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BRITISH STANDARD 1500: 1958

FUSION WELDED PRESSURE VESSELS

FOR USE IN THE CHEMICAL, PETROLEUM AND ALLIED INDUSTRIES

Part 1. Carbon and Low Alloy Steels

BRITISH STANDARDS INSTITUTION

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Price 40/- net

BRITISH STANDARDS INSTITUTION

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THIS BRITISH STANDARD, having been approved by the Chemical Engineering Industry Standard Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 20th November, 1958.

First issued as a Provisional Standard in November, 1949.
First revision November, 1958.

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 3000, indexed and cross-indexed for reference, together with an abstract of each standard, will be found in the Institution's Yearbook price 15s.

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.

CO-OPERATING ORGANIZATIONS

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

*Association of British Chemical Manufacturers
Association of Consulting Engineers (Incorporated)
Board of Trade
*British Chemical Plant Manufacturers' Association
Coke Oven Managers' Association
*Engineering Equipment Users' Association
Gas Council
Glass Manufacturers' Federation
Institute of Metal Finishing
*Institute of Petroleum
*Institution of Chemical Engineers
Institution of Gas Engineers
*Institution of Mechanical Engineers
Institution of Structural Engineers
*Society of Chemical Industry (Chemical Engineering Group)

The scientific and industrial organizations marked with an asterisk in the above list, together with the following, nominated members to serve upon the committee entrusted with the preparation of this British Standard:

Associated Offices Technical Committee
Association of Shell Boilermakers
British Iron and Steel Federation
British Welding Research Association
D.S.I.R.—Mechanical Engineering Research Laboratory
Engineer Surveyors' Association
Imperial College of Science and Technology
Institute of Refrigeration
Institute of Welding
Lloyd's Register of Shipping
Ministry of Labour and National Service
Ministry of Supply
Ministry of Transport and Civil Aviation
Oil Companies' Materials Committee
Individual manufacturers

The following B.S.I. references relate to the work on this standard:
Committee reference CHE 19/-/1 Draft for comment: 1949 provisional edition of B.S. 1500.

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BRITISH STANDARD FOR

FUSION WELDED PRESSURE VESSELS

FOR USE IN THE CHEMICAL, PETROLEUM AND ALLIED INDUSTRIES

Part 1. Carbon and Low Alloy Steels

FOREWORD

Part 1 of this British Standard supersedes the 1949 edition, which was issued as a provisional standard. In preparing this standard, account has been taken of all the comments received on the 1949 provisional standard.

The industry which makes the greatest use of pressure vessels (other than steam boilers) is undoubtedly the chemical industry in its many branches—petroleum, soap, paper, rubber, plastics, etc. There are also many subsidiary 'chemical units' in general industrial plants, such as impregnators in electric cable manufacture and vacuum stills for dry cleaning in laundries.

The petroleum branch operates on a very large scale and, appropriately, the special activities of this branch have received consideration during the formulation of the requirements for pressure vessels. In the preparation of this standard, therefore, full consideration has been given not only to British practice but also to the experience of the American petroleum industry, and acknowledgement is made to the American Petroleum Institute and American Society of Mechanical Engineers.

It is recognized that the design of pressure vessels, particularly in the chemical industry, is the subject of continuous development, and it is intended to keep the standard under review in order to incorporate such modifications as are found desirable as a result of progress.

Part 2 and Part 3 of this standard are under consideration, namely:

Part 2. Alloy steel pressure vessels.
Part 3. Non-ferrous pressure vessels.

When it is required to convert the figures in this standard from British units into metric units it is recommended that the conversion factors and the tables of conversion contained in B.S. 350, 'Conversion factors and tables', be used. Attention is also drawn to B.S. 2856, 'Precise conversion of inch and metric sizes on engineering drawings'.

Section One: General

A. SCOPE

Part I of this British Standard covers the design, construction and inspection of fusion-welded pressure vessels in carbon and low alloy steels for use in the chemical, petroleum and allied industries. It does not necessarily apply to pressure vessels covered by existing British Standards. Vessels in which the internal pressure is due solely to the static head of liquid are outside the scope of this standard, and provision for lightly loaded breathing devices has not been made. Also excluded from this standard are vessels in which the calculated stress in the welded seam at the thinnest point is less than 2500 lb/sq. in. at 350°F.

The design of vessels lined with vitreous enamel requires special consideration and is not covered by this standard.

The term 'pressure vessel' as used in this standard also includes branches up to the point of connection, by bolting, screwing or welding, to the connecting piping.

This standard is intended to serve as a guide for agreement between purchaser and manufacturer. Some of the requirements are not obligatory and nothing in this standard is intended to contravene any provision of the Factories Act, 1937, or of any regulations made thereunder, or any other statutory requirements.

Where the words 'purchaser' and 'manufacturer' occur in the text they shall be taken to include representatives of the purchaser and manufacturer or inspectors mutually agreed upon.

B. DEFINITIONS

For the purpose of this British Standard the following definitions shall apply:

Safe working pressure—the maximum gauge pressure, at the coincident metal temperature, that is permitted for the vessel when in operation.

Design pressure—a value used in the formulae of Section Three to determine the minimum thicknesses of the various component parts of the vessel. In the case of