Safety Alert

Hyperbaric Chambers

This Alert provides general guidance about the safe operation and use of single person hyperbaric chambers.

July 2016

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Background

This alert has been prepared in response to a serious incident that occurred earlier this year during the operation of a single person (monoplace) hyperbaric chamber.

Risk Control and Employer Duties

Risks to a person's health and safety may arise if safe operational procedures have not been adequately developed and implemented.

When developing safe operational procedures for hyperbaric chambers, and especially for monoplace treatment systems, the employer should ensure that an appropriate hazard identification and risk control process has been undertaken and implemented.

Employers should ensure that:

- Prior to each pressurization treatment, persons to be subjected to hyperbaric chamber pressure have been medically assessed in order to determine their fitness for pressurization.
- During pressurisation treatment there are sufficient, appropriately trained hyperbaric facility staff, operators, and medical staff to ensure that the person in the chamber can be continually observed that will enable an immediate response in the event of an emergency.
- There is sufficient infrastructure at the facility to ensure the safe use of the hyperbaric chamber.
- In the event of an emergency the operator is able to perform a 'hands-free' call for assistance without the need to leave the control panel.
- Alarm activation systems are located at the console
- There is sufficient medical equipment at the facility and appropriately trained people to provide a high level of care during an emergency.
- View ports in the hyperbaric chamber are positioned to allow the operator when stationed at the control panel, to have unimpeded observation of the person in the chamber.
  - Where unimpeded observation by the operator is not possible, closed circuit television cameras may be appropriate. These should be mains powered and alarmed for loss of power.
- In order to facilitate continual observation of the person in the chamber the chamber should be adequately lit, and there should be an uninterruptable power source or emergency power.
- There is a continual ability for the operator to communicate with the person in the chamber, which encompasses a primary and emergency means of communication.
- There are correct therapeutic flow rates and pressures. The operator, while at the control panel, should have the ability to monitor and adjust gas flow rates and activate emergency systems.
- All therapeutic flow rates, whether programmer logic controlled (PLC) or manually controlled, should be fitted with:
  - Pressure relief systems,

- Inflow limiters,
  - Inflow isolation valves,
  - Manual overrides if PLC controlled
  - Incorporate exhaust systems that will limit the patient – ambient negative pressure to within specified limits; and
  - Pressure monitoring that incorporates visual and audible alarm systems that will alert the operator should a flow rate or pressure increase above or fall below pre-set limits during operation of the chamber.
- The safe operating procedure includes a pre-start functionality test or check of all alarm systems, and evaluation of the pre-start gas supply.
- Prior to a person entering the chamber appropriate risk control systems be reviewed having considered the emergency management protocols for incidents. This includes incidents such as a rapid loss/increase of pressure in the chamber and possible medical emergencies associated with the person in the chamber.
- All safety systems undergo regular calibration and testing.
- Due to depressurisation delays associated with evacuating a person from a hyperbaric chamber, the flammability of all materials and gases used at the facility be reviewed to ensure:
  - for the treatment being provided, they are the least flammable and most difficult to ignite,
  - There are sufficient fire suppression systems in place that are tested on a regular basis; and
  - Self-contained breathing apparatus is readily available to the attendant operator.
- Preventative maintenance is undertaken at regular intervals to ensure the safe use of the hyperbaric chamber.

The Department of Health and Human Services advises caution be used in undertaking hyperbaric chamber therapy for indications for which the efficacy and effectiveness has not been established. Examples of indications recommended by the Underwater and Hyperbaric Medical Society are available at: https://www.uhms.org/resources/hbo-indications.html

Further Information

Further information on the use of hyperbaric chambers can be found in Australian and International Standards:

AS 1210 – 2010 *Pressure vessels*

AS 1345 – 1995 *Identification of the contents of pipes, conduits and ducts*

AS/NZS 1680.2.5 – 1997 *Interior lighting Part 2.5: Hospital and medical tasks*

AS/NZS 2299.1 – 2015 *Occupational diving operations Part 1: Standard operational practice*

AS 2568 – 1991 *Medical gases—Purity of compressed medical breathing air*

AS 2896 – 2011 *Medical gas systems—Installation and testing of non-flammable medical gas pipeline systems*

AS 4774.2 – 2002 *Work in compressed air and hyperbaric facilities Part 2: Hyperbaric oxygen facilities*

ASME PVHO-1 – 2007 *Safety standard for pressure vessels for human occupancy*

VICTORIA State Government | Health and Human Services

Contact Details

Call us on: **1800 136 089**

Email us at: info@worksafe.vic.gov.au

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