STATUTORY INSTRUMENTS

# 1998 No. 2514

# The Merchant Shipping (Passenger Ship Construction: Ships of Classes I, II and II(A)) Regulations 1998

## PART VIII U.K.

## BOILERS AND MACHINERY

### General U.K.

**62.**—(1) In every ship the machinery, boilers and other pressure vessels, associated piping systems and fittings shall be of a design and construction adequate for the service for which they are intended and shall be so installed and protected as to reduce to a minimum any danger to persons on board, due regard being paid to moving parts, hot surfaces and other hazards. The design shall have regard to the materials used in construction including design standards, material specifications, and certification etc, the purpose for which the equipment is intended, the working conditions to which it will be subjected and the environmental conditions on board.

(2) Where the arrangements of the main propulsion machinery are unconventional and without a known history of satisfactory service the Secretary of State may require a separate source of propulsion power to be provided sufficient to give the ship a navigable speed.

(3) The main and auxiliary machinery essential for the propulsion and overall safety of the ship shall be provided with effective means of control. In addition, suitable means shall be provided to ensure that machinery can be brought into operation from dead ship conditions.

(4) Where risk from over-speeding of machinery would otherwise exist, two independent means of control shall be provided to ensure that the safe speed is not exceeded; provided that where the Secreary of State considers it is safe to do so, a single means of limiting the speed of machinery may be permitted.

(5) All boilers, main or auxiliary machinery or any parts of such machinery, all steam, hydraulic, pneumatic and other systems and their associated fittings which are under internal pressure, shall be subjected to appropriate testing including a pressure test in excess of the working pressure, prior to being put into service for the first time. The pressure test shall have regard to—

**[**[F1](a) the design and the materials of which the respective items are constructed;**]**

(b) the purpose for which they are intended to be used; and

(c) the working conditions under which they are intended to be used, and such parts shall be maintained in an efficient condition and be subject to periodic inspection/testing.

(6) Access shall be provided to facilitate the cleaning, maintain cleanliness, inspection and maintenance of main propulsion and auxiliary machinery including boilers and pressure vessels.

*Additional requirements for ships constructed on or after 1st September 1984*

(7) In every ship means shall be provided whereby the normal operation of propulsion machinery can be sustained or restored when there is a breakdown of—

(a) a generating set which serves as a main source of electrical power;

(b) the sources of steam supply;

(c) the boiler feed water systems;

(d) the fuel oil supply systems for boilers or engines;

(e) the sources of lubricating oil pressure;

(f) the sources of water pressure;

(g) a condensate pump and the arrangements to maintain vacuum in condensers;

(h) the mechanical air supply for boilers;

(i) an air compressor and receiver for starting or control purposes;

(j) the hydraulic, pneumatic or electrical means for control of main propulsion machinery including controllable pitch propellors; or

(k) any other auxiliary system essential for propulsion.

A partial reduction in propulsion capability from normal operation may be permitted if it can be shown that the safety of the ship will not be impaired.

(8) In any such ship the main propulsion machinery and all auxiliary machinery essential to the propulsion and the safety of the ship shall be designed to operate when the ship is upright and when inclined at any angle of list up to and including 15 degrees either way under static conditions and 22.5 degrees either way under dynamic conditions (rolling) and simultaneously inclined dynamically (pitching) 7.5 degrees by bow or stern. Where it can be shown that the overall safety of the ship will not be impaired, deviation from the aforesaid angles may be permitted, taking into account the type, size and service conditions.

**Textual Amendments**

**F1** Reg. 62(5)(a) substituted (11.6.2001) by The Merchant Shipping (Miscellaneous Amendments) Regulations 2001 (S.I. 2001/1638), regs. 1, **5(g)**

**Commencement Information**

**I1** Reg. 62 in force at 12.11.1998, see **reg. 1(1)**

## Machinery U.K.

**63.**—(1) In every such ship the propulsion machinery systems shall be designed, constructed and installed so that undue stress due to vibration is not induced during normal operation.

(2) All gearing and every shaft and coupling used for transmission of power for the propulsion and safety of the ship or for the safety of persons on board shall be so designed and constructed that they will withstand the maximum working stresses to which they will be subjected in all service conditions taking into account the type of engines by which these components are driven or of which they form part.

(3) Every main propulsion turbine and, where applicable main internal combustion propulsion machinery and auxiliary machinery shall be provided with automatic shut-off arrangements that will operate in the case of failures, such as lubricating oil supply failure, which could lead rapidly to complete breakdown, serious damage or explosion, provided that arrangements may be permitted to over-ride the automatic shut-off devices.

*Additional requirements for ships constructed on or after 1st September 1984*

(4) In every ship each internal conbustion engine having a cylinder diameter of 200 millimetres or greater, or a crankcase volume of 0.6 cubic metres or greater, shall be provided with crankcase

explosion relief valves of a suitable type having sufficient area to relieve abnormal pressure in the crankcase. Each explosion relief valve shall be arranged or provided with means to ensure that any discharge from it is so directed as to minimise the possibility of injury to personnel.

**Commencement Information**

**I2** Reg. 63 in force at 12.11.1998, see **reg. 1(1)**

### Means of manoeuvring and going astern U.K.

**64.**—(1) Every ship shall have sufficient power for going astern to secure proper control of the ship in all normal circumstances. The ability of the machinery to reverse the direction of thrust of the propeller in sufficient time, and so bring the ship to rest from maximum ahead service speed shall be demonstrated and recorded.

*Additional requirements for ships constructed on or after 1st September 1984*

(2) The effectiveness of any supplementary means of stopping or manoeuvring the ship shall be demonstrated and recorded.

(3) Every ship with multiple propellers shall undergo trials to determine the ability of the ship to manoeuvre with one or more propellers inoperative. The results of such trials shall be recorded.

(4) The stopping times, ship headings and distances recorded on trials, including the records required by paragraphs (1), (2) and (3) shall be available on the ship.

**Commencement Information**

**I3** Reg. 64 in force at 12.11.1998, see **reg. 1(1)**

### Boilers and other pressure vessels U.K.

**65.**—(1) Every boiler or other pressure vessel and its respective mountings, shall, before being put into service for the first time, be subjected to a hydraulic test complying with the applicable test requirements of regulation 62(5).

(2) Means shall be provided which will prevent overpressure in any part of boilers and other pressure vessels, and in particular every boiler and every unfired steam generator shall be provided with not less than two safety valves, provided that, having regard to the output or any other feature of any boiler or unfired steam generator, only one safety valve may be fitted if adequate protection against overpressure is provided.

(3) Where oil-fired water tube boilers are fitted, an automatic boiler water low level alarm and an automatic boiler water low level shut-off valve in the fuel supply pipe to the furnace fronts shall be provided.

*Additional requirements for ships constructed on or after 1st September 1984*

(4) Every oil fired boiler which is not continuously attended shall be provided with arrangements to shut off the fuel supply and give an alarm at an attended location in the event of low boiler water level, combustion air supply failure or flame failure.

(5) Every boiler designed to contain water at a specific level shall be provided with at least two means for indicating the water level, at least one of which shall be a direct reading gauge glass.

(6) Every water tube boiler serving turbine machinery shall be fitted with a high water level alarm.

(7) Means shall be provided to test and control the quality of water in the boiler.

**Commencement Information**

**I4** Reg. 65 in force at 12.11.1998, see **reg. 1(1)**

## Boiler feed systems U.K.

**66.**—(1) Every boiler shall be provided with not less than two efficient and separate feed water systems so arranged that either of such systems may be opened for inspection or overhaul without affecting the efficiency of the other. Means shall be provided which will prevent overpressure in any part of the systems.

(2) Every ship in which boilers are fitted shall be provided with not less than two feed pumps and when the boilers are operating under full load conditions, there shall be at least one feed pump available for stand-by duties.

(3) If it is possible for oil to enter the feed water system of a boiler, the arrangements for supplying boiler feed water shall provide for the interception of oil in the feed water.

(a) (4) (a) Every feed check valve, fitting or pipe through which feed water passes from a pump to such boilers shall be designed and constructed to withstand the maximum working stresses to which it may be subjected, with a factor of safety which is adequate having regard to the material of which it is constructed and the working conditions under which it will be used;

(b) Every such valve, fitting, or pipe shall, before being put into service for the first time, be subjected to a hydraulic test suitably in excess of the maximum working pressure of the boiler to which it is connected or of the maximum working pressure to which the feed line may be subjected, whichever shall be the greater, and shall be maintained in an efficient condition;

(c) The feed pipes shall be adequately supported.

(5) In every ship in which boilers are fitted provision shall be made to ensure that a supply of suitable reserve feed water is available, having regard to the nature and intended duration of the voyage.

*Additional requirements for ships constructed on or after 1st September 1984*

(6) Means shall be provided to test and control the quality of the feed water to the boilers.

**Commencement Information**

**I5** Reg. 66 in force at 12.11.1998, see **reg. 1(1)**

## Steam pipe systems U.K.

**67.**—(1) Every steam pipe and every fitting connected thereto through which steam may pass shall be so designed and constructed as to withstand the maximum working stresses to which it may be subjected.

(2) Efficient means shall be provided for draining every steam pipe so as to ensure that the interior of the pipe is kept free of water and that water hammer action will not occur under any condition likely to arise in the course of the intended service of the ship.

(3) If any steam pipe can receive steam from any source at a higher pressure than it can otherwise withstand with an adequate factor of safety, an efficient reducing valve, relief valve and pressure gauge shall be fitted to such pipe.

**Commencement Information**
**I6** Reg. 67 in force at 12.11.1998, see **reg. 1(1)**

### Air pressure systems U.K.

**68.**—(1) In every ship in which machinery essential for the propulsion and safety of the ship or of persons on board is required to be started, operated or controlled solely by compressed air, there shall be provided at least two independently driven air compressors each of which shall be of efficient design and of sufficient strength and capacity for the service for which it is intended.

(2) Every ship which is propelled by compression ignition engines designed to start by compressed air shall be provided with at least two air receivers.

(3) Every air receiver and air bottle shall be fitted with means of access for purposes of inspection and shall be provided with efficient drains for the removal of oil and water and with efficient relief valves to prevent overpressure. If the air receiver or air bottle can be isolated from the relief valve, it shall be fitted with one or more fusible plugs so as to discharge its contents in the event of fire.

(4) The main air starting arrangements for main propulsion internal combustion engines shall be adequately protected against the effects of internal explosions and backfiring in the starting air pipes.

(5) Where an emergency air compressor is included and essential in the dead start arrangements, it is to be subject to regular inspection and testing.

**Commencement Information**
**I7** Reg. 68 in force at 12.11.1998, see **reg. 1(1)**

### Cooling systems U.K.

**69.** In every ship where machinery essential for the propulsion or safety of the ship or of persons on board is dependent for its operation on an efficient cooling water system there shall be provided at least one circulating pump and, except in the case of an emergency generator, an alternative pump shall be available should that pump fail. These pumps shall be capable of supplying adequate cooling water to such machinery, oil coolers, fresh water coolers or condensers fitted thereto.

**Commencement Information**
**I8** Reg. 69 in force at 12.11.1998, see **reg. 1(1)**

### Oil fuel installations U.K.

**70.** The arrangements for the storage, distribution and utilisation of the fuel oil shall be such as to ensure the safety of the ship and persons on board and shall comply, as a minimum, with the provisions set out in Schedule 8 in Merchant Shipping Notice MSN 1698 (M).

**Commencement Information**
**I9** Reg. 70 in force at 12.11.1998, see **reg. 1(1)**

### Oil systems for lubricating, heating, cooling and control U.K.

**71.**—(1) In every ship in which oil is circulated under pressure for lubrication, heating or cooling or as the sole means of control of machinery essential for the propulsion or safety of the ship or persons on board, at least two pumps shall be provided each of which shall be adequate for circulating such oil.

*Additional requirements for ships constructed on or after 25th May 1980*

(2) The arrangements for the storage and distribution of flammable oils used in pressure systems in machinery spaces shall comply with the requirements of paragraphs 3, 4, 5, 9 and 10 of Schedule 8 in Merchant Shipping Notice MSN 1698 (M) as they apply to oil fuel installations except that sight flow glasses having an acceptable degree of fire resistance may be permitted. Alternative arrangements may be permitted in machinery spaces, other than those of Category A, provided the safety of the ship is not impaired.

**Commencement Information**
**I10** Reg. 71 in force at 12.11.1998, see **reg. 1(1)**

### Machinery controls U.K.

**72.**—(1) Effective means shall be provided for the operation and control of main and auxiliary machinery essential for the propulsion and safety of the ship.

(2) In every ship provided with remote control of the propulsion machinery from the navigating bridge and in which the machinery spaces are intended to be manned the following provisions shall apply—

(a) the speed, direction of thrust and, if variable, the pitch of the propeller shall be fully controllable from the navigating bridge under any sailing condition including manoeuvring;

(b) the remote control from the navigating bridge shall be performed by a single control device for each independent propeller; where necessary each such device shall be provided with means of preventing overload of the propulsion machinery: provided that multiple propeller installations may be controlled by a single control device;

(c) propulsion machinery movements selected at the navigating bridge shall be indicated in the main machinery control room or at the manoeuvring platform as appropriate;

(d) the main propulsion machinery shall be provided with an emergency stopping device, located on the navigating bridge, which shall be independent of the controls otherwise required by this regulation;

(e) remote control of the propulsion machinery shall be possible from only one location at a time. Inter-connected control units may be permitted at such locations. There shall be provided at each location an indicator showing which location is in control of the propulsion machinery. Transfer of control between the navigating bridge and the machinery spaces shall only be possible from the machinery space or the main machinery control room. The control system shall be arranged so that the propeller thrust does not alter significantly when control is transferred from one station to another;

(f) means shall be provided to control the propulsion machinery locally in the event of failure of the remote control system;

(g) the design of the propulsion machinery remote control system shall be such that in the event of its failure an alarm will be given and the pre-set speed and direction of thrust maintained until local control is in operation. This requirement need not be met if other essential features of the system design render compliance impracticable;

(h) indication shall be given on the navigating bridge of—

(i) propeller speed and direction of rotation in the case of fixed pitch propellers;

(ii) propeller speed and pitch position in the case of controllable pitch propellers;

(i) the number of automatic and consecutive attempts which fail to start any internal combustion propulsion engine shall be limited so as to maintain sufficient air pressure for further attempts under local control; and

(j) an alarm shall be provided on the navigating bridge and in the machinery space to indicate low starting pressure at a level which still permits further main propulsion machinery starting operations.

(3) Every ship provided with remote or automatic control of the main propulsion and its associated machinery, including the sources of main electric supply, enabling that machinery to be operated and supervised from a control room shall be as safe as if the machinery is under direct supervision.

(4) Any automatic starting, operating or control systems shall include provisions for manually overriding the automatic controls and shall be so designed that the failure of any part of such systems shall not prevent their operation manually.

**Commencement Information**
**I11** Reg. 72 in force at 12.11.1998, see **reg. 1(1)**

**Steering gear** **U.K.**

**73.**—(1) Every ship shall be provided with an efficient main steering gear and, subject to paragraph 5 of Schedule 9 in Merchant Shipping Notice MSN 1698 (M), an efficient auxiliary steering gear. The main steering gear and the auxiliary steering gear shall be arranged so that the failure of one of them will not render the other one inoperative.

(2) The design and operation of main and auxiliary steering gears shall be in accordance with the specifications set out in Schedule 9 in Merchant Shipping Notice MSN 1698 (M).

**Commencement Information**
**I12** Reg. 73 in force at 12.11.1998, see **reg. 1(1)**

**Ventilating systems in machinery spaces** *Requirements for ships constructed on or after 1st September 1984* **U.K.**

**74.** Machinery spaces of Category A shall be ventilated so that an adequate supply of air is maintained for the safety and well-being of personnel and the operations of machinery, including boilers, at full power in all weather conditions. Any other machinery space shall be adequately ventilated having regard in particular to the prevention of an accumulation of oil vapour under all normal conditions.

**Commencement Information**

**I13** Reg. 74 in force at 12.11.1998, see **reg. 1(1)**

**Protection against noise** *Requirements for ships constructed on or after 1st September 1984* **U.K.**

**75.**—(1) In every ship measures shall be taken to reduce noise levels in machinery spaces as far as is reasonable and practicable. On completion of a ship, noise levels in machinery spaces shall be measured when the largest number of machines that operate simultaneously in service are working at their normal service loads. Measurements taken during sea trials at the maximum ahead service speed of the ship can be used to provide the necessary information.

(2) The equipment and procedures for measuring and recording noise levels in machinery spaces shall be generally in accordance with the provisions of the publication. "The Code of Practice for Noise Levels in Ships" published by Her Majesty's Stationery Office **[**[F2](published 1990)**]**.

(3) Noise levels in machinery spaces shall not exceed 110 dB(A) provided that the Secretary of State may, under such conditions as he may specify, permit higher noise levels having regard to the size of ship and the type of machinery installed.

(4) Any machinery space in which the noise level exceeds 90 dB(A) and which is required to be manned shall be provided with a designated refuge from noise.

(5) Every entrance to a machinery space in which the noise level exceeds 85 dB(A) shall be provided with a warning notice comprising a symbol complying with British Standards Institution specification number BS 5378: 1980 and supplementary sign stating "High Noise Levels. Use Ear Protectors". Sufficient ear protectors shall be provided for use in such spaces.

**Textual Amendments**

**F2** Words in reg. 75 substituted (1.8.2002) by The Merchant Shipping (Miscellaneous Amendments) Regulations 2002 (S.I. 2002/1650), regs. 1, **2(a)**

**Commencement Information**

**I14** Reg. 75 in force at 12.11.1998, see **reg. 1(1)**

**Communication between navigating bridge and machinery space** **U.K.**

**76.**—(1) Subject to paragraph (2) every ship shall be provided with two independent means for communicating orders from the navigating bridge to the position in the machinery space or machinery control room from which the main engines are normally controlled. One of the means shall be an engine room telegraph which provides visual indication of the orders and responses both in the machinery space and on the navigating bridge. Means of communication shall also be provided to any other position from which the main propulsion machinery may be controlled.

(2) On ships constructed on or after 1st October 1994 at least two independent means shall be provided for communicating orders from the navigation bridge to the position in the machinery space or in the control room from which the speed and direction of thrust of the propellers are normally controlled; one of these shall be an engine room telegraph which provides visual indication of the orders and responses both in the machinery spaces and on the navigation bridge. Appropriate means of communication shall be provided from the navigation bridge and the engine room to another position from which the speed or direction of thrust of the propellers may be controlled.

**Commencement Information**
**I15** Reg. 76 in force at 12.11.1998, see **reg. 1(1)**

## Engineers' alarm U.K.

**77.** Every ship shall be provided with an engineers' alarm which shall be clearly audible in the engineer's accommodation when operated from a position in the machinery space or machinery control room from which the engines are normally controlled.

**Commencement Information**
**I16** Reg. 77 in force at 12.11.1998, see **reg. 1(1)**

## Spare gear U.K.

**78.** Every ship shall be provided with sufficient spare gear relating to the boilers and machinery referred to in this Part having regard to the intended service of the ship.

**Commencement Information**
**I17** Reg. 78 in force at 12.11.1998, see **reg. 1(1)**

**Changes to legislation:**
There are currently no known outstanding effects for the The Merchant Shipping (Passenger Ship Construction: Ships of Classes I, II and II(A)) Regulations 1998, PART VIII.