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No. 534—1934.

Sup. Eg 1966 issue

British Standards Institution

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FORMED IN 1901 AS THE ENGINEERING STANDARDS COMMITTEE

INCORPORATED IN 1918 AS THE BRITISH ENGINEERING STANDARDS ASSOCIATION.

BRITISH STANDARD SPECIFICATION

FOR

STEEL SPIGOT AND SOCKET PIPES AND SPECIALS FOR WATER, GAS, AND SEWAGE.

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LONDON:
PUBLISHED BY THE BRITISH STANDARDS INSTITUTION,
PUBLICATIONS DEPARTMENT,
28, VICTORIA STREET, LONDON, S.W. 1.

Telegrams: Standards, Sowest, London. *Telephones:* Victoria 3127 & 3128.

February, 1934.

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The Public Works Industry Committee under whose supervision this Specification was prepared consists of representatives from the following Government Departments and Scientific and Industrial Organisations :—

Admiralty.
*Crown Agents for the Colonies.
*High Commissioner for India.
*H.M. Office of Works.
*Ministry of Health.
Ministry of Transport.
War Office.
*Association of Consulting Engineers.
Asphalt Roads Association.
*British Waterworks Association.
Bridge and Constructional Ironwork Association.
British Road Tar Association.
*County Surveyors' Society.
Cement Makers' Federation.
Federation of Civil Engineering Contractors.
*Institution of Civil Engineers.
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Iron and Steel Institute.
Municipal Tramways and Transport Association.
National Federation of Clay Industries.
National Federation of Granite and Roadstone Quarry Owners.
*National Federation of Iron and Steel Manufacturers.
Public Works Contractors' Association.
Railway Companies of Great Britain.
Tramways, Light Railways, and Transport Association.

The Government Departments and Scientific and Industrial Organisations marked with an asterisk in the above list, together with the following, were directly represented on the Committee entrusted with the preparation of this Specification :—

Gas Companies' Protection Association.
National Gas Council of Great Britain and Ireland.
Royal Sanitary Institute.
Water Companies' Association.
Makers of Steel Pipes.

This Specification having been approved by the Public Works Industry Committee and endorsed by the Chairman of the Engineering Divisional Council, was published by the authority of the General Council as a British Standard on 19th February, 1934.

NOTE.

In order to keep abreast of progress in the Industries concerned, the British Standard Specifications are subjected to periodical review.

Suggestions for improvements, addressed to the British Standards Institution, 28, Victoria Street, London, S.W.1, will be welcomed at all times. They will be recorded, and in due course brought to the notice of the Committees charged with the revision of the Specifications to which they refer.

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NOTE.

This Specification includes a reference to the following British Standard :—

No. 12. Portland Cement.

NOTE.—*The Institution desires to call attention to the fact that this Specification is intended to include the technical provisions necessary for the supply of the material herein referred to, but does not purport to include all the necessary provisions of a contract.*

BRITISH STANDARD 5

SPECIFICATION

FOR

STEEL SPIGOT AND SOCKET PIPES AND SPECIALS

FOR WATER, GAS, AND SEWAGE.

Scope.

1. This Specification applies to lapwelded, ~~and~~ electric fusion welded, weldless pipes, and specials and specials for use therewith, of nominal sizes from 2 in. to 72 in. inclusive.

It does not apply to what are commercially known as gas, water, and steam tubes, which have screwed joints. Its requirements are applicable to pipes with flange joints, flexible joints, or the like, except with regard to the joint.

Definitions.

2. For the purposes of this Specification the following definitions have been adopted :—

(*a*) *Pipe.*—The term "pipe" denotes a straight pipe of uniform bore.

(*b*) *Special.*—The term "special" denotes any connecting length other than a straight pipe of uniform bore, as, for example, a bend, tee, or collar.

(*c*) *Nominal Size.*—The term "nominal size" denotes the nominal internal diameter of the steel pipe.

Designation of Pipes and Specials.

3. Pipes and bends shall be designated by their respective nominal sizes. Collars shall be designated by the respective nominal sizes of the pipes for which they are intended. Tees shall be designated by the respective nominal sizes of the through pipe and the branch pipe, in this order.

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Process of Manufacture. electric fusion welded

4. The pipes and specials shall be lapwelded or weldless. If the Purchaser specifies that the pipes are to be weldless and that the specials are to be made from weldless pipes he shall also state whether they are to be made of high or low tensile steel.

NOTE.—High tensile steel is not recommended for mains with welded joints of the type specified in Table 4.

Lapwelded pipes up to and including 12 in. nominal size shall be welded by the rolling process: pipes over this size may be welded by the rolling process or the water-gas welding process. Pipes made by the water-gas welding process shall be reheated in a furnace to a dull red heat and then be re-rolled.

Weldless pipes shall be hot rolled or hot finished.

An identification mark, of such a nature as to remain readily legible until the pipes have been tested, shall be marked on one end of all weldless pipes to identify the pipes with their respective casts.

Quality of the Steel.

5. The pipes and specials shall be manufactured from steel which shall show on analysis not more than 0·06 per cent of sulphur and not more than 0·06 per cent of phosphorus. The Manufacturer shall supply when required a copy of the work's analysis of each cast.

NOTE.—The Purchaser should state the process by which the steel is to be manufactured.

Selection of Test Samples for Tensile and Bend Tests.

6. For the tensile and bend tests specified in Clauses 7 and 8 respectively, test samples shall be cut from plates or pipes selected by the Purchaser or his representative, in the manner specified below. The test samples shall not be subjected to any form of heat treatment other than that involved in the process of manufacture of the pipes from which they have been cut.

(*a*) *Lapwelded Pipes* or E.F.W. pipes:—The samples shall be cut transversely from the flat plates to be used for the manufacture of the pipes, one tensile test sample and one bend test sample being taken to represent each cast or 30 tons, whichever is the less.

(*b*) *Weldless Pipes.*—The samples shall be cut longitudinally from finished pipes, and may be flattened cold. For pipes 6 in. and smaller, one tensile test sample shall be taken for each batch of 400 pipes or less, for pipes over 6 in. and up to and including

12 in., one sample shall be taken for each batch of 200 pipes or less; and for pipes over 12 in. one sample shall be taken for each batch of 100 pipes or less.

Tensile Test.

7. The selected samples shall be machined to the form of British Standard Test Piece "A" (see Appendix A). The test pieces shall be tested without further manipulation, and in the presence of the Purchaser or his representative, and shall show the appropriate tensile strength and minimum elongation given in the following table:—

Class of Pipe.		Tensile Strength.	Minimum Elongation in 8 inches.	
			Plates and Pipes up to and including ¼ in. thick.	Plates and Pipes over ¼ in. thick.
		Tons/sq. in.	per cent	per cent
Lapwelded Pipes		24 to 28	15	20
Weldless Pipes.	Low tensile steel ...	24 to 30	15	20
	High tensile steel ...	35 to 41	10	15

Should a test piece break outside the middle half of its gauge length (see Fig. 1), it may be discarded, and such break shall not

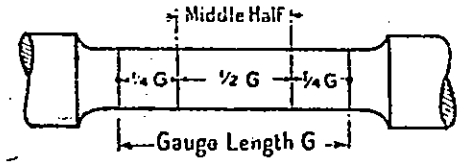

Fig. 1. Diagram explaining the term "Middle Half" of the Gauge Length.

be considered as a failure of the test, and a fresh test may be made by the manufacturer with a test piece taken from the same plate or pipe as that from which the discarded test piece was taken.

Bend Test on Plates for Lapwelded Pipes or EFW-pipes

8. Strips 1½ in. wide selected by the Purchaser or his representative and cut transversely from the plates to be used for the manufacture of lapwelded pipes, or EFW shall withstand without fracture being doubled over cold until the sides are parallel and the internal radius at the bend is not more than 1½ times the thickness of the test piece.

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Re-Tests.

9. Should any of the test pieces from the samples first selected by the Purchaser or his representative fail to pass the tensile or bend tests specified in Clauses 7 and 8 respectively, then for each failure two further test samples, from the same cast or batch of pipes but cut from two plates or pipes other than that from which the first test sample was cut, shall be selected for testing.

Should two out of the total of three test pieces tested fail to pass the mechanical tests, the cast or batch of pipes represented by the test pieces shall be liable to rejection. Should the two re-tests pass, the cast or batch of pipes, with the exception of the plate or pipe from which the test pieces which failed were cut, shall be accepted.

The selection of the samples for re-test and the tests shall be carried out in the same manner in all respects as in the first instance.

Test on Weld.

10. The Purchaser or his representative may select, for testing, two pipes from each batch of 100 lapwelded pipes or less. If either of the two samples fails to meet the requirements of the appropriate test given below, the Purchaser or his representative may call for such further pipes to be tested as he may require to satisfy himself that the remainder of the pipes in the batch are satisfactory. If further tests indicate that the welds are unsatisfactory, the Purchaser shall have the right to refuse to accept the batch, or if the Manufacturer should so desire, test pieces shall be taken from each pipe, and any pipes which fail to comply with the requirements of the specification shall be rejected.

(*a*) *Pipes up to and including* 15 *in. nominal size.*—Rings 2 in. wide, cut from the ends of lapwelded pipes up to and including 15 in. nominal size shall be capable of being flattened between parallel plates, with the weld at the point of maximum bending, until the opposite walls of the pipe meet. No opening in the weld shall take place until the distance between the plates is less than one half of the original outside diameter of the pipe, and no evidence of laminations or burnt material shall develop during the entire flattening process.

No cracks or breaks in the metal elsewhere than in the weld shall occur until the distance between the plates is less than one-quarter of the original outside diameter of the pipe.

(*b*) *Pipes over* 15 *in. nominal size.*—Strips, 2 in. wide, cut circumferentially from lapwelded pipes over 15 in. nominal size, with the weld near the middle of the strip, shall withstand, without

fracture, being doubled over round a bar the radius of which is not more than four times the thickness of the test piece, the weld being placed at the point of maximum bending.

Workmanship.

11. All pipes shall be cleanly finished, free from cracks, surface flaws, laminations, and all other defects. They shall be cylindrical and concentric in the bore within the tolerances prescribed in Clause 14, and straight in the axis. The ends shall be cleanly cut and square with the axis of the pipe.

The repair of minor defects by welding or otherwise shall be permitted but when pipes are being manufactured under inspection at the Manufacturer's works such repair shall be done only after the sanction of the Purchaser or his representative has first been obtained.

Lengths.

12. The term "length" as used in this clause denotes the effective length of the pipe as laid.

(*a*) *Lapwelded Pipes.*—Except when otherwise specified by the Purchaser all lapwelded pipes shall be supplied in random effective lengths as given in the following table :—

Nominal size.	Limits of Random lengths and average length.
Up to and including 16 in.	16 ft. to 25 ft. with an average of not less than 20 ft.
Over 16 in.	18 ft. to 25 ft. with an average of not less than 24 ft.

(*b*) *Weldless Pipes.*—As the length of weldless pipes depends upon the diameter and thickness, the range of lengths in which the pipes shall be supplied shall be the subject of agreement between Purchaser and Manufacturer.

Joints.

13. The joints of ordinary spigot and socket type shall comply with Table 3.

The joints of sleeve-welded type shall comply with Table 4.

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