

TP 12301E

**Standard for
5 ppm Bilge Alarms
(for Canadian Inland Waters)**

April 1995

Standard for 5 ppm Bilge Alarms (for Canadian Inland Waters)

1.0 Introduction

- 1.1 The current Oil Pollution Prevention Regulations came into force on February 16, 1993. When a ship is en route in the inland waters of Canada, the regulations allow for the discharge, from the ship's machinery space, of an undiluted effluent that does not contain cargo oil, chemicals, or any substances introduced for the purpose of circumventing the Regulations, providing an alarm and a discharge stopping device are activated when the oil content in the effluent exceeds 5 ppm.
- 1.2 In order to achieve the foregoing criteria, it is necessary to fit a "bilge alarm" that is capable of detecting and measuring 5 ppm of oil in the oil/water effluent mixture.
- 1.3 At the May 1993 meeting of the Canadian Marine Advisory Council (CMAC), the Canadian Coast Guard introduced the "Standard for Performance and test Specifications for Bilge Alarms for Use in Canadian Inland Waters", which was based on the International Maritime Organization (IMO) Resolution A.393(X).
- 1.4 As IMO Resolution A.393(X) was superseded by IMO Resolution MEPC 60(33) which came into force on April 30, 1994, it is necessary to bring in this new Standard, which is based on the latter Resolution. This new Standard will supersede the Standard mentioned in the preceding paragraph.
- 1.5 Comments and suggestions for the improvement of this Standard should be forwarded to the Director, Pollution Prevention, Ship Safety Branch, Canadian Coast Guard, Minto Place, Canada Bldg., 344 Slater Street, Ottawa, Ontario, K1A 0N7. Fax No. 613-954-4916.
- 1.6 Information on the ISO can be obtained from the Standards Council of Canada, 45 O'Connor Street, Floor 12, Ottawa, Ontario, K1P 6N7, Canada, Fax: 613-995-4564.

2.0 Definitions

- 2.1 "accredited testing facility" means a testing laboratory that has been accredited in accordance with the requirements of ISO Guide 25, as being capable of carrying out the test procedures determined by this Standard;

- 2.2 “accredited testing laboratory” means a laboratory that is:
- (a) free of control and influence of the accredited testing facility; and
 - (b) accredited in accordance with Guide 25 as being capable of making a successful determination of oil content in accordance with IMO Resolutions MEPC 60(33), Part 4;
- 2.3 “bilge alarm” means an oil content meter with associated alarm and DSS;
- 2.4 “Board” means the Board of Steamship Inspection;
- 2.5 “CCG” means Canadian Coast Guard;
- 2.6 “DSS” means Discharge Stop Signal;
- 2.7 “Guide 25” means ISO “Guide 25 - General requirements for the competence of calibration and testing facilities”, latest edition;
- 2.8 “IMO” means International Maritime Organization;
- 2.9 “ISO” International Standards Organization;
- 2.10 “MEPC” means the Marine Environment Protection Committee of the IMO;
- 2.11 “ppm” means parts of oil per million parts of oil/water mixture by volume;
- 2.12 “Resolution A.393 (X)” means the IMO recommendation entitled Recommendation on International Performance and Test Specifications for Oily-Water Separating Equipment and Oil Content Meters, adopted November 14, 1977; (résolution A.393 (X));
- 2.13 “Resolution MEPC 60(33)” means the IMO recommendation entitled Resolution on Guidelines and Specifications for Pollution Prevention Equipment for Machinery Space Bilges for Ships.”

3.0 Background

- 3.1 The requirement for bilge alarms for ships in Canadian inland waters are set out in sections 8, 17 and 31 of the Oil Pollution Prevention Regulations.

4.0 Summary of Requirements

- 4.1 The approval requirements for bilge alarms specified in this Standard are summarized as follows:
- .1 In addition to having undergone tests and obtained a CCG Certificate of Type Approval in accordance with Resolution MEPC 60(33) of the IMO, for a 15 ppm bilge alarm, the apparatus shall comply with the requirements of this Standard to enable it to be used as a 5 ppm bilge alarm in Canadian inland waters.
 - .2 Where an apparatus has undergone a particular test or requirement in order to qualify as a 15 ppm bilge alarm in accordance with IMO Resolution MEPC 60(33), the apparatus need not undergo an identical test or requirement for the purposes of this Standard.
 - .3 The oil content meter for the bilge alarm should be tested for type approval in accordance with Part 2 of this Standard.

Part 1 - General

5.0 General Provisions

- 5.1 Providing grab samples are taken, and calibration, cleansing and testing procedures are sequenced as detailed in this specification, testing equipment shown in Figure 2 may be used in lieu of the testing equipment shown in Figure 1.

6.0 Application

- 6.1 This Standard applies:
- .1 to installations fitted to ships, the keels of which are laid, or which are at a similar stage of construction, on or after April 30, 1994; and
 - .2 to new installations fitted on or after April 30, 1994 to ships, the keel of which were laid or which were at similar stage of construction before April 30, 1994, insofar as is reasonable and practicable.

6.2 Bilge alarms fitted to ships the keels of which were laid or were at similar stage of construction before April 30, 1994, may comply with either this Standard or the Standard referred to in paragraph 1.3.

7.0 Technical Specifications for “Bilge Alarms”

7.1 This specification refers to bilge alarms that have a meter with associated alarm and overboard discharge stop, that are capable of detecting and measuring 5 ppm or less of oil in a ship’s machinery space bilge water overboard discharge.

7.2 It shall be a robust and practical instrument suitable for shipboard use.

7.3 It shall be able to withstand normal stresses due to the ship’s motion, including rolling and pitching.

7.4 It shall comply with the test and performance requirements of Part 2 of this Standard.

7.5 It shall resist corrosion in the conditions of the marine environment and shall be compatible with the liquids which it will monitor.

7.6 It shall, if intended to be fitted in locations where flammable atmospheres may be present, comply with the relevant safety regulations for such spaces. Any electrical equipment which is part of the meter shall be placed in a non-hazardous area, or shall be certified as safe for use in a hazardous atmosphere. Any moving parts which are fitted in hazardous areas shall be arranged so as to avoid the formation of static electricity.

7.7 It shall not contain or use any substance of a dangerous nature, unless adequate arrangements are provided to eliminate any hazard introduced thereby.

7.8 The accuracy of the meter shall be such that the reading will represent within ± 3 ppm, the actual oil content of the sample being tested.

7.9 An alarm shall be provided which will indicate when the oil content of the effluent exceeds 5 ppm.

7.10 The accuracy of the alarm shall be ± 1 ppm.

7.11 The alarm shall be tested in accordance with section 12 of this specification.

- 7.12 The meter shall be designed so that it functions within the above limits when the power supply is varied by 10% from the value for which the meter was designed, i.e. in respect of electricity, compressed air, etc.
- 7.13 It is desirable that the reading should not be affected by the type of oil. If it is, it should not be necessary to calibrate the meter on board ship, but pre-set alterations in the calibration in accordance with instructions drawn up at the time of manufacture are permitted.

In the latter case, means shall be available to check that the correct calibration has been selected for the oil in question. The accuracy of the readings shall at all times remain within the limit specified.

8.0 Specification for Type Approval of Pollution Prevention Equipment

8.1 Production Model

- .1 A production model bilge alarm for which the approval will apply, shall be identical to the equipment type-tested in accordance with the Test and Performance Specification contained in Part 2 of this Standard.

9.0 Approval and Certification Procedures

- 9.1 Apparatus for which a Certificate of Type Approval for 15 ppm has been issued in accordance with IMO Resolution MEPC 60(33), and which in every particular also fulfils the relevant requirements of these specifications, may be approved by the Board for use in ships in Canadian inland waters.
- 9.2 Apparatus that meets the requirements of paragraph 9.1 may be issued with a CCG Certificate of Type Test in accordance with section 14.
- 9.3 A copy of the Certificate of Type Approval for the oil bilge alarm shall be carried on board each ship that is fitted with such equipment.

Part 2 - Test and Performance Specifications for Type Approval of Oil Content Meters for Bilge Alarms

10.0 Fuel Specification

- 10.1 Calibration and testing shall be carried out using a light distillate fuel oil having a relative density of 0.83 at 15°C.
- 10.2 The oily-water testing mixtures shall be at a temperature between 10°C and 40°C.
- 10.3 Heating and cooling coils shall be provided in order to maintain the temperature if necessary.

11.0 Calibration of Meter

- 11.1 The oil content meter shall be calibrated at 0, 2, 4, 6, and 9 ppm. A complete calibration curve shall be provided in the format shown in Figure 4. The calibration procedure shall be conducted as follows.
- 11.2 The alarm and DSS shall be rendered inoperative.
- 11.3 Four tanks for pre-mixed oily mixtures, one tank of fresh water and one settling tank for drainage, with associated piping and testing equipment, shall be provided in a testing arrangement as shown in Figure 1.
- 11.4 With all valves closed the tank shall be filled with liquid, as appropriate.
- 11.5 Valve A shall be opened and fresh water shall be allowed to flow through the meter for 5 minutes, at which time the reading on the meter shall be noted and the point shall be marked on the calibration diagram. This point should be the zero point on the meter scale. If this is not so, corrective action should be taken. Valve A shall be shut.
- 11.6 Valve B shall be opened and the 2 ppm oily mixture shall be allowed to flow through the meter for 5 minutes, at which time the meter reading point shall be marked on the calibration diagram. Valve B shall be closed.
- 11.7 Valve A shall again be opened and fresh water shall be allowed to flow through the meter. The flow of the cleansing water shall be continued until the meter reading has been zeroed for 5 minutes. Valve A shall then be closed.

- 11.8 Valve C shall be opened and the calibration operation shall be continued using an identical calibration and cleansing sequences to those described in paragraph 11.6 and 11.7.
- 11.9 The calibration point for the 6 ppm and 9 ppm oily mixtures shall be plotted, using an identical calibration and cleansing sequence to those described in paragraph 11.6 and 11.7.
- 11.10 The five calibration points shall be joined in order to establish the calibration curve.

12.0 Testing of Meter, Alarm and Discharge Stop Signal

- 12.1 Following calibration and cleansing of the equipment, the alarm and DSS shall be made operative.
- 12.2 Valve A shall be opened and the meter shall be zeroed for 5 minutes with fresh water. Valve A shall then be closed.
- 12.3 Valve B shall be opened and the 2 ppm oily mixture shall be allowed to flow through the meter until the alarm and DSS are activated, or for one minute, whichever occurs first.
- 12.4 If the alarm and DSS are activated, the time lag between the opening of the valve B and the time of activation, which must not exceed 20 seconds, shall be noted. At the time of the start of the third alarm, a grab sample shall be taken from the sample valve. The sample shall be identified, and sealed in a clean container of at least 500 ml, for analysis as soon as practical in accordance with Part IV of IMO Resolution MEPC 60(33). Valve B shall be closed.
- 12.5 The zeroing testing and sampling procedures described in paragraphs 12.2, 12.3 and 12.4, shall be repeated two more times. At the time of the start of the third alarm, a grab sample shall be taken from the sample valve. The sample shall be identified, and sealed in a clean container of at least 500 ml, for analysis as soon as possible in accordance with Part IV of IMO Resolution MEPC 60(33). Valve B shall be closed.
- 12.6 The meter reading of any successful test must not exceed 6 ppm.
- 12.7 If, after following the procedures described in paragraphs 12.2 and 12.3 (and 12.4, if appropriate), the alarm and DSS have not been activated three times with the 2 ppm oily mixture, the equipment shall again be zeroed, using the procedures described in paragraph 12.2.

- 12.8 Valve C shall be opened and the equipment shall be tested with the 4 ppm oily mixture, samples shall be taken if appropriate, and the equipment shall be cleansed and zeroed, all in accordance with paragraphs 12.2, 12.3, 12.4 and 12.5.
- 12.9 Should the alarm and DSS fail to activate during each of three consecutive tests (cleaning, zeroing, testing, sampling) using the 4 ppm oily mixture, testing shall be continued using the 6 ppm oily mixture from tank D and zeroing, testing, sampling and cleansing procedures similar to those described in paragraphs 12.2, 12.3, 12.4 and 12.5. Following three consecutive successful cleaning, zeroing, testing, sampling procedures, a Certificate of Type Approval, as described in paragraph 9.0, shall be issued.
- 12.10 If the alarm and DSS are not activated during the 6 ppm testing, the equipment shall be tested with the 9 ppm oily mixture from tank E and procedures previously described. Following three consecutive successful tests, a Certificate of Type Approval, as described in paragraph 9.0, shall be issued. If the alarm and DSS are not activated when using the 9 ppm oily mixture, a Certificate of Type Approval shall not be issued.

13.0 Contaminants, Pressure, Shutoff, Calibration Drift, De-energizing Tests and Environmental Tests.

- 13.1 The contaminants, pressure, flow, shutoff, calibration drift, de-energizing tests and environmental tests described in IMO Resolution MEPC 60(33) are accepted for the purposes of the standard and need not be repeated.

14.0 Issuance of Certificate of Type Approval

- 14.1 Following successful calibration and three successful zeroing, testing and sampling procedures, and the procedures required by section 13.0 if applicable, the equipment shall be considered to have passed the test.
- 14.2 A copy of the test data and the results of the test shall be forwarded to the Director, Pollution Prevention.
- 14.3 The test results shall include the test laboratory's analyses of the five calibration test samples and the one alarm test sample, in the general format shown in the Table in the Schedule.

- 14.4 If satisfied with the test data and test results, the Director, Pollution Prevention, may cause a Certificate of Type Approval to be issued in the general format shown in the Schedule.

Part 3 - Method of Determination of Oil Content

15.0 General

- 15.1 The method for the determination of oil content of samples taken for the purposes of this Standard, shall be in accordance with the requirements of IMO Resolution MEPC 60(33), Part 4.

Part 4 - Testing Facilities and Laboratories

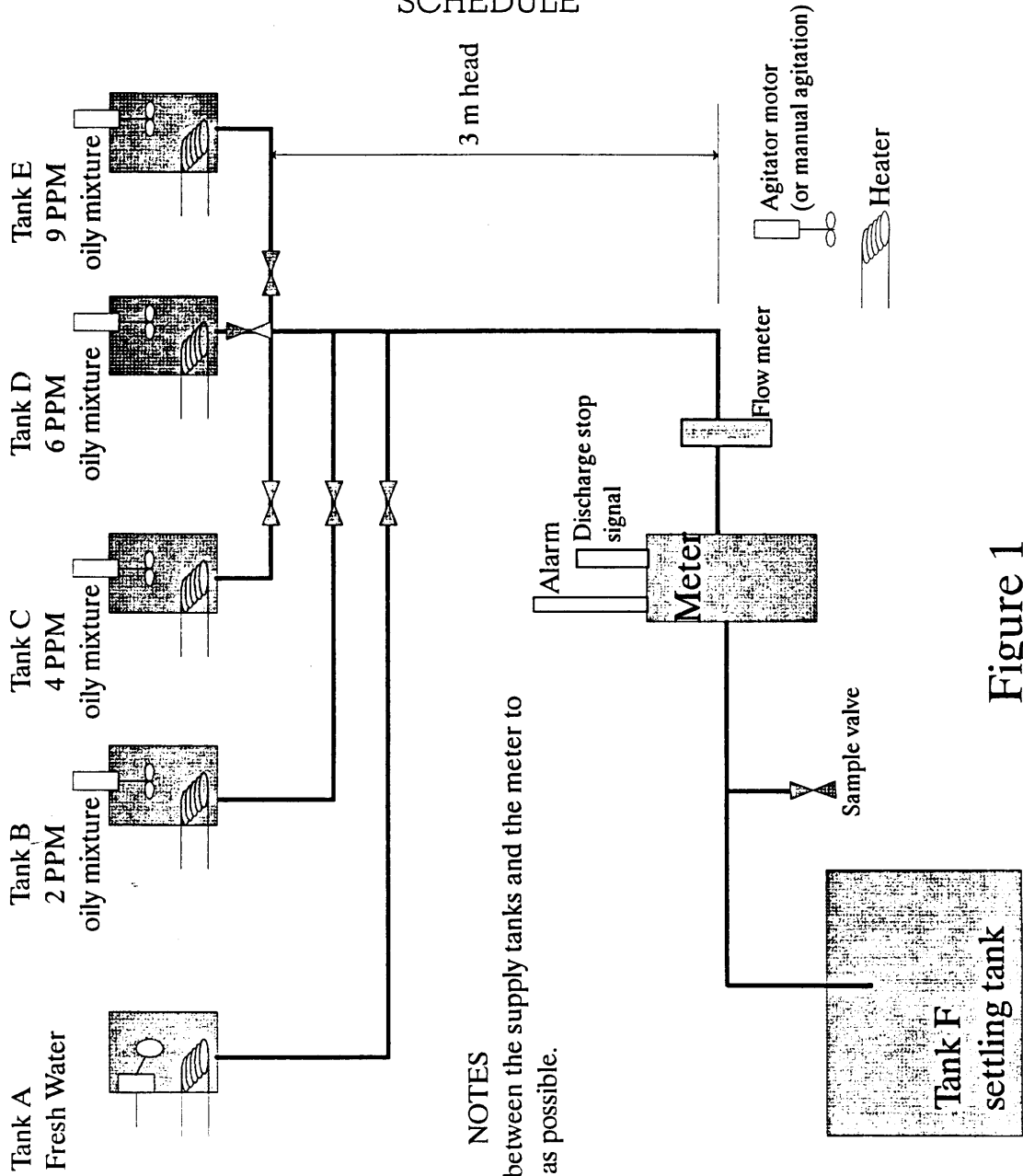
16.0 Accredited Testing Facility

- 16.1 It is recommended that testing carried in accordance with the requirements of this Standard should be conducted at an accredited testing facility.

17.0 Accredited Testing Laboratory

- 17.1 It is recommended that the determination of the oil content of samples taken for the purposes of this Standard should be conducted at an accredited testing laboratory.

SCHEDULE



NOTES

Piping run between the supply tanks and the meter to be as short as possible.

Figure 1

Figure 1

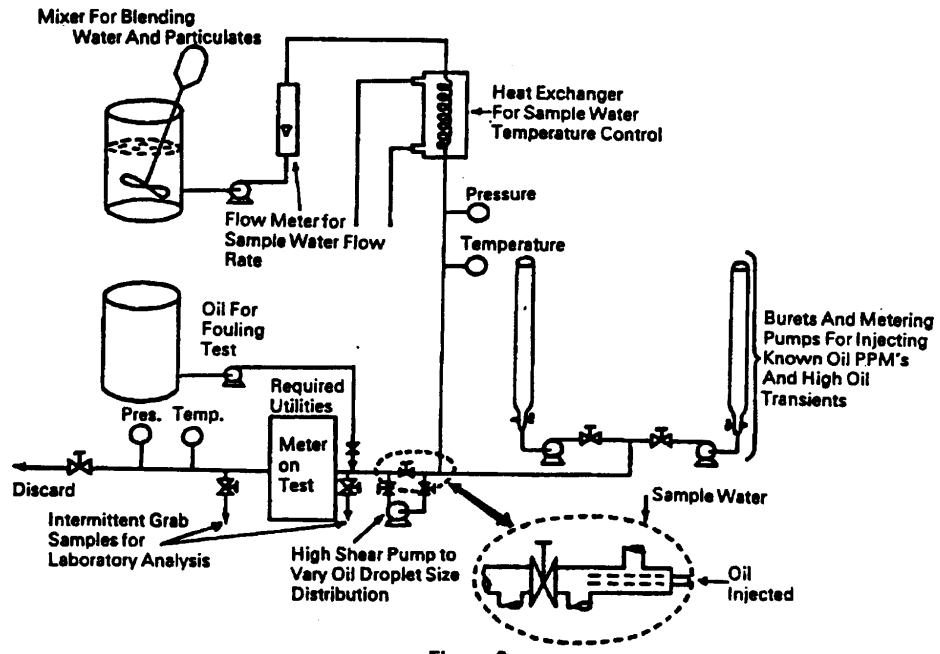
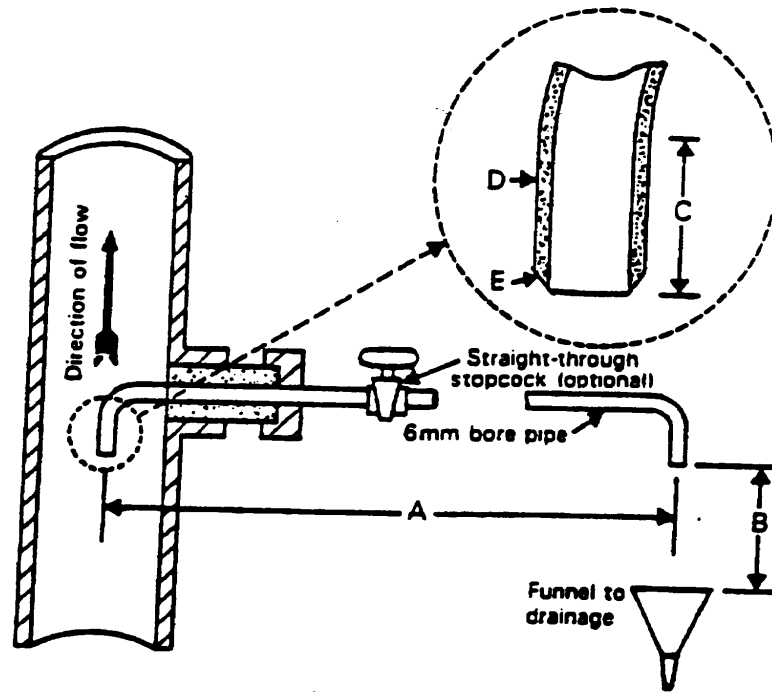


Figure 2



- A Distance A, not greater than 400 mm.
- B Distance B, sufficient to insert sampling bottle.
- C Dimension C, straight length should not be less than 60 mm.
- D Dimension D, pipe thickness should not be greater than 2 mm.
- E Detail E, chisel-edged chamfer (30°).

FIGURE 3 - DIAGRAM OF SAMPLING ARRANGEMENTS

CERTIFICATE OF TYPE TEST FOR OIL CONTENT METERS INTENDED FOR BILGE ALARMS

- 13 -



Certificate number _____
Certificat numéro _____

CERTIFICATE OF TYPE TEST FOR OIL CONTENT METERS INTENDED FOR BILGE ALARMS CERTIFICAT D'AGREMENT PAR TYPE DES DETECTEURS D'HYDROCARBURES DESTINES AUX ALARMES POUR EAUX DE CALE

ppm alarm

ppm alarme

This to certify that the oil content meter, comprising the equipment listed, below has been examined and tested in accordance with the requirements of the Specification contained in Part II of the Annex to the Guidelines and Specifications contained in IMO resolution MEPC 60 (33). This Certificate is valid only for an oil content meter referred to below.

Il est certifié que le détecteur d'hydrocarbures comprenant les éléments ci-après a été examiné et soumis à des essais conformément aux dispositions des spécifications qui font l'objet de la Partie II de l'annexe aux Directives et spécifications contenue dans la résolution 60 (33) de l'OMI. Le présent certificat n'est valable que pour un détecteur d'hydrocarbures du type décrit ci-dessous:

- Oil content meter supplied by
Détecteur d'hydrocarbures fourni par _____
- under type and model designation
type et désignation du modèle _____
- and incorporating:
comprenant: _____
- Oil content meter analysing unit manufactured by
Dispositif d'analyse du détecteur d'hydrocarbures fabriqué par _____
- To specification/drawing numbers
Conformément à la spécification/au schéma n° _____
- Electronic section of oil content meter manufactured by
Éléments électronique du détecteur d'hydrocarbures fabriqué par _____
- To specification/drawing numbers
Conformément à la spécification/au schéma n° _____
- Sample feed pump manufactured by
Pompe d'échantillonnage fabriqué par _____
- To specification/drawing numbers
Conformément à la spécification/au schéma n° _____
- * Sample conditioning unit manufactured by
Dispositif de conditionnement de l'échantillon fabriqué par _____
- To specification/drawing numbers
Conformément au schéma n° _____

**THE SYSTEM IS ACCEPTABLE FOR THE FOLLOWING APPLICATION (*DELETE AS APPROPRIATE)
LE DISPOSITIF EST CONÇU POUR LES UTILISATIONS SUIVANTES (*RAYER LA MENTION INUTILE)**

The oil content meter is acceptable for use with a 15 ppm bilge alarm in accordance with regulation 16(5).
Le détecteur d'hydrocarbures est acceptable et peut être utilisé avec une alarme à 15 ppm pour eaux de cale conformément à la règle 16(5)

* This Bilge Alarm meets the specification for a 5 ppm unit, as contained in the "Standard for Performance and Test Specifications for Bilge Alarms for Use in Canadian Inland Waters," in accordance with the Oil Pollution Prevention Regulations.

** Cette alarme pour eaux de cale satisfait aux spécifications pour une unité à 5 ppm, selon la "Norme de rendement et spécifications d'essais de dispositifs d'alarme pour eaux de cale utilisés sur les navires naviguant dans les eaux intérieures canadiennes", conformément au Règlement sur la Prévention de la pollution par les hydrocarbures.*

Test date and results.
Les données et résultats des essais.

**A COPY OF THIS TEST CERTIFICATE SHOULD BE CARRIED ABOARD A VESSEL FITTED WITH THIS EQUIPMENT AT ALL TIMES
UN EXEMPLAIRE DU PRÉSENT CERTIFICAT D'ESSAIS DEVRAIT SE TROUVER EN PERMANENCE À BORD D'UN NAVIRE ÉQUIPÉ DE CE MATÉRIEL**

(SIGNATURE OF AUTHORIZED INSPECTOR / SIGNATURE DE L'INSPECTEUR AUTORISÉ)

OFFICIAL STAMP
CACHET OFFICIEL

DATED THIS _____ DAY OF _____ 19 _____
DATÉ CE _____ JOUR DE _____

 Canadian Coast Guard
Garde côtière Canadienne
AMSE-C030(06-94)

APPENDIX

Test data and results of tests conducted on a bilge alarm in accordance with the Standard for Performance and Test Specifications for Bilge Alarms, for use in Canadian Inland Waters, in accordance with the Oil Pollution Prevention Regulations.

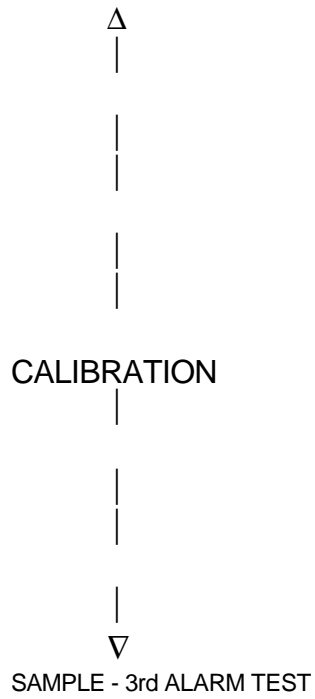
Bilge Alarm Response Tests

| Test No.....(of 3) | | | | | | |
|---|------------------|-------------|-----------------------|-------------------|-----------------------------|---|
| Meter zeroed for 5 minutes with fresh water | | | | | | Yes <u>(circle)</u> |
| Oil | | | | Readings (ppm) | | |
| Type | Specific gravity | Temperature | Measured (Input tank) | Indicated (Meter) | Grab sample (3rd Test Only) | Alarm and Discharge Stop Signal response time |
| | | | | | | |

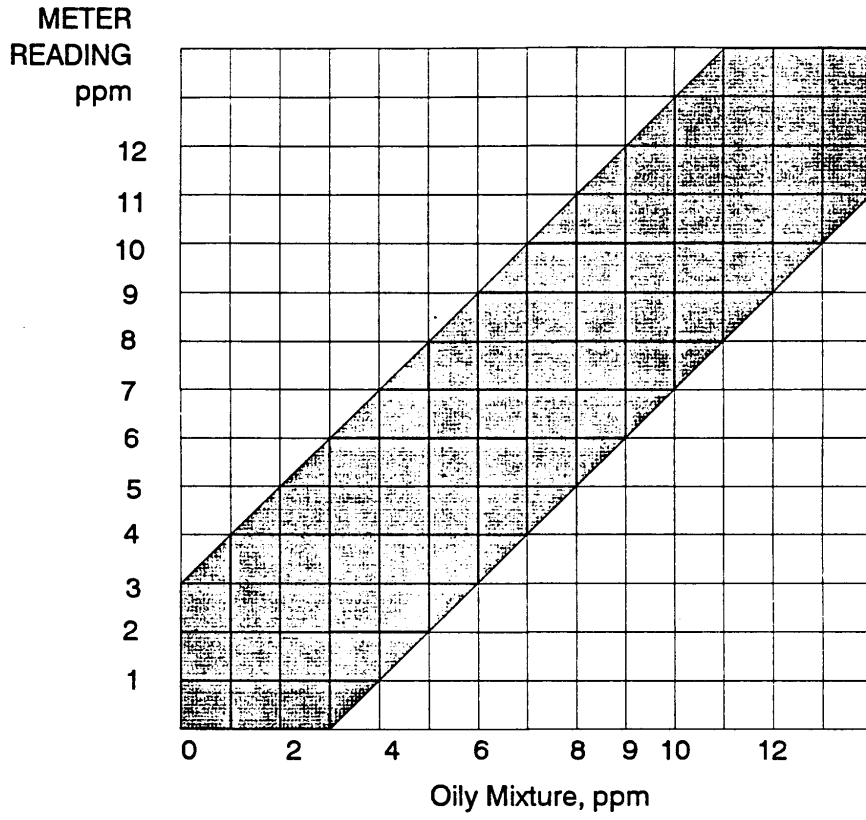
Official Stamp _____
(Signature of Authorized Official)

Date: _____

TABLE



| READINGS (ppm) | | |
|----------------|----------|-------------|
| INDICATED | MEASURED | GRAB SAMPLE |
| 0 | | |
| 2 | | |
| 4 | | |
| 6 | | |
| 9 | | |
| | | |



Bilge Alarm Calibration Graph Format

FIGURE 4 BILGE ALARM CALIBRATION GRAPH FORMAT

Oil Pollution Prevention Regulations

“Standard for 5ppm Bilge Alarms (for Canadian Inland Waters) April 95”

List of Accredited Testing Facilities

1. ERA Technology Ltd.
Cleeve Road
Leatherhead
Surrey KT22 7SA
England
Tel: 0372 374151
Fax: 0372 374496

Contact: Mr. John Billing
Materials Technology Department