STANDARDS FOR PORT LIMIT METHANOL BUNKER TANKERS

INTRODUCTION

The “Standards for Port Limit Methanol Bunker Tankers” covers equipment, operational performance and efficiency of methanol bunker tankers. All methanol bunker tankers operating in the Port of Singapore shall comply with the standards as set out in this document.

All methanol bunker tankers licensed by MPA must be registered with the Singapore Registry of Ships (SRS) and classed by any one of the MPA Recognised Organisation as an IMO type II tanker.

All cargo tanks, cargo pipes, pumps, valves etc in contact with methanol or methanol vapour must be compatible with methanol.

All methanol bunker tankers licensed by MPA must comply with the requirements and conditions of licensing as imposed by MPA, including compliance with standards listed in this document, Technical References, Singapore Standards, Port Marine Circulars and other applicable requirements that may be in force or amended from time to time.

In 2023, MPA announced that all licensed methanol bunker tankers operating in Singapore’s port waters will be required to be fully electric, be capable of using B100 biofuel, or be compatible with net-zero fuels from 2030 onwards.

STANDARDS FOR PORT LIMIT METHANOL BUNKER TANKERS

All methanol bunker tankers shall comply with MARPOL ANNEX II and all items of this document

1 Manoeuvring Requirements

1.1 Manoeuvring Flexibility

The following propulsion types and requirements are set:

250 to less than 500GT	500 to less than 1,500GT	1,500GT and above
Single Screw or equivalent performance	Twin Screw or Single Screw with Bow Thruster(s) or equivalent performance	Twin Screw with Bow Thruster(s) or equivalent performance

1.2 Any equivalent design such as azimuth thrusters etc may also be considered only with prior approval from MPA.

1.3 Speed

A minimum speed of 8 knots measured at 100% of engine rated load at the time of sea trial under loaded condition shall be attained.

1.4 Engine Reliability

The following standards shall apply:

(i) Number of Engine Starting

The minimum number of successful starts attainable by the engine shall at least meet the requirement set by the Recognised Organisation authorised by MPA.

(ii) Engine Response time

With the methanol bunker tanker travelling at a speed of at least 4 knots, the engine response time from stop to ahead or astern shall not exceed 3 seconds.

(iii) Stopping Distance at Load Draft

The stopping distance at loaded draft with a speed of 5 knots shall not be greater than three ships' length.

(iv) Turning Circle in Confined Waters

The methanol bunker tanker shall have a turning circle of not more than 1.5 times of its own length, and the time taken to complete a swing of 180 degrees from a stationary position shall not exceed 2 minutes.
For methanol bunker tankers of 5,000 GT and above, the time taken to complete a swing of 180 degrees from a stationary position shall not exceed 4 minutes.

(v) Bridge-controlled Propulsion Machinery

The methanol bunker tanker shall have Centralized Bridge Control for the main propulsion system which shall incorporate stopping, reversing and speed control of the main engine(s).

1.5 Fuel used for main and auxiliary engine(s)

(i) The main and auxiliary engine of the methanol bunker tanker must be capable to burn using B100 biofuel or be compatible with net-zero fuels.

(ii) The methanol bunker tanker may also be fully electric.

2 Vapour Management

Both the methanol bunker tanker and receiving vessel shall commit to carrying out the bunkering operation without venting methanol vapour to the atmosphere, except in a safe and controlled manner as approved by MPA or in emergency circumstances. During the bunkering process, tank pressures shall be monitored and controlled to prevent over-pressurization and subsequent release through the Pressure-Vacuum (PV) valves. The vapor management methodology shall be included in the bunkering plan.

3 Pumping Rate

For methanol as marine fuel, pumping rates shall be determined at the methanol bunker tanker manifold(s). The methanol bunker tanker shall achieve the minimum pumping rate of 1000 cu m/hr (subjected to MPA's review) when pumping methanol marine grade (MMA, MMB, MMC) fuel under the pressure of 7 bar without the use of flow meter and without the vapour recovery line in place. The flow rate in the cargo lines shall not be more than 7 m/s.

4 Loading Rate

4.1 The methanol bunker tanker shall achieve the minimum loading rate of 1000 cu m/hour when receiving methanol marine grade (MMA, MMB, MMC) cargo under the pressure of 7 bar without the use of flow meter and without the vapour recovery line in place.

4.2 Vent Systems for Cargo Containment

All cargo tanks, including deck tanks, shall be fitted with a minimum of two pressure relief valves (PRVs), each being of equal size within manufacturer's tolerances and suitably designed and constructed for the prescribed service, in accordance with IBC Code Chapter 8, and comply with the requirements of the MPA Recognised Organisation.

5 Bunker Boom

5.1 All methanol bunker tankers shall have bunker boom fitted. The bunker boom shall meet the following standards:

(i) Pneumatically or hydraulically operated by a single person.

(ii) The minimum safe working load shall commensurate with the size of the boom.

(iii) For non-flow bunker boom having bunker hose attached, lifting bridles and saddles shall be provided at suitable positions along the boom to support the hose and prevent it from bending.

(iv) Materials used in the bunker boom in contact with methanol or its vapour are to be compatible with the characteristics of methanol.

(v) The bunker boom should be designed to be capable of reaching the bunker manifolds of receiving vessels and/or of semi enclosed design.

(vi) The bunker boom must be able to handle and transfer both the liquid and vapour hoses to the receiving vessel safely.

(vii) The Bunker boom piping components and/or hose(s) are to be leak tested not less than the maximum operating pressure in accordance to the requirements of Recognised Organisation authorised by MPA, taking into account of the IBC Code.

6 Product Segregation

6.1 If more than one grade of methanol marine grade (MMA, MMB, MMC) fuel* are carried, means for complete segregation should be available which includes:

(i) double-valve segregation at the pump room and at the manifold(s)

(ii) has segregated tanks to minimise product contamination.

*Refer to ISO 6583

6.2 If methanol and other products are carried, means for complete segregation should be available which includes:

(i) double-valve segregation at the pump room and at the manifold(s)

(ii) has segregated tanks to minimise product contamination.

(iii) has suitable number of cargo systems.

7 Manifold Size

7.1 The methanol bunker tanker manifold(s) shall be fitted with American National Standards Institute (ANSI) 150 flange or equivalent.

7.2 The methanol bunker tanker shall have the manifold sizes of at least 200 mm diameter.

7.3 The main manifold(s) shall be located at the mid-ship to facilitate loading and supply.

7.4 The bunkering manifold should be designed to withstand the external loads during bunkering. The connections at the bunkering station should be of dry-disconnect type equipped with additional safety dry break-away coupling/self-sealing quick release. The couplings should be of a standard type.

7.5 Manifold strong back rails are recommended to be provided to assist in securing the methanol bunker hose for additional support as may be necessary.

8 Manifold Drip/Spill Pan

8.1 The manifold(s) of the methanol bunker tanker shall be fitted with drip spill pan to contain any methanol spill. A drain valve must be installed at the drip spill pan and may lead to a holding tank.

8.2 Gutter plate shall also be provided on the main deck to contain any methanol spill on deck and the spill is to be managed according to Shipboard Marine Pollution Emergency Plan for noxious liquid substances (SMPEP).

9 Reducers for Hose Connection

9.1 The methanol bunker tanker shall carry Japanese Industrial Standards (JIS) and American National Standards Institute (ANSI) standard reducers and adaptors on board to accommodate the different sizes of bunker manifold flanges on the receiving vessels.

9.2 Materials used in the manufacture of the reducers and adaptors are to be compatible with the characteristics of methanol or its vapour.

9.3 The sizes of the reducers and adaptors carried onboard the methanol bunker tankers are as follows:

100 mm and 4-inch

125 mm and 5-inch
150 mm and 6-inch
200 mm and 8-inch
250 mm and 10-inch

9.4 In the event that multiple reducers and adaptors are required to be connected and used at a single connection side, a spreader or equivalent structure should be utilised under these group of reducers and adaptors to support the weight of these additional fittings extending from the bunker line connection.

10 Bunkering Connections

10.1 Appropriately sized Quick Connect and Disconnect Coupling (QCDC) shall be provided for both the liquid and the vapour hose.

10.2 Dry Breakaway coupling (DBC) shall also be provided for both the liquid and the vapour hose.

10.3 Portable support to be provided to support the weight of the QCDC and DBC for both liquid and vapour line.

10.4 Manual for the QCDC and DBC must be present onboard.

11 Methanol Bunker and vapour recovery hoses

11.1 Methanol bunker and vapour recovery hoses ("hoses") shall meet the following standards:

(i) Hoses shall be of composite type suitable for methanol with the specific maximum working pressure not less than 10 bar gauge.

(ii) The composite type hoses must be type approved by a MPA Recognised Organisation.

(iii) Hoses shall comply with the testing requirements in Chapter 8 of IMO MSC.1/Circ.1621 Interim Guidelines for the Safety of Ships Using Methyl/Ethyl Alcohol as Fuel, as may be amended.

(iv) The hoses must have built-in insulating flanges and must have a resistance of no less than 25,000Ω measured from flange to flange.

(v) The nominal diameter of the hose(s) shall be determined based on the maximum flow velocity and the transfer rate taking into account the sizes of reducers and adaptors.

(vi) The length of each of the hose(s) must be of sufficient length to avoid the need for connecting two or more hoses.

(vii) There must be at least three hoses onboard and arrangements made for safe storage of the hoses.

(viii) Tests and inspection of the hose(s) must be carried out every 12 months, including electrical continuity test.

(ix) Hoses to be visually inspected by a MPA Recognised Organisation during the annual survey of the methanol bunker tanker.

(x) The vapour recovery hose(s) must be marked clearly to prevent inadvertent use as liquid hose.

(xi) Hosebun and strops must be provided for supporting the hoses to ensure that they are not narrow than the helix pitch of the hose and able to support several turns of the outer helix. At least four hosebuns of appropriate size to be provided onboard.

(xii) Sufficient number of hose lifting strops with suitable safe working load (SWL) should be provided onboard and all rated and certified by the manufacturer.

12 Purging and cladding

12.1 The Methanol bunker tanker must have provision to:

(i) Blow through and purge the bunker and the vapour recovery hoses with nitrogen after each bunkering operation.

(ii) Leak test the bunker and the vapour recovery hoses with nitrogen prior to starting of each bunkering operation no less than the maximum operating pressure.

(iii) Clad the methanol cargo tanks with nitrogen after each loading operation.

12.2 Installation of the Inert Gas System such as the Nitrogen Generator, shall be designed, constructed and tested to the satisfaction of the MPA Recognised Organisation. It shall be designed to be capable of rendering and maintaining the atmosphere of the relevant cargo tanks non-flammable.

13 Bunker Quantity Control – Cargo Measurement System

13.1 The methanol bunker tanker shall have the following document and equipment for measuring the quantity of bunkers:

13.2 Tank Calibration Tables

(i) The methanol bunker tanker tanks shall be calibrated and certified by a surveying company acceptable to the MPA Recognised Organisation. An original certified copy of the tank calibration tables shall be kept onboard.

(ii) The tank calibration tables shall contain the following: -

(a) name and SB licence number of the methanol bunker tanker;

(b) list /trim correction;

(c) cargo tanks measurement;

(d) reference height of every cargo tank;

(e) name and stamp of the company which calibrated the tanks on every page;

(f) date of calibration;

(g) page number on every page; and

(h) tank capacity plan of the methanol bunker tanker.

(iii) The tank calibration tables shall be sealed and properly bound to prevent any unauthorised tampering.

(iv) The methanol bunker tanker shall only carry its latest certified tank calibration tables for verification by the vessel receiving bunkers and by the relevant authority. An identical copy of the tank calibration tables shall have been deposited with MPA.

(v) Should there be any change in the tank capacity of the methanol bunker tanker, the owner and/or operator of the methanol bunker tanker shall not carry out any delivery of bunkers until new tank calibration tables for the affected or modified tanks, which comply with the requirements mentioned in items 15.1 (i) to 15.1 (iv) above, are placed onboard the methanol bunker tanker and a true copy of the same, with each page certified, deposited with the MPA.

13.3 Sounding Pipe

(i) Each sounding pipe of the cargo tank shall have a reference height which shall be clearly stated in the tank calibration tables.

(ii) A template stating the reference height shall also be permanently fitted onto every sounding pipe of the cargo tank.

(iii) All the sounding pipes for the cargo/slop tanks must have provisions to facilitate “closed” sounding and “closed” sampling.

13.4 Ullage and Temperature Measuring Devices

(i) The methanol bunker tanker must be provided with at least two intrinsically safe gastight portable instruments for measuring ullage, oil-water interface, temperature, and bottom dryness in shipboard chemical tank systems.

(ii) These devices must be calibrated and certified annually according to the manufacturer, Flag and MPA Recognised Organisation's recommendations.

13.5 Automatic gauging (Level or Volume)

(i) Automatic gauging system is to be fitted as a supplement to the manual tank sounding / ullaging system, the following standards shall apply:

(a) The system shall be able to provide remote oil temperature readings to allow for volumetric correction of the methanol bunker quantity.

(b) Every cargo tank shall be installed with one level and multiple temperature sensors. The level sensors shall preferably be located at the after-bulkheads of the tanks.

(c) The system may also be connected to a computer having sounding, volume and weight calculations with specific gravity and temperature corrections.

(d) The automatic gauging system must be installed in accordance with the requirements with applicable class rules and certified by the MPA Recognised Organisation.

13.6 High Level Alarm

(i) All the cargo/slop tanks of the methanol bunker tanker must be fitted with High Level (HL) and High High Level (HHL) alarm providing audio and visual alarms. The HHL alarm system shall be independent from the HL alarm system and shall be accordance to IBC Code.

13.7 Flow – meter

(i) A Mass Flow Meter (MFM) accepted by MPA is to be used for measurement of the methanol quantity delivered. In addition, the following standards shall apply:

(a) The MFM must be certified to be used for methanol and the materials used in the MFM in contact with methanol or its vapour are to be compatible with the characteristics of methanol.

(b) The MFM system shall have an accuracy of plus or minus 0.5%.

(c) Instructions on the flow-meter volumetric calculation shall be available for reference.

(d) A certificate of verification issued by the Weights and Measures Office, Singapore, for the MFM shall be carried on board.

(e) The seal of the MFM by the Weight & Measures Office shall be intact.

(f) The cargo piping diagram must have the flow meter incorporated and approved by the MPA Recognised Organisation of the vessel.

(g) The installation of the MFM and the MFM system must be approved by the MPA Recognised Organisation of the vessel.

(h) Prior to the methanol bunker tanker starting with methanol bunkering operation in the port of Singapore, all the requirements of the standards in the Technical Reference (TR) Methanol Bunkering must be complied with.

13.8 Plans and Diagrams

(i) General layout plan of the methanol bunker tanker shall be conspicuously displayed on board.

(ii) Tank capacity plan, Piping Diagram and Trim and Stability Tables shall be available on board for inspection by any party concerned.

14 Bunker Quality Control

14.1 The methanol bunker tanker shall be equipped with proper sampling equipment as described below.

14.2 Sampling Equipment

(i) The sampling equipment shall consist of the sampling device, including the needle valve with tamper-proof cap and have the following requirements:

(ii) The probe of the sampling device shall extend across the full diameter of the sampler. The end of the sampling probe shall be closed, and the wall perforated with 5 mm diameter holes spaced 20 mm apart throughout its length. A needle valve shall be fitted at the bottom of the sampling probe outside the sampler to control the rate at which a continuous drip sample can be drawn. This shall also serve as a stop valve for the sampling. The sampling probe shall be detachable for cleaning and inspection.

(iii) A weather-tight drip stainless steel / glass sampling container that having a capacity of at least 5 litres which can be secured with tamper-proof seal.

(iv) Every methanol bunker tanker shall be equipped with a sampling device as per Appendix 1.

(v) The sampling device as per Appendix 1 shall be attached to the end flange of the delivery hose for the connection to the bunker manifold flange of the receiving vessel.

(vi) Every methanol bunker tanker shall carry the following items

(a) Colourless glass sample bottles. Bottle cap should be resistant to UV and have no influence on quality of Methanol. (refer to Appendix 1 example 2)

15 Navigation Equipment/ Signalling Equipment/ Charts/ Nautical Publications

15.1 To be compliance with SOLAS Chapter IV Radiocommunications and SOLAS Chapter V Safety of Navigation.

16 Communication Equipment

16.1 To be compliance with SOLAS Chapter IV Radiocommunications.

16.2 The methanol bunker tanker shall be equipped with a radiotelephone which is capable of operating in the International Maritime Mobile VHF Radiocommunication Service in the 156-174 MHZ and on such channels as may be specified by the Port Master from time to time.

16.3 A ship-shore link (SSL) or an equivalent means for automatic and manual emergency shut down (ESD) communication should be fitted so that any activation of ESD systems performs a simultaneous shutdown on both the supply ship and the receiving ship.

17 Other Standards

17.1 Identification Marks

(i) The licence number of the methanol bunker tanker shall be painted in large letters on each side of the bow against a contrasting background and carved on, cut in, or centre punched into the main beam.

(ii) The licence number of the methanol bunker tanker shall also be painted or carved in large letters on each side of the navigating bridge and on the bridge front for easy identification purposes.

(iii) The minimum height (with proportionate breadth and thickness) of the letters and numbers comprising the licence number of the bunker tanker at the bow shall be as follows:

Length of Bunker Tanker	Height	Breadth	Thickness of Letters and Numbers

Above 20 m	30 cm	20 cm	5 cm

17.2 Lighting and CCTV camera

(i) The methanol bunker tanker shall be fitted with adequate safe lighting to cover the area of the methanol bunker tanker, bunker manifold connection and hose handling equipment.

(ii) The minimum illumination at night shall be at least 100 lux at the bunker manifold(s).

(iii) CCTV must be installed so that all the manifolds, the MFM on deck and the MFM computer can be continuously monitored at least from the bridge or the cargo control room. Installation of such CCTV must be approved by the MPA Recognised Organisation. It is recommended to install CCTV camera with IR capability.

(iv) The CCTV camera must be connected to a storage and extraction device which can store the video footages for at least 30 days.

(v) The bunker tanker shall be fitted with lightning arresters installed on its main and fore mast grounded to ship's hull structure. Installation of such lightning arresters must be approved by the MPA Recognised Organisation.

17.3 Fender

(i) The methanol bunker tanker shall have proper fender system to minimise damage to the receiving vessel during bunkering. Factors determining the number and size of fenders include:

(a) Size and displacement of the vessel

(b) Impact force over landing area

(c) Environmental force

(d) Fender type and material

(e) Characteristics of the receiving vessel

*References can be made from OCIMF's Ship to Ship transfer guide. Launch boat is recommended to be deployed for crew transfer if required.

17.4 Anti-pollution Equipment

The methanol bunker tanker shall carry onboard a SMPEP and shall be approved by MPA. The guidelines for development of the SMPEP may be found in resolution MEPC.85(44) as amended by resolution MEPC.137(53).

17.5 Operational Safety

(i) The methanol bunker tanker shall have on board a copy of the following publications:

(a) Latest edition of the International Safety Guide for Oil Tankers & Terminals (ISGOTT).

(b) Latest editions of the Ship-to-Ship Transfer Guide for petroleum, chemicals and liquefied gases (CDI, ICS, OCIMF, SIGTTO)

(c) Guidelines for Liquid Chemical Hose management (CDI)

(d) IGF Code

(e) MSC.1/Circ1621 - Interim Guidelines for Safety of Ships using Methy/Ethyl alcohol as fuel, as amended from time to time.

17.6 Methanol vapour sensor

Bunker tanker shall be provided with methanol vapour sensors to detect any leakage. i.e. bunker station.

17.7 Other safety equipment's

(i) In addition to the personal protective equipment's required under statutory and class requirements, the following safety equipment must be provided onboard the methanol bunker tanker:

(a) At least three portable methanol personal gas detectors

(b) Intrinsically safe Infra-red camera

(c) Portable lightning detector

17.8 Training and Certification

(i) The crew of the methanol bunker tanker must be trained in accordance with all statutory requirements.

(ii) In addition, the crew of the methanol bunker tanker must attend the training for methanol handling as developed by MPA, including:

(a) Basic Training for handling of Methanol as fuel for Maritime personnel for those seafarers and maritime personnel who are responsible for designated safety duties associated with the care, use or in emergency response to methanol as fuel; and

(b) Advanced Training for Handling of Methanol as Fuel for Maritime Personnel for those masters, officers and other personnel who are immediately responsible for the care, use

or in emergency response to methanol as fuel.

(iii) In the event the methanol bunker tanker also burns methanol as fuel or other alternative fuels (such as LNG, ammonia, etc) for their tanker's own propulsion and power generation, the crew must also hold all relevant certifications under the STCW Convention and Code including regulation V/3 of the STCW Convention and Section A-V/3 of the STCW Code.

(iv) The company shall ensure that seafarers on board ships using methanol as fuel or other alternative fuels (such as LNG, ammonia, etc) for their tanker's own propulsion and power generations, have completed training to attain the abilities that are appropriate to the capacity to be filled, and duties and responsibilities to be taken up, taking into account the specific hazards of the alternative fuel used.

17.9 Document of Compliance

The ISM manager of the methanol bunker tanker must have a Document of Compliance to operate chemical tankers.

17.10 Crew Accommodation and recreational facilities

(i) The crew accommodation and recreational facilities must be in accordance with title 3 of the Maritime Labour Convention, 2006 as may be amended.

(ii) A Statement of Fact to be issued by the MPA Recognised Organisation and verified every 5 years.

17.11 Digital Bunkering

(i) The methanol bunker tanker must be installed with provisions capable of transmitting bunkering data to MPA's digitalBunker@SG such as 5G cellular antenna with Wi-Fi access points or similar. The cellular antenna(s) should be located at the highest point of the vessel, preferably at the monkey island.

(ii) Parts that are located outside of the vessel's bridge/accommodation block must be suitable for marine use.

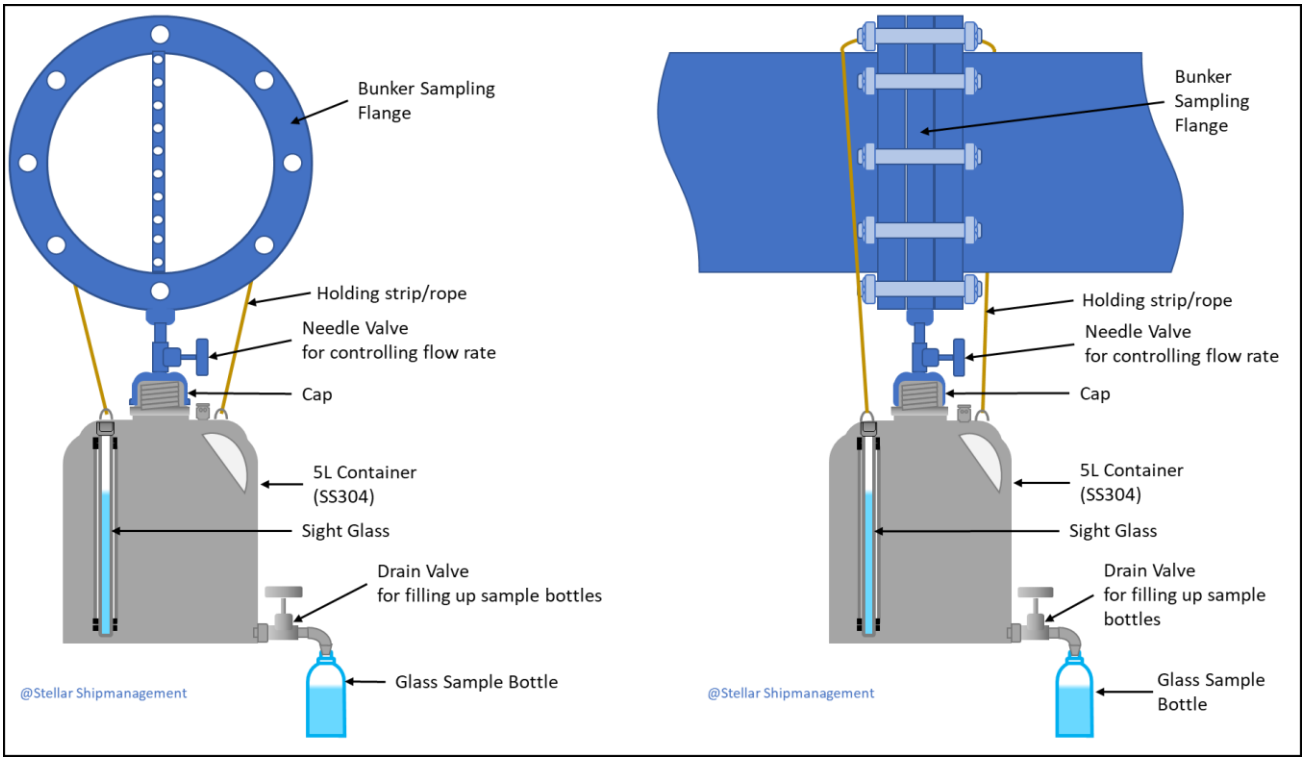
(iii) All such installations must be carried out to the satisfaction of the MPA Recognised Organisation.

- End –

Appendix 1
(Informative)

Diagrams of sampling equipment

Design of sampling equipment - Example 1



Example of a sample bottle - Example 2