

RESOLUTION A.496(XII)

Superseded by [A.586\(14\)](#)

*Adopted on 19 November 1981
Agenda item 11*

**GUIDELINES AND SPECIFICATIONS FOR OIL DISCHARGE
MONITORING AND CONTROL SYSTEMS FOR OIL TANKERS**

THE ASSEMBLY,

RECALLING resolution A.297(VIII) by which the Assembly established the Marine Environment Protection Committee and specified the functions and responsibilities of that Committee,

NOTING that Regulation 15(3)(a) of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), specifies that an oil discharge monitoring and control system, approved by the Administration, shall be fitted on oil tankers of 150 tons gross tonnage and above,

RECALLING resolution A.445(XI) by which the Assembly invited the Marine Environment Protection Committee to develop guidelines for the progressive installation of oil discharge monitoring and control systems for new and existing tankers,

RECALLING ALSO resolution A.393(X) by which the Assembly adopted the Recommendation on International Performance and Test Specifications for Oily-Water Separating Equipment and Oil Content Meters,

RECALLING FURTHER that by resolution MEPC.4(XIII) existing oil content meters which have been approved under the terms of resolution A.393(X) will remain acceptable as long as they conform to the original performance requirements,

NOTING FURTHER that the Marine Environment Protection Committee at its fifteenth session agreed on proposed amendments to Regulation 15(3)(a) to provide that the oil discharge monitoring and control system shall be designed and installed in compliance with the Guidelines and Specifications for Oil Discharge Monitoring and Control Systems for Oil Tankers developed by IMCO and further that Administrations may accept such specific arrangements as detailed in the Guidelines and Specifications,

RECOGNIZING THEREFORE the need for the development of the above-mentioned Guidelines and Specifications which shall be implemented under Regulation 15(3)(a), including proposed amendments,

HAVING CONSIDERED the recommendation made by the Marine Environment Protection Committee at its fifteenth session,

1. ADOPTS the Guidelines and Specifications for Oil Discharge Monitoring and Control Systems for Oil Tankers the text of which is set out in the Annex to this resolution;
2. INVITES Governments to implement these Guidelines and Specifications when approving oil discharge monitoring and control systems under Regulation 15(3)(a) of Annex I of MARPOL 73/78.

ANNEX

GUIDELINES AND SPECIFICATIONS FOR OIL DISCHARGE MONITORING AND CONTROL SYSTEMS FOR OIL TANKERS

1 PURPOSE

1.1 The purpose of these Guidelines and Specifications is:

- .1 to provide a uniform interpretation of the requirements of Regulation 15(3)(a) of Annex I of MARPOL 73/78, and
- .2 to assist Administrations in determining appropriate design, construction and operational parameters for oil discharge monitoring and control systems when such systems are fitted in ships flying the flag of their State.

2 BACKGROUND

2.1 The requirements of Annex I of MARPOL 73/78 relating to oil content monitoring of oil tanker ballast and tank washing water are contained in Regulation 15(3)(a), which stipulates that oil tankers of 150 tons gross tonnage and above shall be equipped with an approved oil discharge monitoring and control system and that the system shall record continuously:

- .1 the discharge of oil in litres per nautical mile and total quantity of oil discharged; or
- .2 in lieu of the total quantity of oil discharged, the oil content of the effluent and rate of discharge.

In both cases the record shall be "identifiable as to time and date" and shall be kept for at least three years.

2.2 Regulation 15 also stipulates that the system shall come into operation when there is any discharge of effluent into the sea and shall be such as will ensure that any discharge of oily mixture is automatically stopped when the instantaneous rate of discharge of oil exceeds that permitted by Regulation 9(1)(a). In existing oil tankers the stopping of the discharge may be performed manually and the rate of discharge may be estimated from the pump characteristic.

2.3 A test and performance specification for the basic oil content meter, indicating oil content in ppm, has been adopted by resolution A.393(X).

2.4 Resolution A.445(XI) recognizes the need for early installation of oil discharge monitoring and control systems in order that operational experience can be gained. That resolution further invites the Marine Environment Protection Committee (MEPC) to develop guidelines for the progressive installation of oil discharge monitoring and control systems for new and existing oil tankers.

3 APPLICATION

3.1 An oil discharge monitoring and control system, approved by the Administration, shall be fitted in every oil tanker of 150 tons gross tonnage and above, and shall be fitted in:

- .1 new* tankers, on the date of entry into force of the Convention;
- .2 existing tankers, within three years of the date of entry into force of the Convention.

* As defined in Regulation 1(6).

3.2 Existing tankers operating with a tank cleaning procedure using crude oil washing in accordance with Regulation 13(8) or with dedicated clean ballast tanks in accordance with Regulation 13(9) must fit an oil content meter not later than the first scheduled shipyard visit after entry into force of the Convention.

3.3 An incentive scheme to encourage the early installation of oil discharge monitoring and control systems (resolution A.445(XI)) has been developed which allows different requirements depending on the date of installation of the system and the size and building date of the oil tanker. The terms used in the description of the various requirements are defined in section 4 below.

4 DEFINITIONS

4.1 "Oil discharge monitoring and control system"

4.1.1 Oil discharge monitoring and control system is a general term covering any one of the units referred to in paragraphs 4.2, 4.3 and 4.4.

4.2 "Control unit"

4.2.1 A control unit is a system which receives automatic signals of:

- .1 oil content;
- .2 flow rate of discharge;
- .3 ship's speed;
- .4 date and time (G.M.T.); and
- .5 discharge valve position (open or closed).

4.2.2 The unit shall make automatic recordings of:

- .1 instantaneous rate of discharge of oil;
- .2 total quantity of oil discharged;
- .3 date and time (G.M.T.);
- .4 discharge valve position (open or closed);
- .5 alarm condition;
- .6 failure (i.e. no flow, fault etc.); and
- .7 override action (i.e. manual override, flushing, calibration etc.).

4.2.3 The unit shall be fitted with a starting interlock and discharge valve control capability. The unit shall meet the specifications contained in the relevant paragraphs of section 6.

4.3 "Computing unit"

4.3.1 A computing unit is a system which receives automatic signals of:

- .1 oil content;
- .2 date and time (G.M.T.);
- .3 discharge valve activation;

- .4 flow rate of discharge; and
- .5 ship's speed in knots.

The flow rate and ship's speed may be manually inserted into the unit.

4.3.2 The unit shall make automatic recordings of:

- .1 instantaneous rate of discharge of oil;
- .2 total quantity of oil discharged;
- .3 date and time (G.M.T.);
- .4 discharge valve position (open or closed);
- .5 alarm condition;
- .6 failure (i.e. no flow, fault etc.);
- .7 override action;
- .8 manual input (i.e. speed, flow); and
- .9 oil content if the flow rate has been manually inserted.

4.3.3 Unless explicitly stated in the implementation requirements (see section 5 below) the unit need not be fitted with a starting interlock or discharge valve control capability.

4.3.4 The unit shall meet the specifications contained in the relevant paragraphs of section 6.

4.4 "Calculating unit"

4.4.1 A calculating unit is a system which receives automatic signals of:

- .1 oil content;
- .2 flow rate of discharge;
- .3 ship's speed.

The flow rate and ship's speed may be manually inserted into the unit.

4.4.2 The unit shall make an automatic recording of:

- .1 oil content, unless the oil content meter is provided with a recorder.

4.4.3 The unit shall display:

- .1 instantaneous rate of discharge of oil;
- .2 total quantity of oil discharged, unless permitted to be calculated manually.

4.4.4 The time and date, instantaneous rate of discharge of oil and the total quantity of oil discharged may be recorded manually.

4.4.5 The unit need not be fitted with a starting interlock or discharge valve control capability.

4.4.6 The unit shall meet the specifications contained in the relevant paragraphs of section 6.

4.5 "Starting interlock" is an automatic device which prevents the initiation of the opening of the discharge valve before the monitoring and control system is fully operational when use of this system is required by the Convention.

4.6 The "discharge valve control" is an automatic device which initiates the sequence to stop the overboard discharge.

5 IMPLEMENTATION REQUIREMENTS

5.1 To assist in the implementation of resolution A.445(XI), an implementation scheme has been developed by the MEPC which provides slightly different requirements for oil discharge monitoring and control systems depending on size and building date of the oil tanker. The scheme also allows for different requirements, depending on the installation date of the system.

5.2 Under the implementation scheme contained in paragraph 5.4, oil tankers of 150 tons gross tonnage and above have been arranged into five categories. Each category of oil tanker shall be fitted with an oil discharge monitoring and control system as set out below. The definitions given in section 4 should be consulted for a description of the different systems.

5.3 The implementation scheme set out in paragraph 5.4 gives details, with reference to paragraph 4, of the minimum equipment required to comply with this scheme. Where it is expedient to fit equipment of a higher category than required, no objection shall be raised to this arrangement.

5.4. Implementation scheme

5.4.1 *Category I*

- .1 An oil tanker of this category is of 4,000 tons deadweight and above and is a "new ship" as defined in Regulation 1(6) of Annex I of MARPOL 73/78 and the oil discharge monitoring and control system is installed on or after 1 June 1982.
- .2 This category of ship shall be fitted with a control unit as defined under paragraph 4.2.

5.4.2 *Category II*

- .1 An oil tanker of this category is of 4,000 tons deadweight and above and is a "new ship" as defined in Regulation 1(6) of Annex I of MARPOL 73/78 and the oil discharge monitoring and control system is installed before 1 June 1982.
- .2 This category of ship shall be fitted with a computing unit as defined under paragraph 4.3.
- .3 The system shall also be fitted with a starting interlock and a discharge valve control.

5.4.3 *Category III*

- .1 An oil tanker of this category is of 150 tons gross tonnage and above, but less than 4,000 tons deadweight and is a "new ship" as defined in Regulation 1(6) of Annex I of MARPOL 73/78.
- .2 This category of ship shall be fitted with a computing unit as defined under paragraph 4.3.
- .3 No automatic devices are required to activate overboard discharge valve closure, neither is a starting interlock required.

5.4.4 Category IV(a)

- .1 An oil tanker of this category is of 20,000 tons deadweight and above and is an "existing ship" as defined in Regulation 1(7) of Annex I of MARPOL 73/78 and the oil discharge monitoring and control system is installed between one year and three years after the date of entry into force of MARPOL 73/78.
- .2 This category of ship shall be fitted with a computing unit as defined under paragraph 4.3.
- .3 The system shall also be fitted with a starting interlock but need not be fitted with a discharge valve control.
- .4 For oil tankers within this category up to and including 100,000 tons deadweight, where the overboard discharge has local manual control or where control is provided by means of extension rods, Administrations may grant waivers or exemptions from the requirement to fit a starting interlock system.

5.4.5 Category IV(b)

- .1 An oil tanker of this category is of 20,000 tons deadweight and above and is an "existing ship" as defined in Regulation 1(7) of Annex I of MARPOL 73/78 and the oil discharge monitoring and control system is installed not later than one year after the date of entry into force of MARPOL 73/78.
- .2 This category of ship shall be fitted with a computing unit as defined under paragraph 4.3.
- .3 No automatic devices are required to activate overboard discharge valve closure, neither is a starting interlock required.

5.4.6 Category V(a)

- .1 An oil tanker of this category is of 150 tons gross tonnage and above but less than 20,000 tons deadweight and is an "existing ship" as defined in Regulation 1(7) of Annex I of MARPOL 73/78 and the oil discharge monitoring and control system is installed between one year and three years after the entry into force of MARPOL 73/78.
- .2 This category of ship shall be fitted with a calculating unit as defined under paragraph 4.4.
- .3 No automatic devices are required to activate overboard discharge valve closure, neither is a starting interlock required.

5.4.4 Category V(b)

- .1 An oil tanker of this category is of 150 tons gross tonnage and above but less than 20,000 tons deadweight and is an "existing ship" as defined in Regulation 1(7) of Annex I of MARPOL 73/78 and the oil discharge monitoring and control system is installed not later than one year after the entry into force of MARPOL 73/78.
- .2 This category of ship shall be fitted with a calculating unit as defined under paragraph 4.4. However, the total quantity of oil discharged may be computed manually.
- .3 No automatic devices are required to activate overboard discharge valve closure, neither is a starting interlock required.

5.5 Shown in the Appendix is a summary, in tabular form, of the implementation requirements.

6 TECHNICAL SPECIFICATIONS

6.1 Oil discharge monitoring and control system

6.1.1 The oil discharge monitoring and control system shall be so fitted that it can effectively monitor and control the discharge of any effluent into the sea through those overboard discharge outlets permitted by Regulation 18(2) which in the opinion of the Administration are necessary to fulfil the operational requirements of the tanker. The system should additionally cover:

- .1 the gravitational discharge of ballast water from cargo tanks; and
- .2 the midship cargo manifold arrangement when used to meet the requirements of Regulation 18.

6.1.2 The discharge of dirty ballast water or oil contaminated water into the sea through outlets which are not controlled by the monitoring and control system is an infringement of the Convention.

6.1.3 The system should function effectively, according to the criteria shown below, under all environmental conditions which vessels are normally assumed to encounter, and shall be designed and constructed to withstand the environmental conditions as specified in paragraph 6.1.6 of these Guidelines and Specifications:

- .1 Except where manual operation of the system is permitted the system shall be so designed that no ballast discharge can take place unless the monitor is in the normal operating mode and the relevant sampling point has been connected to the monitor.
- .2 Preferably the system should have a minimum number of discharge outlets and sampling points so arranged that discharge can take place via only one sampling point at a time.
- .3 Where it is intended that more than one line is used for simultaneous discharge purposes, one oil content meter, together with a flow meter, shall be installed per discharge line. These instruments shall be connected to a common processor.
- .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 may be suppressed for a maximum of 10 seconds by employing a delay relay. Alternatively, the instantaneous rate of discharge may be the average during the preceding 20 seconds or less as computed from instantaneous ppm values produced by the oil content meter with intervals of a maximum of 5 seconds.

6.1.4 The system should comprise the following:

- .1 an oil content meter to measure the oil content of the effluent in parts per million. This meter shall be approved in accordance with the provisions contained in resolution A.393(X) and certified to take into account the range of cargoes carried;
- .2 a flow rate system to indicate the quantity of effluent being discharged in a unit of time (see also paragraphs 6.3.7 and 6.3.8);
- .3 a vessel speed indicating device to give the vessel's speed in knots (see also paragraphs 6.4.2 and 6.4.3);
- .4 a sampling system to convey a representative sample of the effluent to the oil content meter;
- .5 a control section which includes:

- .5.1 a processor, which accepts signals of oil content, flow rate and the vessel's speed and converts them into litres per nautical mile and the total quantity of oil discharged (see also paragraph 6.5.3);
- .5.2 a transmitting device to provide alarms and, where required, command signals to the discharge control arrangement;
- .5.3 a recording device to provide, where required, a continuous record of the effluent discharged;
- .5.4 a manual override system to be used in the event of failure of the monitoring and control system; and
- .5.5 where required, a transmitting device to provide signals to a starting interlock preventing the discharge of effluent before the oil content meter is fully operative.

6.1.5 The electrical components of the system installed in a hazardous area of a vessel shall meet the appropriate safety requirements* provided for these areas.

6.1.6 The control section of an oil discharge monitoring and control system shall be capable of operating satisfactorily under the following environmental conditions:

- .1 **Ambient air temperature:** 0°C to 55°C in enclosed space
–25°C to 55°C on open decks
- .2 **Vibration:** 2.0 to 13.2 Hz, with displacement amplitude of ± 1.0 mm
13.2 to 80.0 Hz, with an acceleration amplitude of ± 0.7 g
- .3 **Voltage variations for alternating current:** permanent variation of $\pm 10\%$
- .4 **Inclination:** inclination at angles of up to 22.5° in any place from the normal operational position

6.2 Sampling system

6.2.1 Sampling points should be so located that relevant samples can be obtained from those outlets that are used for operational discharges in accordance with paragraph 6.1.1. The sampling probes located in the overboard discharge lines and the piping system connecting the sampling probes to the oil content meter should meet the following requirements:

- .1 the piping and probes shall be of corrosion-resistant and oil-resistant material, of adequate strength, properly jointed and supported;
- .2 the system shall have a stop valve fitted adjacent to each probe, except that where the probe is mounted in a cargo line, e.g. to the midship cargo manifold arrangement, two stop valves shall be fitted, in series, in the sample line;
- .3 sampling probes should be arranged for easy withdrawal and should as far as practicable be mounted at an accessible location in a vertical section of the discharge line. If a sampling point has to be made in a horizontal section then suitable arrangements should be made to obtain representative samples. Sampling probes should normally penetrate inside the discharge pipe to a distance of one quarter the diameter of that pipe;

* As contained in the provisions of IEC Publication 92 or its equivalent.

- .4 means shall be provided for cleaning the probes and piping system by the provision of permanent clean water flushing arrangements or some other equivalent method, especially in the case of probes mounted in a cargo line. The design of the probes and piping should be such as to minimize their clogging by oil, oily residue and other matter;
- .5 the velocity of the fluid in the piping shall be such that, taking into consideration the length of the piping, the overall response time should be as short as possible between an alteration in the mixture being pumped and the alteration in the meter reading and in any case not more than 40 seconds;
- .6 the location of sampling probes in relation to any point of flow diversion to a slop tank shall be selected with regard to the need for sampling the oily water in the recirculation mode;
- .7 the arrangements for driving the sampling pump or any other pumps such as those provided for washing windows shall have regard to the safety requirements of the space in which the pump is located;
- .8 the flushing arrangements should be such that where necessary they can be utilized for stabilizing the oil content meter and correcting for zero setting;
- .9 sample water when returned to the slop tank shall not be allowed to free fall into the tank.

6.3 Flow rate indicating system

6.3.1 A flow meter for measuring the rate of discharge should be installed in a vertical section of a discharge line or in any other section of discharge line as appropriate, so as to be always filled with the liquid.

6.3.2 A flow meter should employ an operating principle which is suitable for shipboard use and, where relevant, can be used in large diameter pipes.

6.3.3 A flow meter should 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.

6.3.4 The flow meter, as installed, should have an accuracy of ± 15 per cent, or better, of the instantaneous rate throughout the operating range.

6.3.5 Any component part of the flow meter in contact with the effluent discharge including associated piping, if fitted, shall be of corrosion-resistant and oil-resistant material of adequate strength.

6.3.6 The design of the flow metering arrangements shall have regard to the safety requirements of the space in which such metering arrangements are located.

6.3.7 In ships fitted with a computing unit the flow rate may be determined from the pump characteristic and the data manually inserted into the unit.

6.3.8 In ships fitted with a calculating unit the flow rate may be manually inserted into the unit. The flow rate is to be estimated from the best available source e.g. pump characteristic, speed of pump(s), ullages or knowledge of pumping rates for particular tanks on the ship.

6.3.9 In oil tankers where the gravitational discharge of ballast water from the cargo tanks is an established practice, in accordance with Regulation 18(6)(d), means, such as calibration curves, shall be provided to estimate the flow rate of discharge.

6.4 Vessel's speed indicating system

6.4.1 The automatic speed signal required for the control unit shall be obtained from the vessel's speed indicating device* by means of a repeater signal. This information shall be readily available in a form that can be accepted by a processor. The speed information used may be either speed over the ground or speed through the water depending upon the speed measuring equipment installed on board.

6.4.2 In ships where a computing unit is required the vessel's speed may be manually inserted into the unit. Such data shall be obtained from the ship's log or from an indicating device which transmits signals which need not be in a form which can be accepted by a computer system.

6.4.3 The vessel's speed on ships required to install a calculating unit may be obtained from the ship's log or from the navigation charts and shall be estimated from the most reliable source.

6.5 Processor and transmitting device

6.5.1 The processor should receive, at time intervals not exceeding 5 seconds, signals from the oil content meter, the flow rate measuring system and the vessel's speed indicator and automatically compute the following:

- .1 instantaneous rate of discharge of oil in litres per nautical mile; and
- .2 total quantity of oil discharged per voyage in cubic metres or litres.

6.5.2 When the calculations of the processor exceed the limits imposed by Regulation 9(1)(a)(iv) and (v) the transmitting device will provide alarms and, in new ships, it will also provide command signals to the discharge valve control which will cause the discharge of effluent into the sea to stop.

6.5.3 In existing ships fitted with a calculating unit where the unit is installed early, the total quantity of oil discharged may be computed manually.

6.6 Recording devices

6.6.1 *Control unit*

- .1 The recording device for a control unit should include a digital printer or an analogue recorder or the combination of both or a recorded visible display. The record shall be identifiable as to time and date and shall be kept for at least three years.
- .2 The data to be automatically recorded shall include at least the following items:
 - .2.1 instantaneous rate of discharge of oil (litres per nautical mile);
 - .2.2 the total quantity of oil discharged (litres);
 - .2.3 time and date (G.M.T.);
 - .2.4 the discharge valve position (open or closed);
 - .2.5 alarm condition;
 - .2.6 failure (i.e. no flow, fault, etc.); and
 - .2.7 override action (i.e. manual override, flushing, calibrating, etc.)

* See "Recommendation on Performance Standards for Devices to Indicate Speed and Distance" (Annex to resolution A.478(XII)).

6.6.2 *Computing unit*

- .1 The recording device for a computing unit should include a digital printer or an analogue recorder or the combination of both or a recorded visible display. The record shall be identifiable as to time and date and shall be kept for at least three years. Manual input information should be identifiable on the record.
- .2 The data to be automatically recorded shall include at least the following items:
 - .2.1 instantaneous rate of discharge of oil (litres per nautical mile);
 - .2.2 the total quantity of oil discharged (litres);
 - .2.3 time and date (in G.M.T.);
 - .2.4 manual input information;
 - .2.5 the valve position (open or closed);
 - .2.6 alarm condition;
 - .2.7 failure (i.e. no flow, fault, etc.);
 - .2.8 override action (i.e. manual override, flushing, calibration, etc.); and
 - .2.9 oil content if flow rate is manually inserted.

6.6.3 *Calculating unit*

- .1 An automatic recording device is not required for a calculating unit, but, where fitted, the recording device should include a digital printer or an analogue recorder or the combination of both or a recorded acceptable visible display. The record shall be identifiable as to time and date, which may be entered manually, and shall be kept for at least three years.
- .2 The data to be automatically recorded on the above-mentioned recording device shall include at least the following item;

oil content in ppm, unless the oil content meter is provided with a recorder.

6.6.4 *Recording for digital printers*

Occasions of recordings. Data required in paragraphs 6.6.1.2, 6.6.2.2 and 6.6.3.2 of these Specifications shall be printed out with the following minimum frequency:

- .1 when the discharge is started;
- .2 when the discharge is stopped;
- .3 at intervals of not more than 10 minutes;
- .4 when an alarm condition is developed;
- .5 when normal conditions are restored;
- .6 at the change of valve order or valve position;
- .7 when introducing input data;
- .8 whenever the computed rate of discharge varies by 10 litres per nautical mile, unless an equivalent trend-indicating arrangement is provided;

- .9 when selecting zero setting or calibration mode; and
- .10 on manual command.

6.6.5 *Recording for analogue recorders*

Data required in paragraphs 6.6.1.2, 6.6.2.2 and 6.6.3.2 of these Specifications should be continuously recorded in such a way as would satisfy the following requirements:

- .1 the chart speed should be indicated. If the speed is controllable, the recorder shall be provided with a marker to identify the speed of the chart paper; and
- .2 means shall be provided to enable the chart paper to be interpreted as to time, date and readings after it has been removed from the recorder.

6.7 Data display

6.7.1 The current data shall be visibly displayed.

6.7.2 The recording device and data display should be located in a position easily accessible to the person in charge of the operation of discharging the effluent overboard.

6.8 Manually operated alternatives

6.8.1 The alternative means and information for use in case of any one failure in the system should be as follows:

- .1 oil content meter: visual observation of the surface of the water;
- .2 sampling pump: visual observation of the surface of the water;
- .3 flow meter: pump characteristics, etc.;
- .4 vessel's speed indicating device; main engine r.p.m. etc.;
- .5 processor: manual calculation and manual recording; and
- .6 discharge valve control: manual operation of pumps and valves.

6.9 Alarm conditions resulting in the stopping of discharge

6.9.1 Audio-visual alarms shall be initiated for any of the following conditions:

- .1 whenever the instantaneous rate of discharge of oil exceeds 60 litres per nautical mile;
- .2 when the total quantity of oil discharged reaches the allowable limit prescribed by the provisions of the relevant Regulations;
- .3 failure of the system's operation, such as:
 - .3.1 power failure;
 - .3.2 loss of sample;
 - .3.3 failure of the measuring or recording system; or
 - .3.4 when the input signal of the sensors exceeds the effective capacity of the system.

6.10 Location of alarm indicator

6.12.1 The alarm indicator of the system shall be installed in the cargo control room where provided and/or other places where it will attract immediate attention and action.

7 EQUIPMENT, OPERATION AND MAINTENANCE MANUALS

7.1 Administrations shall ensure that approved equipment, operational and/or maintenance manuals for the various items comprising the oil discharge monitoring and control systems are on board the vessel. These manuals shall cover the oil content meter, control, computing or calculating unit, flow meter and ship's speed indicator, where required.

APPENDIX


OIL DISCHARGE MONITORING AND CONTROL SYSTEM FOR OIL TANKERS –
SUMMARY OF IMPLEMENTATION REQUIREMENTS

Feature	CATEGORY TYPE						
	I	II	III	IV(a)	IV(b)	V(a)	V(b)
Applicability	New ≥ 4K	New ≥ 4K	New < 4K	Existing ≥ 20K		Existing < 20K	
Compliance	Late	Early	Late or early	Late	Early	Late	Early
Input information							
Ppm	A	A	A	A	A	A	A
Flow rate	A	M	M	M	M	E	E
Speed	A	M	M	M	M	E	E
Time and date	A	A	A	A	A	M	M
Starting interlock	A	A		A*			
Discharge valve control	A	A					
Output information							
ℓ/mile	A	A	A	A	A	A M*	A M*
Total quantity	A	A	A	A	A	A M*	A M*
Time and date	A	A	A	A	A	M*	M*
Ppm		A	A	A	A	A	A
System format	Control unit	Computing unit			Calculating unit		

Key to table:

- NEW — New oil tanker according to Regulation 1(6) of Annex I of MARPOL 73/78
- EXISTING — Existing tanker according to Regulation 1(7) of Annex I of MARPOL 73/78
- K — 1,000 tons deadweight
- EARLY-NEW — Before 1 June 1982
- EARLY-EXISTING — Not later than one year after the date of entry into force of MARPOL 73/78
- LATE-NEW — On or after 1 June 1982
- LATE-EXISTING — Between one year and three years after the date of entry into force of MARPOL 73/78
- A — Automatic function
- M — Manually inserted data from installed source
- E — Manually inserted data estimated from best available source
- A* — Automatic function, but waivers may be granted for oil tankers ≤ 100K where the overboard discharge valve control system is manual
- M* — Manual recording

NOTE: COW and CBT tankers shall fit oil content meters not later than the first scheduled dry dock after the date of entry into force of MARPOL 73/78

- CONTROL UNIT — The complete control system as required by Regulation 15(3)(a) of Annex I of MARPOL 73/78
- COMPUTING UNIT — Computer with manual input of speed and flow rate. Automatic input of ppm and a built-in clock. The output information is automatically recorded.
- CALCULATING UNIT — A calculating device capable of converting ppm, speed and flow rate information to ℓ/mile (and total quantity) available for use during the discharge operation. An automatic recording is not required.
-  — Information presented on permanent record.