



MARITIME AND PORT AUTHORITY OF SINGAPORE

PORT MARINE CIRCULAR
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Shipping Community
Harbour Craft Community
Owners and Operators of Oil Terminals

HYDROGEN SULPHIDE (H₂S)

1 This circular provides operational guidance to minimise the risks associated with the carriage and handling of oil and petroleum cargoes including bunker fuels containing high concentration of **H₂S** for vessels calling the Port of Singapore.

Information

2 Hydrogen Sulphide (**H₂S**) is a very toxic, corrosive and flammable gas. It is colourless and has a very low odour threshold and a distinctive odour of rotten eggs. In addition to being a health hazard, the H₂S odour is also considered a public nuisance.

3 Guidelines on **H₂S** toxicity, precautions, safe handling procedures, measurement and testing are published in the latest edition of International Safety Guide for Oil Tankers and Terminals (**ISGOTT**).

4 Cargo and bunker fuels should not be treated as free of **H₂S** until after they have been loaded and the absence of **H₂S** has been confirmed by both the results of monitoring and relevant MSDS information.

5 **Precautions against high H₂S concentrations are normally considered necessary, if the H₂S content in the vapour phase is 5 ppm by volume in air or above. A high H₂S cargo is considered to be a cargo that produces H₂S concentrations in the vapour space in excess of 100ppm. This concentration in the tank may potentially create an exposure concentration in excess of 5ppm on the open deck through leakage of vapour.**

Safety Procedures and Measures

6 The instructions and procedures to ensure safe operations when handling cargo and bunker fuels that are likely to contain **H₂S** and additional procedures for use when handling cargoes with very high levels of **H₂S** should be included in the tanker operator's Safety Management System (SMS) and the terminal's Operations Manual.

7 The cargo tank pressures should be maintained within acceptably low limits to avoid accidental release of gas. It should be noted that the tank vapour pressure will rapidly increase during tank washing and if vapour space is exposed to heat or the product is agitated.

8 The exposure levels in all work locations should be monitored by using suitable instrumentation for detecting and measuring the concentration of the gas. However, the operational procedures should ensure that the lowest possible gas concentrations are achieved at the work locations. When the concentration of **H₂S** exceeds the **TLV-TWA (5 ppm by volume in air)** and the vapour does not disperse easily, considerations should be given for suspending cargo operations in still wind conditions.

9 Personnel should always carry personal gas monitors when engaged in cargo operations and working in enclosed spaces.

10 Personnel should be required to wear respiratory protective equipment i.e. Emergency Escape Breathing Devices in working areas where positive monitoring cannot be carried out and/or concentrations of vapour may be expected to exceed the **TLV-TWA (5 ppm by volume in air)**. They should be used in conjunction with a personal **H₂S** gas monitoring/alarm instrument.

11 Self-contained breathing apparatus should always be worn if it is considered necessary to breach the integrity of the cargo system and a vapour free atmosphere cannot be guaranteed. This would include the following activities:

- i. Open gauging and sampling;
- ii. Removing blanks for connecting the cargo hose or loading arm;
- iii. Cleaning filters;
- iv. Draining lines to open containment; and
- v. Mopping up spills.

12 For any queries relating to this circular, please contact Marine Safety Control Centre at (65) 6325 2488 / 2489.

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