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Specification for

Suction strainers

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Foreword

This British Standard has been prepared under the authority of the Shipbuilding and Marine Industry Standards Committee and is based on a proposal of the British Ship Research Association.

A number of the principal piping systems for shipboard use require the provision of some form of fluid filtration to prevent the blockage of pipes and to protect pumping equipment, heat exchangers and other machinery incorporated in the systems. This standard concerns a basic range of low-pressure coarse type suction strainers which are intended to be used for main and auxiliary sea water weedboxes, and as suction strainers for oil services.

The strainers are recommended to be used as an important step in the rationalization of straining equipment and to increase the frequency of use by concentrating on a single form of strainer.

For the purposes of this standard use is made of the generic term “strainer” to cover the various applications for which they are used.

All dimensions are quoted in millimetres throughout this standard.

This standard makes reference to the following British Standards:

BS 21, *Pipe threads.*

BS 729, *Hot dip galvanized coatings on iron and steel articles.*

BS 1400, *Copper alloy ingots and copper and copper alloy castings.*

BS 1449, *Steel plate, sheet and strip — Part 1: Carbon steel plate, sheet and strip.*

BS 1452, *Grey iron castings.*

BS 1669, *Industrial perforated plates.*

BS 1737, *Jointing materials and compounds for water, town gas and low-pressure steam installations.*

BS 1832, *Oil resistant compressed asbestos fibre jointing.*

BS 2870, *Rolled copper and copper alloys. Sheet, strip and foil.*

BS 2874, *Copper and copper alloys. Rods and sections (other than forging stock).*

BS 3643, *ISO metric screw threads — Part 2: Limits and tolerances for coarse pitch series threads.*

BS 4190, *ISO metric black hexagon bolts, screws and nuts.*

BS 4360, *Weldable structural steels.*

BS 4439, *Screwed studs for general purposes. Metric series.*

BS 4504, *Flanges and bolting for pipes, valves and fittings. Metric series.*

BS MA 18, *Salt water piping systems in ships.*

BS MA 51, *Summary and application of pipework flanges for marine use — Part 2: Cast iron flanges — Part 3: Copper alloy flanges¹⁾.*

CP 3003, *Lining of vessels and equipment for chemical processes.*

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

¹⁾ In course of preparation.

NOTE Users of this British Standard should note that while observing the requirements of the standard they should at the same time ensure compliance with such statutory requirements, rules and regulations as may be applicable to the individual ship concerned.

1 Scope

1.1 This British Standard specifies the general basic design requirements and materials for strainers intended for the coarse filtration of sea water and oil under low pressure conditions for ships' pipework systems. The general term of "strainer" is used in this standard to cover the various applications employed.

1.2 The strainer bodies shall be of cast iron or copper alloy construction with in-line branches. The strainer cage shall be fabricated from commercially available perforated plate (see Table 1).

1.3 The range of branch sizes specified is from 40 mm to 500 mm inclusive and the strainer cage perforations are 10 mm or 5 mm diameter depending upon the application required.

2 Types and applications

2.1 The strainers specified in this standard are of rectangular cross section in the direction of fluid flow, with horizontal "in-line" inlet and outlet circular body branches of equal size.

2.2 Principal dimensional details of the various component parts of the strainers are given in Figure 1 to Figure 5.

2.3 This one basic type of strainer shall be used for various applications which are defined as follows in 2.3.1 and 2.3.2.

2.3.1 *Weedbox*: when used in sea water suction pipelines. The range of nominal sizes specified extends from 40 mm to 500 mm in selected steps corresponding to standard steel tubes.

2.3.2 *Oil strainers*: when used in oil suction pipelines (fuel, cargo or lubricating) The apertures in the perforated plate shall be of smaller diameter than those for a main weedbox. The range of nominal sizes specified extends from 40 mm to 250 mm in selected steps corresponding to standard steel tubes.

3 Nominal sizes

3.1 The nominal sizes of the strainers, in millimetres, correspond to the nominal bores of the inlet and outlet branches, and are:

40, 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 450 and 500.

4 Pressure rating

4.1 Irrespective of the intended service the complete strainer shall have a working pressure rating of 4.0 bar (0.40 MPa) gauge. Flange details for the body branches will vary according to the nominal size of the strainer and shall be in accordance with BS 4504 and supplementary information contained in BS MA 51-2 and BS MA 51-3*, as follows:

For nominal sizes 40 to 150 inclusive: NP.16

For nominal sizes 200 to 500 inclusive: NP.10

Table 1 — Materials

Components		Ferrous body construction			Non-ferrous body construction		
		Material	Specification		Material	Specification	
			BS No.	Designation		BS No.	Designation
Body		Grey cast iron	1452	Grade 14	Gunmetal	1400	LG2
Cover		Steel plate	4360	Grade 43A	Steel plate	4360	Grade 43A
Strainer cage		Steel plate	1449-1	HR 37/23	Rolled copper alloy sheet Perforations	2870	CN102
		Perforations	1669	—		1669	
		Galvanizing (see Note)	729	—			
Gasket	Water	General purpose rubber insertion	1737-2.3	—	General purpose rubber insertion	1737-2.3	—
	Oil	Compressed asbestos fibre	1832	—	Not applicable	—	
Fasteners	Studs	Steel	4439	Grade 4.8	Steel	4439	Grade 4.8
	Nuts		4190	Grade 4		4190	Grade 4
Drain plug		Aluminium bronze	2874	CA104	Aluminium bronze	2874	CA104
NOTE Where strainer cages of steel perforated plate are intended for weedbox applications they shall be protected by galvanizing complying with the requirements of BS 729 except that the minimum weight of coating shall be 0.61 kg/m ² . Galvanizing shall not be used for strainers to be fitted in oil systems.							

5 Materials

5.1 The materials used in the manufacture of the strainers shall be in accordance with the requirements given in Table 1. The selection of body material is optional, but in general, strainers used for oil straining applications should be of cast iron and strainers for sea water services may be of cast iron or copper alloy materials.

5.2 Other materials may be used provided they are at least as suitable for the intended duty and are equally acceptable to the purchaser. In this respect attention is drawn to BS MA 18²⁾.

6 Design

6.1 The strainer body shall be a one-piece casting with integral inlet and outlet branches as shown in Figure 1 and Figure 2, the bores of which shall be circular on a common axis and the diameters in accordance with the nominal size of the strainer.

6.2 Flanges shall be at right angles to the axis of the branch bore and concentric with the bore, and the faces shall be parallel. Flanges for ferrous strainers may have flat or raised jointing faces. Flanges for non-ferrous strainers shall have flat jointing faces. All bolt holes shall be drilled off centre lines unless otherwise specified.

6.3 The shape of the top cover facings for the strainers are of variable outline depending on the nominal sizes concerned and together with details of stud fasteners are shown in Figure 3.

6.4 With the exception of the clearance holes for studs all covers shall be fitted with full area gaskets. The cover shall be machine faced on the joint side; details of the covers are given in Figure 4.

6.5 The strainer cage is to be fabricated from perforated plate, all faces being flat and the cage to be truly rectangular in cross section as shown in Figure 5. The design incorporates provision to prevent the cage being incorrectly located within the strainer body.

6.6 The free-flow area characteristic of the strainers is based on the ratio:

$$\frac{\text{open area through strainer cage}}{\text{area of inlet branch}}$$

6.7 These ratios shall be not less than the values given in Table 2.

Table 2 — Minimum ratio of open area/branch nominal size area

Nominal size of branches	Ratio $\frac{\text{open area}}{\text{branch area}}$
mm	
40 and 50	3.5
65 to 100	3.0
above 100	2.3

6.8 In selecting the strainer cage aperture size, particular attention should be paid to the bore size of tubes of various heat exchangers and other equipment which are downstream of the strainer. The type references of strainers and their associated applications together with perforated plate particulars are shown in Table 3.

Table 3 — Type references and perforated plate particulars

Type	Application	Aperture diameter	Pitch (60° staggered pitch)	Percentage open area
		mm	mm	%
A	Main weedbox	10	14	46
B	Secondary weedbox Oil strainers	5	8	36

²⁾ In course of preparation.