume or vapour could enter the confined space, pipework needs to be isolated. In all cases, a check should be made to ensure isolation is effective. On tank barges, the cargo lines should be blanked off with blind flanges and/or "Jo-Jo's". Furthermore, precautions should be put in place to insure that the space cannot be inadvertently closed with persons still inside.



### TESTING THE AIR

Testing should be carried out by a competent person who is able to confirm that the space is gas free and contains sufficient oxygen; approx. 20,9 vol.%. Before entry the enclosed space should be tested to check that the environment is still free from both toxic and flammable vapours and safe to breathe. Preferably a "gas-free" certificate issued by a recognized expert should be available on site\*. As a further precaution/best practice a personal monitoring device should be worn by persons entering the enclosed space.



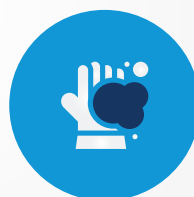
### LOCAL EMERGENCY SERVICES

When working at a shipyard, local emergency services (eg. Fire and Rescue Service) should be made aware of an incident. Information about the particular dangers in the confined space should be given to them as soon as possible.



### APPOINTMENT OF A SUPERVISOR

A supervisor should be given responsibility to make sure that works carried out in confined spaces have been correctly risk assessed and signed-off. This may include them being present while work is underway.



### CLEANING BEFORE ENTRY

This may be necessary to ensure fumes do not develop from residues while the work is being completed.



### PROVISION OF VENTILATION

Mechanical ventilation may be needed to make sure there is an adequate supply of fresh air and or it may be possible to increase the number openings to improved ventilation.



### COMMUNICATIONS

An adequate communication system is recommended to enable communication between people inside and outside the confined space and to summon help in an emergency.

Note: when entering a confined space when the ship is being repaired at a shipyard, a gas-free certificate must be issued by an independent gas expert ("gas doctor").

## EXTRA INFORMATION

Only available in the Dutch language: Arbo Catalogus Binnenvaart (<https://www.arbo-binnenvaart.nl>), alleen

UK Maritime & Coastguard Agency regarding confined spaces (<https://www.gov.uk/government/publications/enclosed-spaces-on-sea-going-vessels>).

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