Department of Marine Administration - Yangon Myanmar			
Policy for Testing of Oil Discharge Monitoring and Control System			
Operational Procedure : QOP - 72 - 01- (17)		**Revision: 0**	**Page 1**
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Subj: INTERIM GUIDANCE FOR TESTING OF OIL DISCHARGE MONITORING AND CONTROL SYSTEM (ACCORDING TO MARPOL ANNEX I)

Ref: International Convention for the Prevention of Pollution from ship (MARPOL), Regulations 14, 15, 30 & 31 of Annex I –Regulations for the Prevention of Pollution by Oil from ships.

IMO Resolution MEPC.108 (49) Revised Guidelines and Specifications for Oil Discharge Monitoring and Control Systems for Oil Tankers

IMO Resolution MEPC.240 (65) Amendment of 2013 to the Revised Guidelines and Specifications for Oil Discharge Monitoring and Control Systems for Oil Tankers

1. **Purpose**

This policy letter provides interim guidance to ensure that, Myanmar and other flag oceangoing ships are equipped with oil filtering equipment, in compliance with MARPOL 73/ 78 and amendments to reference.

2. **Action**

Myanmar flag state Surveyors and recognized Surveyors shall use this interim guidance in the oversight of their respective Myanmar flag and foreign flag ships.

3. **Directives Affected**

April 21 2014.

4. **Background**

MARPOL ANNEX I, REGULATION FOR THE PREVENTION OF POLLUTION BY OIL FROM SHIP. On May 4, 1988, the Republic of the Union of Myanmar was signed for the MARPOL Annex (1) & (2) and enters into force on August 4, 1988.

Approved by & date:	Approved by & date:
Originated by :	This Revision Date :

5. **Enforcement**

Myanmar flag state officers should verify a foreign flag ship's compliance with MARPOL Annex – I during normally scheduled inspection. For Myanmar ships operating strictly on domestic routes, compliance should be verified by Myanmar Flag state Surveyors during normally scheduled inspections, but an educational outreach and awareness approach is encouraged. However, current enforcement options remain in place for willful and egregious violators or repeat offenders.

6. **Limitation**.

6.1 **Oil discharge monitoring and control system**

6.1.1 The monitoring system is to be capable of effectively monitoring and controlling the overboard discharge of any effluent into the sea through those overboard discharge outlets permitted by Regulation 30 of MARPOL Annex I which, in the opinion of the Administration, are necessary to fulfill the operational requirements of the oil tanker. Any discharge of oily ballast water or other oily waters from the cargo tank area into the sea via ports not controlled by the monitoring and control system is against the Convention.

6.1.2 The monitoring system is to function effectively under all environmental conditions which oil tankers are normally assumed to encounter, and is to be designed and constructed to comply with IMO Resolution MEPC. 108 (49) and satisfy the specifications for environmental testing specified in Part 2 of the annex to Resolution MEPC. 240 (65). Moreover,

(1) The monitoring system is to be so designed that no discharge of oily ballast water or other oily waters from the cargo tank areas can take place unless the system is under the normal operation mode and the relevant sampling point has been selected;

(2) The monitoring system is preferably to sample the effluent discharge from a minimum number of discharge outlets and be so arranged that overboard discharge can take place via only one outlet at a time;

(3) Where more than one line is intended to be used for simultaneous discharge, an oil content meter, together with a flow meter, are to be installed on each discharge line. These instruments are to be connected to a common processor; and

(4) In order to avoid alarms due to short-term high oil concentration signals (spikes) causing indications of high instantaneous rates of discharge, the short-term high ppm signal (spike) may be suppressed for a maximum of 10s. As an alternative, the instantaneous rate of discharge may be continuously averaged during the preceding 20s or less as computed from instantaneous ppm values of the oil content meter readings received at intervals not exceeding 5s.

6.1.3 The monitoring system is to comprise:

(1) An oil content meter to measure the oil content of the effluent in ppm. The oil content meter is to be approved in accordance with the provisions contained intima Resolution MEPC.108(49) and the Annex to IMO Resolution MEPC.240(65), and be certified taking into account the range of cargos carried;

(2) A flow rate indicating system to measure the flow rate of effluent being discharged into the sea;

(3) A ship speed indicating device to give the ship's speed in knot; (4) A ship position indicating device to give the ship's position both in longitude and latitude;

(5) A sampling system to convey a representative sample of the effluent to the oil content meter;

(6) An overboard discharge control to stop the overboard discharge;

(7) A starting interlock to prevent discharge overboard of any effluent unless the monitoring system is fully operational; and

(8) A control section comprising:

- A processor, which receives signals of oil content in the effluent, the effluent flow rate and the ship's speed and computes these values into liters of oil discharged per nautical mile and the total quantity of discharged oil;
- Means to provide alarms and command signals to the overboard discharge control;
- A recording device to provide a record of data in accordance with paragraph4.9.2;

- A data display to exhibit the current operational data in accordance with paragraph4.10;
- An override system to be used in the event of the monitoring system failure;
- Means to provide signals to the starting interlock to prevent the discharge of any effluent before the monitoring system is fully operational.

Each main component of the oil content monitoring system is to be fitted with a nameplate, and such component is to be capable of being properly identified by the assembly drawing number, type or model type and serial number on the nameplate, as appropriate.

The electrical components of the monitoring system, if installed in a hazardous area, are to meet the applicable safety requirements laid down for these areas (see IEC Publication 92 or equivalent document).

6.2 **Oil content meter**

6.2.1 An oil content meter is to comply with IMO Resolution MEPC. 108(49), satisfy the test and performance specifications contained in Part 1 of the Annex to Resolution MEPC. 240(65) and conform to the general requirements contained in the subsection.

6.2.2 The accuracy of oil content meters designed to monitor a wider range of oil content is to be such that the reading can represent the actual oil content of the sample being tested within ±10 ppm or ±10%, whichever is the greater. The accuracy is to remain within the above range despite the presence of contaminants other than oil, such as entrained air, rust, mud and sand.

6.2.3 The oil content meter is to be designed so that if functions within the above range when the power supply (in the form of electricity, compressed air, etc.) is varied by 10%from the value for which the meter is designed.

6.2.4 It is desirable that the readings are not to be affected by the type of oil. In case they are affected, it is not to be necessary to calibrate the meter onboard, but pre-set alterations in the calibration may be made in accordance with the manufacturer’s instructions. In the latter case, means are to be available to check that the correct calibration has been selected for the oil in question. The accuracy of readings is to at all times remain within the range specified in 6.2.2.

6.2.5 The response time of the oil content meter is not to exceed 20 seconds.

6.2.6 The oil content meter may have several scales as appropriate for its intended use. The full range of the scale is not to be less than1000ppm.

6.2.7 The oil content meter is to be provided with simple means to enable the ship's crew to check the functioning of the electrical and electronic circuitry of the oil content meter by introduction of a simulated signal corresponding approximately to half the full-scale reading of the meter. It may also be possible for qualified personnel to recalibrate the meter onboard the oil tanker.

6.2.8 The oil content meter is, if intended to be fitted in locations with possible flammable atmospheres, to comply with the relevant safety regulations for such spaces. Any electrical device as a part of the oil content meter is to be placed in a non-hazardous area or to be certified by the Administration as safe for use in a hazardous area. Any moving part which is fitted in a hazardous area is to be so arranged as to avoid electrostatic discharge.

6.2.9 The oil content meter is not to contain or use any substance of dangerous nature, unless adequate arrangements, acceptable to the Administration, are provided to eliminate any hazard caused thereby.

6.2.10 The oil content meter is to be of corrosion resistance under marine environment conditions.

6.2.11 The oil content meter is to be constructed of the materials compatible with the liquids to be tested.

6.3 Sampling system

6.3.1 The sampling points are to be so located that the relevant samples can be obtained from those discharge outlets described in 6.1.1. The sampling probes located on the overboard discharge pipe and the piping system connecting the sampling probes to the oil content meter are to comply with the requirements of this section.

6.3.2 The piping and probes are to be of a material resistant to fire, corrosion and oil, and to be adequately strong, properly joined and supported.

6.3.3 The system is to be provided with a stop valve fitted adjacent to each probe, except that, where the probe is mounted on a cargo line, two stop valves are to be fitted, in series, on the sample line; one of these may be a remotely controlled sample selector valve.

6.3.4 The sampling probes are to be arranged for easy withdrawal, and as far as practicable, be mounted at an easily accessible location on a vertical section of the discharge line. Where it is necessary to install the sampling probes on a horizontal section of the discharge line, it is to be ascertained, during the installation inspection, that the pipe runs full of liquid at all times during discharge of the effluent. The sampling probes are normally to penetrate inside the discharge pipe to a distance of one quarter the diameter of that pipe.

6.3.5 Means are to be provided for cleaning the probes and piping system by provision of permanent clean water flushing arrangements or an equivalent method. The probes and piping are to be so designed as to minimize their clogging by oil, oil residue and other substances.

6.3.6 The velocity of the fluid in the piping is to be such that, taking into account the length of the piping, the overall response time from the moment of change in concentration of the mixture out of the sampling point to the moment of change in the meter reading, including the response time of the meter, is to be not more than 40 seconds.

6.3.7 The location of sampling probes in relation to any point of flow diversion to a slop tank is to be selected with regard to the need for sampling the oily water in the recirculation mode.

6.3.8 The sampling pump or any other pump provided in the system is to be arranged with attention to the safety requirements for the space in which the pump is located. Any bulkhead penetration between a hazardous area and a non-hazardous area is to be of a design approved by the Administration.

6.3.9 The flushing arrangements are to be capable of being used for Operation test and stabilizing the oil content meter and correcting for zero setting, where necessary.

6.3.10 The sample water returning to the slop tank is not to be allowed to free-fall into the tank. In tankers equipped with inert gas systems, a U-seal of appropriate height is to be arranged on the piping leading to the slop tank.

6.3.11 A valve is to be provided for manual collection of samples from the inlet piping of the oil content meter at a point downstream of any sampling pump or at an equivalent location satisfactory to the Administration.

6.4 Flow rate indicating system

6.4.1 A flow meter for measuring the rate of discharge is to be installed on a vertical section of a discharge line or on any other section of a discharge line as appropriate, so as to keep the flow meter full of the liquid being discharged all the times.

6.4.2 A flow meter is to be provided by the operation principle which is suitable for shipboard use and can be used in large diameter pipes.

6.4.3 A flow meter is to be suitable for the full range of flow rates that may be encountered during normal operation. Alternatively, arrangements such as the use of two flow meters of different ranges or a restriction of the operational flow rate range may be necessary to meet this requirement.

6.4.4 The flow meter, as installed, is to have an accuracy of ± 10%, or better, of the instantaneous rate of discharge throughout the discharge of the effluent.

64.5 Any component of the flow meter in contact with the effluent is to be of corrosion and oil resistant material of adequate strength.

6.4.6 The arrangement of the flow meter is to be designed taking into account the safety requirements for the space in which the flow meter is located.

6.5 Ship speed indicating system

The automatic speed signal required for a monitoring system is to be obtained from the ship speed indicating device (refer to Recommendation on Performance Standards for Devices to Indicate Speed and Distance (Annex to Resolution A. 824(19), as amended by Resolution MSC.96(72)) by means of a repeater signal. The speed information used may be either speed over the land or speed through the water, depending on the speed measuring device installed on board.

6.6 Ship position indicating device

The ship position indicating device is to consist of a receiver for the global navigation satellite system or the terrestrial radio navigation system, or other means, suitable for use at all times throughout the intended voyage to establish and update the ship position information automatically.

6.7 Overboard discharge control management

The overboard discharge control is to be able to stop the discharge of the effluent into the sea automatically by either closing all relevant overboard discharge valves or stopping all relevant pumps. The discharge control arrangement is to be fail-safe so that all effluent

discharge is stopped when the monitoring system is not in operation, under alarm conditions, or when the monitoring system fails to function.

6.8 Processor and transmitting device

6.8.1 The processor of a control section is to receive signals from the oil content meter, the flow rate indicating system and the ship speed indicating system at the interval not exceeding 5seconds and is to automatically compute the following:

(1) Instantaneous rate of discharge of oil, in liters per nautical mile (L/NM); and

(2) Total quantity of oil discharged during the voyage, in m3 or liters.

6.8.2 Where the limits specified in 6.12 are exceeded, the processor is to activate the alarms and give command signals to the overboard discharge control arrangement to stop discharge of effluent into the sea.

6.8.3 The processor is normally to include a device for continuous generation of time and date information. Alternative arrangements for the automatic and continuous reception of time and date information from an external source may be accepted.

6.8.4 In the event of power failure, the processor is to save its memory in respect to the (current) computation of the total quantity of oil discharged, time and date. A printout of data is to be obtained when the monitoring system is operating with manual override, however this is not required if, when the power fails, the monitoring system activates the overboard discharge control to stop the discharge of effluent.

6.9 Recording devices

6.9.1 The recording device of a control section is to include a digital printer capable of being formatted electronically. The recorded parameters are to be expressly identified on the printout. The printout is to be clear and legible and remain so once removed from the recording device and be retained for at least three years.

6.9.2 The data to be automatically recorded is to include at least the following:

(1) Instantaneous rate of discharge of oil, in liter per nautical mile (L/NM);

(2) Instantaneous oil content (ppm);

(3) Total quantity of oil discharged (cubic meter or liter)

(4) Time and date (GMT);

(5) Ship speed, in knot;

(6) Ship's position-longitude and latitude;

(7) Effluent flow rate;

(8) Conditions of the overboard discharge control or arrangement;

(9) Setting of oil type selector, where applicable;

(10) Alarm condition;

(11) Failure (i.e. no flow, fault, etc.); and

(12) Override action (i.e. manual override, flushing, calibration, etc.).

Any information inserted manually as a result of an override action is to be identified on the printout.

6.9.3 The data required in 6.9.2 above is to be printed out, as applicable, or may be stored electronically with print function, at the following minimum frequency:

(1) When the discharge is started;

(2) When the discharge is stopped;

(3) At the interval of not more than 10 minutes (except when the system is under the standby mode);

(4) When the alarm conditions have been reached;

(5) When the normal conditions have been restored;

(6) Whenever the computed rate of discharge varies by 10 liters per nautical mile (L/NM);

(7) When the zero-setting or calibration mode has been selected; and

(8) On manual command.

6.9.4 The recording device is to be located in a position easily accessible to the person in charge of the overboard discharge operation.

6.10 Data display

6.10.1 In addition to the printed records, the real-time data is to be clearly displayed and as a minimum contain the following:

(1) Instantaneous rate of discharge of oil, in liter per nautical mile (L/NM);

(2) Total quantity of oil discharged (cubic meter or liter);

(3) Instantaneous oil content (ppm);

(4) Flow rate;

(5) Ship speed; and

(6) Conditions of the overboard discharge control or arrangement.

6.10.2 The data display is to be located in a position easily observable to the person in charge of the overboard discharge operation.

6.11 Method in place of manual operation in the event of equipment failure

The alternative means to obtain information in the event of the monitoring system failure is to comply with the requirements of Regulation 31.4, Annex I of MARPOL and the operation manual approved by the Administration and is to be as follows:

(1) Oil content meter or sampling system: measurement of the position of oil/ water interface and the capacity using the equipment required by Regulation 32, Annex I of MARPOL, visual observation of the surface of the water adjacent to the effluent discharge and correct recording of the related discharge data in H and I of Part II of oil record book;

(2) Flow meter: pump discharge state, etc.;

(3) Ship speed indicating device: main engine rpm; etc.;

(4) Processor: manual calculation and manual recording; and

(5) Overboard discharge control: manual operation of pumps and valves.

6.12 Alarm conditions resulting in termination of discharge

The visual and audible alarms are to be activated in any of the following circumstances and the monitoring system is to be so arranged as to stop the discharge of effluent into the sea:

(1) When the instantaneous rate of discharge of oil exceeds30 L/NM;

(2) When the total quantity of oil discharged reaches 1/ 30,000 of the previous (load) cargo (for existing ships, the requirements in Regulation 34.1.5, Annex I of MARPOL are to be complied with);

(3) In the event of system operation failure, such as:

- Power failure;

- Loss of sample;
- Significant failure of the measuring or recording system; or
- When the input of any sensor exceeds the effective capacity of the system.

6.13 The alarm indicators of the system, if provided, are to be installed in the cargo control room and/or in other spaces where it can attract immediate attention and take actions.

6.14 Drawings and documentation to be submitted

6.14.1 The following drawings and documentation are to be submitted to appropriate Classification Society for approval:

(1) Product technical specifications or enterprise standard;

(2) General plan;

(3) Structure drawing;

(4) Panel arrangement plan;

(5) Label plate and marking diagram;

(6) Circuit diagram;

(7) List of elements and components;

(8) Software description (including programming platform, software type, software version, etc., applicable to products with programmable elements);

(9) Software flow chart/program block diagram (applicable to products with programmable elements);

(10) Product manufacturer inspection/test program and format of inspection records.

6.15 The following drawings and documentation are to be submitted to appropriate Classification Society for review:

(1) User’s manual (in English);

(2) Process flow chart showing quality monitoring points;

(3) Process documents;

(4) Type and specifications of main raw materials and parts and suppliers list;

(5) External wiring diagram.

6.16 The documents mentioned above are to include at least the following:

(1) A description of the monitoring system

(2) Equipment manual, supplied by the manufacturer, which is to contain details of the major components of the monitoring system;

(3) An operation and technical manual for the complete monitoring system which is proposed to be installed on the oil tanker. This manual is to cover the arrangements and operation of the system as a whole and is to specifically describe parts of the system which are not covered by the manufacturer's equipment manuals;

(4) The operation section of the manual is to include normal operational procedures and the procedures for discharge of oily water in the event of equipment malfunction;

(5) The technical section of the manual is to include adequate information (description and diagrammatic drawings of the pumping and piping arrangements of the monitoring system and electrical/electronic wiring diagrams) to facilitate fault finding and is to include the instructions for keeping a maintenance record;

(6) A technical installation specification defining, specially, the location and installation of components, arrangements for maintaining the integrity of the boundary between safe and hazardous spaces and the arrangement of the sample piping, including calculation of the sample response time referred to inparagraph4.3.6. The installation is to comply with the manufacturer's specific installation criteria;

(7) A copy of the certificate of type approval for the oil content meter and technical document relevant to other main components of the monitoring system; and

(8) A recommended test and checkout procedure specific to the monitoring system installed. This procedure is to specify all the checks to be carried out in a function test by the installation contractor and to provide guidance for the surveyor when he is carrying out the on-board inspection of the monitoring system and confirming the installation reflects the manufacturer's specific installation criteria.

6.17 Materials and components

Materials and components are to comply with relevant requirements of appropriate Classification Society Rules

7 Type test

7.1 Test requirements

The oil content meter is to be type tested in accordance with, as a minimum, the test and performance specifications included in item 13 of Table 7 so as to determine the content of different types of oil, and the accuracy of oil content meter for measuring the oil content of large range is to be within the range specified in 6.2.2.

The control sections of the oil content meter and the monitoring and control system are to be type tested in accordance with, as a minimum, items 1~12 and items 14~16 of Table 7.

Unless otherwise specified, all system components are to be so connected as to simulate the actual conditions. All tests are to be carried out under the following atmospheric conditions:

(1) Ambient temperature: 15 °C~35 °C;

(2) Relative humidity: 30%RH~90%RH;

(3) Atmospheric pressure: 86 kPa~106 kPa.

Prototype test Items Table 7

No.	Test item	Technical requirements	Test method
1	Visual inspection	2.1 of GD01-2006	2.1 of GD01-2006
2	Insulation resistance verification	2.3 of GD01-2006	2.3 of GD01-2006
3	Electric strength verification	2.14 of GD01-2006	2.14 of GD01-2006
4	Energy source fluctuation test	2.4 of GD01-2006	2.4 of GD01-2006
5	Energy source failure test	2.5 of GD01-2006	2.5 of GD01-2006
6	Inclining test	2.6 of GD01-2006	2.6 of GD01-2006
7	Vibration test	2.2.2.1, Part 2 of annex to Resolution MEPC. 108(49)	2.2.2.1, Part 2 of annex to Resolution MEPC. 108 (49)
8	Test of the degree of protection provided by enclosure	2.15 of GD01-2006	IEC60529(2001-02)
9	High temperature test	2.8 of GD01-2006	IEC60068-2-2(2007)
10	Low temperature test	2.2.2.2, Part 2 of Annex to Resolution MEPC.108 (49)	IEC60068-2-1(2007)
11	Alternate humid and heat test	2.10 of GD01-2006	2.10 of GD01-2006

12	Saltfog test (Kb) (applicable to equipment installed on open decks)	2.12 of GD01-2006	IEC60068-2-52 (1996-02)
13	Oil content meter performance and function verification		
13.1	Calibration and zero test	1.2.5, Part 1 of Annex to Resolution MEPC.108(49)	1.2.5, Part 1 of Annex to Resolution MEPC.108(49)
13.2	Response test	1.2.6 and 1.2.7, Part 1 of annex to Resolution MEPC.108 (49)	1.2.6 and 1.2.7, Part 1 of annex to Resolution MEPC.108(49)
13.3	Response time	1.2.8, Part 1 of Annex to Resolution MEPC.108(49)	1.2.8, Part 1 of Annex to Resolution MEPC.108(49)
13.4	Oil fouling and calibration shift test	1.2.9, Part 1 of Annex to Resolution MEPC.108(49)	1.2.9, Part 1 of Annex to Resolution MEPC.108(49)
13.5	Contaminant test	1.2.10, Part 1 of Annex to Resolution MEPC.108(49)	1.2.10, Part 1 of Annex to Resolution MEPC.108(49)
13.6	Air entrainment test	1.2.11, Part 1 of Annex to Resolution MEPC.108(49)	1.2.11, Part 1 of Annex to Resolution MEPC.108(49)
13.7	Oil particle size-shear pump test	1.2.12, Part 1 of Annex to Resolution MEPC.108(49)	1.2.12, Part 1 of Annex to Resolution MEPC.108(49)
13.8	Temperature test	1.2.13,Part 1 of Annex to ResolutionMEPC.108(49)	1.2.13, Part 1 of Annex to Resolution MEPC.108(49)
13.9	Sample pressure or flow test	1.2.14, Part 1 of Annex to Resolution MEPC.108(49)	1.2.14, Part 1 of Annex to Resolution MEPC.108(49)
13.1	Shut-off test	1.2.15, Part 1 of Annex to Resolution MEPC.108(49)	1.2.15, Part 1 of Annex to Resolution MEPC.108(49)

7.2 Selection of typical test specimens

7.2.1 The test specimens used for prototype test are to be sampled from the manufacturer's qualified products by surveyor.

7.2.2 A least one set (may be increased as required for the test) of the oil discharge monitoring and control system, including all system components, is to be selected as the test specimen.

7.2.3 Testing organization

(1) For initial type approval, the organization undertaking the test is to be an appropriate testing organization which holds the Certificate of Approval for Product Inspection

and Testing Organizations issued by appropriate Classification Society.

(2) For renewal of the type approval certificate, upon the approval of appropriate Classification Society, the option of conducting prototype test in the manufacturer's lab under the witness of class surveyor may be considered, provided that the equipment manufacturer has the test environment and equipment specified by relevant standard and has competent inspection and testing personnel.

8 Requirements for manufacturer function test

8.1 Each oil content meter and each control section of a monitoring system are to be subjected to a function test on a suitable test bench prior to delivery. The detailed procedure of the function test of such equipment is to be developed by the manufacturer, taking into account the features and functions of the specific design of the equipment. A complete manufacturer certificate including the delivery test report is to be provided with each unit delivered. At least the following tests are to be included:

Visual inspection, function test of the oil content meter, functional check of the control section of the monitoring system, measurement of insulation resistance and voltage withstanding test.

8.2 A function test on an oil content meter is to include at least all the following operations:

(1) Check flow rate, pressure drop or an equivalent parameter as appropriate;

(2) Check all alarm functions of the meter;

(3) Check all switchover functions interconnecting with other parts of the system; and

(4) Check the correct reading at each ppm value on all measurement scales when the operation is performed using the sample oily water suitable for the meter or by an equivalent method.

8.3 A functional check for a control section of a monitoring system is to include at least all the following operations:

(1) Check all alarm functions;

(2) Check the function correctness of the signal processor and the recording device when the simulated input signals of ppm, flow rate and speed change;

(3) Check whether the alarm is activated when the input signals change so that the discharge limits are exceeded;

(4) Check that a signal to stop the discharge is given to the overboard discharge control when alarm conditions are reached; and

(5) Check whether the alarm is activated when each of the input signals changes to exceed the capacity of the system.