

Austenitic stainless steel pipes and tubes for pressure purposes

Part 2. Specification for longitudinally welded tubes

ICS 23.040.10

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Iron and Steel Standards Policy Committee (ISM/-) to Technical Committee ISM/73, upon which the following bodies were represented:

- Associated Offices Technical Committee
- BEAMA Ltd.
- British Compressed Air Society
- British Forging Industry Association
- British Gas plc
- British Steel Industry
- Electricity Supply Industry in England and Wales
- Engineering Equipment and Materials Users' Association
- Lloyds Register of Shipping
- Power Generation Contractors' Association (BEAMA Ltd.)
- Process Plant Association
- Seamless Steel Tube Association
- Welding Institute
- Coopted members

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- British Fluid Power Association
- British Welded Steel Tube Association
- Confederation of British Industry
- Energy Industries Council
- Stainless Steel Fabricators' Association of Great Britain

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Summary of pages

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a	1	11 to 24	original
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Foreword

This Part of BS 3605 has been prepared under the direction of the Iron and Steel Standards Policy Committee. It complements Part 1 of BS 3605 which specifies requirements for seamless austenitic stainless steel pipes and tubes. Together with Part 1, which is already published, it supersedes BS 3065 : 1973, which is now withdrawn.

This Part of BS 3605 is one of a series of standards specifying requirements for steel pipes and tubes for pressure purposes. Other standards in the series are as follows:

BS 3601	<i>Specification for carbon steel pipes and tubes with specified room temperature properties for pressure purposes</i>
BS 3602	<i>Steel pipes and tubes for pressure purposes: carbon and carbon manganese steel with specified elevated temperature properties</i> <i>Part 1 Specification for seamless and electric resistance welded including induction welded tubes</i> <i>Part 2 Specification for longitudinally submerged arc welded tubes</i>
BS 3603	<i>Specification for carbon and alloy steel pipes and tubes with specified low temperature properties for pressure purposes</i>
BS 3604	<i>Steel pipes and tubes for pressure purposes: ferritic alloy steel with specified elevated temperature properties</i> <i>Part 1 Specification for seamless and electric resistance welded tubes</i>
BS 3605	<i>Specification for seamless and welded austenitic stainless steel pipes and tubes for pressure purposes</i> <i>Part 1 Specification for seamless tubes</i>

The steels covered by this Part of BS 3605 are generally regarded as being weldable. However, care should be taken and welding should be carried out in accordance with the requirements of the appropriate British Standards for welding.

The main technical differences in this edition of this Part of BS 3605 are as follows. Reference to spirally welded tubes has been deleted as there is no evidence of the manufacture of spirally welded tubes in the UK. The chemical composition of the steels in table 2 has been aligned with that in other standards in the series. Type 316 steel has been divided into two ranges of molybdenum content. Non-destructive testing requirements are based on BS 3889, with the specific requirements in the annexes of this standard, and include eddy current leak tightness testing as an alternative to hydraulic leak tightness testing.

The designations of steel tubes in this Part of BS 3605 and their nearest equivalent designations in BS 3605 : 1973 and ISO 2604 : Part V are given in annex A for information.

This Part of BS 3605 is aligned as far as possible with corresponding material requirements and test procedures now agreed for incorporation in documents by the International Organization for Standardization (ISO).

The specified elevated temperature yield or proof strength values are those derived by the procedure described in BS 3920 : Part 1. Additionally, provision is made for the application of the related procedure for verifying that a product consistently meets specified levels of elevated temperature values.

It is recommended that the results of elevated temperature tests, together with information on the product thickness, the room temperature tensile properties and the chemical composition of the material, should be sent to the committee so that, for future revisions of this Part of BS 3605, minimum elevated temperature proof strength values can be derived from a continuously updated data bank. The address is Secretariat of ISM/73/-/1, British Standards Institution, 3 York Street, Manchester M2 2AT, UK.

The appropriate British Standards for the design and construction of boilers, pressure vessels, pipework, etc. should be consulted for requirements relating to the application and permissible design stress of the products made to this Part of BS 3605.

Assessed capability. Users of this Part of BS 3605 are advised to consider the desirability of quality system assessment and registration against the appropriate Part of BS 5750 by a third party certification body.

It is outside the scope of this Part of BS 3605 to specify formal qualifications for personnel engaged in testing but it is emphasized that the operation of all equipment should be supervised by competent, trained personnel.

For the purposes of this Part of BS 3605, no difference is intended in meaning between 'pipe' and 'tube' though idiomatic use prefers sometimes the one and sometimes the other.

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

Specification

1 Scope

This Part of BS 3605 specifies the requirements for longitudinally welded austenitic stainless steel tubes suitable for general pressure and corrosion-resisting purposes.

This Part of BS 3605 also specifies room temperature properties and 1.0 % proof strength values at elevated temperatures.

In addition to the definitive requirements, this standard also requires the items detailed in **3.1** to be documented. It also requires options selected by the purchaser from those detailed in **3.2** to be documented. For compliance with this Part of BS 3605 both the definitive requirements and the documented items have to be satisfied.

This Part of BS 3605 provides for two categories of room temperature test procedure, designated test category 1 and test category 2 (see clause **12**).

All the types of steel specified are suitable for low temperature service. In view of the good notch ductility characteristics of the steels at temperatures down to $-196\text{ }^{\circ}\text{C}$, it has not been considered necessary to include specified low temperature impact properties.

NOTE. Diameters and thicknesses appropriate to the tubes specified in this Part of BS 3605 should preferably be selected from table 2 of BS 3600 : 1976 and those for use with compression couplings from table 5 of BS 3600 : 1976. Tubes conforming to this Part of BS 3605 may also be supplied in accordance with the dimensions given in BS 1600 : Part 2.

2 References

2.1 Normative references

This Part of BS 3605 incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the publications are listed on page 23. Subsequent amendments to, or revisions of, any of these publications apply to this Part of BS 3605 only when incorporated in it by updating or revision.

2.2 Informative references

This Part of BS 3605 refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on page 24, but reference should be made to the latest editions.

3 Information and requirements to be agreed and to be documented

3.1 Information to be supplied by the purchaser

The following information to be supplied by the purchaser shall be fully documented. Both the definitive requirements specified throughout the

standard and the following documented items shall be satisfied throughout the standard and the following documented items shall be satisfied before a claim of compliance with this Part of BS 3605 can be made and verified:

- a) the designation of the tubes, i.e. the number and Part of this British Standard, the method of manufacture of the tube, the type of steel and the category of test as specified in clause 4, e.g. BS 3605 : Part 2 LWHT 321S31 Cat. 2;
- a) the tube dimensions, e.g. outside diameter and thickness;
- b) the tube length, if exact (see **11.6**);
- c) the quantity of tubes in metres or number of lengths.

3.2 Options

If the purchaser wishes to take up any of the optional requirements listed below, such requirements shall be specified and documented at the time of the enquiry and order. In the absence of such information, the manufacturer shall select the options where appropriate:

- a) whether a product analysis is required (see **7.2** and **16g**);
- b) whether the upper limit above which the dressing of surface imperfections is required will be 1.5 mm (see **10.8**);
- c) whether the tube tolerances are required to suit compression couplings (see **11.3**);
- d) whether lengths other than random lengths are required (see **11.6**);
- e) whether the method of leak tightness test to be carried out on test category 2 tubes up to and including 180 mm outside diameter is the hydraulic test or the eddy current test (see **13.5** and **16h**);
- f) whether the hydraulic test, if specified, is to be carried out at a pressure in excess of 140 bar¹⁾ and the pressure required (see **14.3** and **16h**);
- g) whether additional non-destructive testing is required (see **14.6**);
- h) whether verification of elevated temperature proof strength values is required (see **14.7**);
- i) whether verification of elevated temperature proof stress values by acceptance testing is required and the temperature selected from table 4 at which this is to be carried out (see **14.7.2**);
- j) whether intergranular corrosion tests are required (see **14.8**);
- k) whether marking in accordance with BS 5383 : 1986 is required. (see **18.4**).

¹⁾ 1 bar = 10^5 N/m^2 = 100 kPa.