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SPECIFICATION FOR
**SHELL BOILERS OF
WELDED CONSTRUCTION**

(OTHER THAN WATER-TUBE BOILERS)

UDC 621.181

Part 1. Class I welded construction

BS 2790 : Part 1 : 1969

including Amendment No 1, AMD 1106, 15 Jan 1973
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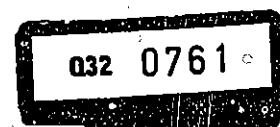
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The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

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 5000, fully indexed and with a note of the contents of each, will be found in the British Standards Yearbook, price 15s. The BS Yearbook may be consulted in many public libraries and similar institutions.

This standard makes reference to the following British Standards, in addition to those listed in the Foreword:

2

BS 131. Methods for notched bar tests.

~~Part 1. The Izod impact test on metals.~~

Part 2. The Charpy V-notch impact test.

BS 427. Method for Vickers hardness test.

BS 499. Welding terms and symbols.

BS 1821. Class I oxy-acetylene welding of steel pipelines and pipe assemblies for carrying fluids.

BS 2486. Treatment of water for land boilers.

BS 2600. General recommendations for the radiographic examination of fusion welded butt joints in steel.

BS 2633. Class I arc welding of ferritic steel pipework for carrying fluids.

BS 2645. Tests for use in the approval of welders.

Part 1. Manual metal-arc and oxy-acetylene welding of mild steel and low alloy steel sheets, plates and sections.

BS 3643. ISO metric screw threads.

BS 3923. Methods for ultrasonic examination of welds.

Part 1. Manual examination of circumferential butt welds in pipes.

Part 2. Automatic examination of welded seams.

Part 3. Manual examination of nozzle welds.

BS 3971. Image quality indicators for radiography and recommendations for their use.

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

The following BSI references relate to the work on this standard:
Committee reference MEE/34/1 Draft for comment 67/1584.

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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:

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| *Associated Offices' Technical Committee | *Institution of Gas Engineers |
| *Association of Consulting Engineers | *Institution of Heating and Ventilating Engineers |
| Association of Mining Electrical and Mechanical
Engineers | *Institution of Mechanical Engineers |
| *Board of Trade | Institution of Mechanical Engineers (Automobile
Division) |
| British Chemical Plant Manufacturers' Association | Institution of Production Engineers |
| British Compressed Air Society | Locomotive and Allied Manufacturers' Association
of Great Britain |
| British Electrical and Allied Manufacturers' Association | London Transport Board |
| British Gear Manufacturers' Association | Machine Tool Trades Association |
| British Internal Combustion Engine Manufacturers'
Association | Ministry of Defence |
| *British Steel Industry | Ministry of Defence—Army Department |
| *British Mechanical Engineering Federation | *Ministry of Labour (H.M. Factory Inspectorate) |
| British Pump Manufacturers' Association | *Ministry of Power |
| *Crown Agents for Oversea Governments and
Administrations | Ministry of Public Building and Works |
| *Electricity Council, the Central Electricity Generating
Board and the Area Boards in England and Wales | Ministry of Technology |
| *Engineering Equipment Users' Association | Ministry of Technology—National Engineering
Laboratory |
| *Gas Council | Ministry of Transport |
| *Institute of Marine Engineers | National Coal Board |
| *Institution of Civil Engineers | National Physical Laboratory (Ministry of Technology) |
| | Royal Institute of British Architects |

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 committee entrusted with the preparation of this British Standard:

- | | |
|---|--------------------------------------|
| Association of Shell Boilermakers | Welding Institute |
| Combustion Engineering Association | Water-Tube Boilermakers' Association |
| Institution of Engineers and Shipbuilders in Scotland | Boiler Manufacturers |
| Lloyd's Register of Shipping | |

BRITISH STANDARD SPECIFICATION FOR SHELL BOILERS OF WELDED CONSTRUCTION (OTHER THAN WATER-TUBE BOILERS)

Part 1. Class I welded construction

FOREWORD

This British Standard, first published in 1956 under the title 'Cylindrical land steam boilers of welded construction', has now been revised to include ^{requirements equivalent to those} of Recommendation R 831* of the International Organization for Standardization (ISO). It has been necessary, therefore, to publish the standard in two parts. Part 1 refers only to boilers of Class I construction and examination to which the ISO Recommendation is applicable. Part 2 will refer only to Class II and III boilers, to which the ISO Recommendation is not applicable.

△ An option to use non normalized plate, with a modified stress factor, is included but this is not compatible with R 831 and should only be implemented within the UK

This standard forms one of a series of British Standards used in boiler construction, the others being:

- BS 10. Flanges and bolting for pipes, valves and fittings.
- BS 592†. Carbon steel castings for general engineering purposes.
- BS 759. Valves, gauges and other safety fittings for application to boilers and to piping installations for and in connection with boilers.
- BS 1113. Water-tube boilers.
- BS 1501. Steels for fired and unfired pressure vessels. Plates.
- BS 1502. Steels for fired and unfired pressure vessels. Sections and bars.
- BS 1503‡. Steels for fired and unfired pressure vessels. Forgings.
- BS 1504‡. Steels for fired and unfired pressure vessels. Castings.
- BS 1971. Corrugated furnaces for cylindrical boilers.
- BS 3059. Steel boiler and superheater tubes.
- BS 3601. Steel pipes and tubes for pressure purposes. Carbon steel : ordinary duties.
- BS 3602. Steel pipes and tubes for pressure purposes. Carbon steel : high duties.

All the standards of this series taken together satisfy the requirements of ISO Recommendation R 831.

The ISO Recommendation and the standards in this series have been formulated with the object of providing adequate protection of life and property, a reasonably long safe period of usefulness and a proper margin for deterioration in service.

ISO Recommendation R 831 is the subject of continuing study and development to increase its scope and to take account of trends in design and construction and this British Standard will accordingly be revised as further Recommendations are made.

NOTE. Information concerning SI units is given in BS 350, 'Conversion factors and tables' and in PD 5686, 'The use of SI units'.

* ISO R 831, 'Rules for construction of stationary boilers'.

† Included in BS 3100, 'Steel castings for general engineering purposes'.

‡ Included in BS 1501-6, 'Steels for use in the chemical, petroleum and allied industries'.

SPECIFICATION

1. GENERAL

1.1 SCOPE

1.1.1 This British Standard specifies requirements for directly-fired boilers and for waste-heat boilers of cylindrical, vertical and locomotive type designs, constructed by fusion welding, where the design metal temperature does not exceed 350°C. The boilers covered by this standard are intended for land use for providing steam or high pressure hot water. This standard does not apply to water-tube boilers (see BS 1113*) nor to boilers for railway locomotives.

1.1.2 The boilers covered by Part 1 of this standard are defined as of Class I fusion-welded construction which includes mechanical tests of the welded joints, non-destructive testing and heat treatment, where required (see 4.3.3.1), of the finished boiler after welding.

1.1.3 This standard applies to boilers of 600 mm diameter and over, having a minimum shell thickness of 6.5 mm, and where:

- (1) the design pressure exceeds 0.725 N/mm²
or (2) the design pressure in N/mm² multiplied by the mean diameter of the boiler shell in millimetres, exceeds 920.

1.1.4 Superheaters, economizers, air pre-heaters, mechanical stokers, gas or oil-burning equipment, forced or induced draught equipment or other accessories which may be required by the purchaser are extraneous to this standard and are matters for mutual arrangement between the purchaser and the manufacturer, reference being made to the appropriate British Standards (for example, BS 1113* for superheaters, BS 759† for boiler mountings).

1.1.5 This standard does not cover brickwork setting, insulation, boiler mountings or furnace fittings. Nevertheless it is recommended that each boiler be furnished with mountings and furnace equipment, unless these are specifically excluded in the enquiry or order.

1.2 DEFINITIONS

For the purposes of this British Standard the definitions in BS 499‡, together with the following apply:

(1) *Inspecting authority*. The body or association acting on behalf of the purchaser which ensures that the design, materials and construction are in accordance with this standard.

(2) *Certifying authority*. The authority in the country of installation which certifies the compliance of the installation with the legal requirements in force in that country.

(3) *Design pressure* (for natural or assisted circulation boilers). The maximum permissible working pressure for the boiler.

* BS 1113, 'Water-tube boilers'.

† BS 759, 'Valves, gauges and other safety fittings for application to boilers and to piping installations for and in connection with boilers'.

‡ BS 499, 'Welding terms and symbols'.

1.3 INFORMATION TO BE SUPPLIED BY THE PURCHASER AND THE MANUFACTURER

1.3.1 Information to be supplied by the purchaser. The purchaser shall disclose to the manufacturer at the time of the enquiry:

- (1) The name of the inspecting authority representing the purchaser.
- (2) Conditions under which the boiler will be required to operate (see 3.1.1).
- (3) Any special statutory or other regulations with which the boiler is required to comply (e.g. boiler laws in countries other than Great Britain).

1.3.2 Information to be supplied by the manufacturer. The manufacturer shall supply, on request, the purchaser or the inspecting authority, or both, with fully dimensioned sectional drawings showing in full detail the construction of all the pressure parts of the boiler, including weld details (see 4.2.2.2); the drawings shall include values of design metal temperature for various components (see 2.2.2).

Where alternative methods of manufacture, or testing, are permitted by this standard, the manufacturer shall disclose to the purchaser or the inspecting authority, or both, the procedure selected by him before putting the work in hand.

1.4 INTERPRETATION

If any ambiguity or doubt arise as to the meaning or effect of any part of this standard or as to whether anything ought to be done or omitted to be done in order that this standard should be complied with in full, the question shall be referred to the Boilers Technical Committee of the British Standards Institution whose interpretation of the requirements of this standard upon the matter at issue will be given free of charge and shall be accepted as final and conclusive. Parties adopting this standard for the purposes of any contract shall be deemed to have accepted this provision unless by their contract they either expressly exclude it or else import an arbitration provision in terms extending to the interpretation of this standard. But this provision is limited to questions of interpretation and does not confer on the Committee any power or jurisdiction to adjudicate upon the contractual rights or duties of any person under a contract except so far as they may necessarily be affected by the interpretations arrived at by the Committee.

Findings or rulings of the Committee upon matters of interpretation may be incorporated in amendments to the standard.

1.5 CONDITIONS FOR COMPLIANCE WITH THIS STANDARD

Use of the provisions of this standard for design and construction is only valid when the relevant requirements of the other standards listed in the Foreword are completely satisfied. Boilers and their ancillary pressure parts may only be marked and certified in accordance with Section 6 of this standard when all the relevant requirements of the appropriate standards in that list have been fulfilled.