

BRITISH STANDARD 1563:1949

**CAST IRON
SECTIONAL
TANKS
(RECTANGULAR)**

BRITISH STANDARD SPECIFICATION

CAST IRON
SECTIONAL TANKS
(RECTANGULAR)

B.S. 1563 : 1949

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THIS REVISED BRITISH STANDARD, having been approved by the Mechanical Engineering Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published by the authority of the General Council on 15th July, 1949.

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over four thousand, indexed and cross-indexed for reference, together with an abstract of each standard, will be found in the Institution's Yearbook.

This standard requires reference to the following British Standards :—

- B.S. 4. Channels and beams.
- B.S. 4A. Angles and tees.
- B.S. 10. Flanges.
- B.S. 15. Structural steel.
- B.S. 24, Part 4. Steel forgings, Specifications 8 and 9.
- B.S. 449. Use of structural steel.
- B.S. 916. Black bolts and nuts.
- B.S. 1083. Precision hexagon bolts, screws and nuts.
- B.S. 1452. Grey iron castings, Grade 10.
- B.S. 1768. Unified precision hexagon bolts, screws and nuts (UNC and UNF threads)—normal series.

*As Altered
September, 1963*

British Standards are revised, when necessary, either by the issue of amendment slips or revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or edition.

MEE/92/2

CO-OPERATING ORGANIZATIONS

The Mechanical Engineering Industry Standards Committee under whose supervision this British Standard was prepared consists of representatives from the following Government departments and scientific and industrial organizations :—

Admiralty
 Associated Offices Technical Committee (Engineering Insurance Companies)
 Association of Consulting Engineers (Incorporated)
 British Chemical Plant Manufacturers' Association
 British Compressed Air Society
 British Electrical and Allied Manufacturers' Association
 British Engineers' Association
 British Internal Combustion Engine Manufacturers' Association
 *British Iron and Steel Federation
 *British Railways
 Crown Agents for the Colonies
 Department of Scientific and Industrial Research
 Institute of Marine Engineers
 Institute of Petroleum
 *Institution of Civil Engineers
 Institution of Gas Engineers
 Institution of Heating and Ventilating Engineers
 *Institution of Mechanical Engineers
 Institution of Mechanical Engineers (Automobile Division)
 Institution of Production Engineers
 Locomotive Manufacturers' Association
 Machine Tool Trades Association
 Ministry of Labour and National Service (Factory Department)
 Ministry of Supply
 Ministry of Transport
 *Ministry of Works
 Office of the High Commissioner for India
 War Office

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committees entrusted with the preparation of this standard :—

British Launderers' Research Association
 Imperial Chemical Industries
 Institute of British Foundrymen
 Institute of Welding
 Institution of Chemical Engineers
 Institution of Municipal Engineers
 Institution of Structural Engineers
 Institution of Water Engineers
 Makers of Cast Iron Sectional Tanks
 Ministry of Fuel and Power
 National Association of Drop Forgers and Stampers
 Oil Companies Materials Committee
 Royal Institute of British Architects
 Water Companies Association

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FOREWORD

Sectional tanks provide a convenient means for the bulk storage of a variety of liquids not subject to pressure other than static head. As with all sectional assemblies the components are readily transportable and—subject to unit multiples—can be erected to give varying proportions of length to breadth and depth. It is also possible, by arrangement between purchaser and manufacturer at the time of the enquiry and order, to make provision for future extension in capacity by increase in floor area or (within limits) depth.

This British Standard provides for cast iron sectional rectangular tanks (excluding all supporting structures and internal and external access ladders), with external and/or internal flanges either open or covered.

This standard does not provide for tanks subject to earth or other external pressure other than wind pressure.

Tanks with internal flanges are suitable for use where they can be erected on a solid level floor or where access to the exterior for erection is precluded by reasons of space inside a building or where the tank is to be erected on a high supporting structure when scaffolding for external erection is undesirable.

Tanks with external flanges are suitable for use where a plain internal surface is necessary, or where there are no restrictions as to external access or where the exterior of the tank is to be lagged. Where tanks with external flanges are to be erected in a confined space, it is essential that there shall be a clear working space of not less than 18 inches all round the outside and underneath the tank to facilitate erection, inspection and maintenance, due allowance being made for valves or other external fittings and for access to the top of the tank.

It is recommended that all cast iron sectional tanks should be inspected inside and outside at intervals not greater than 12 months. At such periodical inspection care should be taken to examine the tie-rods, eye ends, through bolts, turnbuckles, and (where fitted) internal access ladders. Where there is excessive corrosion apparent the component affected should be replaced.

Water and other liquids differ in corrosive action on the inside of the tank ; location and climatic and other conditions differ as to the corrosive action on the outside of the tank. It has, therefore, not been found practicable to specify appropriate internal or external coatings, which should be the subject of mutual arrangement between the purchaser and the manufacturer at the time of the enquiry and order.

It is recommended that for tanks to hold liquids which may be corrosive to mild steel the tie-rods, turnbuckles, internal bolts and struts should be protected against corrosion by sherardizing or other suitable means.

This standard is in four sections as follows :—

Section One. Provisions common to cast iron rectangular tanks made from 2 ft. 0 in., 3 ft. 0 in., 4 ft. 0 in. unit plates.

Section Two. Provisions special to tanks made from 2 ft. 0 in. unit plates.

a. Without brackets between bolt holes.

b. With brackets between bolt holes.

Section Three. Provisions special to tanks made from 3ft. 0 in. unit plates.

Section Four. Provisions special to tanks made from 4 ft. 0 in. unit plates.

BRITISH STANDARD SPECIFICATION FOR

CAST IRON SECTIONAL

RECTANGULAR TANKS

This standard provides alternatives and the information required by the Appendix to Section One on page 13 should invariably be supplied at the time of the enquiry and order.

SECTION ONE

PROVISIONS APPLICABLE TO ALL TANKS

SCOPE

1. This British Standard applies to cast iron sectional rectangular tanks, not working under pressure other than static head, built up of cast iron plates, in the main, either 2 ft. 0 in. square throughout, 3 ft. 0 in. square throughout or 4 ft. 0 in. square throughout, to contain cold water, hot water, potable liquids, oils and certain chemicals, and of the following types :—

Type A. Tanks with external flanges :—

(1) Open top.

(2) Closed top.

(See Fig. 3, page 24, for tanks without brackets between bolt holes.)

(See Fig. 5, page 35, for tanks with brackets between bolt holes.)

Type B. Tanks with internal flanges :—

(1) Open top.

(2) Closed top.

(See Fig. 4, page 24, for tanks without brackets between bolt holes.)

(See Fig. 6, page 35, for tanks with brackets between bolt holes.)

NOTE. For typical sizes approximate weights and nominal capacities, see Tables 6, 7, 8, 9, 12, 15 and 16.

WORKING TEMPERATURES

2. For the purpose of this standard cold liquids are defined as having a temperature not exceeding 100 degrees F. and hot liquids are defined as having a temperature exceeding 100 degrees F. but not exceeding 300 degrees F.

NOTE (1) In the case of tanks to hold hot liquids, care shall be taken in use to avoid excessive vibration or turbulence from boiling or other causes.

NOTE (2) Care shall be taken that tanks are not subjected to a sudden change of temperature from charging a hot liquid into a cold tank or a cold liquid into a hot tank.

MATERIALS

3. *a. Plates.* The cast iron used in the manufacture of the plates shall conform to B.S. 1452, 'Grey iron castings', Grade 10. The plates shall be clean, smooth, free from cold shuts, sand, slag inclusions and porosity.

b. Bolts, studs, nuts and washers. Bolts, other than those referred other than those referred to in Table 4, studs, nuts and washers shall be made from mild steel in accordance with B.S. 15. Bolts and nuts shall be hexagonal, black finish, screwed British Standard Whitworth (B.S.W.) in accordance with B.S. 916. Washers shall be in accordance with Table 2, B.S. 916.

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Bolts referred to in Table 4 shall be of 'R' quality as specified in B.S. 1083 Table 9 for Whitworth threads, and shall be of grade 'S', B.S. 1768 Table 5 for Unified threads. Nuts referred to in Table 4 shall be of 'A' quality as specified in B.S. 1083 Table 10 for Whitworth threads, and B.S. 1768 Table 6 for Unified threads.

c. Tie-rods. Tie-rods shall be of round bar section of mild steel in accordance with B.S. 15 and, where forged, in accordance with B.S. 24, Part 4, Specifications 8 and 9, Class B, and shall have enlarged ends, screwed with plus R.H. or L.H. Whitworth threads in accordance with B.S. 84, Tables 6 and 7. Eye ends, where used, shall be in accordance with Fig. 1, and their dimensions in accordance with Table 1.

NOTE. Tie-rods may be supplied without enlarged ends provided that the diameter at the bottom of the thread complies with Clauses 16, 19 and 22.

d. Turnbuckles. Turnbuckles (where used) shall be neatly and cleanly forged from mild steel in accordance with B.S. 24, Part 4, Specifications 8 and 9, Class B, tapped R.H. and L.H. and shall be in accordance with Fig. 2 and their dimensions in accordance with Table 2.

e. Struts. Struts shall be of mild steel of suitable rolled section in accordance with B.S. 15.

STRENGTH OF PLATES

4. The tensile stress in any plate shall not exceed 2 tons/sq. in. calculated for diagonally ribbed plates on the thickness of the body metal only, no account being taken of the flanges and diagonal ribbing. The scantlings in Tables 4, 5, 11 and 14 are based on a tensile stress not exceeding 2 tons/sq. in.

For externally flanged tanks having a depth greater than 12 ft. 0 in., the bottom plates shall have ribs running transversely between the supports under the plates and these ribs shall be taken into account when calculating the stress in the plates.

Internally flanged tanks greater in depth than 12 ft. 0 in. shall be subject to special consideration in design.