

No. 78—1917.

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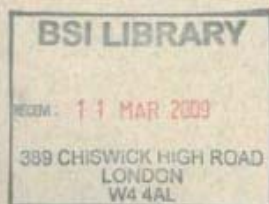
British Engineering Standards Committee

FORMED IN 1901 BY

THE INSTITUTION OF CIVIL ENGINEERS.
THE INSTITUTION OF MECHANICAL ENGINEERS.
THE INSTITUTION OF NAVAL ARCHITECTS.
THE IRON AND STEEL INSTITUTE.
THE INSTITUTION OF ELECTRICAL ENGINEERS.

WITHDRAWN

BRITISH
STANDARD SPECIFICATION
FOR
CAST IRON PIPES
AND SPECIAL CASTINGS
FOR
WATER, GAS
AND
SEWAGE.



LONDON:

PUBLISHED FOR THE COMMITTEE BY CROSBY LOCKWOOD & SON,
7, STATIONERS' HALL COURT, LUDGATE HILL, E.C. 4, AND 5, BROADWAY, WESTMINSTER, S.W. 1,
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October, 1917.

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The following are lists of Members of the Sectional Committee on Cast Iron Pipes, and of the Sub-Committee on Cast Iron Pipes for Water, Gas and Sewage.

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* Succeeded the late Mr. Henry Rofo, May 1915.

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Institution of Gas Engineers: DR. CHARLES CARPENTER; MR. CHARLES HUNT.

Cast Iron Pipe Founders: MR. C. H. BOWSER; MR. F. CHAMBERS; MR. CECIL A. COCHRANE, M.P.

MR. W. E. GRAY; MR. ERNEST MANSENGH; MR. W. S. NICHOLSON; †MR. HERBERT PILKINGTON; MR. MARTIN F. ROBERTS; MR. HENRY J. ROFE.

* Succeeded the late Mr. Henry Rofo, June 1916.

† Deceased, November, 1916.

PREFACE.

The Standardisation of Cast Iron Pipes was first brought before the British Engineering Standards Committee in 1903 by the British Association of Water Works Engineers (now the Institution of Water Engineers), which body had been considering the matter for some time, and the papers in connection with this subject were forwarded by the Association to the Committee with the request that the matter might be dealt with. As a result the Sectional Committee on Cast Iron Pipes, under the Chairmanship of Mr. Charles Hawksley, was appointed by the Main Committee on October 23rd, 1903, and at their first meeting held on March 29th, 1904, the following Sub-Committees were formed :—

<i>Name.</i>	<i>Chairman.</i>
Cast Iron Pipes for Water, Gas and Sewage	MR. HENRY ROFE.
Cast Iron Pipes for Hydraulic Power Purposes	MR. E. B. ELLINGTON.
Cast Iron Pipes for Heating, Ventilating and House Drainage	MR. LOUIS F. PEARSON.

At a subsequent date a Sub-Committee dealing with Cast Iron Pipes for Electrical Purposes was formed with Mr. Martin F. Roberts as Chairman.

The drafting of the Standards which form the subject of the present report was entrusted to the Sub-Committee on Cast Iron Pipes for Water, Gas and Sewage. It is a matter of profound regret to the Committee that the Chairman, Mr. Henry Rofe, did not live to see the completion of the work on which his Sub-Committee was engaged and in which he took so great an interest.

In presenting the annexed Specification and designs for Cast Iron Pipes for Water, Gas and Sewage, the Sectional Committee make the following remarks :—

Four Standard thicknesses of Cast Iron Pipes have been drawn up, Class **A**, which is primarily intended for gas purposes, and Classes **B**, **C**, and **D**, which are considered suitable for water mains. The four series of thicknesses are so graded that if the pipes in one series are not sufficiently thick for the purpose for which they are required, those in the

next higher series can generally be employed. The Committee feel that the four Standard series offer sufficient choice of thickness to enable the Standards to meet the requirements of ordinary engineering practice, and their adoption will enable the manufacturers to make for stock and thus facilitate delivery.

The Committee desire to point out that the suggested working pressures for the four Standard thicknesses of Cast Iron Pipes are only to be regarded as a general indication of the pressures for which the pipes will be found most generally useful. Cases repeatedly arise in engineering practice when pipes of a given thickness can be used for greater or lesser pressure than those indicated in the tables, and the selection of the Standard series to be employed must be left to the professional judgment of the Engineer.

This Report was adopted by the Sectional Committee on Cast Iron Pipes at their meeting held on 8th May, 1917.

This Report was approved by the Main Committee at their Meeting held on 26th July, 1917.

CHARLES HAWKSLEY,

Chairman of the Sectional Committee on Cast Iron Pipes.

NOTE.—The Committee desire to call attention to the fact that this Specification is intended to include the technical provisions necessary for the supply of the material referred to therein, but does not purport to include all the necessary provisions of a Contract.

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BRITISH STANDARD SPECIFICATION FOR CAST IRON PIPES AND SPECIAL CASTINGS FOR WATER, GAS AND SEWAGE.

1. Straight Pipes and Special Castings.

The Pipes shall be of cast iron, and of three kinds,* that is to

say:—

- (i.) Straight Spigot and Socket Pipes and Special Castings with plain sockets,
- (ii.) Straight Spigot and Socket Pipes with half turned and bored joints,
- (iii.) Straight Flange Pipes,

and shall conform in every respect to this Specification, and to the Tables and Drawings hereunto annexed.

Classes A, B and D Pipes up to and including 10 inches nominal internal diameter shall have the same external diameters as Class C Pipes, and Classes A and C Pipes of 12 inches nominal internal diameter and over shall have the same external diameters as Classes B and D Pipes respectively, as shown in Table 1.

* The word "Pipe" or "Pipes" hereinafter contained in this Specification includes the three kinds of pipes, where the context so admits, unless any one kind is particularly mentioned.

2. Quality of Metal used in casting the Pipes.

The metal used for casting the pipes shall be pig iron alone, or pig iron and scrap, and shall be re-melted in the cupola or air-furnace. The pig iron shall be best tough grey foundry pig iron, and the scrap shall be clean, unburnt and of good quality. There shall be no admixture of cinder iron or any material calculated to render the metal inferior in quality, and the resulting casting shall not be white or vitreous on fracture.

3. Provision of Transverse Test Bars and Tensile Test Pieces.

The Manufacturer shall cast, free of charge, at suitable intervals during each day from, and so as to be fairly representative of, the metal drawn for making the pipes six Standard transverse test bars and six Standard tensile test pieces (hereinafter respectively referred to as transverse test bars and tensile test pieces) of the shape and dimensions shown in the Appendix, page 35, and each transverse test bar and each tensile test piece shall have cast on it a consecutive number, or a distinguishing number and date.

The transverse test bars and tensile test pieces may either be cast separately (see Figs. 1 and 2, Appendix, page 35) or as a composite Test Bar (see Fig. 3, Appendix, page 35). They shall be cast horizontally, and the transverse test bar cast so that the top edge of the casting may be as in the diagram (see Figs. 1 and 3, Appendix, page 35).

The results obtained from the testing of the transverse test bars and tensile test pieces shall be accepted by the Purchaser or Purchasers of all pipes cast during the day from the metal above referred to.

4. Mechanical Tests.

The quality of metal shall be ascertained by applying to the transverse test bars and tensile test pieces, in suitable approved and accurate testing apparatus, the tests provided for in Clauses 5 and 7.

The results of all tests made at the foundry shall be at once entered in a test book, and each entry shall be initialled as correct by the representative of the foundry present when the tests were made. The test book shall be kept at the works and be open to inspection by the Engineer* (or the Purchaser) and the Inspector.†

5. Transverse Test.

The transverse test bars being placed as shown in Fig. 1 on page 35 on knife edges 3 feet apart shall sustain a load of 28 cwt. applied at the centre, and shall also show before rupture a deflection of not less than 0.33 inch.

* The word "Engineer" throughout this Specification shall mean the Engineer or Engineers supervising or acting as Engineer or Engineers for the Purchaser or Purchasers.

† The word "Inspector" throughout this Specification shall mean any person expressly authorised in writing by the Engineer (or by the Purchaser) to perform the duties herein referred to or any of them.

6. Number of Transverse Tests.

Such number of transverse tests not less than two shall be made from each day's test bars as provided in Clause 3 as the Engineer (or the Purchaser) or the Inspector may require. If the Engineer (or the Purchaser) or the Inspector is not present not less than two nor more than six transverse tests shall be made and the results entered in the test book.

7. Tensile Test.

The tensile breaking strength of the metal shall be not less than 10 9½ tons per square inch.

8. Number of Tensile Tests.

Such number of tensile tests not less than two shall be made from each day's test pieces as provided in Clause 3 as the Engineer (or the Purchaser) or the Inspector may require. If the Engineer (or the Purchaser) or the Inspector is not present, not less than two nor more than six tensile tests shall be made and the results entered in the test book.

9. Tests at Manufacturer's Works or elsewhere.

The transverse and tensile tests shall be carried out at the Manufacturer's works by a competent representative of the Manufacturer at such reasonable time or times during the day as shall be arranged by the Manufacturer and the Engineer (or the Purchaser) or the Inspector, each of whom, as the case may be, shall have free and full access to the testing house and apparatus during the carrying out of the tests and at any other time during working hours, or failing proper facilities at the Manufacturer's Works for making these tests, the Manufacturer shall bear the cost of carrying them out elsewhere to the satisfaction of the Engineer (or the Purchaser) or the Inspector, who shall have the same powers as if the testing were carried on at the Manufacturer's works, and the results of the tests properly made, whether at the Manufacturer's works or elsewhere, shall, unless independent tests are carried out as provided for in Clause 10, be held to be conclusive as to the quality of the metal as ascertainable by mechanical tests.

10. Independent Tests.

Should the Engineer (or the Purchaser) desire to make independent transverse or tensile tests, the Manufacturer shall at the request of the Engineer (or of the Purchaser) furnish so many transverse test bars and tensile test pieces of the metal used in casting the Pipes as the Engineer (or the Purchaser) may require. Such test bars and test pieces shall be cast and marked in all respects as provided for in Clause 3.

The above-mentioned independent transverse or tensile tests shall be carried out by an independent Expert who shall be agreed upon between the Engineer (or the Purchaser) and the Manufacturer, or, failing agreement within seven days from the posting of a written notice by the Engineer (or the Purchaser) to the Manufacturer, one shall be appointed,

at the request of either party, by the Chairman for the time being of the British Engineering Standards Committee. The certificate of such Expert shall be accepted by the Engineer, the Purchaser, and the Manufacturer as conclusive of the result of such tests.

- 5 The costs attendant on the carrying out of the independent tests, including the provision at reasonable cost of the test bars and test pieces, shall follow the acceptance or rejection of the metal as the result of the independent tests.

11. Mode of Casting.

- 10 The Straight Pipes shall be cast vertically, in dry sand moulds formed from turned iron patterns, and in accurately faced and truly jointed boxes, and without the use of core nails, chaplets, or thickness pieces, or any substitute therefor. They shall be cast with a sufficient head of metal to ensure soundness, which head shall be afterwards cut
15 off in a lathe and the finished Pipe left the length and shape required.

All straight Spigot and Socket Pipes shall be cast socket downwards.

12. Moulds and Cores.

- The sand used in the moulds and cores shall be sufficiently fine and fresh to produce a smooth and regular surface; the cores shall be
20 smoothly finished and the moulds and cores, where dry sand is used, shall be properly blackwashed and carefully dried.

13. Removal from Moulds.

- The Pipes shall not be removed from the moulds until cooling has proceeded so far as to prevent all risk of straining, cracking or other
25 injury consequent on their removal.

14. Freedom from Defects, and Permissible Variation in Diameter and Thickness.

- The Pipes shall be of the full specified dimensions, and shall be straight or curved in the axis as may be required. They shall be in all
30 respects sound and good castings, easily worked with a drill or file, free from laps or other imperfections, shall be neatly dressed and carefully fettled so that no lumps or rough places shall be left in the barrels or sockets, their inner and outer surfaces shall be smooth, and the inner edge of the sockets shall be left reasonably square.

- 35 The thickness of the barrels of the straight Pipes shall be not less than nine-tenths of the prescribed Standard thickness, whether the reduction in thickness be due to want of concentricity or other cause, except that in the case of Pipes of 12 inches diameter and over the thickness in an area extending over not more than 6 inches $\times$ 6 inches,
40 or its equivalent, may be not less than seven-eighths of the prescribed Standard thickness.

In no case shall the external diameters be more than one-sixteenth inch above or below the Standard external diameters given in Table 1.

15. Test for Straightness, Regularity of Thickness, etc.

Each Straight Pipe shall be tested for straightness, regularity of thickness and diameter, by being rolled on a level iron gantry, and by the use of suitable straight edges, gauges, and callipers, which with the iron gantry are to be provided and maintained in proper condition for the purpose by the Manufacturer.

16. Plain Sockets and Tests thereof.

In the case of Spigot and Socket Pipes with Plain Sockets great care shall be taken that the sockets will in all cases receive the spigots, and that the spigots will in all cases enter to the bottom of the sockets. The internal diameter of the plain sockets of the Straight Pipes shall not deviate by more than $\frac{1}{8}$ inch above or below the specified diameter, and the internal diameter of the plain sockets of the special castings shall not deviate by more than $\frac{1}{16}$ inch above or below the specified diameter. To test whether these conditions have been complied with the Manufacturer shall provide and use iron templates of suitable dimensions which shall be passed to the bottom of every socket, and circular iron rings of suitable dimensions which shall be passed over every spigot.

17. Half Turned and Bored Joints and Tests thereof.

In the case of Spigot and Socket Pipes having half turned and bored joints, the spigots shall be accurately turned, and the sockets shall be accurately bored, and they shall be conical, having a taper of one-sixteenth of an inch measured on the diameter per inch of length (*i.e.*, 1 in 32). When fitted tightly together the spigot end of each pipe shall have a clearance space of not less than three-eighths nor more than five-eighths of an inch between it and the bottom of the socket of the pipe into which it is inserted. To test compliance with these conditions suitable coned gauges, to be approved by the Engineer (or the Purchaser) or the Inspector, shall be provided and applied by the Manufacturer to every pipe.

18. Length of Straight Pipes.

The Standard lengths of the Straight Spigot and Socket Pipes (exclusive of the internal depth of the sockets), and of the Straight Flange Pipes (measured over the flanges), shall be as follows:—

Nominal Internal Diameter of Pipe.	Length of Pipe.	
	Spigot and Socket.	Flange.
3 ins.	9 ft.	9 ft.
4 to 12 ins. inclusive	9 ft. or 12 ft. (as may be specified).	9 ft. or 12 ft. (as may be specified).
14 to 24 ins. "	12 ft.	12 ft.
26 to 48 ins. "	12 ft.	—

19. Permissible Variation in Length of Straight Pipes.

The lengths of the Straight Spigot and Socket Pipes shall be not more than $\frac{1}{8}$ inch, and the lengths of the Straight Flange Pipes not more than $\frac{1}{4}$ inch, under or over the Standard lengths given in Clause 18, but averagely such pipes shall be not less in length than the Standard lengths given in Clause 18.

20. Flanges.

All Flanges shall be at right angles to the axis of the Pipe or branch and, in the case of Flange Pipes up to and including 24 inches diameter, the Flanges shall, unless otherwise specified, be made in accordance with Table 13 as regards thickness, outside diameter, diameter of bolt circle, and number and dimensions of bolt holes. The bolt holes shall be either cored or drilled from the solid as may be specified. Except where machined facing strips are specified, the flanges shall be truly faced over their full width.

21. Marking.

Each Pipe shall have cast upon it the Brand (see sketch) indicating that the Pipe purports to have been manufactured in conformity with this Specification, and the appropriate Class Letter shown in the Tables shall be cast or stencilled on each Pipe. The Brand shall be 1 inch in length and project $\frac{1}{8}$ inch for Pipes up to and including 12 inches diameter, and be 2 inches in length and project $\frac{3}{8}$ inch for Pipes above 12 inches diameter. The Class Letter shall be 1 inch high for Pipes up to 12 inches diameter, and 2 inches high for Pipes above 12 inches diameter. The Brand and Class Letter shall in the case of Spigot and Socket Pipes be either upon or adjacent to the socket, and in the case of Flange Pipes shall be upon the body of the Pipe and adjacent to a flange. In the event of any Pipe being rejected, the Brand shall immediately be chipped off in the presence of the Engineer (or of the Purchaser) or of the Inspector, and the Class Letter shall be removed.

In addition to the Brand and Class Letter each Pipe shall have cast on and projecting from it the initials or trade mark of the Manufacturer (which shall be enclosed in a rectangle or other figure with the Brand) and the year of manufacture, e.g., B  X. & Co. 1917.

Special castings shall in addition have cast upon and projecting from them (to the extent before mentioned), adjacent to the Class Letter, marks indicating:—

As to *Bends*, the nominal internal diameter and the angle contained by the Bend.

„ „ *Tees and Branches*, the nominal internal diameter of the main body and of the branch.

„ „ *Tapers*, the nominal internal diameter at each end.

„ „ *Collars*, the nominal internal diameter of the Pipes for which they are intended.

22. Hydraulic Test.

Before being coated the Straight Pipes shall be tested at the Manufacturer's works, by a competent workman, in the presence and to the satisfaction of the Engineer (or of the Purchaser) or of the Inspector, and they shall respectively withstand the following hydraulic test pressures without showing any leakage, sweating, or other defect of any kind:—

	GAS.	WATER.			
	Class A.	Class B.	Class C.	Class D.	
Test Pressure in Foot Head	200	400	600	800	

The pressure shall be steadily applied by approved means and maintained sufficiently long for proof and inspection. The pipe conveying the pressure must be fitted with a strong and accurate pressure gauge and provided with means for attaching the gauge of the Engineer (or of the Purchaser) or of the Inspector.

While under the test pressure each Pipe shall be smartly struck with a suitable hand hammer weighing not less than one and a half pounds.

In addition the Engineer shall have power to select for the hydraulic test as above described any Special Castings he may require.

All Straight Pipes, and the Special Castings when practicable, shall be tested under cover.

23. Coating.

As soon as each Pipe has satisfactorily withstood the foregoing tests, and before it shall have become affected by rust, it shall be heated to a suitable temperature not exceeding 250° Fahr. and perfectly coated, in the most approved manner, by being dipped, except in the case of pipes which are to be only partially coated, in a bath of approved composition maintained at a temperature of not less than 300°, nor more than 330° Fahr., according to Dr. Angus Smith's process. When the Pipe is removed from the bath it shall be properly drained, and the coating must fume freely and set hard within an hour. If the coating does not so fume and set, the Pipe shall be recoated.

In the case of Pipes intended for gas, the coating shall, except when otherwise specified, be applied only to the exterior of the Pipe, and shall be carried up to a distance from the spigot end equal to the depth of the socket in the case of Pipes with plain sockets, and as far as the turned band in the case of Pipes having turned and bored joints, provided that as regards the pipes which are not to be completely coated with the approved composition such composition may be applied to the surfaces to be coated by a brush or other suitable means.

All faced pipes and all turned and bored joints shall before they become affected by rust have their machined surfaces coated with a mixture of white lead and tallow or other approved protective composition.

24. Weighing, and Marking of Weights.

After coating, each Pipe shall be weighed, and its weight distinctly marked thereon in oil paint, and, wherever practicable, on the inside of the socket. Pipes under 5 inches in diameter may, unless otherwise specified, be weighed in batches of 15 cwt. or thereabouts.

25. Permissible Deviation from Standard Weights.

The following variation in weight above or below the Standard weights of the Straight Pipes given in Tables 2 and 3 shall be allowed:—

Nominal Internal Diameter of Pipe in inches.	Limit of Deviation from Standard Weight.	
	Above.	Below.
3 to 7	4 per cent.	4 per cent.
Over 7 " 16	3½ " "	3½ " "
" 16 " 24	3 " "	3 " "
" 24 " 32	2½ " "	2½ " "
" 32 " 42	2 " "	2 " "
" 42 " 48	1½ " "	1½ " "

N.B.—It is hoped to give the Standard weights of the Special Castings (Tables 5 to 12) in a subsequent edition.

26. Defective Castings.

No Pipes shall in any way whatever be stopped, repaired, or altered, and the Engineer (or the Purchaser) or the Inspector may reject any Pipe which has been so treated, notwithstanding that it may have been previously passed.

27. Inspection.

The Engineer, or the Purchaser and the Inspector shall have free access to the Works of the Manufacturer at all reasonable times, and shall be at liberty to inspect the manufacture at all stages. The charging of the cupola, the melting, drawing off, conveying and pouring of the metal shall be carried out in such a manner and at such time or times that the Engineer (or the Purchaser) or the Inspector may have every facility for seeing that the work is carried out in accordance with this Specification.

28. Maker's Certificate.

In the case of any Pipes which have not been inspected at the Foundry, the Manufacturer shall on request supply to the Engineer (or the Purchaser) a certificate signed by him giving the result of the transverse, tensile and hydraulic tests specified in Clauses 5, 7 and 22 hereof, and certifying that the Pipes have been manufactured in accordance with this Specification.

29. Rejection.

Should the metal used in casting any Pipe not comply with the tests required in Clauses 5 and 7, or in any other respects not conform to the requirements of this Specification, or should any Pipe not comply with the Hydraulic Test required in Clause 22, or not conform in all respects to the requirements of this Specification, such Pipe may be rejected, provided that the requirements of Clauses 5 and 7 shall be deemed to have been complied with, if at least two and not less than half the transverse tests and at least two and not less than half the tensile tests fulfil the requirements of those Clauses.

30. Testing Facilities.

The Manufacturer shall at his own expense supply the necessary gauges and shall supply and prepare all transverse test bars and tensile test pieces and supply all labour and apparatus for testing which may be necessary or which may be required by the Engineer (or by the Purchaser) for carrying out the tests and requirements of this Specification at the Manufacturer's works, and shall also supply all transverse test bars and tensile test pieces for carrying out the independent tests provided for in Clause 10. If the Manufacturer shall fail to perform the foregoing obligations with regard to testing, or any of them, the Engineer (or the Purchaser) shall be at liberty to perform the said obligations or any of them which the Manufacturer has failed to perform, either at the Manufacturer's Works or elsewhere and charge the costs and expenses thereof to the Manufacturer.

31. Arbitration.

In case any dispute shall arise between the parties to any contract in which this Specification is in whole or part incorporated as to whether the metal is or is not of the quality mentioned in Clause 2, or as to whether the Pipes are free from the defects mentioned in Clause 14, or as to whether any test or requirement of this Specification has or has not been carried out and/or complied with, then such dispute shall be referred to the arbitration of a person to be agreed upon between the parties, or failing agreement to be appointed, at the request of either party to the said dispute, by the Chairman for the time being of the British Engineering Standards Committee, provided always that if such dispute is within the terms of such or any contract or agreement to refer or submit to arbitration, or if the matter which might have given rise to such dispute is within the terms of such or any contract or agreement under which the decision of the Engineer is final, then this Clause shall be of no effect.

BRITISH STANDARD CAST IRON PIPES FOR WATER, GAS AND SEWAGE.

STANDARD THICKNESSES AND EXTERNAL DIAMETERS FOR SPIGOT AND SOCKET AND FLANGE STRAIGHT PIPES.

Nominal Inside Diameter of Pipe, (ins.)	GAS.		WATER AND SEWAGE.						Nominal Internal Diameter of Pipe, (ins.)
	Class A.		Class B.		Class C.		Class D.		
	Test Pressure 200 ft. hd.		Test Pressure 400 ft. hd.		Test Pressure 600 ft. hd.		Test Pressure 800 ft. hd.		
	Thickness (ins.)	External Diameter (ins.)	Thickness (ins.)	External Diameter (ins.)	Thickness (ins.)	External Diameter (ins.)	Thickness (ins.)	External Diameter (ins.)	
3	·38	3·76	·38	3·76	·38	3·76	·40	3·76	3
4	·39	4·80	·39	4·80	·40	4·80	·46	4·80	4
5	·41	5·90	·41	5·90	·45	5·90	·52	5·90	5
6	·43	6·98	·43	6·98	·49	6·98	·57	6·98	6
7	·45	8·06	·45	8·06	·53	8·06	·61	8·06	7
8	·47	9·14	·47	9·14	·57	9·14	·65	9·14	8
9	·49	10·20	·49	10·20	·60	10·20	·69	10·20	9
10	·52	11·26	·52	11·26	·63	11·26	·73	11·26	10
12	·55	13·14	·57	13·14	·69	13·60	·80	13·60	12
14	·57	15·22	·61	15·22	·75	15·72	·86	15·72	14
15	·59	16·26	·63	16·26	·77	16·78	·89	16·78	15
16	·60	17·30	·65	17·30	·80	17·84	·92	17·84	16
18	·63	19·38	·69	19·38	·85	19·96	·98	19·96	18
20	·65	21·46	·73	21·46	·89	22·06	1·03	22·06	20
21	·67	22·50	·75	22·50	·92	23·12	1·06	23·12	21
22	·68	23·54	·77	23·54	·94	24·16	1·08	24·16	22
24	·71	25·60	·80	25·60	·98	26·26	1·13	26·26	24
26	·74	27·66	·83	27·66	1·02	28·36	1·18	28·36	26
27	·75	28·70	·85	28·70	1·04	29·40	1·20	29·40	27
28	·76	29·72	·86	29·72	1·06	30·44	1·22	30·44	28
30	·79	31·78	·89	31·78	1·09	32·52	1·26	32·52	30
32	·82	33·84	·92	33·84	1·13	34·62	1·31	34·62	32
33	·83	34·88	·94	34·88	1·15	35·66	1·33	35·66	33
36	·87	37·96	·98	37·96	1·20	38·76	1·38	38·76	36
38	·90	40·02	1·01	40·02	1·23	40·84	1·42	40·84	38
40	·92	42·06	1·03	42·06	1·26	42·92	1·46	42·92	40
42	·95	44·12	1·06	44·12	1·30	45·00	1·50	45·00	42
44	·98	46·16	1·08	46·16	1·33	47·06	1·53	47·06	44
46	1·00	48·22	1·11	48·22	1·36	49·14	1·57	49·14	46
48	1·03	50·26	1·13	50·26	1·38	51·20	1·60	51·20	48

NOTE.—It is suggested that the Working Pressures should not exceed one-half of the respective Test Pressures.

Table 2.

BRITISH STANDARD CAST IRON PIPES FOR WATER, GAS AND SEWAGE.

STANDARD WEIGHTS OF STRAIGHT SPIGOT AND SOCKET PIPES.
(OPEN AND HALF TURNED AND BORED SOCKETS.)

Nominal Internal Diameter of Pipe. (ins.)	GAS.		WATER AND SEWAGE.								Nominal Internal Diameter of Pipe. (ins.)
	Class A.		Class B.		Class C.		Class D.				
	Length (exclusive of Depth of Socket).		Length (exclusive of Depth of Socket).		Length (exclusive of Depth of Socket).		Length (exclusive of Depth of Socket).				
	9 feet.	12 feet.	9 feet.	12 feet.	9 feet.	12 feet.	9 feet.	12 feet.			
WEIGHTS.											
3	cwts. qrs. lbs. 1 0 17		cwts. qrs. lbs. 1 0 17		cwts. qrs. lbs. 1 0 17		cwts. qrs. lbs. 1 0 22			3	
4	1 2 4	1 3 26	1 2 4	1 3 26	1 2 7	2 0 3	1 3 0	2 1 3		4	
5	2 0 4	2 2 14	2 0 4	2 2 14	2 0 22	2 3 10	2 1 24	3 0 23		5	
6	2 2 6	3 1 4	2 2 6	3 1 4	2 3 10	3 2 19	3 0 23	4 0 19		6	
7	3 0 9	3 3 26	3 0 9	3 3 26	3 2 3	4 2 8	3 3 24	5 0 17		7	
8	3 2 24	4 3 4	3 2 24	4 3 4	4 1 12	5 2 15	4 3 12	6 1 6		8	
9	4 1 9	5 2 9	4 1 9	5 2 9	5 0 14	6 2 15	5 3 0	7 1 25		9	
10	5 0 6	6 2 2	5 0 6	6 2 2	5 3 22	7 2 23	6 2 25	8 2 27		10	
12	6 0 27	8 0 6	6 1 20	8 1 6	7 3 19	10 1 1	8 3 25	11 2 18		12	
14		9 3 5		10 1 15		13 0 0		14 2 15		14	
15		10 3 6		11 1 21		14 1 3		16 0 20		15	
16		11 2 25		12 2 7		15 2 25		17 3 1		16	
18		13 3 18		15 0 5		18 3 7		21 1 5		18	
20		15 3 18		17 2 11		21 3 7		24 3 3		20	
21		17 0 22		18 3 25		23 2 14		26 2 26		21	
22		18 1 26		20 2 8		25 1 22		28 2 23		22	
24		20 3 25		23 1 0		28 3 12		32 2 17		24	
26		23 2 8		26 0 4		32 1 26		36 3 14		26	
27		24 3 2		27 2 13		34 1 5		38 3 12		27	
28		25 3 25		28 3 20		36 0 22		40 3 20		28	
30		28 3 8		31 3 26		39 3 5		45 0 20		30	
32		31 3 2		35 0 16		43 3 26		50 0 7		32	
33		33 0 25		37 0 5		46 0 16		52 1 18		33	
36		37 3 13		42 0 4		52 1 8		59 0 17		36	
38		41 1 8		45 2 25		56 2 9		64 0 22		38	
40		44 1 14		49 0 1		60 3 26		69 1 20		40	
42		48 0 6		52 3 19		65 3 15		74 3 0		42	
44		52 0 23		56 3 9		71 0 1		80 1 5		44	
46		55 2 23		61 0 3		75 3 9		86 0 2		46	
48		59 2 18		64 2 24		80 1 1		91 1 16		48	

For Weights of One Foot Lengths of Plain Barrels see Table 14.

Table 3.

BRITISH STANDARD CAST IRON PIPES FOR WATER, GAS AND SEWAGE.

STANDARD WEIGHTS OF STRAIGHT FLANGE PIPES.

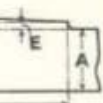
Nominal Internal Diameter of Pipe. (ins.)	GAS.		WATER AND SEWAGE.						Nominal Internal Diameter of Pipe. (ins.)
	Class A.		Class B.		Class C.		Class D.		
	Length (measured over the Flanges).		Length (measured over the Flanges).		Length (measured over the Flanges).		Length (measured over the Flanges).		
	9 feet.	12 feet.	9 feet.	12 feet.	9 feet.	12 feet.	9 feet.	12 feet.	
WEIGHTS.									
3	cwts. qrs. lbs. 1 0 12		cwts. qrs. lbs. 1 0 12		cwts. qrs. lbs. 1 0 13		cwts. qrs. lbs. 1 0 18		3
4	1 1 26	1 3 21	1 1 26	1 3 21	1 2 4	2 0 0	1 2 25	2 1 0	4
5	1 3 21	2 2 4	1 3 21	2 2 4	2 0 14	2 3 2	2 1 17	3 0 15	5
6	2 1 19	3 0 18	2 1 19	3 0 18	2 2 25	3 2 7	3 0 11	4 0 6	6
7	2 3 19	3 3 8	2 3 19	3 3 8	3 1 19	4 1 24	3 3 12	5 0 6	7
8	3 1 27	4 2 7	3 1 27	4 2 7	4 0 19	5 1 23	4 2 19	6 0 13	8
9	4 0 8	5 1 8	4 0 8	5 1 8	4 3 18	6 1 19	5 2 5	7 1 2	9
10	4 3 8	6 1 4	4 3 8	6 1 4	5 2 25	7 1 26	6 2 0	8 2 2	10
12	5 3 21	7 3 1	6 0 14	8 0 1	7 2 5	9 3 15	8 2 11	11 1 4	12
14		9 1 23		10 0 5		12 2 8		14 0 23	14
15		10 1 20		11 0 7		13 3 2		15 2 19	15
16		11 1 8		12 0 18		15 0 19		17 0 23	16
18		13 1 14		14 2 1		18 0 22		20 2 19	18
20		15 1 18		17 0 11		21 1 0		24 0 24	20
21		16 2 19		18 1 21		23 0 4		26 0 16	21
22		17 2 26		19 3 8		24 2 5		27 3 5	22
24		20 0 23		22 1 26		28 0 8		31 3 14	24

For Weights of Standard Flanges and One Foot Lengths of plain barrels, see Table 14.

The Standard Thicknesses and External Diameters of the Flange Pipes shall be the same as those for Spigot and Socket Pipes of corresponding nominal internal diameter.

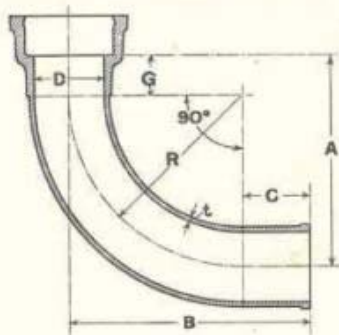
Nominal Internal Diameter of Pipe.		Ins. 3	Ins. 4	Ins. 5	Ins. 6	Ins. 7	Ins. 8	Ins. 9	Ins. 10	Ins. 12	Ins. 14	Ins. 15	Ins. 16	Ins. 18	Ins. 20
A		Thicknesses to													
B		$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{7}{16}$
C	Classes A and B.	1	1	$\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{5}{16}$	$1\frac{11}{16}$	$1\frac{13}{16}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{1}{16}$
	Classes C and D.														
D		1	1	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{76}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$
E		$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
F, G		3	3	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	4	4	4	4	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$
H		$\frac{3}{8}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{19}{32}$	$\frac{5}{8}$	$1\frac{1}{16}$	$1\frac{1}{16}$	$1\frac{1}{16}$	$\frac{3}{4}$	$1\frac{1}{8}$
J		$\frac{1}{2}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$1\frac{1}{8}$	$\frac{23}{32}$	$\frac{3}{4}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$\frac{7}{8}$	$1\frac{1}{8}$
K, L		$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
M		$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$
N		$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$
O, P		$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$
Q	Min.	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
	Max.	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
R	Classes A and B.	$\frac{3}{8}$	$1\frac{1}{16}$	$\frac{1}{2}$	$1\frac{1}{16}$	$\frac{27}{32}$	$\frac{29}{32}$	$1\frac{1}{16}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$\frac{31}{32}$	$1\frac{1}{16}$	$1\frac{1}{8}$
	Classes C and D.								$\frac{31}{32}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$
R ₁		$\frac{7}{16}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$1\frac{1}{16}$
R ₂		$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
R ₃ , R ₄ , R ₅ , R ₆ , R ₇		$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
R ₈ , R ₉		$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$
R ₁₀		$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
S		$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	1	1
T		$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	2	2	2	2

IRON PIPES FOR WATER, GAS AND SEWAGE.
OF STANDARD SPIGOTS AND SOCKETS.

[illegible]

BRITISH STANDARD CAST IRON PIPES FOR WATER, GAS AND SEWAGE.

STANDARD 90° BENDS.



D Nominal Internal Diameter, ins.	A ft. ins.	B ft. ins.	C ft. ins.	G ins.	R ft. ins.	Classes A and B.		Classes C and D.	
						Thickness, in.	Weight, cwt. qrs. lbs.	Thickness, in.	Weight, cwt. qrs. lbs.
3	1 0	1 3	0 6	3	0 9	.38		.40	
4	1 3	1 6	0 6	3	1 0	.39		.46	
5	1 3½	1 6	0 6	3½	1 0	.41		.52	
6	1 6½	1 9	0 6	3½	1 3	.43		.57	
7	1 6½	1 10	0 7	3½	1 3	.45		.61	
8	1 10	2 2	0 8	4	1 6	.47		.65	
9	1 10	2 3	0 9	4	1 6	.49		.69	
10	2 1	2 7	0 10	4	1 9	.52		.73	
12	2 1	2 9	1 0	4	1 9	.57		.80	
14	2 1½	2 9	1 0	4½	1 9	.61		.86	
15	2 4½	3 0	1 0	4½	2 0	.63		.89	
16	2 4½	3 0	1 0	4½	2 0	.65		.92	
18	2 4½	3 0	1 0	4½	2 0	.69		.98	
20	2 7½	3 3	1 0	4½	2 3	.73		1.03	
21	2 10½	3 6	1 0	4½	2 6	.75		1.06	
22	3 2	3 9	1 0	5	2 9	.77		1.08	
24	3 5	4 0	1 0	5	3 0	.80		1.13	

The actual internal diameters of Bends of Classes **A** and **B** shall be the same as for Straight Pipes of Class **B**, and the actual internal diameters of Bends of Classes **C** and **D** shall be the same as for Straight Pipes of Class **D**.

Table 6.

BRITISH STANDARD CAST IRON PIPES FOR WATER, GAS AND SEWAGE.

STANDARD 45° BENDS.



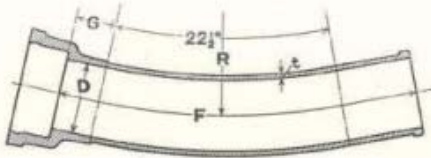
D Nominal Internal Diameter, ins.	F ft. ins.		G ins.	R ft. ins.		Classes A and B.		Classes C and D.	
						Thickness, t in.	Weight, cwt. qrs. lbs.	Thickness, t ins.	Weight, cwt. qrs. lbs.
3	2	4	3	2	0	·38		·40	
4	2	4	3	2	0	·39		·46	
5	2	7	3½	2	3	·41		·52	
6	2	7	3½	2	3	·43		·57	
7	2	9	3½	2	6	·45		·61	
8	2	10	4	2	6	·47		·65	
9	3	0	4	2	9	·49		·69	
10	3	0	4	2	9	·52		·73	
12	3	3	4	3	0	·57		·80	
14	3	6	4½	3	3	·61		·86	
15	3	8	4½	3	6	·63		·89	
16	3	8	4½	3	6	·65		·92	
18	3	10	4½	3	9	·69		·98	
20	4	1	4½	4	0	·73		1·03	
21	4	3	4½	4	3	·75		1·06	
22	4	4	5	4	3	·77		1·08	
24	4	6	5	4	6	·80		1·13	

The actual internal diameters of Bends of Classes A and B shall be the same as for Straight Pipes of Class B, and the actual internal diameters of Bends of Classes C and D shall be the same as for Straight Pipes of Class D.

Table 7.

BRITISH STANDARD CAST IRON PIPES FOR WATER, GAS AND SEWAGE.

STANDARD $22\frac{1}{2}^\circ$ BENDS.



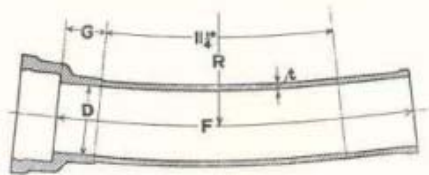
D Nominal Internal Diameter, ins.	F ft. ins.	G ins.	R ft. ins.	Classes A and B.		Classes C and D.	
				Thickness, t in.	Weight, cwt. qrs. lbs.	Thickness, t in.	Weight, cwt. qrs. lbs.
3	2 4	3	4 0	.38		.40	
4	2 4	3	4 0	.39		.46	
5	2 7	$3\frac{1}{2}$	4 6	.41		.52	
6	2 7	$3\frac{1}{2}$	4 6	.43		.57	
7	2 9	$3\frac{1}{2}$	5 0	.45		.61	
8	2 10	4	5 0	.47		.65	
9	3 0	4	5 6	.49		.69	
10	3 0	4	5 6	.52		.73	
12	3 3	4	6 0	.57		.80	
14	3 6	$4\frac{1}{2}$	6 6	.61		.86	
15	3 8	$4\frac{1}{2}$	7 0	.63		.89	
16	3 8	$4\frac{1}{2}$	7 0	.65		.92	
18	3 10	$4\frac{1}{2}$	7 6	.69		.98	
20	4 1	$4\frac{1}{2}$	8 0	.73		1.03	
21	4 3	$4\frac{1}{2}$	8 6	.75		1.06	
22	4 4	5	8 6	.77		1.06	
24	4 6	5	9 0	.80		1.13	

The actual internal diameters of Bends of Classes A and B shall be the same as for Straight Pipes of Class B, and the actual internal diameters of Bends of Classes C and D shall be the same as for Straight Pipes of Class D.

Table 8.

BRITISH STANDARD CAST IRON PIPES FOR WATER, GAS AND SEWAGE.

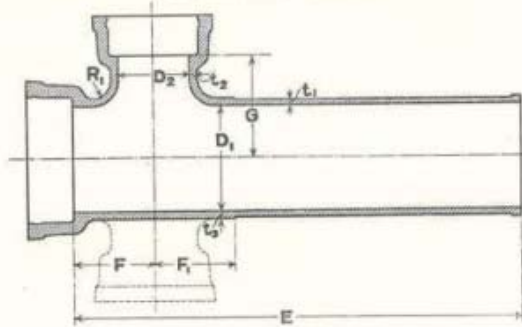
STANDARD 11½° BENDS.



D Nominal Internal Diameter, ins.	F ft. ins.		G ins.	R ft. ins.		Classes A and B.		Classes C and D.	
						Thickness t ins.	Weight cwt. qrs. lbs.	Thickness t ins.	Weight cwt. qrs. lbs.
3	2	4	3	8	0	·38		·40	
4	2	4	3	8	0	·39		·46	
5	2	7	3½	9	0	·41		·52	
6	2	7	3½	9	0	·43		·57	
7	2	9	3½	10	0	·45		·61	
8	2	10	4	10	0	·47		·65	
9	3	0	4	11	0	·49		·69	
10	3	0	4	11	0	·52		·73	
12	3	3	4	12	0	·57		·80	
14	3	6	4½	13	0	·61		·86	
15	3	8	4½	14	0	·63		·89	
16	3	8	4½	14	0	·65		·92	
18	3	10	4½	15	0	·69		·98	
20	4	1	4½	16	0	·73		1·03	
21	4	3	4½	17	0	·75		1·06	
22	4	4	5	17	0	·77		1·08	
24	4	6	5	18	0	·80		1·13	

The actual internal diameters of Bends of Classes **A** and **B** shall be the same as for Straight Pipes of Class **B**, and the actual internal diameters of Bends of Classes **C** and **D** shall be the same as for Straight Pipes of Class **D**.

**BRITISH STANDARD CAST IRON PIPES FOR
WATER, GAS AND SEWAGE.
STANDARD TEES.**



The radius R_1 shall be $1\frac{1}{2}$ inches for all sizes of Tees.

Nominal Internal Diameter.					Classes A and B.				Classes C and D.			
D_1 in.	D_2 in.	E ft. ins.	F and F_1 ft. ins.	G ft. ins.	Thickness.			Weight.	Thickness.			Weight.
					t_1 in.	t_2 in.	t_3 in.	wt. qrs. lbs.	t_1 in.	t_2 in.	t_3 in.	wt. qrs. lbs.
3	3	3 0	0 5	0 5	.38	.57	.57		.40	.59	.59	
4	3	3 0	0 5	0 6	.39	.57	.58		.46	.59	.65	
	4	3 0	0 6	0 6	.39	.58	.58		.46	.65	.65	
5	3	3 0	0 5	0 6	.41	.57	.60		.52	.59	.71	
	4	3 0	0 6	0 6	.41	.58	.60		.52	.65	.71	
	5	3 0	0 7	0 7	.41	.60	.60		.52	.71	.71	
6	3	3 0	0 6	0 7	.43	.57	.62		.57	.59	.76	
	4	3 0	0 6	0 7	.43	.58	.62		.57	.65	.76	
	5	3 0	0 7	0 7	.43	.60	.62		.57	.71	.76	
	6	3 0	0 7	0 7	.43	.62	.62		.57	.76	.76	
7	3	3 0	0 6	0 7	.45	.57	.64		.61	.59	.80	
	4	3 0	0 6	0 8	.45	.58	.64		.61	.65	.80	
	5	3 0	0 7	0 8	.45	.60	.64		.61	.71	.80	
	6	3 0	0 7	0 8	.45	.62	.64		.61	.76	.80	
	7	3 0	0 8	0 8	.45	.64	.64		.61	.80	.80	
8	3	3 6	0 6	0 8	.47	.57	.66		.65	.59	.84	
	4	3 6	0 6	0 8	.47	.58	.66		.65	.65	.84	
	5	3 6	0 7	0 8	.47	.60	.66		.65	.71	.84	
	6	3 6	0 7	0 8	.47	.62	.66		.65	.76	.84	
	7	3 6	0 8	0 8	.47	.64	.66		.65	.80	.84	
	8	3 6	0 8	0 8	.47	.66	.66		.65	.84	.84	

The actual internal diameters of Tees of Classes A and B shall be the same as for Straight Pipes of Class B, and the actual internal diameters of Tees of Classes C and D shall be the same as for Straight Pipes of Class D.

(Continued on next page.)

Table 9
(continued).

STANDARD TEES (continued).

Nominal Internal Diameter	D ₁ in.	E			F and F ₁			G			Classes A and B.				Classes C and D.			
		ft. ins.			ft. ins.			ft. ins.			Thickness			Weight net. qrs. lbs.	Thickness			Weight net. qrs. lbs.
		t ₁ in.	t ₂ in.	t ₃ in.	t ₁ in.	t ₂ in.	t ₃ in.	t ₁ in.	t ₂ in.	t ₃ in.	t ₁ in.	t ₂ in.	t ₃ in.		t ₁ in.	t ₂ in.	t ₃ in.	
3	3	3 6	0 6	0 8	49	57	68								69	59	88	
	4	3 6	0 6	0 9	49	58	68								69	65	88	
	5	3 6	0 7	0 9	49	60	68								69	71	88	
	6	3 6	0 7	0 9	49	62	68								69	76	88	
	7	3 6	0 8	0 9	49	64	68								69	80	88	
	8	3 6	0 8	0 9	49	66	68								69	84	88	
	9	3 6	0 9	0 9	49	68	68								69	88	88	
	10	3 6	0 9	0 9	49	68	68								69	88	88	
	12	3 6	0 9	0 9	49	68	68								69	88	88	
4	3	3 6	0 6	0 9	52	57	71								73	59	92	
	4	3 6	0 6	0 9	52	58	71								73	65	92	
	5	3 6	0 7	0 9	52	60	71								73	71	92	
	6	3 6	0 7	0 9	52	62	71								73	76	92	
	7	3 6	0 8	0 9	52	64	71								73	80	92	
	8	3 6	0 9	0 9	52	66	71								73	84	92	
	9	3 6	0 9	0 10	52	68	71								73	88	92	
	10	3 6	0 10	0 10	52	71	71								73	92	92	
	12	3 6	0 10	0 10	52	71	71								73	92	92	
5	3	3 6	0 6	0 10	57	57	76								80	59	99	
	4	3 6	0 7	0 10	57	58	76								80	65	99	
	5	3 6	0 7	0 10	57	60	76								80	71	99	
	6	3 6	0 8	0 10	57	62	76								80	76	99	
	7	3 6	0 8	0 11	57	64	76								80	80	99	
	8	3 6	0 9	0 11	57	66	76								80	84	99	
	9	3 6	0 9	0 11	57	68	76								80	88	99	
	10	3 6	0 10	0 11	57	71	76								80	92	99	
	12	3 6	0 11	0 11	57	76	76								80	99	99	
6	4	4 0	0 7	0 11	61	58	80								86	65	1 05	
	6	4 0	0 8	1 0	61	62	80								86	76	1 05	
	8	4 0	0 9	1 0	61	66	80								86	84	1 05	
	10	4 0	0 10	1 0	61	71	80								86	92	1 05	
	12	4 0	0 11	1 0	61	76	80								86	99	1 05	
	14	4 0	1 0	1 0	61	80	80								86	1 05	1 05	

The actual internal diameters of Tees of Classes A and B shall be the same as for Straight Pipes of Class B, and the actual internal diameters of Tees of Classes C and D shall be the same as for Straight Pipes of Class D.

(Continued on next page.)

Table 9
(continued).

STANDARD TEES (continued).

Nominal Internal Diameter.		E		F and F ₁		G		Classes A and B.				Classes C and D.			
D ₁	D ₂	ft. ins.		ft. ins.		ft. ins.		Thickness.			Weight. cwt. qrs. lbs.	Thickness.			Weight. cwt. qrs. lbs.
in.	ins.							t ₁ in.	t ₂ in.	t ₃ in.		t ₁ ins.	t ₂ ins.	t ₃ ins.	
15	4	4	0	0	7	1	0	.63	.58	.82		.89	.65	1.08	
	6	4	0	0	8	1	0	.63	.62	.82		.89	.76	1.08	
	8	4	0	0	9	1	0	.63	.66	.82		.89	.84	1.08	
	10	4	0	0	10	1	0	.63	.71	.82		.89	.92	1.08	
	12	4	0	0	11	1	1	.63	.76	.82		.89	.99	1.08	
	15	4	0	1	1	1	1	.63	.82	.82		.89	1.08	1.08	
16	4	4	0	0	7	1	0	.65	.58	.84		.92	.65	1.11	
	6	4	0	0	8	1	1	.65	.62	.84		.92	.76	1.11	
	8	4	0	0	9	1	1	.65	.66	.84		.92	.84	1.11	
	10	4	0	0	10	1	1	.65	.71	.84		.92	.92	1.11	
	12	4	0	0	11	1	1	.65	.76	.84		.92	.99	1.11	
	15	4	0	1	1	1	1	.65	.82	.84		.92	1.08	1.11	
	16	4	0	1	1	1	1	.65	.84	.84		.92	1.11	1.11	
18	4	4	6	0	7	1	1	.69	.58	.88		.98	.65	1.17	
	6	4	6	0	8	1	2	.69	.62	.88		.98	.76	1.17	
	8	4	6	0	9	1	2	.69	.66	.88		.98	.84	1.17	
	10	4	6	0	10	1	2	.69	.71	.88		.98	.92	1.17	
	12	4	6	0	11	1	2	.69	.76	.88		.98	.99	1.17	
	15	4	6	1	1	1	2	.69	.82	.88		.98	1.08	1.17	
	16	4	6	1	2	1	2	.69	.84	.88		.98	1.11	1.17	
	18	4	6	1	3	1	3	.69	.88	.88		.98	1.17	1.17	
20	6	4	6	0	8	1	3	.73	.62	.92		1.03	.76	1.22	
	8	4	6	0	9	1	3	.73	.66	.92		1.03	.84	1.22	
	10	4	6	0	10	1	3	.73	.71	.92		1.03	.92	1.22	
	12	4	6	1	0	1	3	.73	.76	.92		1.03	.99	1.22	
	15	4	6	1	1	1	3	.73	.82	.92		1.03	1.08	1.22	
	16	4	6	1	2	1	3	.73	.84	.92		1.03	1.11	1.22	
	18	4	6	1	3	1	4	.73	.88	.92		1.03	1.17	1.22	
	20	4	6	1	4	1	4	.73	.92	.92		1.03	1.22	1.22	

The actual internal diameters of Tees of Classes A and B shall be the same as for Straight Pipes of Class B, and the actual internal diameters of Tees of Classes C and D shall be the same as for Straight Pipes of Class D.

(Continued on next page.)

Table 9
(continued).

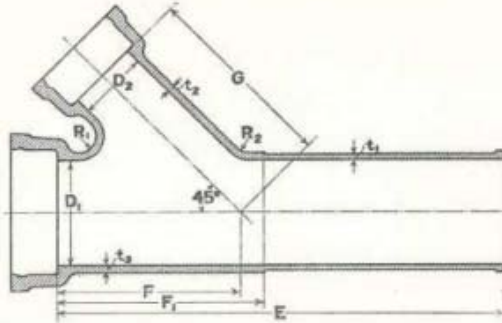
STANDARD TEES (continued).

Nominal Internal Diameter.		E	F and F ₁	G	Classes A and B.				Classes C and D.			
D ₁ ins.	D ₂ ins.				Thickness.			Weight. cwt. qrs. lbs.	Thickness.			Weight. cwt. qrs. lbs.
		ft. ins.	ft. ins.	ft. ins.	t ₁ in.	t ₂ in.	t ₃ in.		t ₁ ins.	t ₂ ins.	t ₃ ins.	
21	6	4 6	0 8	1 3	.75	.62	.94		1.06	.76	1.25	
	8	4 6	0 9	1 3	.75	.66	.94		1.06	.84	1.25	
	10	4 6	0 10	1 4	.75	.71	.94		1.06	.92	1.25	
	12	4 6	1 0	1 4	.75	.76	.94		1.06	.99	1.25	
	15	4 6	1 1	1 4	.75	.82	.94		1.06	1.08	1.25	
	16	4 6	1 2	1 4	.75	.84	.94		1.06	1.11	1.25	
	18	4 6	1 3	1 4	.75	.88	.94		1.06	1.17	1.25	
	20	4 6	1 4	1 4	.75	.92	.94		1.06	1.22	1.25	
	21	4 6	1 4	1 4	.75	.94	.94		1.06	1.25	1.25	
22	6	5 0	0 8	1 4	.77	.62	.96		1.08	.76	1.27	
	8	5 0	0 9	1 4	.77	.66	.96		1.08	.84	1.27	
	10	5 0	0 10	1 4	.77	.71	.96		1.08	.92	1.27	
	12	5 0	1 0	1 4	.77	.76	.96		1.08	.99	1.27	
	15	5 0	1 1	1 4	.77	.82	.96		1.08	1.08	1.27	
	16	5 0	1 2	1 4	.77	.84	.96		1.08	1.11	1.27	
	18	5 0	1 3	1 5	.77	.88	.96		1.08	1.17	1.27	
	20	5 0	1 4	1 5	.77	.92	.96		1.08	1.22	1.27	
	22	5 0	1 5	1 5	.77	.96	.96		1.08	1.27	1.27	
24	6	5 0	0 8	1 5	.80	.62	.99		1.13	.76	1.32	
	8	5 0	0 9	1 5	.80	.66	.99		1.13	.84	1.32	
	10	5 0	0 11	1 5	.80	.71	.99		1.13	.92	1.32	
	12	5 0	1 0	1 5	.80	.76	.99		1.13	.99	1.32	
	15	5 0	1 1	1 6	.80	.82	.99		1.13	1.08	1.32	
	16	5 0	1 2	1 6	.80	.84	.99		1.13	1.11	1.32	
	18	5 0	1 3	1 6	.80	.88	.99		1.13	1.17	1.32	
	20	5 0	1 4	1 6	.80	.92	.99		1.13	1.22	1.32	
	24	5 0	1 6	1 6	.80	.99	.99		1.13	1.32	1.32	

The actual internal diameters of Tees of Classes A and B shall be the same as for Straight Pipes of Class B, and the actual internal diameters of Tees of Classes C and D shall be the same as for Straight Pipes of Class D.

Table 10.

**BRITISH STANDARD CAST IRON PIPES FOR
WATER, GAS AND SEWAGE.
STANDARD 45° BRANCHES.**



The radii R_1 and R_2 shall be $1\frac{1}{2}$ inches for all sizes of Branches.

Nominal Internal Diameter.						Classes A and B.				Classes C and D.			
D_1 in.	D_2 in.	E ft. ins.	F ft. ins.	F_1 ft. ins.	G ft. ins.	Thickness.			Weight. cwt. qrs. lbs.	Thickness.			Weight. cwt. qrs. lbs.
						t_1 in.	t_2 in.	t_3 in.		t_1 in.	t_2 in.	t_3 in.	
3	3	3 0	0 10	1 1	0 10	.38	.57	.57		.40	.59	.59	
4	3	3 0	0 11	1 1	0 11	.39	.57	.58		.40	.59	.65	
	4	3 0	1 0	1 2	1 0	.39	.58	.58		.46	.65	.65	
5	3	3 0	1 0	1 1	1 0	.41	.57	.60		.52	.59	.71	
	4	3 0	1 0	1 2	1 0	.41	.58	.60		.52	.65	.71	
	5	3 0	1 1	1 4	1 1	.41	.60	.60		.52	.71	.71	
6	3	3 6	1 0	1 1	1 1	.43	.57	.62		.57	.59	.76	
	4	3 6	1 1	1 3	1 1	.43	.58	.62		.57	.65	.76	
	5	3 6	1 2	1 4	1 2	.43	.60	.62		.57	.71	.76	
	6	3 6	1 3	1 6	1 3	.43	.62	.62		.57	.76	.76	
7	3	3 6	1 1	1 1	1 1	.45	.57	.64		.61	.59	.80	
	4	3 6	1 2	1 3	1 2	.45	.58	.64		.61	.65	.80	
	5	3 6	1 2	1 4	1 3	.45	.60	.64		.61	.71	.80	
	6	3 6	1 3	1 6	1 3	.45	.62	.64		.61	.76	.80	
	7	3 6	1 4	1 7	1 4	.45	.64	.64		.61	.80	.80	
8	3	3 6	1 1	1 1	1 2	.47	.57	.66		.65	.59	.84	
	4	3 6	1 2	1 3	1 3	.47	.58	.66		.65	.65	.84	
	5	3 6	1 3	1 4	1 3	.47	.60	.66		.65	.71	.84	
	6	3 6	1 4	1 6	1 4	.47	.62	.66		.65	.76	.84	
	7	3 6	1 5	1 7	1 5	.47	.64	.66		.65	.80	.84	
	8	3 6	1 5	1 9	1 5	.47	.66	.66		.65	.84	.84	

The actual internal diameters of the Branches of Classes **A** and **B** shall be the same as for Straight Pipes of Class **B**, and the actual internal diameters of Branches of Classes **C** and **D** shall be the same as for Straight Pipes of Class **D**.

(Continued on next page.)

Table 10
(continued).

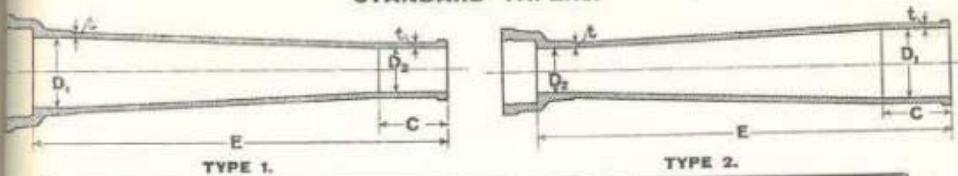
STANDARD 45° BRANCHES (continued).

Nominal Internal Diameter.		E		F		F ₁		G		Classes A and B.				Classes C and D.			
D ₁	D ₂	ft. ins.		ft. ins.		ft. ins.		ft. ins.		Thickness.			Weight.	Thickness.			Weight.
in.	ins.									t ₁	t ₂	t ₃	cwt. qrs. lbs.	t ₁	t ₂	t ₃	cwt. qrs. lbs.
										in.	in.	in.		in.	in.	in.	
9	3	3	6	1	2	1	1	1	3	.49	.57	.68		.60	.69	.88	
	4	3	6	1	3	1	3	1	4	.49	.58	.68		.60	.65	.88	
	5	3	6	1	4	1	4	1	4	.49	.60	.68		.60	.71	.88	
	6	3	6	1	4	1	6	1	5	.49	.62	.68		.60	.76	.88	
	7	3	6	1	5	1	7	1	5	.49	.64	.68		.60	.80	.88	
	8	3	6	1	6	1	9	1	6	.49	.66	.68		.60	.84	.88	
	9	3	6	1	7	1	10	1	7	.49	.68	.68		.60	.88	.88	
10	3	4	0	1	3	1	1	1	4	.52	.57	.71		.73	.59	.92	
	4	4	0	1	3	1	3	1	4	.52	.58	.71		.73	.65	.92	
	5	4	0	1	4	1	4	1	5	.52	.60	.71		.73	.71	.92	
	6	4	0	1	5	1	6	1	6	.52	.62	.71		.73	.76	.92	
	7	4	0	1	6	1	7	1	6	.52	.64	.71		.73	.80	.92	
	8	4	0	1	6	1	9	1	7	.52	.66	.71		.73	.84	.92	
	9	4	0	1	7	1	11	1	7	.52	.68	.71		.73	.88	.92	
	10	4	0	1	8	2	0	1	8	.52	.71	.71		.73	.92	.92	
12	3	4	0	1	4	1	2	1	5	.57	.57	.76		.80	.59	.99	
	4	4	0	1	5	1	3	1	6	.57	.58	.76		.80	.65	.99	
	5	4	0	1	6	1	5	1	7	.57	.60	.76		.80	.71	.99	
	6	4	0	1	6	1	6	1	7	.57	.62	.76		.80	.76	.99	
	7	4	0	1	7	1	8	1	8	.57	.64	.76		.80	.80	.99	
	8	4	0	1	8	1	9	1	8	.57	.66	.76		.80	.84	.99	
	9	4	0	1	9	1	11	1	9	.57	.68	.76		.80	.88	.99	
	10	4	0	1	9	2	0	1	10	.57	.71	.76		.80	.92	.99	
	12	4	0	1	11	2	4	1	11	.57	.76	.76		.80	.99	.99	

The actual internal diameters of the Branches of Classes **A** and **B** shall be the same as for Straight Pipes of Class **B**, and the actual internal diameters of Branches of Classes **C** and **D** shall be the same as for Straight Pipes of Class **D**.

BRITISH STANDARD CAST IRON PIPES FOR WATER, GAS AND SEWAGE.

STANDARD TAPERS.



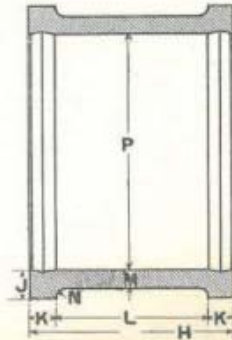
Nominal Internal Diameter.		E ft. ins.	C ins.	Classes A and B.			Classes C and D.		
D ₁ ins.	D ₂ ins.			Thickness. t in.	Weight.		Thickness. t ins.	Weight.	
					TYPE 1. cwt. qrs. lbs.	TYPE 2. cwt. qrs. lbs.		TYPE 1. cwt. qrs. lbs.	TYPE 2. cwt. qrs. lbs.
4	3	3 0	6	.39			.46		
5	4	3 0	6	.41			.52		
5	3	3 0	6	.41			.52		
6	5	3 0	6	.43			.57		
6	4	3 0	6	.43			.57		
6	3	3 0	6	.43			.57		
7	6	3 0	6	.45			.61		
7	4	3 0	6	.45			.61		
8	7	3 0	6	.47			.65		
8	6	3 0	6	.47			.65		
9	8	3 0	6	.49			.69		
9	6	3 0	6	.49			.69		
10	9	3 0	6	.52			.73		
10	8	3 0	6	.52			.73		
12	9	4 0	6	.57			.80		
14	12	4 0	6	.61			.86		
15	14	4 0	6	.63			.89		
15	12	4 0	6	.63			.89		
16	15	4 0	6	.65			.92		
18	15	4 0	6	.69			.96		
20	18	4 0	6	.73			1.03		
21	20	4 0	6	.75			1.06		
22	21	4 0	6	.77			1.08		
24	22	4 0	6	.80			1.13		

The actual internal diameters D_1 of Tapers of Classes A and B shall be the same as for Straight Pipes of Class B, and the actual internal diameters D_1 of the Tapers of Classes C and D shall be the same as for Straight Pipes of Class D.

The actual internal diameters D_2 shall be such as to maintain the Standard external diameters given in Table 1.

BRITISH STANDARD CAST IRON PIPES FOR WATER, GAS AND SEWAGE.

STANDARD COLLARS.



Nominal Internal Diameter of Pipe, ins.	H ins.	J ins.	K ins.	L ins.	N ins.	Classes A and B.			Classes C and D.		
						M ins.	P ins.	Weight cwt. qrs. lbs.	M ins.	P ins.	Weight cwt. qrs. lbs.
3	9	1	1	7	$\frac{7}{16}$	$\frac{23}{32}$	$\frac{43}{8}$		$\frac{23}{32}$	$\frac{43}{8}$	
4	9	1	1	7	$\frac{7}{16}$	$\frac{23}{32}$	$5\frac{11}{16}$		$\frac{23}{32}$	$5\frac{11}{16}$	
5	$10\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$8\frac{1}{2}$	$\frac{1}{2}$	$\frac{27}{32}$	$6\frac{13}{16}$		$\frac{27}{32}$	$6\frac{13}{16}$	
6	$10\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	8	$\frac{9}{16}$	$\frac{33}{32}$	$7\frac{1}{4}$		$\frac{33}{32}$	$7\frac{1}{4}$	
7	$10\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	8	$\frac{9}{16}$	$\frac{13}{8}$	$8\frac{13}{16}$		$\frac{13}{8}$	$8\frac{13}{16}$	
8	12	$1\frac{5}{16}$	$1\frac{1}{2}$	$9\frac{1}{2}$	$\frac{9}{16}$	$1\frac{1}{32}$	10		$1\frac{1}{32}$	10	
9	12	$1\frac{13}{32}$	$1\frac{1}{8}$	$9\frac{1}{2}$	$\frac{9}{16}$	$1\frac{1}{32}$	$11\frac{1}{16}$		$1\frac{1}{32}$	$11\frac{1}{16}$	
10	12	$1\frac{15}{32}$	$1\frac{7}{16}$	$9\frac{1}{2}$	$\frac{9}{16}$	$1\frac{1}{32}$	$12\frac{1}{8}$		$1\frac{1}{32}$	$12\frac{1}{8}$	
12	12	$1\frac{1}{8}$	$1\frac{1}{2}$	9	$\frac{9}{16}$	$1\frac{1}{32}$	14		$1\frac{7}{32}$	$14\frac{1}{2}$	
14	$13\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{8}$	$10\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{16}$	$16\frac{1}{8}$		$1\frac{5}{16}$	$16\frac{1}{8}$	
15	$13\frac{1}{2}$	$1\frac{33}{32}$	$1\frac{1}{8}$	$10\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{16}$	$17\frac{1}{2}$		$1\frac{1}{32}$	$17\frac{1}{2}$	
16	$13\frac{1}{2}$	$1\frac{27}{32}$	$1\frac{1}{8}$	$10\frac{1}{2}$	$\frac{1}{2}$	$1\frac{3}{32}$	$18\frac{1}{2}$		$1\frac{1}{32}$	$18\frac{1}{2}$	
18	$13\frac{1}{2}$	$1\frac{21}{32}$	$1\frac{1}{2}$	10	$\frac{1}{2}$	$1\frac{5}{16}$	$20\frac{1}{2}$		$1\frac{7}{16}$	$20\frac{1}{2}$	
20	$13\frac{1}{2}$	$2\frac{1}{16}$	$1\frac{1}{2}$	$9\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{5}{16}$	$22\frac{1}{8}$		$1\frac{1}{2}$	23	
21	$13\frac{1}{2}$	$2\frac{1}{8}$	$1\frac{1}{8}$	$9\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{7}{32}$	$23\frac{1}{2}$		$1\frac{1}{32}$	24	
22	15	$2\frac{3}{16}$	2	11	$\frac{3}{4}$	$1\frac{9}{32}$	$24\frac{1}{2}$		$1\frac{9}{16}$	$25\frac{1}{8}$	
24	15	$2\frac{3}{8}$	2	11	$\frac{3}{4}$	$1\frac{5}{16}$	$26\frac{1}{2}$		$1\frac{1}{8}$	$27\frac{1}{8}$	

Internal grooving of Collars shall be the same as for Sockets of Standard Straight Pipes of corresponding nominal internal diameter (Table 4).

**BRITISH STANDARD CAST IRON PIPES FOR
WATER, GAS AND SEWAGE.**

STANDARD FLANGES.

Nominal Internal Diameter of Pipe.	Diameter of Flange.	Diameter of Bolt Circle.	Number of Bolts.	Diameter of Bolts.	Thickness of Flanges.	
					Classes A and B.	Classes C and D.
ins. 3	ins. $7\frac{1}{2}$	ins. $5\frac{1}{2}$	4	ins. $\frac{3}{8}$	ins. $\frac{1}{16}$	ins. $\frac{3}{8}$
4	$8\frac{1}{2}$	7	4	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{7}{8}$
5	10	$8\frac{1}{2}$	8	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{7}{8}$
6	11	$9\frac{1}{2}$	8	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{7}{8}$
7	12	$10\frac{1}{2}$	8	$\frac{3}{8}$	$\frac{1}{2}$	1
8	$13\frac{1}{2}$	$11\frac{1}{2}$	8	$\frac{3}{8}$	$\frac{7}{8}$	1
9	$14\frac{1}{2}$	$12\frac{1}{2}$	8	$\frac{3}{8}$	$\frac{7}{8}$	1
10	16	14	8	$\frac{3}{4}$	$\frac{1}{2}$	1
12	18	16	12	$\frac{3}{4}$	$\frac{1}{2}$	$1\frac{1}{2}$
14	$20\frac{1}{2}$	$18\frac{1}{2}$	12	$\frac{7}{8}$	1	$1\frac{1}{2}$
15	$21\frac{1}{2}$	$19\frac{1}{2}$	12	$\frac{7}{8}$	1	$1\frac{1}{2}$
16	$22\frac{1}{2}$	$20\frac{1}{2}$	12	$\frac{7}{8}$	$1\frac{1}{16}$	$1\frac{1}{2}$
18	$25\frac{1}{2}$	23	12	$\frac{7}{8}$	$1\frac{3}{16}$	$1\frac{3}{8}$
20	$27\frac{1}{2}$	$25\frac{1}{2}$	16	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$
21	29	$26\frac{1}{2}$	16	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$
22	30	$27\frac{1}{2}$	16	1	$1\frac{3}{16}$	$1\frac{1}{2}$
24	$32\frac{1}{2}$	$29\frac{1}{2}$	16	1	$1\frac{3}{16}$	$1\frac{3}{8}$

Bolt-holes.—For $\frac{3}{8}$ -inch bolts the diameters of the holes to be $\frac{1}{16}$ -inch larger than the diameters of the bolts, and for larger sizes of bolts $\frac{1}{8}$ -inch. Bolt-holes to be drilled off centre lines.

Table 14.

BRITISH STANDARD CAST IRON PIPES FOR WATER, GAS AND SEWAGE.

APPROXIMATE WEIGHTS OF ONE FOOT LENGTHS OF PLAIN BARREL (FIG. 1) AND
WEIGHT OF ONE STANDARD FLANGE* (FIG. 2).



FIG. 1.

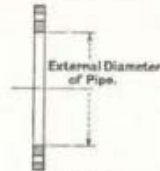


FIG. 2.

Internal Dia. of Pipe.	GAS.		WATER.					
	Class A.		Class B.		Class C.		Class D.	
	Barrel. Fig. 1.	Flange. Fig. 2.	Barrel. Fig. 1.	Flange. Fig. 2.	Barrel. Fig. 1.	Flange. Fig. 2.	Barrel. Fig. 1.	Flange. Fig. 2.
Ins. 3	Lbs. 12.59	Lbs. 5.13	Lbs. 12.59	Lbs. 5.13	Lbs. 12.59	Lbs. 5.60	Lbs. 13.17	Lbs. 5.60
4	16.86	7.25	16.86	7.25	17.25	8.45	19.57	8.45
5	22.06	9.40	22.06	9.40	24.04	10.97	27.42	10.97
6	27.61	11.36	27.61	11.36	31.17	12.24	35.81	12.24
7	33.57	12.49	33.57	12.49	39.12	15.37	44.57	15.37
8	39.94	15.77	39.94	15.77	47.88	18.02	54.09	18.02
9	46.64	18.30	46.64	18.30	56.46	20.92	64.32	20.92
10	54.74	23.56	54.74	23.56	65.64	25.14	75.35	25.14
12	67.87	27.21	70.23	27.21	87.31	29.83	100.37	29.83
14	81.85	38.17	87.35	38.17	110.05	43.76	125.27	43.76
15	90.62	40.16	96.52	40.16	120.83	45.82	138.62	45.82
16	98.21	44.75	106.08	44.75	133.62	47.81	152.56	47.81
18	115.78	54.24	126.41	54.24	159.22	63.78	182.32	63.78
20	132.58	67.43	146.33	67.43	184.68	81.91	212.32	81.91
21	143.36	73.23	159.89	73.23	200.19	88.97	229.19	88.97
22	152.37	78.96	171.85	78.96	213.94	90.68	244.31	90.68
24	173.22	92.30	194.47	92.30	242.84	114.95	278.33	114.95

* In making the calculations for the weights of the Standard Flanges the volume of the bolt-holes has been deducted.

APPENDIX.

**FORM
OF
BRITISH STANDARD
TRANSVERSE TEST BAR AND TENSILE TEST PIECE.**

BRITISH ENGINEERING STANDARDS COMMITTEE.

BRITISH STANDARD TRANSVERSE TEST BAR AND TENSILE TEST PIECE.

TRANSVERSE TEST BAR

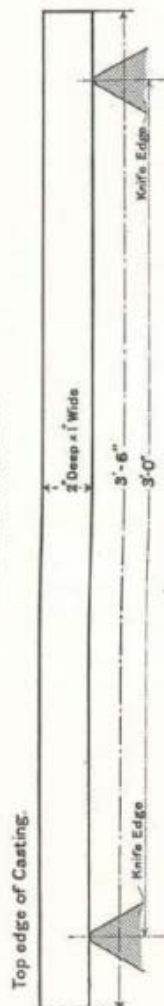


Fig. 1.

TRANSVERSE TEST PORTION

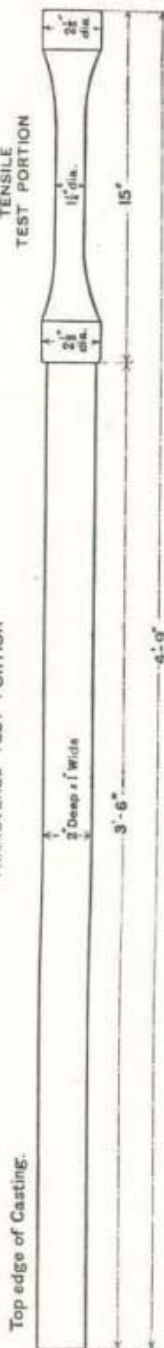


Fig. 2.

FIG. 3. BRITISH STANDARD COMPOSITE TEST BAR.

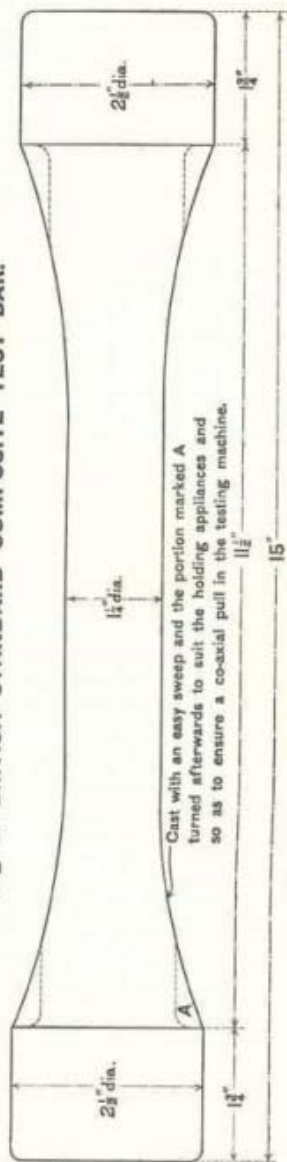


FIG. 4. ENLARGED VIEW OF TENSILE TEST PIECE.

PRICE LIST OF PUBLICATIONS, OCTOBER, 1917.

(This cancels all previous lists.)

NOTE—Directly the necessary arrangements have been completed the Publications of the Committee with a few exceptions will also be issued in French, Italian, Spanish and Russian. Both the English Editions and the Foreign Translations will be published in octavo form, and will be available at 1/- net per copy or its equivalent in Foreign money.

Report No.	Net.	Post free.	Report No.	Net.	Post free.
1 Rolled Sections for Structural Purposes, List of British Standard (REVISED DECEMBER, 1914)	2/-	2/3	42 Steam Engines for Electrical Purposes, Report on Rectifying	5/-	5/3
2 Tramway Rails and Fishplates, British Standard Specification and Sections of	21/-	21/4	43 Boiler Tubes, British Standard Specification for Channel Iron Lapwelded	2/6	2/9
3 Influence of Gauge Length and Section of Test Bar on the Percentage of Elongation, Report on, By Professor W. C. UNWIN, F.R.S.	5/-	5/3	44 Cast Iron Pipes for Hydraulic Power, British Standard Specification for	5/-	5/4
4 Beams, Properties of Standard (Included in No. 8). Denny Bros, revised	1/-	1/2	45—1917. Sparking Plugs for Internal Combustion Engines, Report on Standard Dimensions for (REVISED SEPTEMBER, 1917)	1/-	1/2
5 Locomotives for Indian Railways, First Report on Standard (Superseded by No. 26)	Withdrawn.		46 Keys and Keyways, British Standard Specification for	2/6	2/9
6 Rolled Sections for Structural Purposes, Properties of British Standard	2/6	2/10	47 Steel Fishplates for Bull Head and Flat Bottom Railway Rails, British Standard Specification and Sections of (REVISED DECEMBER, 1914)	10/6	10/10
This Publication contains Sizes, Areas, Weights, Moments of Inertia, Moments of Resistance, etc., for all Standard Sections of Structural Steel. Denny Bros, cloth.			48 Wrought Iron of Smithing Quality for Shipbuilding (Grade D), British Standard Specification for	2/6	2/9
7 Copper Conductors, Tables of British Standard (REVISED MARCH, 1917)	5/-	5/4	49 Ammeters and Voltmeters, British Standard Specification for	5/-	5/3
8 Tramway Poles, British Standard Specification for Tubular	5/-	5/3	50 Locomotives for Indian Railways, Third Report on Standard (Superseding Nos. 5 and 26)	21/-	21/4
9 Railway Rails, British Standard Specification and Sections of Bull Head (REVISED JULY, 1902)	21/-	21/4	51 Wrought Iron for use in Railway Rolling Stock ("Best-Yorkshire" and Grades A, B and C), British Standard Specification for (REVISED AUGUST, 1913)	10/6	10/10
10 Pipe Flanges, British Standard Tables of	2/6	2/10	52 Lampholders and Caps, British Standard Specification for Bayonet Socket	Under Revision.	
11 Railway Rails, British Standard Specification and Sections of Flat Bottom (REVISED JULY, 1902)	21/-	21/4	53 Boiler Tubes for Locomotive Boilers, British Standard Specification for Cold Drawn Weldless Steel (REVISED AUGUST, 1913)	2/6	2/9
12 Portland Cement, British Standard Specification for (REVISED MARCH, 1917)	5/-	5/4	54 Screw Threads, Nuts and Bolt Heads for use in Automobile Construction, Report on British Standard	2/6	2/9
13 Steel for Shipbuilding, British Standard Specification for Structural (REVISED SEPTEMBER, 1914)	5/-	5/3	55 Copper and Bronze Wire, Report on Hard Drawn	10/6	10/10
14 Steel for Marine Boilers, British Standard Specification for Structural (REVISED MARCH, 1907)	5/-	5/3	56 Yield Point and Elastic Limit, British Standard Definitions of	Gratia	-/2
15 Steel for Bridges, etc., and General Building Construction, British Standard Specification for Structural (REVISED AUGUST, 1913)	5/-	5/4	57 Small Screws, Report on British Standard Heads for	2/6	2/9
16 Telegraph Material, British Standard Specifications for	21/-	21/5	58 Cast Iron Soil Pipes, British Standard Specification for Spigot and Socket	5/-	5/4
17 Electrical Machinery, Interim Report on (Superseded by No. 72)	Withdrawn.		59 Cast Iron Waste and Ventilating Pipes (for other than Soil Purposes), British Standard Specification for Spigot and Socket	5/-	5/4
18 Tensile Test Pieces, Forms of Standard (REVISED NOVEMBER, 1910)	Gratia	-/2	60 Tungsten Filament Glow Lamps (Parts 1 and 2), Report on Experiments on	21/-	21/6
19 Temperature Experiments on Field Coils of Electrical Machines, Report on	10/6	10/10	61 Copper Tubes and their Screw Threads (primarily for domestic and similar work), British Standard Specification for	2/6	2/10
20 Screw Threads, Report on British Standard (REVISED FEBRUARY, 1917)	2/6	2/10	62 Marine Boiler Stays, British Standard Screwing for	Gratia	-/1
21 Pipe Threads for Iron or Steel Pipes and Tubes, Report on British Standard (REVISED NOVEMBER, 1909)	2/6	2/9	63 Broken Stone and Chippings, British Standard Specification for Sizes of	3/-	3/3
22 Insulating Materials, Report on the Effect of Temperature on	5/-	5/4	64 Fishbolts and Nuts for Railway Rails, British Standard Specification for	5/-	5/3
23 Trolley Groove and Wire, British Standards for	1/-	1/3	65 Salt-Glazed Ware Pipes, British Standard Specification for	5/-	5/3
24 Railway Rolling Stock, British Standard Specifications for Material used in the Construction of (REVISED 1911)	21/-	21/5	66 Copper-Alloy Three-Piece Unions for Low and Medium Pressure British Standard Size and Copper Tubes, British Standard Specification for	5/-	5/4
25 Errors in Workmanship, Report on	10/6	10/11	67 Ceiling Roses, British Standard Specification for Two and Three-Flare	5/-	5/4
26 Locomotives for Indian Railways, Second Report on Standard (Superseded by No. 26)	Withdrawn.		68 Steel Conductor Rails, British Standard Method of Specifying the Resistance of	10/6	10/9
27 Limit Gauges for Running Fits, Report on British Standard Systems of	5/-	5/3	69 Tungsten Filament Glow Lamps (Vacuum Type) for Automobiles, Report on British Standard	2/6	2/9
28 Nuts, Bolt Heads and Spanners, Report on British Standard (REVISED NOVEMBER, 1908)	2/6	2/9	70 Pneumatic Tyre Rims for Automobiles, Nuts, Cylinders and Cylinders, Report on British Standard	5/-	5/4
29 Steel Forgings for Marine Purposes, British Standard Specification for Forged (REVISED NOVEMBER, 1909)	5/-	5/3	71—1917. Solid Tyre Rims and Tyre Bands for Automobiles, Report on British Standard (REVISED SEPTEMBER, 1917)	1/-	1/2
30 Steel Castings for Marine Purposes, British Standard Specification for	5/-	5/3	72—1917. Electrical Machinery, British Standard Specification Rules for (REVISED SEPTEMBER, 1917)	1/-	1/3
31 Steel Conduits for Electrical Wiring, British Standard Specification for (REVISED SEPTEMBER, 1910)	5/-	5/3	73 Wall Plugs and Sockets, British Standard Specification for	5/-	5/3
32 Steel Bars for use in Automatic Machines, British Standard Specification for	2/6	2/10	74—1917. Charging Plug and Socket, for Vehicles propelled by Electric Secondary Batteries, British Standard Specification for (REVISED SEPTEMBER, 1917)	1/-	1/3
33 Carbon Filament Glow Lamps, British Standard Specification for	5/-	5/3	75 Steels for Automobiles, British Standard Specification for Wrought	7/6	7/10
34 Screw Threads, Tables of British Standard Whitworth, British Standard Fine and British Standard Pipe Threads (REVISED FEBRUARY, 1917)	Gratia	-/2	76 Tars, Pitches, Bitumens and Asphalts when used for Road Purposes, and British Standard Specifications for Tar and Pitch for Road Purposes, Report on British Standard Nomenclature of	5/-	5/4
35 Copper Alloy Bars for use in Automatic Machines, British Standard Specification for	2/6	2/10	77 Electrical Pressures for New Systems and Installations (Low and Medium Pressure), British Standard	Gratia	-/2
36 Electrical Machinery, Report on British Standards for (Superseded by No. 72)	Withdrawn.		78—1917. Cast Iron Pipes and Special Castings for Water, Gas and Sewage, British Standard Specification for	1/-	1/4
37 Electricity Meters, British Standard Specification for (REVISED AUGUST, 1912)	7/6	7/10	80—1917. Magnets for Automobile and Aircraft Purposes, Report on British Standard Dimensions of	1/-	1/3
38 Limit Gauges for Screw Threads, Report on British Standard Systems for (REVISED FEBRUARY, 1917)	5/-	5/4			
39 Screw Threads, Circular Reports on British Standard (REVISED NOVEMBER, 1908)	Withdrawn.				
40 Cast Iron Low Pressure Heating Pipes, British Standard Specification for Spigot and Socket	2/6	2/9			
41 Cast Iron Flue or Smoke Pipes, British Standard Specification for Spigot and Socket	2/6	2/9			

INTERIM REPORTS.

C.L. 2582 Ball Journal Bearings, Interim Report on British Standard Sizes of Single Row

C.L. 3750 French Metric Screw Threads for Aircraft Purposes, Interim Report on

G.B. (C) 5858.

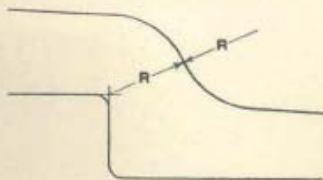
British Engineering Standards Association.

BRITISH STANDARD SPECIFICATION
FOR
CAST IRON PIPES FOR WATER, GAS AND SEWAGE.
(No. 78-1917).

CORRECTION TO G.B. (C) 5479 (*Issued June, 1928*)

REVISED TABLE OF DIMENSIONS OF STANDARD SPIGOTS AND SOCKETS
(*September, 1928*).

The following correction is to be made to the position
of the radii, R , in both diagrams.



CAST IRON PIPES FOR

(No. 2)

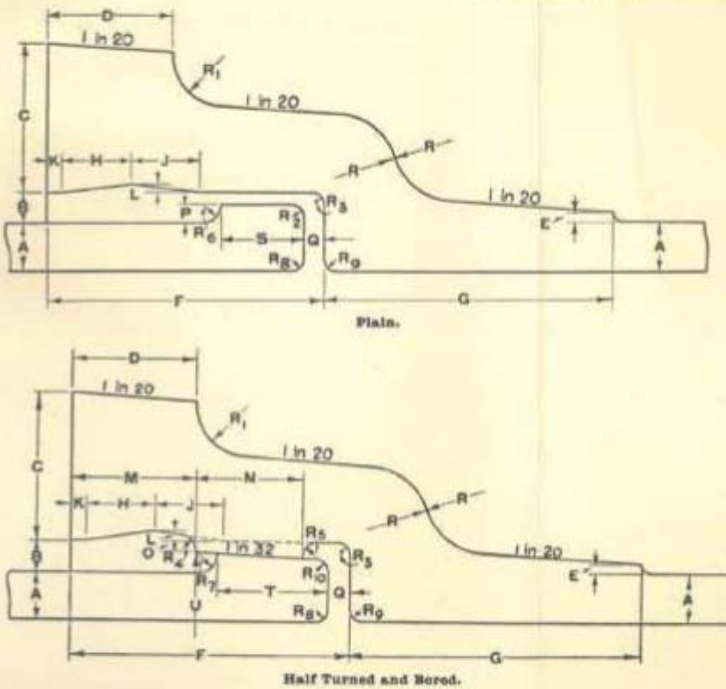
ALTERATION TO TABLE 4.—DIMENSIONS

(June 1920)

The Table and Diagrams here reproduced supersede Table 4 of B.S. Specification No. 78—1917.

The revised Table differs from Table 4 of B.S. Specification No. 78—1917, in certain dimensions, so as to permit the use of ordinary plain spigots. The modification has necessitated certain alterations to dimensions **N**, **T** and **O**, and the addition of dimension **U**.

The opportunity has been taken to increase dimension **K** from $\frac{3}{8}$ in. to $\frac{1}{4}$ in., and to



B.S. Spec. No. 78—1917, P. 20.

NOMINAL INTERNAL DIAMETER OF PIPE.		in.	in.	in.	in.	in.
		3	4	5	6	7
A						
B		0.38	0.38	0.38	0.38	0.38
C	Classes A and B	1.00	1.00	1.13	1.25	1.25
	Classes C and D					
D		1.00	1.00	1.13	1.25	1.25
E		0.13	0.13	0.13	0.13	0.13
F, G		3.00	3.00	3.50	3.50	3.50
H		0.38	0.38	0.44	0.50	0.50
J		0.50	0.50	0.56	0.63	0.63
K		0.25	0.25	0.25	0.25	0.25
L		0.13	0.13	0.13	0.13	0.13
M		1.25	1.25	1.38	1.38	1.38
N		1.25	1.25	1.38	1.38	1.38
O		0.13	0.13	0.13	0.13	0.13
P		0.19	0.19	0.19	0.19	0.19
Q*	Min.	0.38	0.38	0.38	0.38	0.38
	Max.	0.63	0.63	0.63	0.63	0.63
R	Classes A and B	0.63	0.69	0.75	0.81	0.84
	Classes C and D					
R₁		0.44	0.44	0.50	0.56	0.56
R₂		0.13	0.13	0.13	0.13	0.13
R₃, R₄, R₅, R₆, R₇		0.25	0.25	0.25	0.25	0.25
R₈, R₉		0.06	0.06	0.06	0.06	0.06
R₁₀		0.13	0.13	0.25	0.25	0.25
S		0.63	0.63	0.69	0.75	0.75
T		1.25	1.25	1.63	1.63	1.63
U	Classes A and B	4.25	5.30	6.40	7.48	8.55
	Classes C and D					

* The limits of tolerance for machining of the turn

STANDARD SPECIFICATION
FOR
WATER, GAS AND SEWAGE.
(1917.)

OF STANDARD SPIGOTS AND SOCKETS.
(1928.)

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of the dimensions relating to the half-turned and bored joint. The turned portions of the spigot and with bored sockets, which was impossible in many cases with the former dimensions. This new dimension **U**,
publish the dimensions in the table in decimals of an inch in place of fractions.

in. 8	in. 9	in. 10	in. 12	in. 14	in. 15	in. 16	in. 18	in. 20	in. 21	in. 22	in. 24	in. 26	in. 27	in. 28	in. 30	in. 32	in. 33	in. 36	in. 38	in. 40	in. 42	in. 44	in. 46	in. 48
Thicknesses to be in accordance with Table 1.																								
0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
1.31	1.41	1.47	1.63	1.75	1.78	1.84	1.97	2.06	2.13	2.19	2.28	2.28	2.28	2.28	2.31	2.38	2.47	2.56	2.59	2.69	2.72	2.78	2.84	2.84
1.25	1.38	1.44	1.50	1.63	1.63	1.63	1.75	1.88	1.88	2.00	2.00	2.13	2.13	2.13	2.25	2.25	2.38	2.38	2.50	2.50	2.50	2.63	2.63	2.63
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
4.00	4.00	4.00	4.00	4.50	4.50	4.50	4.50	4.50	4.50	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
0.50	0.56	0.59	0.63	0.69	0.69	0.69	0.75	0.81	0.81	0.88	0.88	0.94	0.94	0.94	1.00	1.00	1.06	1.06	1.13	1.13	1.13	1.19	1.19	1.19
0.63	0.69	0.72	0.75	0.81	0.81	0.81	0.88	0.94	0.94	1.00	1.00	1.06	1.06	1.06	1.13	1.13	1.19	1.19	1.25	1.25	1.25	1.31	1.31	1.31
0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
1.63	1.63	1.63	1.63	1.88	1.88	1.88	1.88	1.88	1.88	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1.50	1.50	1.63	1.63	1.88	1.88	1.88	1.88	1.88	1.88	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.50	2.50
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.17	0.17	0.17	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
0.91	0.94	0.94	0.94	0.94	0.97	1.06	1.09	1.13	1.16	1.19	1.22	1.22	1.25	1.28	1.28	1.31	1.34	1.38	1.41	1.44	1.47	1.50	1.50	1.50
0.56	0.56	0.56	0.56	0.63	0.63	0.63	0.63	0.69	0.69	0.75	0.75	0.81	0.81	0.81	0.88	0.88	0.94	0.94	1.00	1.00	1.00	1.06	1.06	1.06
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
0.75	0.75	0.75	0.75	0.88	0.88	0.88	1.00	1.00	1.00	1.00	1.00	1.13	1.13	1.13	1.25	1.25	1.38	1.38	1.50	1.50	1.50	1.63	1.63	1.63
1.75	1.75	1.75	1.75	2.00	2.00	2.00	2.00	2.00	2.00	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.50	2.50	2.50
9.64	10.70	11.76	13.64	15.72	16.76	17.80	19.92	22.00	23.04	24.11	26.17	28.23	29.27	30.29	32.35	34.41	35.45	38.53	40.59	42.63	44.69	46.73	48.79	50.83
			14.10	16.22	17.28	18.34	20.50	22.60	23.66	24.73	26.83	28.93	29.97	31.01	33.09	35.19	36.23	39.33	41.41	43.49	45.57	47.63	49.71	51.77

portions of the spigot and socket shall be such that the permissible variation in the dimension **Q** shall be divided equally between the spigot and the socket.

British Engineering Standards Committee.

[REPORT No. 78-1917.]

Table 4.

ERRATUM.

5 inch dia. Pipe. Dimension C. The figure " $\frac{1}{8}$ " should read " $1\frac{1}{8}$."