1952 No. 1957

The Merchant Shipping (Direction-Finders) Rules, 1952

Made - - - - 11*th November*, 1952
Laid before Parliament 13*th November*, 1952
Coming into Operation 19*th November*, 1952

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The Minister of Transport, in exercise of the powers conferred upon him by section 5 of the Merchant Shipping (Safety Convention) Act, 1949(a) and of all other powers him enabling in that behalf, hereby makes the following Rules:—

Interpretation, repeal and transitional provisions

1.—(1) These Rules shall come into operation on the 19th day of November, 1952, and may be cited as the Merchant Shipping (Direction-Finders) Rules, 1952.

(2) The Interpretation Act, 1889(b) shall apply to the interpretation of these Rules as it applies to the interpretation of an Act of Parliament.

(a) 12, 13 & 14 Geo. 6. c. 43. (b) 52 & 53 Vict. c. 63.

(3) In these Rules, unless the context otherwise requires, the following expressions have the meanings hereby respectively assigned to them, that is to say :—

" Interference " has the same meaning as in the Wireless Telegraphy Act, 1949(a).

" Fishing boat " has the same meaning as in Section 370 of the principal Act.

" Mile " means a nautical mile of 6080 feet.

" Tons " means gross tons.

In relation to waves and signals :—

" Type A1 " means radiotelegraphy by the keying of a continuous wave on and off.

" Type A2 " means amplitude modulated radiotelegraphy by the keying of a modulating audio frequency or of an emission continuously modulated by an audio frequency.

" Type B waves " means damped waves.

(4) The Merchant Shipping (Wireless Telegraphy) Rules, 1938(b), and the Merchant Shipping (Wireless Telegraphy) Rules, 1942(c), in so far as they relate to direction-finding apparatus, are hereby revoked.

(5) The provisions of the First Schedule to these Rules shall have effect for the purpose of the transition from the law in force before these Rules come into operation to the provisions of these Rules.

Application

2. These Rules shall apply to ships which are—

(*a*) sea-going British ships of 1600 tons and upwards registered in the United Kingdom,

(*b*) other sea-going ships of 1600 tons and upwards while they are within any port in the United Kingdom.

and are not—

(i) troopships not registered in the United Kingdom ;

(ii) ships not propelled by mechanical means ;

(iii) pleasure yachts ; or

(iv) fishing boats.

Provided that these Rules shall not apply to any ship not engaged on an international voyage.

Provision of direction-finders

3. Every ship to which these Rules apply shall be provided with a direction-finder, complying with the requirements specified in the Second Schedule to these Rules.

Climatic and durability tests

4.—(1) The direction-finder required by these Rules shall be such that it will be free from mechanical defects and will comply with the requirements of these Rules—

(*a*) while undergoing the vibration, dry heat, and low temperature tests specified in the Third Schedule to these Rules ;

(a) 12, 13 & 14 Geo. 6. c. 54. (b) S.R. & O. 1938/1546; Rev. XIV, p. 545; 1938 II, p. 2108.
(c) S.R. & O. 1942/376; Rev. XIV, p. 558; 1942 I, p. 560.

(*b*) when subjected to the damp heat test specified in sub-paragraph (4) of paragraph 3 of the said Schedule ; and

(*c*) immediately after undergoing the other tests specified in the said Schedule.

(2) The loop aerial system referred to in the Second Schedule to these Rules shall be such that after undergoing the mould growth tests specified in the Third Schedule to these Rules no mould growth will be present on it.

Interference with reception

5. At no time when the ship is at sea shall interference or mechanical noise produced by the direction-finder required by these Rules or by other equipment in the ship be sufficient to prevent the efficient determination of radio bearings by means of the direction-finder.

High voltage parts

6. All parts and wiring of the equipment specified in these Rules in which the direct and alternating voltages (other than radio frequency voltages) combine at any time to given an instantaneous voltage greater than 250 volts shall be protected from accidental access and, except in the case of a generator or converter, shall be isolated automatically from all sources of electrical energy when the means of protection are removed.

Supply of electrical energy

7. There shall be available in every ship to which these Rules apply, at all times she is at sea, a supply of electrical energy sufficient for the operation of the direction-finder. When the ship is in port such supply shall also be available for testing purposes at all reasonable times.

Charging of batteries

8. Equipment shall be provided on board every ship to which these Rules apply for the charging of any batteries which are provided as a source of electrical energy for the direction-finder, and the ship's main source of electrical energy shall always be available for charging the batteries when the ship is at sea. The master of the ship shall cause such batteries to be tested once a day by voltmeter and once a month by hydrometer, and shall cause any battery which is found not to be fully charged to be brought up to that condition as soon as may be.

Installation of direction-finder

9.—(1) The direction-finder shall be installed in such a position that efficient determination of radio bearings by means of the direction-finder will not be hindered by extraneous noises.

(2) (*a*) The loop aerial system referred to in the Second Schedule to these Rules shall be mounted in such manner that the efficient determination of radio bearings by means of the direction-finder will be hindered as little as possible by the proximity of aerials, derricks, wire halyards and other large metal objects.

(*b*) Unless the feeder cables connecting the loop aerial system with the receiver forming part of the direction-finder consists of solid-dielectric screened cable, they shall be protected by metal tubes which are bonded to earth. The joints of the feeder cables shall be watertight.

Means of communication

10.—(1) In every ship to which these Rules apply an efficient two-way means of calling and voice communication shall be provided between the receiver forming part of the direction-finder and the bridge from which the ship is normally navigated.

(2) In every such ship an efficient means of signalling shall be provided between the receiver forming part of the direction-finder and the ship's standard compass or gyro compass repeater, if any.

Restriction of use of the direction-finder

11. The direction-finder required by these Rules shall not be used

(*a*) for any purpose other than the business of the ship; or

(*b*) for keeping the radio watch required by Rule 17 of the Merchant Shipping (Radio) Rules, 1952(**a**).

Calibration

12.—(1) The master of every ship to which these Rules apply shall cause the direction-finder required by these Rules to be calibrated in accordance with this Rule by two persons, the one experienced in taking of radio bearings and the other experienced in taking visual bearings.

(2) The direction-finder shall be so calibrated as soon as may be after it has been installed in the ship and whenever any change is made in the position of the loop aerial system.

(3) The direction-finder shall be calibrated in the following manner:—

(*a*) The calibration of the direction-finder shall be carried out by taking simultaneously visual bearings upon a calibrating transmitter and radio bearings thereon by means of the direction-finder, the ship being either

(i) swung through a complete circle, or

(ii) circled by another ship carrying the calibrating transmitter,

and in either case the bearings being taken throughout 360° at intervals of 5 degrees or as close thereto as may be. The calibrating transmitter upon which the bearings are taken, whether it is situated on shore or on board another ship, shall be a transmitter operating on a frequency between 285 kc/s and 315 kc/s.

(*b*) Calibration tables and curves shall be prepared on the basis of the bearings taken in accordance with sub-paragraph (*a*) of this paragraph.

(4) The master of the ship shall cause the calibration tables and curves prepared in accordance with the foregoing provisions of this Rule to be verified by means of check-bearings taken in the manner therein specified—

(*a*) at intervals not exceeding twelve months, and

(*b*) whenever any change is made in any structure or fitting on deck which is likely to affect the accuracy.

If such verification shall show that the calibration tables or curves are materially inaccurate the master of the ship shall cause the direction-finder to be recalibrated as soon as may be in the manner specified in the foregoing provision of this Rule.

(a) S.I. 1952/1956, p. 1932 below.

Records of calibration and verification

13. The master of every ship to which these Rules apply shall cause the following records to be kept on board in a place accessible to any person operating the direction-finder, and to be available for inspection at any reasonable time by a Surveyor of Ships:—

(*a*) a list or diagram indicating the conditions and position, on the most recent occasion on which the direction-finder was calibrated, of

(i) the aerials, and of

(ii) all moveable structures

on board the ship which might affect the accuracy of the direction-finder;

(*b*) the calibration tables and curves which were prepared on the most recent occasion on which the direction-finder was calibrated;

(*c*) a certificate of calibration, in the form specified in the Fourth Schedule to these Rules, relating to the most recent occasion on which the direction-finder was calibrated, and signed by the persons making the calibration; and

(*d*) a record, in the form specified in the Fifth Schedule to these Rules, of check-bearings taken for the verification of calibration, the bearings being numbered in the order in which they were taken.

Wiring diagram and instructions

14. A schematic wiring diagram of the direction-finder and a book containing adequate instructions as to the use of the direction-finder shall be provided and shall be available at all times for use by any person operating or testing the direction-finder.

Given under the Official Seal of the Minister of Transport this eleventh day of November, 1952.

(L.S.) *Gilmour Jenkins,*
Secretary of the Ministry of Transport.

FIRST SCHEDULE

Transitional Provisions

Rule 1 (5)

1. Any ship which is provided with a direction-finder which was installed in the ship before these Rules come into operation or which is installed before 19th November, 1954, shall not be required to comply with the requirements of Rules 3 and 4 of these Rules if the direction-finder—

(*a*) complies with such of the requirements of the Merchant Shipping (Wireless Telegraphy) Rules, 1938, as would have been applicable to it had the said Rules not been revoked, and

(*b*) is capable of

(i) receiving type A1, A2 and B waves on all frequencies from 255 kc/s to 525 kc/s; and

(ii) taking radio bearings when the field strength at the loop aerial system is as low as 50 microvolts per metre.

2. Nothing in these Rules shall require a ship of less than 5,000 tons to be provided with a direction-finder before 19th November, 1954.

SECOND SCHEDULE

DIRECTION-FINDER

Rule 3

1. GENERAL.—The direction-finder shall include a receiver and a loop aerial system. For the purposes of this Schedule (except paragraph 10 (2) thereof) any goniometer forming part of the direction-finder shall be deemed to be part of the loop aerial system. The loop aerial system, other than ball bearings, hose clips, set screws and other similar small parts, shall consist of non-magnetic material.

2. CAPABILITY.—The direction-finder shall be capable of headphone reception of waves of type A1, type A2 and type B of any frequency within the range of 255 kc/s to 525 kc/s, so as to enable the radio bearing and sense of the signal to be determined by reference to the minimum strength thereof.

3. CONTROLS.—The receiver shall be provided with

(1) a radio-frequency gain control;

(2) a tuning control;

(3) a tuning scale in which, at no point in the tuning range, an interval of $\frac{1}{8}$ inch corresponds to a frequency change of more than 8 kc/s.

4. GENERAL METHOD OF TESTING.—The receiver shall comply with the requirements of paragraphs 5 to 12 inclusive, and 16 of this Schedule when tested in the following manner on any frequency within the range 255 kc/s to 525 kc/s:—

(1) Signals (in this Schedule referred to as "locally generated signals") shall be obtained from one or more signal generators.

(2) Locally generated signals shall be injected through a network in such manner that the signal generator or generators, as the case may be, and the network are together equivalent to a constant voltage generator in series with an impedance substantially equal to the impedance of the loop aerial system at the test frequency, when

(*a*) the loop aerial system is adjusted for the determination of radio bearings;

(*b*) the sense-finder is not in operation; and

(*c*) the impedance is measured between the two terminals to which the receiver is normally connected.

(3) The effective height (h_e) in metres of the loop aerial system shall be the ratio E/e, where E is the voltage produced by a vertically polarised field of strength e volts per metre, when

(*a*) the loop aerial system is adjusted for the determination of bearings and for maximum pick-up;

(*b*) the sense-finder is not in operation;

(*c*) the receiver is not connected to the loop aerial system; and

(*d*) the voltage is measured between the terminals of the loop aerial system to which the receiver is normally connected.

(4) The standard input level shall be the input level obtained when the electromotive force of the equivalent signal generator referred to in sub-paragraph (2) of this paragraph is 50 h_e microvolts root mean square.

(5) The standard output level shall be an audio-frequency output of one milliwatt into a resistance substantially equal to the modulus of the impedance of the telephone receivers at 1,000 c/s.

(6) The signal-noise ratio of the direction-finder shall be determined either

(*a*) by using vertically polarised waves for transmission of the input signal, and with the loop aerial system arranged for the determination of bearings and adjusted for maximum pick-up, but without the sense-finder in operation, or

(*b*) by using locally generated signals applied to the receiver only in the manner specified in sub-paragraph (2) of this paragraph.

5. SIGNAL AND INTERMEDIATE FREQUENCY SELECTIVITY.—The signal frequency selectivity of the receiver, or in the case of a superheterodyne receiver the signal and intermediate frequency selectivity shall satisfy the following requirements:—

(*a*) The minimum bandwidth for 6 decibels discrimination shall be 2 kc/s.

(*b*) The maximum bandwidth in relation to discrimination shall be as follows:—

Discrimination	30 decibels	60 decibels	90 decibels
Bandwidth	8 kc/s	16 kc/s	35 kc/s

At any frequency outside the bandwidth of 35 kc/s specified in (*b*) the discrimination shall not be less than 90 decibels except in the case of superheterodyne receivers, where at the image frequency the discrimination shall not be less than 80 decibels.

6. GAIN.—When

(*a*) the input terminals of the receiver are closed solely through an external impedance substantially equal to that of the loop aerial system at the test frequency,

(*b*) the sense-finder is not in operation, and

(*c*) impedance is measured between the two terminals of the loop aerial system to which the receiver is normally connected,

the gain of the receiver shall be such that receiver noise can produce an output level of minus 10 decibels relative to the standard output level at any frequency within the range of frequencies specified in paragraph 2 of this Schedule.

7. SIGNAL/NOISE RATIO.—

(1) When

(*a*) the note filter (if any) is switched out of circuit,

(*b*) a type A1 signal is injected at the standard input level, and

(*c*) the receiver gain is manually adjusted to give the standard output level, the signal/noise ratio shall not be less than 20 decibels.

(2) When

(*a*) the note filter (if any) is switched out of circuit,

(*b*) a type A2 signal modulated to a depth of 30 per cent. with a note frequency of 400 c/s is injected at the standard input level, and

(*c*) the receiver gain is manually adjusted to give the standard output level, the signal/noise ratio shall not be less than 10 decibels.

(3) For the purposes of this paragraph spurious whistles shall be regarded as noise.

8. BLOCKING.—The change in output of the receiver shall not exceed 3 decibels at any frequency within the range of frequencies specified in paragraph 2 of this Schedule, and at all levels of wanted signal up to 50 decibels above the standard input level, whether of type A1 or type A2, when locally generated signals of type A1 or type A2 at a level of 40 decibels above the level of the wanted signal and spaced 10 kc/s from the carrier of the wanted signal are applied.

9. INTERMODULATION.—The input level of each of two unwanted signals shall not be less than plus 75 decibels relative to the standard input level when

(*a*) the receiver is adjusted to give standard output level with a locally generated wanted signal of standard input level modulated to a depth of 30 per cent., with a note frequency of 400 c/s at any frequency within the range of frequencies specified in paragraph 2 of this Schedule;

(*b*) the input wanted signal has been removed ; and

(*c*) two unwanted locally generated signals each of any frequency which is not less than 50 kc/s from the frequency of the wanted signal but whose frequency sum or frequency difference is equal to the frequency of the wanted signal, one signal being modulated to a depth of 30 per cent. with a note frequency of 400 c/s and the other signal being unmodulated, are simultaneously applied at equal input levels so as to give an output equal to that previously obtained with the wanted signal.

10. RADIATION.—(1) The direction-finder shall not in normal service produce a field exceeding 0.1 microvolt per metre when measured at a distance of one mile from the receiver.

(2) The receiver, including the goniometer, if any, shall be deemed to comply with the requirement of sub-paragraph (1) of this paragraph if, when

(*a*) the receiver without the aerial system is placed centrally in a screened earthed enclosure of dimensions at least six feet cube,

(*b*) the earth terminal is connected to the inside of the screen,

(*c*) each aerial terminal in turn is connected through an unscreened four-turn rectangular search coil situated within the said enclosure and of dimensions one foot square and an unscreened lead to a resistive measuring instrument mounted outside the enclosure, having its other terminal earthed ;

(*d*) the aerial terminal or terminals of the receiver, other than the terminal connected to the aforesaid measuring instrument, are earthed one at a time or in any combination or remain unearthed or are interconnected in any combination ; and

(*e*) the receiver is energised and unscreened headphones are connected thereto,

the power measured by the said measuring instrument when connected in the manner specified in (*c*) of this paragraph, does not exceed 4×10^{-10} watts whatever the resistance of the measuring instrument or the adjustment of the receiver, notwithstanding that the search coil be short-circuited or moved in any way provided that it does not approach within 6 inches of the receiver case.

11. TUNING DRIFT AND STABILITY.—(1) After the receiver has been switched on for 5 minutes and tuned to any frequency within the frequency range specified in paragraph 2 of this Schedule the tune frequency shall not change by more than one part in one thousand in any period of 5 minutes.

(2) a change of 5 per cent. in any one of the supply voltages to the receiver, or to a power unit associated therewith, shall not cause the tune frequency to change by more than three parts in ten thousand ; and

(3) a change of ambient temperature of 5°C. within the range of 0°C. to 50°C. applied after the receiver has been switched on for one hour shall not cause the tune frequency to change by more than one in one thousand.

12. HETERODYNE NOTE STABILITY.—The heterodyne note stability of the receiver shall be such that

(1) the frequency of a heterodyne note which is initially one kilocycle per second shall not vary by more than 100 c/s when an input signal is increased over the range of levels from 0 to 60 decibels above the standard input ; and

(2) at all input levels within the range specified in sub-paragraph (1) of this paragraph a beat note of 200 c/s can be obtained by tuning either towards or away from zero beat.

13. ACCURACY OF BEARINGS.—When the direction-finder is tested using type A2 waves modulated to a depth of from 80 per cent. to 100 per cent. and with a vertically polarised field having a level of 40 decibels relative to one

microvolt per metre, the bearings indicated by the scale of the direction-finder shall, at all frequencies in the range of frequencies specified in paragraph 2 of this Schedule, throughout the whole 360 degrees of azimuth and after due allowance has been made for any site errors, be correct within plus or minus one degree of the true bearing.

14. QUALITY OF MINIMA.—When the direction-finder is arranged for the taking of bearings and is tested under the conditions specified in paragraph 13 of this Schedule, but with a field strength sufficient to give a signal/noise ratio of at least 50 decibels with the loop aerial system adjusted for maximum output, changes in the setting of the bearing indicator 5 degrees and 90 degrees in either direction from the position or positions of minimum output shall, at all frequencies in the range of frequencies specified in paragraph 2 of this Schedule, cause the audio-frequency output to increase by not less than 18 decibels and not less than 35 decibels respectively.

15. EFFICIENCY OF SENSE-FINDER.—When

(*a*) the equipment is adjusted for the determination of sense, and is tested under the conditions specified in paragraph 13 of this Schedule, but with a field strength sufficient to give a signal/noise ratio of at least 50 decibels with the loop aerial system adjusted for maximum output, and

(*b*) the sense indicator is adjusted to indicate any bearing within plus or minus 10 degrees of the true bearing,

the audio-frequency output level of the receiver due to the wanted signal shall be at least 20 decibels below the output level that is obtained when the sense indicator is adjusted to indicate any bearing within 180 ± 10 degrees of the true bearing.

16. FIDELITY.—The maximum change in level of the output of the receiver shall be less than 8 decibels when the modulation frequency of an input signal of constant level and modulation depth is varied continuously from 300 c/s to 1,500 c/s. For the purposes of this paragraph the output of the receiver shall not exceed the standard output level and the input signal shall be applied at any level in the range from the standard input level to 50 decibels above that level.

THIRD SCHEDULE

CLIMATIC AND DURABILITY TESTS

Rule 4

1. In this Schedule:

(1) References to Class B equipment shall be construed as references to each part of the direction-finder other than the loop aerial system.

(2) References to Class X equipment shall be construed as references to the loop aerial system.

2. (1) Class B equipment shall be subjected to the tests named opposite the letter B in the table given in sub-paragraph (4) of this paragraph, and Class X equipment shall be subjected to the tests named opposite the letter X in that table. Provided that Class X equipment shall not be subjected to the Immersion Test if it is subjected to the Rain Test at a static pressure of not less than 45 or more than 55 pounds per square inch.

(2) All such tests shall be conducted in the order in which they appear in the aforesaid table.

(3) At any time when the equipment is required by the provisions of paragraph 3 of this Schedule to be kept working for the purposes of such tests, power shall be supplied thereto at the voltage at which such equipment is intended to be operated.

(4) TABLE

Nature of Test	Class of Equipment
(1) Vibration test	B X
(2) Bump test	B X
(3) Dry heat test	B X
(4) Damp heat test	B X
(5) Low temperature test...	B X
(6) Rain test	X
(7) Immersion test	X
(8) Corrosion test—salt water	B X
(9) Corrosion test—acid fumes (if a battery is included in the equipment)	B X
(10) Mould growth test	X

3. The tests referred to in paragraph 2 of this Schedule shall be conducted respectively as follows:—

(1) VIBRATION TEST. The equipment, complete with its chassis covers and shock absorbers (if any) shall in its normal operating position be clamped to a vibration table. The table shall be vibrated at all frequencies, between 0 and 12½ cycles per second at an amplitude of plus or minus 0.16 cm. during which period the equipment shall be kept working continuously. The table shall be so vibrated for three periods each of which shall be of eight minutes duration. Throughout each such period the direction of the vibrations shall be perpendicular to the direction of the vibrations during the other two periods.

(2) BUMP TEST. The equipment shall be subjected to not less than 500 bumps at a constant rate of between one and four bumps per second with a free drop of at least 2.5 cm.

(3) DRY HEAT TEST. (*a*) Class B equipment shall be placed in a chamber which is maintained for a period of two hours at a constant temperature of 55°C. within a tolerance of plus or minus 1°C. during which period the equipment shall be kept working continuously.

(*b*) Class X equipment shall be placed in a chamber which is maintained for a period of ten hours at a constant temperature of 70°C. within a tolerance of plus or minus 1°C., during which period the equipment shall not be worked or tested. The said chamber shall then be cooled to a constant temperature of 55°C. within a tolerance of plus or minus 1°C. and the equipment shall be kept working continuously at that temperature for a period of two hours.

(4) DAMP HEAT TEST. The equipment shall be prepared for the damp heat test in the following manner:—

(*a*) The equipment shall be placed in a chamber which within a period not exceeding two hours shall be heated from room temperature to 40°C., and shall be brought to a relative humidity of not less than 95 per cent.

(*b*) The chamber shall be kept at a temperature of 40°C. within a tolerance of plus or minus 1°C. for a period of 12 hours, and at a relative humidity of not less than 95 per cent.

(*c*) At the beginning of the last 60 minutes of such period, all accessible surfaces and components shall be wiped dry and any fans or drying lamps provided in the equipment shall be switched on. After the fans or drying lamps have been in operation for 30 minutes and while the temperature of the chamber is still 40°C., subject to the aforesaid tolerance, the equipment shall be tested.

After the equipment has been tested, the temperature of the chamber shall, in preparation for the low temperature test, be allowed to fall below 25°C., the equipment remaining in the chamber.

(5) LOW TEMPERATURE TEST. (*a*) Class B equipment shall be exposed to a temperature of minus 15°C. at normal atmospheric pressure for a period of not less than twelve hours.

(*b*) Class X equipment shall be exposed to a temperature of minus 25°C. at normal atmospheric pressure for a period of not less than twelve hours.

(6) RAIN TEST. The equipment shall be placed in a chamber fitted with eight shower heads, the discharge end of each of which shall consist of a flat, non-rustable metal plate, 0.16 cm. thick, having thirty-six holes each of 0.1 cm. diameter evenly spaced in concentric circles in the following manner:—

16 holes on the periphery of a circle of 5.1 cm. diameter.

8 holes on the periphery of a circle of 3.8 cm. diameter.

8 holes on the periphery of a circle of 2.5 cm. diameter.

4 holes on the periphery of a circle of 1.3 cm. diameter.

The said shower heads shall be arranged at a distance of not less than 50 cm. and not more than 80 cm. from the equipment in such a manner that spray from four of such shower heads is directed downwards at an angle of 45° at each of the four uppermost corners of the equipment, and the spray from the other four shower heads is directed horizontally at the centre of each area of the four sides of the equipment. Fresh water at room temperature and at a static pressure in accordance with the following table shall be sprayed on the equipment from the aforesaid shower heads for a period of one hour with the equipment in the position in which it is normally operated:

	Minimum pressure (pounds per square inch)	Maximum pressure (pounds per square inch)
If the equipment is subjected to the immersion test	15	25
If the equipment is not subjected to the immersion test	45	55

Throughout the test the equipment shall be rotated at between 12 and 20 revolutions per minute about a vertical axis passing through the centre of the equipment.

(7) IMMERSION TEST. The equipment in the condition in which it will normally be kept on board ship shall be immersed in water the surface of which is at least 10 cm. above the highest point of the equipment, and shall remain for a period of one hour. Upon its removal from the water the equipment shall be drained of water.

(8) CORROSION TEST (SALT WATER). The equipment shall be placed in a chamber fitted with apparatus capable of spraying in the form of a fine mist either natural sea water, or tap water containing the following salts in solution:—

	Per cent.
Sodium Chloride	2.7
Magnesium Chloride	0.6
Calcium Chloride	0.1
Potassium Chloride	0.07

The quantity of each salt shall be subject to a tolerance of plus or minus 10 per cent.

Such spraying apparatus shall be such that the products of corrosion cannot mix with the sea water or solution contained in the spray reservoir. The equipment shall be sprayed simultaneously on all its external surfaces with the sea water or solution for a period of one hour and shall be kept working continuously for the last thirty minutes thereof. The equipment shall immediately thereafter be stored for a period of seven days at a temperature of 40°C. within a tolerance of plus or minus 1°C. at a relative humidity of not less than 60 per cent. and not more than 80 per cent. The equipment shall be sprayed and stored as aforesaid on four separate occasions.

(9) CORROSION TEST (ACID FUMES). Any battery included in the equipment shall be fully charged and shall then be fitted into the equipment. If the arrangements are such that the battery can be charged without being removed from the equipment, the battery shall continue to be charged at the maximum rate appropriate to it for a period of twenty-four hours. The equipment shall immediately thereafter be stored for a period of four weeks at a temperature of 40°C. within a tolerance of plus or minus 1°C. at a relative humidity of not less than 60 per cent. and not more than 80 per cent.

(10) MOULD GROWTH TEST. The equipment shall be inoculated by spraying with an aqueous suspension of mould spores containing all the cultures named in column A or all the cultures named in column B of the following table:—

A	B
Aspergillus niger;	Aspergillus niger;
Aspergillus amstelodami;	Aspergillus amstelodami;
Paecilomyces varioti;	Aspergillus versicolor;
Stachybotrys atra;	Stachybotrys atra;
Penicillium brevi-compactum;	Penicillium brevi-compactum;
Penicillium cyclopium;	Cladosporum herbasum.
Chaetomium globosum.	

Immediately after it has been so sprayed the equipment shall be placed in a chamber, the temperature of which shall be maintained at any fixed value within the range 31°C. to 33°C. inclusive and controlled to within a tolerance of plus or minus 1°C. at a relative humidity of not less than 95 per cent. The equipment shall remain in the said chamber for a period of twenty-eight days.

FOURTH SCHEDULE

CERTIFICATE OF CALIBRATION OF DIRECTION-FINDER

Rule 13 (*c*)

We, the undersigned, hereby certify that we have this day

(*a*) calibrated in accordance with the Merchant Shipping (Direction-Finders) Rules, 195... the direction-finder installed in the $\frac{\text{s.s.}}{\text{m.v.}}$ .....

(*b*) handed to the Master of that ship tables of calibration corrections.

(*c*) adjusted the said direction-finder so that the readings taken thereby, when corrected with such tables differed from the correct bearings by no more than plus or minus two degrees.

We hereby further certify that the Master of the said ship has been furnished with a list or diagram indicating the conditions and position, at the time of such calibration, of the aerials and of all moveable structures on board the ship which might affect the accuracy of the direction-finder.

..... Radio Observer.

..... Visual Observer.

..... Date.

Rule 13 (*d*)

FIFTH SCHEDULE

RECORD OF CHECK-BEARINGS TAKEN BY MEANS OF THE DIRECTION-FINDER

	(1)	Serial Number of Bearings	
	(2)	Date	
	(3)	Times (G.M.T.)	
	(4)	Latitude	Ship's Approximate Position
	(5)	Longitude	
	(6)	Distance from Transmitter	
	(7)	Direction-Finder Bearing of (Name)	
	(8)	Direction-Finder relative Bearing Corrected for Q.E.	
	(9)	Ship's Head by Compass 0/360°	
	(10)	Total Compass Error	
	(11)	½ Convergency Applied	
	(12)	Ship's Head Corrected (True)	
	(13)	True Bearing by Direction-Finder [Col. (8) and Col. (12)]	
	(14)	True Bearing by Calculation or by Visual Check (whether calculated or visual to be indicated)	
	(15)	Correction required to make Col. (13) equal Col. (14) (indicating whether — or +)	
	(16)	Signature of Observer or Observers	

EXPLANATORY NOTE

(This Note is not part of the Rules, but is intended to indicate their general purport.)

These Rules require sea-going ships of 1,600 tons gross tonnage and over engaged on international voyages to be provided with direction-finders, and include such requirements as appear to the Minister of Transport to implement the provisions of the International Convention for the Safety of Life at Sea, 1948, relating to direction-finders.

1952 No. 1978

The Merchant Shipping (Fees) Regulations, 1952

Made - - - -	*12th November*, 1952
Laid before Parliament	*13th November*, 1952
Coming into Operation	*19th November*, 1952

The Minister of Transport with the approval of the Treasury and in exercise of the powers conferred upon him by section 33 of the Merchant Shipping (Safety Convention) Act, 1949(**a**), and the enactments specified in the Second Schedule to that Act which enactments are specified in the First Schedule to these Regulations, and of all other powers him enabling in that behalf hereby makes the following Regulations:—

1.—(1) These Regulations shall come into operation on the 19th day of November, 1952, and may be cited as the Merchant Shipping (Fees) Regulations, 1952.

(2) The Regulations shall supersede the Merchant Shipping (Fees) Order, 1924(**b**), in so far as it relates to the fees to be paid for the services specified in Parts 1 to 5, inclusive, Part 8, Parts 10 to 14, inclusive, and Parts 17 to 19, inclusive, of the Schedule to that Order, and the whole of the Merchant Shipping (Fees) Amendment Order, 1926(**c**), and accordingly the said Orders shall cease to have effect to that extent.

(3) In these Regulations the expression " tons " means gross tons.

(4) The Interpretation Act, 1889(**d**), shall apply to the interpretation of these Regulations as it applies to the interpretation of an Act of Parliament.

2. There shall be paid, under the enactments mentioned in the first column of the Second Schedule to these Regulations, for the services mentioned in the second column of that Schedule, the fees specified in the third column thereof.

Given under the Official Seal of the Minister of Transport this twelfth day of November, 1952.

(L.S.) *Gilmour Jenkins*,
Secretary of the Ministry of Transport.

We approve the making of these Regulations.

Dated this twelfth day of November, 1952.

Herbert Butcher,
Dennis Vosper,
Two of the Lords
Commissioners of Her Majesty's Treasury.

(**a**) 12, 13 & 14 Geo. 6. c. 43. (**b**) S.R. & O. 1924/1056; Rev. XIV, p. 90; 1924, p. 695.
(**c**) S.R. & O. 1926/442; Rev. XIV, p. 97; 1926, p. 1013. (**d**) 52 & 53 Vict. c. 63.