



IMHA position paper

Oxygen on board ships

All sick seafarers should be assessed on board and managed appropriately by the officer responsible for medical care, with support from Telemedical Assistance Services. If shore side medical care is required, the seafarer should be medically disembarked into a shore side facility in an appropriate timeframe, by whatever means necessary. Port States have a duty to provide such care as outlined in the Maritime Labour Convention (MLC) 2006¹, STCW etc.

The need to have medical oxygen on board a ship to optimally treat a sick seafarer until disembarkation is well recognized and outlined in the medicine chest requirements of a flag State. The COVID 19 pandemic has highlighted the question of how much medical oxygen should be carried on board and the difficulties in purchasing and supplying cylinders of oxygen.

If an outbreak of COVID 19 occurs onboard it is noted that 50% of the crew are often affected and that up to 20% of them may require oxygen if they cannot reach medical care ashore for many days. This may mean that more than one seafarer at a time requires oxygen therapy.

How much medical oxygen?

The minimum volume of medical oxygen that ships must carry is outlined in flag State medicine chest requirements and the absolute minimum is 2 cylinders of 2 litres at 200 bar, that is 800 litres, as recommended in the International Medical Guide for Ships, 3rd edition². Many flag States require that ships carry more than this, often 40 litres at 200 bar³ giving a total of 8000 litres. This is also required under the International Maritime Dangerous Goods (IMDG) code⁴.

Many ship owners have expressed a wish to increase the volume of cylinder medical oxygen carried on board but for several reasons, this has become increasingly difficult. Reasons include but are not limited to:

- Lack of supply of medical oxygen
- Prioritisation of hospitals and other health care settings for medical oxygen supplies
- FDA classification of oxygen as an approved substance
- Difficulties in transport as a hazardous cargo

This has led to alternative sources of oxygen being considered and IMHA has been asked to advise on the different options.

¹ https://www.ilo.org/global/standards/maritime-labour-convention/text/WCMS_763684/lang--en/index.htm

² https://apps.who.int/iris/bitstream/handle/10665/43814/9789240682313_eng.pdf?sequence=1&isAllowed=y

³ <https://www.sdir.no/en/shipping/legislation/directives/medical-oxygen-on-board-norwegian-flagged-ships/>

⁴ <https://www.imo.org/en/OurWork/Safety/Pages/DangerousGoods-default.aspx>



Oxygen concentrators

Oxygen concentrators are available for purchase and can provide up to 10l/min of oxygen although many only provide up to 5l/min. They are used successfully on cruise ships and by some major US oil companies in addition to the medical oxygen cylinders carried on board. Those able to supply 10l/min are the most useful when treating acute illness. However, they are more expensive and currently have a long wait time for purchase due to an increase in demand at the this time.

Oxygen concentrators need maintenance to clean and replace the air filters as directed by the manufacturer and there are potential issues with the efficacy of the filters in extreme temperature and humidity. However, these have not been seen as a practical issue in the 'home use' concentrators such as those used on board ships and when the concentrators are used in air-conditioned spaces such as the ship's medical centre.

A decision to purchase a concentrator should be based on a risk assessment that includes but is not limited to:

- Amount of medical oxygen carried in cylinders
- Itinerary of the ship
- Number of crew on board
- Capability and willingness of the crew to perform the necessary checks and maintenance in line with the manufacturer's requirements
- Compliance with international or national standards for medical equipment
- Availability of the device in a suitable time frame.

IMHA notes the potential benefits of having an oxygen concentrator on board and supports ship owners in their decision to purchase such equipment if the appropriate risk assessment has been carried out.

Industrial oxygen

Ships carry industrial oxygen on board for use in procedures such as welding etc. The production of industrial oxygen is less strictly regulated than the production of medical oxygen, in particular the preparation of the tanks and cylinders. This can lead to industrial oxygen containing impurities that are not suitable for human use^{5 6}. Industrial oxygen also has a metallic taste and maybe unpleasant to breathe. However, in times of an acute emergency, where there is no medical oxygen available, and the need for oxygen is recognized, industrial oxygen manufacturers have been allowed to sell their oxygen for medical use⁷.

IMHA feels that the use of industrial oxygen to treat a seafarer on board a ship should only be considered in an acute life-threatening situation where oxygen is required, and **no** medical oxygen is available. It should only be used after consultation with TMAS or other shore side medical personnel and after a risk assessment.

The use of oxygen saturation probes

⁵ <https://www.ima-india.org/ima/pdfdata/Industrial%20Oxygen%20vs%20Medical%20Oxygen.pdf>

⁶ <https://indianexpress.com/article/explained/could-black-fungus-be-linked-to-industrial-oxygen-7326997/>

⁷ <https://www.gasworld.com/india-restrictions-on-oxygen-supply-as-fight-against-covid-continues/2020774.article>



IMHA

International Maritime Health Association

Monitoring oxygen saturation is important to determine whether oxygen treatment is effective and to prevent overtreatment⁸. A simple, inexpensive, and non-invasive way of doing this is pulse oximetry with the use of a fingertip oxygen saturation probe. Any device purchased should comply with the relevant national or international standards.

When a saturation probe is not available, the necessity of oxygen therapy should be guided by clinical signs, even though they are less reliable⁹.

IMHA is aware of the potential limitations to the use of pulse oximetry but strongly suggests that oxygen saturation probes are included as part of the ship's medicine chest during the COVID 19 pandemic, especially if additional oxygen is to be carried on board.

⁸ <https://www.who.int/publications/i/item/9789241509886>

⁹ Pocket book of hospital care for children: guidelines for management of common childhood illnesses, second edition. Geneva: World Health Organization; 2013.

<https://www.who.int/publications/i/item/978-92-4-154837-3>