

pneumatic and other systems and their associated fittings which are under internal pressure shall be subjected to appropriate tests including a pressure test before being put into service for the first time.

(4) Provision shall be made to facilitate cleaning, inspection and maintenance of main propulsion and auxiliary machinery including boilers and pressure vessels.

19. Means of Going Astern—(1) Sufficient power for going astern shall be provided to secure proper control of the ship in all normal circumstances.

20. Machinery—(1) Means shall be provided to ensure that the machinery can be brought into operation from the dead ship condition without external aid.

(2) Where risk from overspeeding of machinery exists, means shall be provided to ensure that the safe speed is not exceeded.

(3) Where main or auxiliary machinery including pressure vessels or any parts of such machinery are subject to internal pressure and may be subject to dangerous overpressure, means shall be provided where practicable to protect against such excessive pressure.

21. Machinery Controls—(1) Main and auxiliary machinery essential for the propulsion and safety of the ship shall be provided with effective means for its operation and control.

(2) Where remote control of propulsion machinery from the navigating bridge is provided, the following shall apply:

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

(b) the remote control shall be performed, for each independent propeller, by a control device so designed and constructed that its operation does not require particular attention to the operational details of the machinery. Where multiple propellers are designed to operate simultaneously, they may be controlled by one control device;

(c) the main propulsion machinery shall be provided with an emergency stopping device on the navigating bridge which shall be independent of the navigating bridge control system;

(d) where a machinery room is manned, propulsion machinery orders from the navigating bridge shall be indicated in the main machinery control room or at the propulsion machinery control position as appropriate;

(e) remote control of the propulsion machinery shall be possible only from one location at a time; at such locations interconnected control positions are permitted. At each location there shall be an indicator showing which location is in control of the propulsion machinery;

(f) it shall be possible for all machinery essential for the safe operation of the ship to be controlled from a local position, even in the case of failure in any part of the remote control systems; and

(g) indicators shall be fitted on the navigating bridge for pitch position in the case of controllable pitch propellers.

22. Steam Boilers and Boiler Feed Systems—(1) Every steam boiler and every unfired steam generator shall be provided with not less than two safety valves of adequate capacity. However, having regard to the output or any other features of any boiler or unfired steam generator, the Chief Surveyor may permit only one safety valve to be fitted if the Chief Surveyor is satisfied that adequate protection against overpressure is thereby provided.

(2) Each oil-fired boiler which is intended to operate without manual supervision shall have safety arrangements which shut off the fuel supply and give an alarm in the case of low water level, air supply failure or flame failure.

(3) Every steam generating system which provides services essential for the safety of the ship, or which could be rendered dangerous by the failure of its feedwater supply, shall be provided with not less than two separate feedwater systems

from and including the feed pumps, noting that a single penetration of the steam drum is acceptable. Unless overpressure is prevented by the pump characteristics means shall be provided which will prevent over-pressure in any part of the systems.

(4) Boilers shall be provided with means to supervise and control the quality of the feedwater. Suitable arrangements shall be provided to preclude, as far as practicable, the entry of oil or other contaminants which may adversely affect the boiler.

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

23. Steam Pipe Systems—(1) In every ship 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, with a factor of safety which is adequate having regard to:

(a) the material of which it is constructed, and

(b) the working conditions under which it will be used.

(2) Without prejudice to the generality of the foregoing, every steam pipe or fitting shall, before being put into service for the first time, be subjected to a test by hydraulic pressure to a pressure suitably in excess of the working pressure to be determined having regard to the requirements of sub-clause 1(a) and (b) of this clause and every such steam pipe or fitting shall be maintained in an efficient condition.

(3) Steam pipes shall be adequately supported.

(4) Provision shall be made which will avoid excessive stress likely to lead to the failure of any such steam pipe or fitting, whether by reason of variation in temperature, vibration or otherwise.

(5) Efficient means shall be provided for draining every such 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.

(6) If a steam pipe may 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.

24. Air Pressure systems—(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 an efficient air system which shall include a sufficient number of air compressors and compressed air storage vessels to ensure that an adequate supply of compressed air is available under all conditions likely to be met in service.

(2)(a) The parts of each compressed air system which are subjected to air pressure shall be designed and constructed to withstand, with an adequate factor of safety, the maximum working stresses to which they may be subjected, and every air pressure pipe or fitting in such system, other than a pneumatic control system, shall, before being put into service for the first time, be subject to a hydraulic test suitably in excess of the maximum working pressure to which it may be subjected and be maintained in an efficient condition.

(b) Means shall be provided to prevent overpressure in any part of any such compressed air system and, where water jackets or castings of air compressors and coolers might otherwise be subjected to dangerous overpressure due to leakage into them from air pressure parts, suitable pressure relief arrangements shall be provided.

(c) Provision shall be made to reduce to a minimum entry of oil into any such compressed air system and to drain the system. Provision shall also be made to protect the system from the effects of internal explosion.