Sjøfartsdirektoratet
Norwegian Maritime Authority

Circular - Series V

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The carriage and use of hydrogen peroxide (H_2O_2) for the treatment of fish

Purpose and scope

This circular provides guidance on the conditions on which exemptions may be granted from the requirements that apply when H_2O_2 (between 8% and 60%) is carried in bulk on cargo ships or barges engaged on domestic voyages and is used for the treatment of fish in wells or sea cages. The circular also provides information on requirements of the HSE Regulations and the Norwegian Coastal Administration's Regulations on vessels' notification obligations.

Vessels which have not been granted exemption must comply with the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals Bulk (IBC Code).

H_2O_2 is considered to be carried in bulk[1] when the substance is pumped to or from a tank arrangement on board, regardless of whether the tanks are integral tanks below deck, permanent tanks on deck or tank containers located on deck or in cargo spaces.

The circular provides information on conditions for exemption from the following regulations that apply when carrying noxious and/or dangerous liquid substances in bulk, including H_2O_2:

- *Regulations of 30 May 2012 No. 488 on environmental safety for ships and mobile offshore units (Environmental Safety Regulations)*
- *Regulations of 1 July 2014 No. 944 on dangerous goods on Norwegian ships (Dangerous Goods Regulations)*

Conditions for exemption

The Norwegian Maritime Authority may, *upon written application*, exempt a ship engaged on domestic voyages from one or more of the provisions of the Environmental Safety Regulations and/or from the Dangerous Goods Regulations when the requirements are not essential and the exemption is justifiable in terms of safety, cf. section 7 fourth paragraph of the Environmental Safety Regulations and section 14 of the Dangerous Goods Regulations. The conditions apply to

[1] The circular does not cover the carriage of H_2O_2 as dangerous packaged goods, where the substance is loaded, transported and unloaded in unbroken packaging. In those cases, the rules on such transport (IMDG Code) shall be complied with, and the vessel shall carry a Document of Compliance for the carriage of dangerous goods in packaged form (DoC).

exemptions granted from now on. Vessels which have already been granted exemption must comply with the conditions of the original exemption decision.

Taking into account the characteristics and the intended use of the substance, the Norwegian Maritime Authority considers that the purposes of the Environmental Safety Regulations and the Dangerous Goods Regulations are sufficiently fulfilled if the terms of this circular are met, and that the condition for exemption from these regulations in such cases is met.

Conditions

H_2O_2 is a dangerous chemical which is both hazardous, strongly oxidising, and, like other acids, corrosive. The following points are based on the IBC Code's general requirements for arrangements and the requirements which apply to H_2O_2 in particular. Before the system is put into service, the company shall ensure that the conditions below are fulfilled.

1. Requirements for arrangement

General

1.1. Arrangement(s) for H_2O_2 shall:
- 1.1.1. be so placed on open deck that in the event of a leak, the substance cannot permeate accommodation spaces, drinking water or provisions;
- 1.1.2. not be placed below accommodation spaces;
- 1.1.3. be separated from other cargoes and fuel oil which could cause a dangerous reaction upon contact with H_2O_2;
- 1.1.4. not be connected to the ship's drinking water system;
- 1.1.5. have the means for emergency discharge of H_2O_2 into the sea.

1.2. The deck shall not consist of organic material, such as wood.

1.3. Spaces that the arrangement passes through shall not contain organic material which may react with hydrogen peroxide in the event of a leakage.

1.4. The system shall be so designed as to prevent high pressure from building anywhere in the system, preferably by means of pressure relief valves.

1.5. The system shall be capable of being shut down easily and safely.

1.6. The system shall be so arranged that any leakage or spillage will be drained overboard.

1.7. Enclosed spaces containing equipment for the handling of H_2O_2, where personnel may enter during operation, shall have mechanical ventilation with the capacity of at least 30 changes of air per hour. The ventilation shall be of the extraction type. This ventilation system shall be capable of being controlled from outside the space in question. For spaces not used by personnel during operation, the capacity may be reduced to 8 changes of air per hour, provided that the hydrogen peroxide concentration in the air is measured before the space is entered.

1.8. Tanks and other equipment which are in contact with H_2O_2 shall be of either pure aluminium (99.5%) or of stainless steel suitable for use with H_2O_2 (304, 304L, 316, 316L, 316Ti). Piping on deck shall not be of aluminium. All non-metallic construction materials shall neither react with H_2O_2 nor contribute to its decomposition.

1.9. Hoses, tank containers and portable tanks containing hydrogen peroxide shall be protected from static electricity build-up.

Tanks

1.10. Tank containers shall be located on open decks.

1.11. Only portable tanks certified in accordance with the IMDG Code shall be used.

1.12. Tanks shall be fitted with a visual and audible high-level alarm activated at 95%.

1.13. Tanks shall be fitted with temperature sensors with a visual and audible alarm activated at 35ºC.

Piping arrangement

1.14. For live fish carriers where hydrogen peroxide is being dosed in wells or in the well circulation system, short pipe sections may be placed below deck. Pipes shall not pass through machinery spaces other than pump rooms.

1.15. Pipes installed inside the vessel shall have a wall thickness of at least 2 mm. Furthermore, the pipes shall be all-welded except from where there are necessary accepted couplings. For pipes piercing the well, thick-walled pipes shall be used, as specified in Regulation 22(7) of the Load Line Convention, from the well and up to a non-return valve or, if a non-return valve is not fitted, up to the freeboard deck.

1.16. Underneath manifolds and other connections, drip trays shall be provided to direct any spillage of H_2O_2 overboard. However, this is not a requirement underneath bolted flanges on open decks.

1.17. The system shall not be provided with valves where there is a risk of H_2O_2 spillage if opened during operation.

1.18. The arrangement shall be pressure-tested to at least 1.5 times the design pressure after assembly on board and after a conversion or repair. Afterwards, annual pressure testing at intervals of not less than 12 months must be documented.

1.19. The use of hoses and flanges shall be kept to a minimum. Hoses forming part of the arrangement shall be pressure-tested to at least 5 times the design pressure of the system. Annual pressure testing at intervals of not less than 12 months must be documented.

2. Operational requirements

2.1. A check list shall be prepared which shall be signed and filed every time the system has been in use. The check list shall cover the following points as a minimum:

- 2.1.1. Before operating the system, a thorough visual check of the flexible hoses in use has been carried out, where no defects or damage was discovered.
- 2.1.2. Before operating the system, all safety equipment specified in paragraph 3 has been tested and is ready for immediate use.
- 2.1.3. All personnel involved in the process has been trained in the use of the system and in the handling of H_2O_2.
- 2.1.4. Camlock couplings, if any, have been secured with strips or similar.
- 2.1.5. All personnel involved in the work are wearing the necessary protective equipment listed in paragraph 3.2.
- 2.1.6. Equipment is thoroughly rinsed after use.

2.2. As an alternative to paragraph 1.13, the temperature of the tanks may be read manually before and 2 hours after each operation/filling. The temperature shall also be read at least once per day even if the system is not in use. This must be specified in a procedure.

2.3. Risk assessment of the operation shall be performed regularly. In connection with the operation of H_2O_2 systems, reference is made in particular to section 2-2 of the HSE Regulations[2].

2.4. Containers and portable tanks shall be secured to the deck. Securing and supporting equipment shall be so arranged and dimensioned that containers and tanks will not shift, flip over or be lifted off the deck as a result of ship movements.

2.5. The portable tanks shall be dedicated H_2O_2 tanks.

3. Requirements for safety equipment and arrangements

3.1. The following safety equipment and arrangements shall be installed and ready for immediate use:

[2] Regulations of 1 January 2005 No. 8 on the working environment, health and safety of persons working on board ship

3.1.1. emergency shower facilities and means for eye wash, placed easily accessible;
3.1.2. hose with sufficient length and capacity for diluting smaller amounts of spillage;
3.1.3. fixed water-spray system for diluting the product in the event of leakage or spillage, if necessary to cool down the containers in the event of decomposition with heat generation. The system shall be capable of diluting the spilled substance to 35% within 5 minutes. The rate and size of the spillage shall be calculated based on the estimated maximum loading and discharge rates, the estimated time required to stop tank overfill or hose failure, and the time necessary to activate the water-spray system. The water-spray system shall be capable of covering all tanks and piping systems on deck containing H_2O_2.

3.2. Personnel handling H_2O_2 shall as a minimum wear the following dedicated personal protective equipment:
3.2.1. full-body protective clothing;
3.2.2. gloves;
3.2.3. shoes or boots; and
3.2.4. tight-fitting protective goggles.

3.3. The above-mentioned protective equipment shall be compliant with the Safety Data Sheet and be made of an inorganic material which is non-reactive with H_2O_2.

4. Documentation requirements

Upon initial installation and any later amendments to approved arrangement(s), the following vessel-specific documentation shall be submitted to the Norwegian Maritime Authority (post@sdir.no):

4.1. request for supervision and notification of conversion;
4.2. the following drawings:
4.2.1. system drawing(s) demonstrating compliance with the above-mentioned requirements, including:
4.2.1.1. the hydrogen peroxide system, including all piping/connections and valves;
4.2.1.2. material grade and the individual components. The individual components, such as valves, indicators, etc., must be numbered and rendered with name/function in a parts list;
4.2.2. ventilation drawings;
4.2.3. general arrangement showing the location of tanks and piping systems;
4.3. procedure for use of the H_2O_2 system, from the filling of product from container/tank ashore to start-up, use and run-down/shut-down of system on board;
4.4. stability documentation showing approved or sufficient stability with all equipment and full H_2O_2 tanks on board;
4.5. risk analyses;
4.6. Safety data sheet for H_2O_2;
4.7. drawing and documentation of tank container characteristics;
4.8. foundation drawings for tank containers, including calculations of underlying structure in accordance with a classification society's rules for such cargoes;
4.9. where portable tanks have a permanent location on board and pipe systems for connection to cargo well, these tanks shall be included in the tonnage calculations.

HSE Regulations

Please also note the requirements of the HSE Regulations, and in particular chapter 11 concerning the protection of persons working on board against exposure to chemicals and biological agents. Note that section 11-3 fifth paragraph stipulates that "common protective measures of a technical nature or measures, methods or procedures related to the organization of work shall be preferred wherever possible to individual protective measures".

National reporting system for dangerous cargo (SafeSeaNet)

Please bear in mind that vessels carrying hydrogen peroxide in bulk must comply with the Norwegian Coastal Administration's Regulations No. 1790 on vessels' notification obligations under the Harbour and Fairways Act. Section 11 sets out a requirement for reporting of dangerous goods on board ships:

"Vessels with hazardous or polluting cargo that depart from a quay, anchorage or mooring facilities in Norwegian territorial waters shall, prior to departure, provide information about the time of departure from the port and the expected time of arrival at the port of destination.

Vessels with hazardous or polluting cargo that shall call at a Norwegian port or territorial waters and which come from a port outside the EEA, shall provide information about the expected time of arrival at the destination".

In accordance with section 5 of the Regulations, notification on dangerous goods shall be submitted electronically via SafeSeaNet Norway.

The requirement to use SafeSeaNet applies to all ships, irrespective of size, carrying dangerous or polluting goods. The notification requirement also applies to vessels calling at and departing from ports in other EU/EEA states.

For more information about SafeSeaNet Norway and equivalent notification systems in other countries, please visit the Norwegian Coastal Administration's website. Please direct any question regarding the Regulations or the notification system to the Norwegian Coastal Administration.

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