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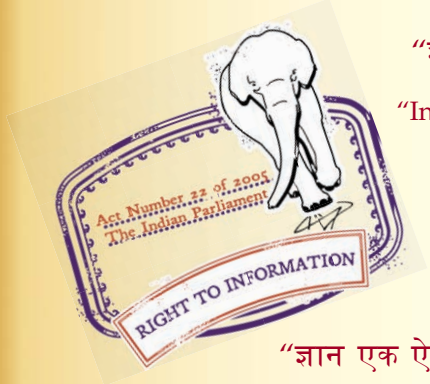

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Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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(Reaffirmed 2003)

Indian Standard

SPECIFICATION FOR STEEL PIPE FLANGES

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 11 *September* 1972

Indian Standard

SPECIFICATION FOR STEEL PIPE FLANGES

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Indian Standard
SPECIFICATION FOR STEEL PIPE FLANGES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 29 October 1971, after the draft finalized by the Steel Tubes, Pipes and Fittings Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 The importance of piping installations in various industries has necessitated the preparation of this standard for the users and manufacturers of flanges and flanged fittings.

0.3 In the formulation of this standard due weightage has been given to international co-ordination among the standards prevailing in different countries in addition to relating it to the practice in the field in this country. Considerable assistance has been drawn from BS 4504 : 1969 'Flanges and bolting for pipes, valves and fittings' issued by the British Standards Institution.

0.4 For the information of designers the high temperature properties of steels, wherever available, have been given in Appendix A. Values for other steels will be included when available.

0.5 This standard contains clauses **1.3**, **5.2** and **7.1** which call for an agreement between the purchaser and the manufacturer.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for cast, forged and plate or flat steel pipe flanges of the following types for use in industry for oil, water, steam, air, gas and chemical services:

a) Integral,

b) Welding neck,

*Rules for rounding off numerical values (*revised*).

c) Plate,

d) Screwed boss,

e) Slip-on boss,

f) Loose flanges for welded-on lapped pipe ends, and

g) Blank.

1.2 This standard does not specify limitations on the use of various methods of attachment of flanges to pipe or other equipment. The adequacy for operating conditions of any method of attachment specified should be determined by the designer of the piping or equipment.

1.3 The types and materials of gaskets used shall be agreed between the purchaser and the manufacturer.

NOTE 1 — The term 'plate flange' indicates the shape of the flange as the flanges are not necessarily made from steel plate but may be made from forged or cast steel.

NOTE 2 — The term 'integral flange' applies to flanges integral with pipes, valves and fittings.

2. MATERIAL

2.1 The materials shall be those given in Table 1 except that alternative materials may be used provided that their mechanical properties are not inferior at the operating temperature.

2.2 Bolting Material — Both bolts and nuts shall be in accordance with IS : 1364-1967*. For alloy steel studs or bolts, nuts of a similar steel, but of a different grade shall be used. If carbon steel is used, it shall have a tensile strength of 415 N/mm², *Min* (1 kgf = 9·81 N).

2.2.1 For temperatures up to 450°C, carbon steel bolts, studs and nuts may be used.

2.2.2 For temperatures higher than 450°C bolts and studs shall be of alloy steel and nuts shall be of carbon or alloy steel of different grade. For bolts less than 12 mm size alloy steel nuts shall be used.

2.3 Steel pipe flanges shall be supplied according to IS : 1387-1967† and all threaded fasteners according to IS : 1367-1967‡.

3. CLASSIFICATION

3.1 This standard applies to flanges of the following class designations:

Classes 0·1, 0·25, 0·60, 1·0, 1·6, 2·5, 4·0, 6·4, 10·0 and 16·0.

*Specification for precision and semi-precision hexagon bolts, screws, nuts and lock nuts (dia range 6 to 39 mm) (*first revision*).

†General requirements for the supply of metallurgical materials (*first revision*).

‡Technical supply conditions for threaded fasteners (*first revision*).

TABLE 1 MATERIAL SPECIFICATION

(*Clause* 2.1)

Sl No.	Classification	Specification
	a) *Forgings*	
i)	Carbon steel	IS : 2004-1970*, Classes 2 and 3
ii)	Carbon molybdenum steel	IS : 1570-1961†, Grade 20 Mo $\frac{55}{}$ with 0·050, *Max*, of S and P
iii)	Chrome-molybdenum steel	
	1) 1 percent chromium—0·5 percent molybdenum steel	IS : 2611-1964‡
	2) 2·25 percent chromium — 1 percent molybdenum steel	IS : 4367-1967§, Grade 10 Cr2Mo1
	b) *Castings*	
iv)	Carbon steel	IS : 2856-1964‖, Grades CS_w—C20 and CS_w—C25
v)	Chrome-molybdenum steel	
	1) Carbon molybdenum steel	IS : 3038-1965¶, Grade 2
	2) 2·25 percent chromium — 0·5 percent molybdenum steel	IS : 3038-1965¶, Grade 4
	3) 2·25 percent chromium—1 percent molybdenum steel	IS : 3038-1965¶, Grade 5
	c) *Rolled Plates*	
vi)	Carbon steel	IS : 2002-1962**, Grades 1 and 2A
vii)	Carbon molybdenum steel	IS : 2041-1962††, Grade 20 Mo ^{55}

*Specification for carbon steel forgings for general engineering purposes (*first revision*).

†Schedules for wrought steels for general engineering purposes.

‡Specification for carbon chromium molybdenum steel forgings for high temperature service.

§Specification for alloy and tool steel forgings for general industrial use.

‖Specification for carbon steel castings suitable for high temperature service (fusion welding quality).

¶Specification for alloy steel castings for pressure containing parts suitable for high temperature service. (Since revised).

**Specification for steel plates for boilers.

††Specification for steel plates for pressure vessels.

3.2 Pressure Temperature Ratings — The class designations represent the primary service pressure ratings of the flanges in newtons/millimetre square.

3.2.1 The allowable stress values for the different materials given in Table 1 shall be determined by dividing the appropriate properties of the material by the factors given in the table below and taking the lowest value.

3.2.2 Pressure ratings at different temperatures for flanges made from different types of steel mentioned in Table 1 may be arrived at by the formula given below:

$$\frac{\text{Pressure ratings at primary service temperature, } T_1}{\text{Pressure ratings at any other temperature, } T_2} = \frac{\text{Allowable stress value at primary service temperature, } T_1}{\text{Allowable stress value at any temperature, } T_2}$$

3.2.3 Other properties are given below:

Property	*Carbon and Carbon Manganese Steels*	*Low Alloy Steels*
Certified or specified minimum yield (or 0·2 ,percent proof) stress at design temperature	1·5	1·5
Specified minimum tensile stress at room temperature	3·0	3·0
Average stress to produce, rupture in 10 000 hours at design temperature	1	1

NOTE 1 — In the case of castings, the above factors shall be divided by a quality factor of 0·75. However, a quality factor of 0·9 shall be used when the following requirements have been met with:

a) Each casting has been radiographically examined at all critical locations and found free from harmful defects, or the castings have been fully machined to such an extent that all critical sections are exposed for the full thickness as in the case of tube plates with holes spaced not further apart than the thickness of the casting.

b) All castings have been examined at all critical locations using magnetic particle, or penetrant fluid procedure (*see* IS : 3658-1966* and IS : 3703-1966†) or by grinding or machining and etching.

c) Castings found to be defective have been rejected or repaired to the satisfaction of the inspecting authority. If repairs by welding are carried out, the castings should be subsequently stress-relieved or heat-treated as agreed between the steel-maker and the inspecting authority, Repair areas of castings should be re-examined in accordance with 3.2.3 (a) and should be shown to be free from harmful defects. In all other cases a factor of 0·75 shall be used instead of 0·90.

NOTE 2 — The minimum tensile strength yield strength at room temperature have been specified in the relevant specifications.

NOTE 3 — For high temperature properties, *see* Appendix A.

*Code of practice for liquid penetrant flaw detection.

†Code of practice for magnetic particle flaw detection.

4. DESIGNATION

4.1 The flanges shall be designated by the nominal bores of their respective pipes as shown in column 1 of Tables 2 to 42. In addition to the nominal bore size the rated pressure, type, grade and standard number of the material for flange should also be given to completely specify the flange.

5. FLANGES

5.1 Dimensions — The dimensions of various types of flanges for different pressure classes conforming to this standard shall be as given in Tables 2 to 42.

5.2 Machining of Flanges — The backs of integral flanges shall be machined except that the backs of integral forged flanges need not be machined provided they are parallel with the whole face within 1 deg. Where machining is carried out it may be either by spot facing at the bolt holes or by back facing at the option of the manufacturer.

5.2.1 The backs of other flanges may be left unmachined unless machining is required by the purchaser.

5.2.2 Unless otherwise specified by the purchaser all bolt holes shall be drilled, equally spaced on the pitch circle diameter. In the case of integral flanges the bolt holes shall be drilled off centres.

6. TOLERANCES

6.1 Tolerances on flange diameter, thickness and length of welding necks shall be as follows:

6.1.1 *Outside Diameter D*

	Machined	*Unmachined*
Up to 200 mm inclusive	± 1 mm	± 2 mm
Over 200 mm to 300 mm inclusive	± 1·5 mm	± 2 mm
Over 300 mm to 400 mm inclusive	± 2 mm	± 3 mm
Over 400 mm	± 2 mm	± 5 mm

6.1.2 *Thickness b*

6.1.2.1 Flanges integral with valves and fittings (other than forged steel):

Thickness		*Machined at Back*	*Not Machined at Back*
Over mm	Up to and Including mm		
—	10	+ 1·5 — 0	+ 2·5 — 0
10	20	+ 2·0 — 0	+ 3·5 — 0
20	30	+ 2·5 — 0	+ 4·5 — 0
30	50	+ 3·0 — 0	+ 6·5 — 0
50	70	+ 4·0 — 0	+ 8·5 — 0
70	100	+ 5·0 — 0	+ 10·5 — 0
100	—	+ 7·0 — 0	+ 14·5 — 0

6.1.2.2 Flanges not integral with valves and fittings:

Thickness	*Machined at Back*	*Not Machined at Back*
Up to 35 mm inclusive	+ 1·5 — 0	+ 3 — 0
Over 35 mm	+ 3 — 0	+ 5 — 0

6.1.2.3 Forged steel flanges integral with valves and fittings:

Thickness	*Machined at Back*	*Not Machined at Back*
Up to 35 mm inclusive	+ 1·5 — 0	+ 3 — 0
Over 35 mm thick	+ 3 — 0	+ 3 — 0

6.1.3 *Length of Welding Neck Flange* (h_1) — shall be as given below:

	Machined
Up to 80 mm nominal size inclusive	± 1·5 mm
Over 80 to 250 mm nominal size inclusive	± 2 mm
Over 250 mm nominal size	± 3 mm

6.2 Finish of Joint Surfaces — The finish of joint faces and the type of gasket to be used are not specified in this standard due to the wide range

of applications for which the flanges can be used. However, the recommended joint face finish to be provided on flanges used for steam, feed, water, and other fluids for which similar standards of joint tightness are required is as follows:

a) *Flanges Up to 300 mm Nominal Size Inclusive* — A continuous spiral groove produced by a 1·5 mm radius round-nosed tool at a feed of approximately 0·8 mm per revolution.

b) *Flanges Over 300 mm Nominal Size* — A continuous spiral groove produced by a 3 mm radius round-nosed tool at a feed of approximately 1·2 mm per revolution.

6.3 Joint Faces — Steel flanges shall have raised joint faces except that blank flanges may be flat faced or have a spigot at the option of the manufacturer.

7. ATTACHMENT OF FLANGES

7.1 The method of securing flanges (other than the integral flanges) to pipes and fittings shall be in accordance with the appropriate application standard. Where there is no application standard the method of attachment shall be the subject of agreement between the purchaser and the manufacturer.

7.2 Flanges machined according to the tolerances in **6** shall be prepared for attachment to pipe as in **7.2.1** to **7.2.3**.

7.2.1 *Screwed Flanges* — These shall be screwed as agreed to between the contracting parties.

7.2.2 *Steel Plate and Steel Slip-On Boss Flanges* — These shall be machined in the bore to a diameter to be specified by the purchaser and suitable for welding to form one of the types in the appropriate application standard as required by the purchaser. The purchaser shall specify the weld preparation required.

7.2.3 *Welding Neck Flanges* — These shall be machined in the bore to a diameter to be specified by the purchaser, and suitably prepared for welding to pipes and fittings. The thickness of the portion of the flange which connects it to the pipe should be not less than the pipe thickness nor more than 3 mm thicker. If the difference is more than 3 mm, it may be negotiated in a slope of 1 in 5.

8. HYDRAULIC TESTING OF FLANGES

8.1 This standard does not specify the hydraulic test pressures for flanged pipes or components, details of which should be obtained from the appropriate standards which specify test pressures for pipes or components but the test pressure applied to the joint shall not exceed 1·5 times the nominal pressure for the flanges.

9. INSPECTION

9.1 The purchaser or his representative shall have free access at all reasonable times to those parts of the manufacturer's works actually engaged upon his contract and shall be at liberty to inspect at any stage of manufacture the materials covered by such contract. He shall be at liberty to reject any material which does not comply with the requirements of this standard.

9.1.1 When the purchaser or his representative desires to witness the specified tests on the materials covered by his contract, the manufacturer shall notify him sufficiently in advance of the tests to enable him to be present.

9.2 Defects which do not impair the strength of the flanges may be welded by a procedure approved by the purchaser. They shall be cleaned out to sound metal before welding, and shall be submitted to the purchaser's inspector for approval in this condition, after which they may be welded if the purchaser so agrees. After welding, flanges shall be heat-treated, except that welds required for finish and appearances only need not be heat treated, if approved by the purchaser. When the welding of defects is permitted, the welding rod shall be such as to produce a weld having characteristics similar to the parent metal.

10. DETAILS TO BE SUPPLIED BY THE PURCHASER WHEN ORDERING FLANGES

10.1 The following information shall be supplied by the purchaser when placing an order or making an enquiry:

a) Nominal size, nominal pressure, type of flange (including type of screwing whether taper or parallel) (*see* Tables 2 to 42) and materials (*see* Table 1);

b) Whether test certificates of the material are required;

c) Details of bolting (if required) (*see* **2.2**);

d) Whether flanges are to be machined (*see* **5.2** and **5.2.1**); and

e) Details of the machining for the attachment of flanges (*see* **7**).

11. MARKING

11.1 Flanges manufactured in accordance with this specification shall be marked as in **11.1.1** to **11.2**.

11.1.1 Manufacturer's name or trade-mark.

11.1.2 *Class Rating* — Numerals giving the primary service pressure for which the product is designated.

11.1.3 *Materials Identification* — Carbon steel flanges shall be marked with the word 'Steel'. Alloy steel flanges shall be marked with the symbols designated in Table 1.

11.1.4 *Thread Identification* — The marking shall be cast or stamped on the flanges to indicate the type of thread used. For details reference may be made to IS : 1367-1967*.

11.1.5 *Size* — Numerals denoting the nominal pipe size in mm size markings but may be omitted from reducing flanges.

11.1.6 *Omission of Markings* — On flanges of such size or shape as will not permit of full markings, those may be omitted with the approval of the purchaser keeping the minimum the markings as under:

a) Size,
b) Materials specification,
c) Class rating, and
d) Manufacturer's name or trade-mark.

The remaining information should be made available to the purchaser, if required.

11.2 The product may also be marked with Standard mark.

11.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

12. PRESERVATION AND PACKING

12.1 After inspection, and before despatch, flanges shall, if necessary, be dried and cleaned.

12.1.1 Threaded and machined surfaces shall be well-covered with an approved rust preventive material that will not become fluid and run off at 65°C.

12.1.2 Exposed faces of flanges shall be protected over their entire surface with a suitable close-fitting protector securely attached at not less than four points. The type of protector and method of attachment shall be approved by the purchaser.

12.2 Packing

12.2.1 Flanges shall be bundled by bolting them together or securing them with wire of suitable strength passed through the bolt holes in such a manner that the flanges are paired and no flange facings remain exposed.

12.2.2 Other methods of preparation for despatch shall be subject to agreement between the purchaser and the manufacturer.

*Technical supply conditions for threaded fasteners (*first revision*).

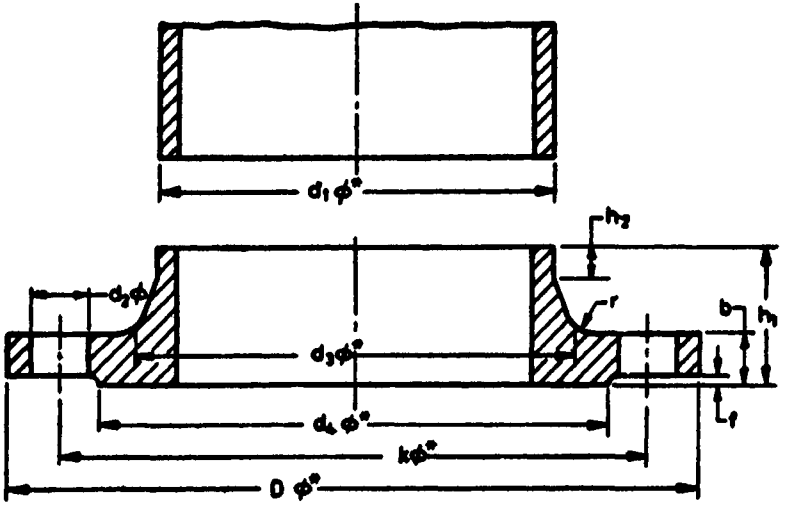
TABLE 2 WELDING NECK FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 0·25 N/mm².

All dimensions in millimetres.

NOTE — For nominal sizes 10 to 1 000 mm, use Table 4.



*These dimensions are not to scale.

NOM SIZE	PIPE o. d. d_1	FLANGE			RAISED FACE		BOLTING	DRILLING			NECK		
		D	b	h_1	d_4	f		No.	d_2	k	d_3	h_2 =	r
1 200	1 220	1 375	26	70	1 280	5	M27	32	30	1 320	1 245	16	16
1 400	1 420	1 575	26	70	1 480	5	M27	36	30	1 520	1 445	16	16
1 600	1 620	1 790	26	80	1 690	5	M27	40	30	1 730	1 645	20	16
1 800	1 820	1 990	26	80	1 890	5	M27	44	30	1 930	1 845	20	16
2 000	2 020	2 190	26	80	2 090	5	M27	48	30	2 130	2 045	22	16

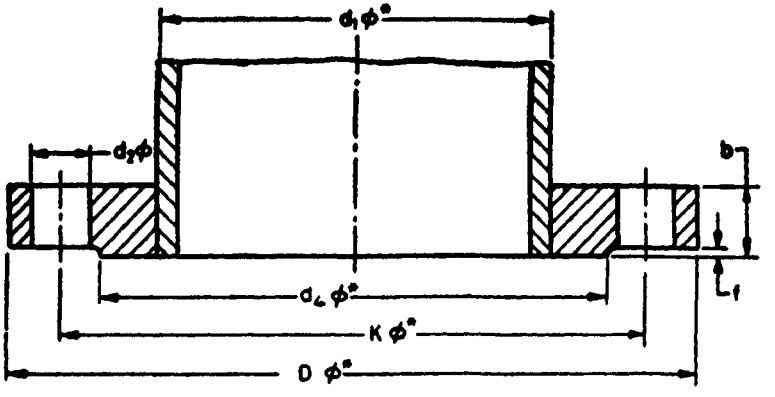
TABLE 3 PLATE FLANGES FOR WELDING

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 0·25 N/mm².

All dimensions in millimetres.

NOTE — For nominal sizes 10 to 1 000 mm, use Table 5.



*These dimensions are not to scale.

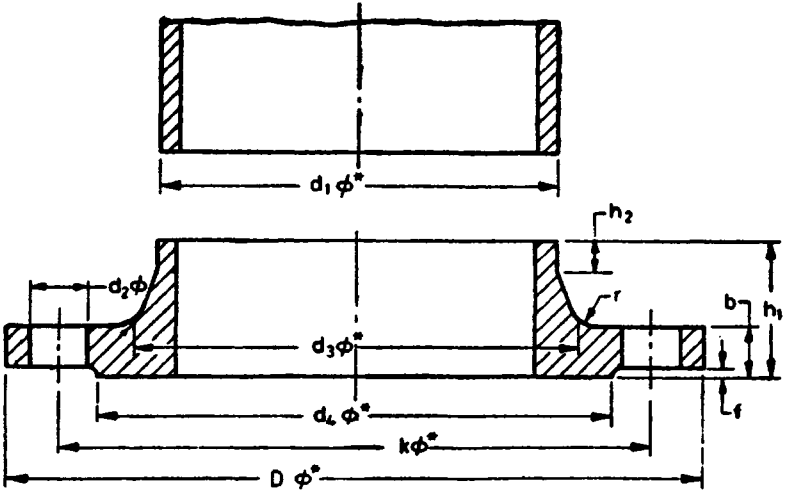
NOM SIZE	PIPE o. d. d_1	FLANGE		RAISED FACE		BOLTING	DRILLING		
		D	b	d_4	f		No.	d_2	k
1 200	1 220	1 375	36	1 280	5	M27	32	30	1 320
1 400	1 420	1 575	42	1 480	5	M27	36	30	1 520
1 600	1 620	1 790	46	1 690	5	M27	40	30	1 730
1 800	1 820	1 990	52	1 890	5	M27	44	30	1 930
2 000	2 020	2 190	58	2 090	5	M27	48	30	2 130

TABLE 4 WELDING NECK FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 0·60 N/mm².

All dimensions in millimetres.



*These dimensions are not to scale.

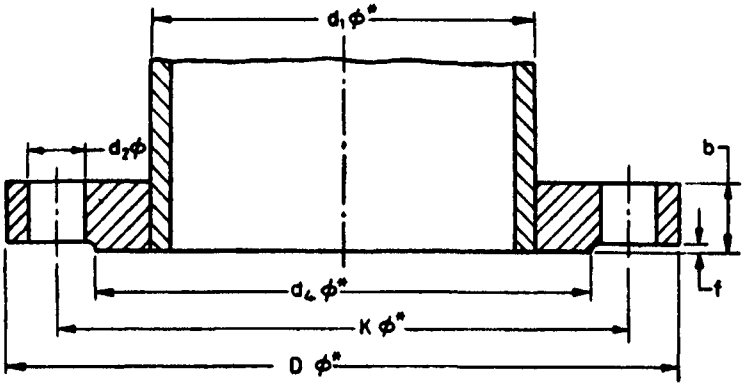
Nom Size	Pipe o. d. d_1	Flange			Raised Face		Bolting	Drilling			Neck		
		D	b	h_1	d_4	f		No.	d_2	k	d_3	h_2≈	r
10	17·2	75	12	28	35	2	M10	4	11	50	26	6	4
15	21·3	80	12	30	40	2	M10	4	11	55	30	6	4
20	26·9	90	14	32	50	2	M10	4	11	65	38	6	4
25	33·7	100	14	35	60	2	M10	4	11	75	42	6	4
32	42·4	120	14	35	70	2	M12	4	14	90	55	6	6
40	48·3	130	14	38	80	3	M12	4	14	100	62	7	6
50	60·3	140	14	38	90	3	M12	4	14	110	74	8	6
65	76·1	160	14	38	110	3	M12	4	14	130	88	9	6
80	88·9	190	16	42	128	3	M16	4	18	150	102	10	8
100	114·3	210	16	45	148	3	M16	4	18	170	130	10	8
125	139·7	240	18	48	178	3	M16	8	18	200	155	10	8
150	168·3	265	18	48	202	3	M16	8	18	225	184	12	10
200	219·1	320	20	55	258	3	M16	8	18	280	236	15	10
250	273	375	22	60	312	3	M16	12	18	335	290	15	12
300	323·9	440	22	62	365	4	M20	12	22	395	342	15	12
350	355·6	490	22	62	415	4	M20	12	22	445	385	15	12
400	406·4	540	22	65	465	4	M20	16	22	495	438	15	12
500	508	645	24	68	570	4	M20	20	22	600	538	15	12
600	609·6	755	24	70	670	5	M24	20	26	705	640	16	12
700	711·2	860	24	70	775	5	M24	24	26	810	740	16	12
800	812·8	975	24	70	880	5	M27	24	30	920	842	16	12
900	914·4	1 075	26	70	980	5	M27	24	30	1 020	942	16	12
1 000	1 016	1 175	26	70	1 080	5	M27	28	30	1 120	1 045	16	16
1 200	1 220	1 405	28	90	1 295	5	M30	32	33	1 340	1 248	20	16
1 400	1 420	1 630	32	90	1 510	5	M33	36	36	1 560	1 452	20	16
1 600	1 620	1 830	34	90	1 710	5	M33	40	36	1 760	1 655	20	16
1 800	1 820	2 045	36	100	1 920	5	M36	44	39	1 970	1 855	20	16
2 000	2 020	2 265	38	110	2 125	5	M39	48	42	2 180	2 058	25	16

TABLE 5 PLATE FLANGES FOR WELDING

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 0·60 N/mm².

All dimensions in millimetres.



*These dimensions are not to scale.

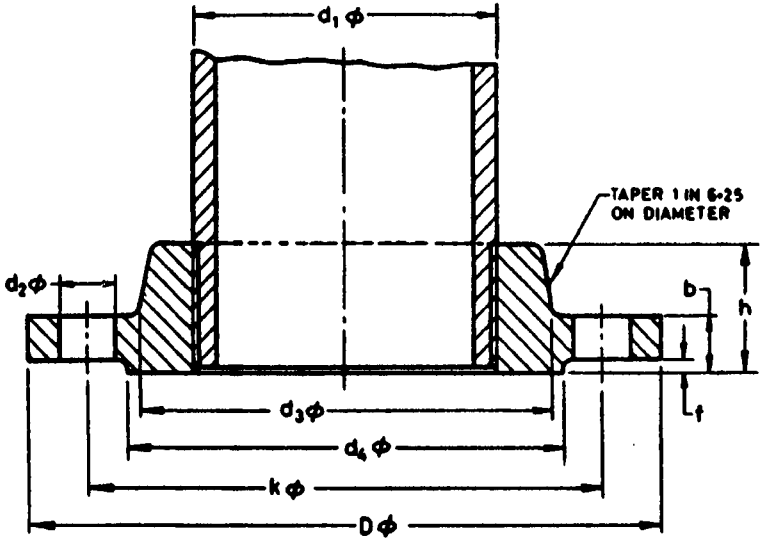
Nom Size	Pipe o. d. d_1	Flange		Raised Face		Bolting	Drilling		
		D	b	d_4	f		No.	d_2	k
10	17·2	75	12	35	2	M10	4	11	50
15	21·3	80	12	40	2	M10	4	11	55
20	26·9	90	14	50	2	M10	4	11	65
25	33·7	100	14	60	2	M10	4	11	75
32	42·4	120	16	70	2	M12	4	14	90
40	48·3	130	16	80	3	M12	4	14	100
50	60·3	140	16	90	3	M12	4	14	110
65	76·1	160	16	110	3	M12	4	14	130
80	88·9	190	18	120	3	M16	4	18	150
100	114·3	210	18	148	3	M16	4	18	170
125	139·7	240	20	178	3	M16	8	18	200
150	168·3	265	20	202	3	M16	8	18	225
200	219·1	320	22	258	3	M16	8	18	280
250	273	375	24	312	3	M16	12	18	335
300	323·9	440	24	365	4	M20	12	22	395
350	355·6	493	26	415	4	M20	12	22	445
400	406·4	540	28	465	4	M20	16	22	495
500	508	645	30	570	4	M20	20	22	600
600	609·6	755	32	670	5	M24	20	26	705
700	711·2	860	34	775	5	M24	24	26	810
800	812·8	975	38	880	5	M27	24	30	920
900	914·4	1 075	42	980	5	M27	24	30	1 020
1 000	1 016	1 175	46	1 080	5	M27	28	30	1 120
1 200	1 220	1 405	56	1 295	5	M30	32	33	1 340
1 400	1 420	1 630	66	1 510	5	M33	36	36	1 560
1 600	1 620	1 830	74	1 710	5	M33	40	36	1 760
1 800	1 820	2 045	84	1 920	5	M36	44	39	1 970
2 000	2 020	2 265	92	2 125	5	M39	48	42	2 180

TABLE 6 SCREWED BOSS FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 0·60 N/mm²

All dimensions in millimetres.



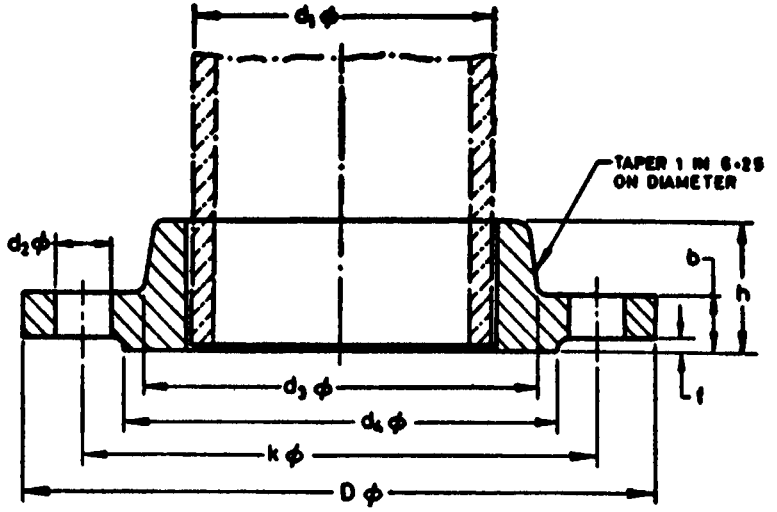
Nom Size	Pipe o. d. d_1	Flange			Raised Face		Bolting	Drilling			Boss d_3
		D	b	h	d_4	f		No.	d_2	k	
6	10·2	65	10	18	25	2	M10	4	11	40	18
8	13·5	70	10	18	30	2	M10	4	11	45	22
10	17·2	75	12	20	35	2	M10	4	11	50	25
15	21·3	80	12	20	40	2	M10	4	11	55	30
20	26·9	90	14	24	50	2	M10	4	11	65	40
25	33·7	100	14	24	60	2	M10	4	11	75	50
32	42·4	120	14	26	70	2	M12	4	14	90	60
40	48·3	130	14	26	80	3	M12	4	14	100	70
50	60·3	140	14	28	90	3	M12	4	14	110	80
65	76·1	160	14	32	110	3	M12	4	14	130	100
80	88·9	190	16	34	128	3	M16	4	18	150	110
100	114·3	210	16	40	148	3	M16	4	18	170	130
125	139·7	240	18	44	178	3	M16	8	18	200	160
150	165·1	265	18	44	202	3	M16	8	18	225	185

TABLE 7 SLIP-ON BOSS FLANGES FOR WELDING

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 0·60 N/mm².

All dimensions in millimetres.



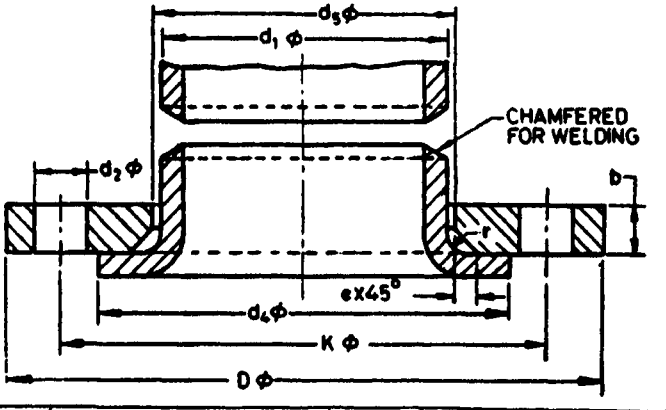
Nom Size	Pipe o. d. d_1 ≈	Flange			Raised Face		Bolting	Drilling			Boss d_3
		D	b	h	d_4	f		No.	d_2	k	
6	10·2	65	10	18	25	2	M10	4	11	40	18
8	13·5	70	10	18	30	2	M10	4	11	45	22
10	17·2	75	12	20	35	2	M10	4	11	50	25
15	21·3	80	12	20	40	2	M10	4	11	55	30
20	26·9	90	14	24	50	2	M10	4	11	65	40
25	33·7	100	14	24	60	2	M10	4	11	75	50
32	42·4	120	14	26	70	2	M12	4	14	90	60
40	48·3	130	14	26	80	3	M12	4	14	100	70
50	60·3	140	14	28	90	3	M12	4	14	110	80
65	76·1	160	14	32	110	3	M12	4	14	130	100
80	88·9	190	16	34	128	3	M16	4	18	150	110
100	114·3	210	16	40	168	3	M16	4	18	170	130
125	139·7	240	18	44	178	3	M16	8	18	200	160
150	168·3	265	18	44	202	3	M16	8	18	225	185
200	219·1	320	20	44	258	3	M16	8	18	280	240
250	273	375	22	44	312	3	M16	12	18	335	295
300	323·9	440	22	44	365	4	M20	12	22	395	355

TABLE 8 LOOSE FLANGES FOR WELDED ON LAPPED PIPE ENDS

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 0·60 N/mm².

All dimensions in millimetres.



Nom Size	Pipe o. d. d_1	Flange				Bolting	Drilling			Pipe End	
		D	b	d_5	e		No.	d_2	k	d_4 Max	r
10	17·2	75	10	20	5	M10	4	11	50	35	3
15	21·3	80	10	24	5	M10	4	11	55	40	3
20	26·9	90	10	30	5	M10	4	11	65	50	3
25	33·7	100	12	37	6	M10	4	11	75	60	4
32	42·4	120	12	46	6	M12	4	14	90	70	4
40	48·3	130	12	52	6	M12	4	14	100	80	4
50	60·3	140	12	65	6	M12	4	14	110	90	5
65	76·1	160	12	81	6	M12	4	14	130	110	5
80	88·9	190	14	94	6	M16	4	18	150	128	5
100	114·3	210	14	119	6	M16	4	18	170	148	5
125	139·7	240	14	145	6	M16	8	18	200	178	5
150	168·3	265	14	174	6	M16	8	18	225	202	5
200	219·1	320	18	225	8	M16	8	18	280	258	5
250	273	375	20	279	8	M16	12	18	335	312	5
300	323·9	440	24	330	8	M20	12	22	395	365	5
350	355·6	490	26	362	8	M20	12	22	445	415	6
400	419	540	30	426	8	M20	16	22	495	465	6
500	508	645	32	516	8	M20	20	22	600	570	6
600	609·6	755	36	618	8	M24	20	26	705	670	6
700	711·2	860	40	720	8	M24	24	36	810	775	6
800	812·8	975	44	822	8	M27	24	30	920	880	6
900	914·4	1 075	48	926	8	M27	24	30	1 020	980	6
1 000	1 016	1 175	52	1 028	8	M27	28	30	1 120	1 080	6
1 200	1 220	1 405	60	1 232	10	M30	32	33	1 340	1 295	8

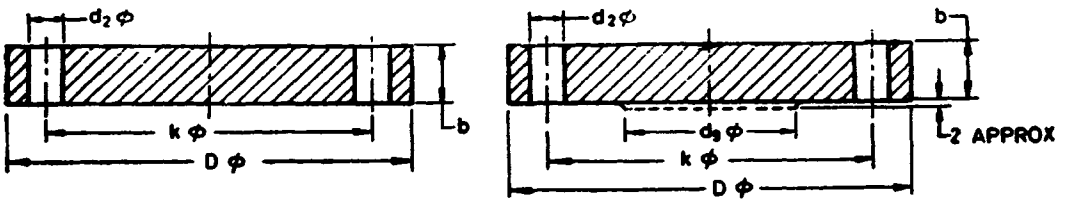
TABLE 9 PLATE BLANK FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 0·60 N/mm².

All dimensions in millimetres.

NOTE — The two types of flanges shown are alternatives at the option of the manufacturer.



NOM SIZE	FLANGE		SPIGOT d_9	BOLTING	DRILLING		
	D	b			No.	d_2	l
10	75	12	—	M10	4	11	50
15	80	12	—	M10	4	11	55
20	90	14	—	M10	4	11	65
25	100	14	—	M10	4	11	75
32	120	14	—	M12	4	14	90
40	130	14	—	M12	4	14	100
50	140	14	—	M12	4	14	110
65	160	14	55	M12	4	14	130
80	190	16	70	M16	4	18	150
100	210	16	90	M16	4	18	170
125	240	18	115	M16	8	18	200
150	265	18	140	M16	8	18	225
175	295	20	165	M16	8	18	255
200	320	20	190	M16	8	18	280
250	375	22	237	M16	12	18	335
300	440	22	285	M20	12	22	395
350	490	22	332	M20	12	22	445
400	540	22	380	M20	16	22	495
500	645	24	475	M20	20	22	600

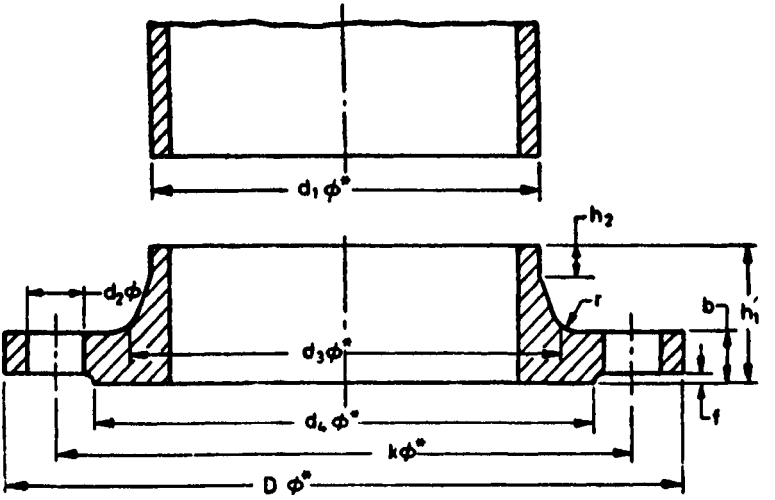
TABLE 10 WELDING NECK FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 1 N/mm².

All dimensions in millimetres.

NOTE — For nominal sizes 10 to 175 mm, use Table 16.



*These dimensions are not to scale.

NOM SIZE	PIPE o.d. d_1	FLANGE			RAISED FACE		BOLTING	DRILLING			NECK		
		D	b	h_1	d_4	f		No.	d_2	k	d_3	h_2 ≈	r
200	219·1	340	24	62	268	3	M20	8	22	295	235	16	10
250	273	395	26	68	320	3	M20	12	22	350	292	16	12
300	323·9	445	26	68	370	4	M20	12	22	400	344	16	12
350	355·6	505	26	68	430	4	M20	16	22	460	385	16	12
400	406·4	565	26	72	482	4	M24	16	26	515	440	16	12
500	508	670	28	75	585	4	M24	20	26	620	542	16	12
600	609·6	780	28	80	685	5	M27	20	30	725	642	18	12
700	711·2	895	30	80	800	5	M27	24	30	840	745	18	12
800	812·8	1 015	32	90	905	5	M30	24	33	950	850	18	12
900	914·4	1 115	34	95	1 005	5	M30	28	33	1 050	950	20	12
1 000	1 016	1 230	34	95	1 110	5	M33	28	36	1 160	1 052	20	16
1 200	1 220	1 455	38	115	1 330	5	M36	32	39	1 380	1 255	25	16
1 400	1 420	1 675	42	120	1 535	5	M39	36	42	1 590	1 460	25	16
1 600	1 620	1 915	46	130	1 760	5	M45	40	48	1 820	1 665	25	16
1 800	1 820	2 115	50	140	1 960	5	M45	44	48	2 020	1 868	30	16
2 000	2 020	2 325	54	150	2 170	5	M45	48	48	2 230	2 072	30	16

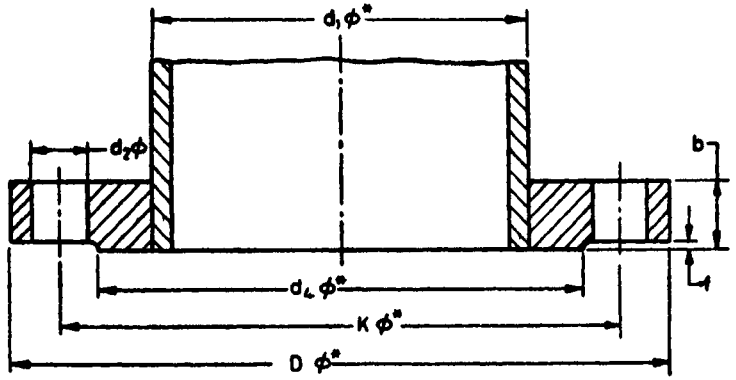
TABLE 11 PLATE FLANGES FOR WELDING

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 1 N/mm².

All dimensions in millimetres.

NOTE — For nominal sizes 10 to 175 mm, use Table 17.



*These dimensions are not to scale.

NOM SIZE	PIPE o. d. d_1	FLANGE		RAISED FACE		BOLTING	DRILLING		
		D	b	d_4	f		No.	d_2	k
200	219·1	340	24	268	3	M20	8	22	295
250	273	395	26	320	3	M20	12	22	350
300	323·9	445	26	370	4	M20	12	22	400
350	355·8	505	28	430	4	M20	16	22	460
400	406·4	565	32	482	4	M24	16	26	515
500	508	670	38	585	4	M24	20	26	620
600	609·6	780	42	685	5	M27	20	30	725
700	711·2	895	46	800	5	M27	24	30	840
800	812·8	1 015	52	905	5	M30	24	33	950
900	914·4	1 115	56	1 005	5	M30	28	33	1 050
1 000	1 016	1 290	62	1 110	5	M33	28	36	1 160
1 200	1 220	1 455	74	1 330	5	M36	32	39	1 380

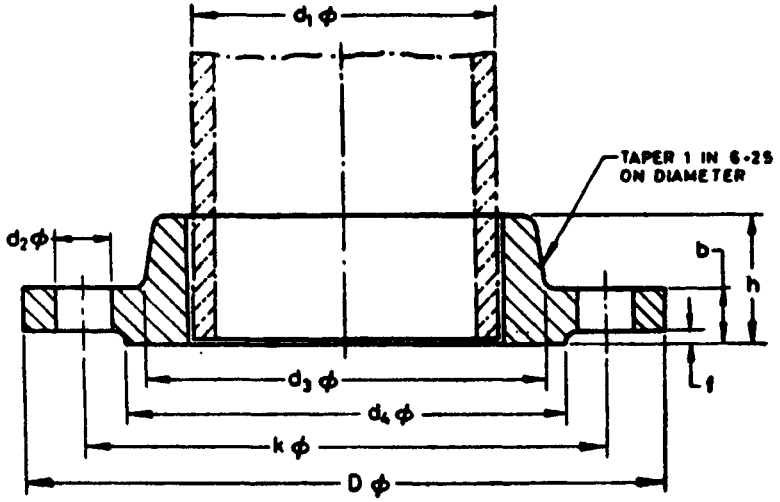
TABLE 12 SLIP-ON BOSS FLANGES FOR WELDING

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 1 N/mm².

All dimensions in millimetres.

NOTE — For nominal sizes 6 to 65 mm inclusive, use Table 19.



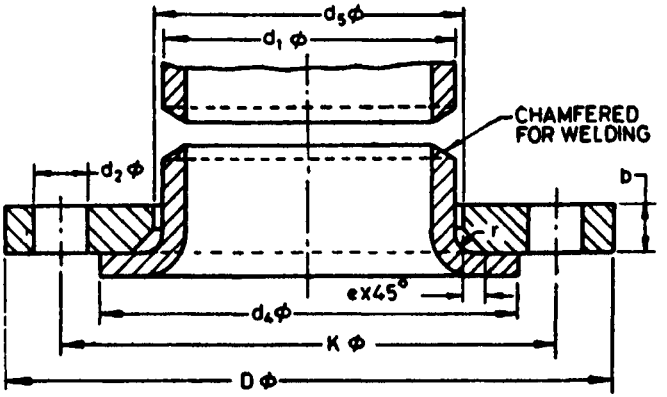
NOM SIZE	PIPE o. d. d_1	FLANGE			RAISED FACE		BOLTING	DRILLING			BOSS d_3
		D	b	h	d_4	f		No.	d_2	k	
80	88·9	200	20	34	138	3	M16	8	18	160	118
100	114·3	220	20	40	158	3	M16	8	18	180	140
125	139·7	250	22	44	188	3	M16	8	18	210	168
150	168·3	285	22	44	212	3	M20	8	22	240	195
200	219·1	340	24	44	268	3	M20	8	22	295	237
250	273	395	26	46	320	3	M20	12	22	350	292
300	323·9	445	26	46	370	4	M20	12	22	400	344

TABLE 13 LOOSE FLANGES FOR WELDED-ON LAPPED PIPE ENDS

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 1 N/mm².

All dimensions in millimetres.



Nom Size	Pipe o. d. d_1	Flange				Bolting	Drilling			Pipe End	
		D	b	d_5	e		No.	d_2	k	d_4 Max	r
10	17·2	90	14	20	5	M12	4	14	60	40	3
15	21·3	95	14	24	5	M12	4	14	65	45	3
20	26·9	105	14	30	5	M12	4	14	75	58	3
25	33·7	115	16	37	6	M12	4	14	85	68	4
32	42·4	140	16	46	6	M16	4	18	100	78	4
40	48·3	150	16	52	6	M16	4	18	110	88	4
50	60·3	165	16	65	6	M16	4	18	125	102	5
65	76·1	185	16	81	6	M16	4	18	145	122	5
80	88·9	200	18	94	6	M16	8	18	160	138	5
100	114·3	220	18	119	6	M16	8	18	180	158	5
125	139·7	250	18	145	6	M16	8	18	210	188	5
150	168·3	285	18	174	6	M20	8	22	240	212	5
200	219·1	340	20	225	8	M20	8	22	295	268	5
250	273	395	22	279	8	M20	12	22	350	320	5
300	323·9	445	26	330	8	M20	12	22	400	370	5

TABLE 14 PLATE BLANK FLANGES

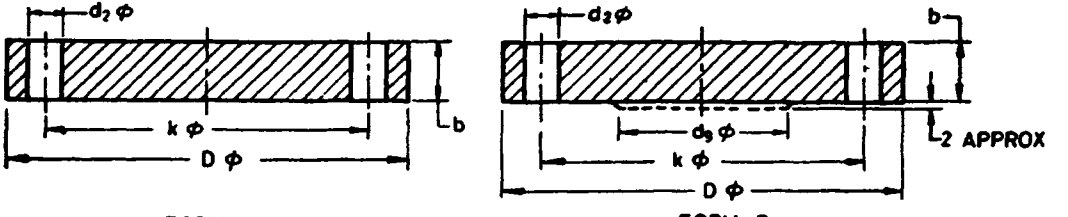
(*Clauses* 4.1 *and* 5.1)

Nominal pressure 1 N/mm².

All dimensions in millimetres.

NOTE 1 — The two types of flanges shown are alternatives at the option of the manufacturer.

NOTE 2 — For nominal sizes 10 to 175 mm, use Table 20.



NOM SIZE	FLANGE		SPIGOT d_9	BOLTING	DRILLING		
	D	b			No.	d_2	k
200	340	24	190	M20	8	22	295
250	395	26	237	M20	12	22	350
300	445	26	285	M20	12	22	400
350	505	26	332	M20	16	22	460
400	565	26	380	M24	16	23	515
500	670	28	475	M24	20	26	620

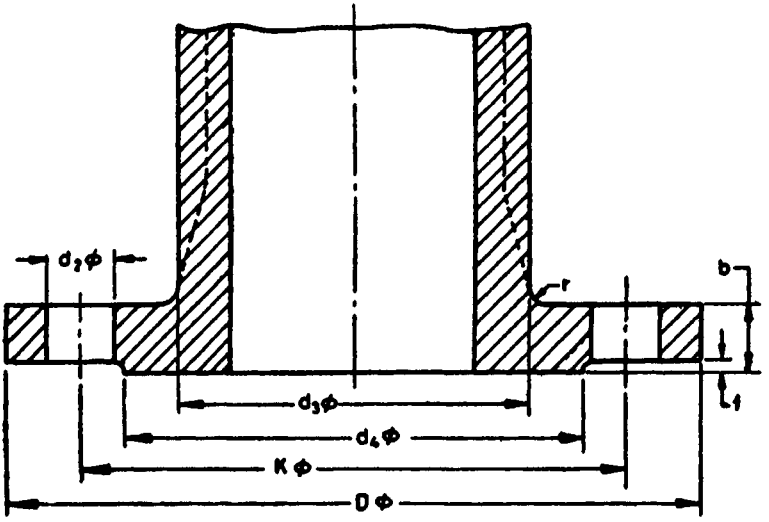
TABLE 15 INTEGRAL FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 1·6 N/mm².

All dimensions in millimetres.

NOTE — For nominal sizes 10 to 50 mm, use Table 26.



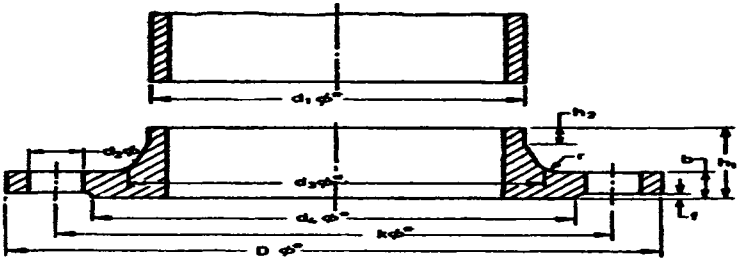
NOM SIZE	FLANGE		RAISED FACE		BOLTING	DRILLING			NECK	
	D	b	d_4	f		No.	d_2	k	d_3	r
65	185	18	122	3	M16	4	18	145	93	5
80	200	20	138	3	M16	8	18	160	110	5
100	220	20	158	3	M16	8	18	180	130	5
125	250	22	188	3	M16	8	18	210	159	6
150	285	22	212	3	M20	8	22	240	184	6
175	315	24	242	3	M20	8	22	270	211	6
200	340	24	268	3	M20	12	22	295	236	6
250	405	26	320	3	M24	12	26	355	290	8
300	460	28	378	4	M24	12	26	410	342	8
350	520	30	438	4	M24	16	26	470	396	8
400	580	32	490	4	M27	16	30	525	448	10
500	715	36	610	4	M30	20	33	650	554	10
600	840	40	725	5	M33	20	36	770	660	10
700	910	42	795	5	M33	24	36	840	760	12
800	1 025	42	900	5	M36	24	39	950	864	12
900	1 125	44	1 000	5	M36	28	39	1 050	966	12
1 000	1 255	46	1 115	5	M39	28	42	1 170	1 070	12
1 200	1 485	52	1 330	5	M45	32	48	1 390	1 278	15
1 400	1 685	58	1 530	5	M45	36	48	1 590	1 488	15
1 600	1 930	64	1 750	5	M52	40	56	1 820	1 696	18
1 800	2 130	68	1 950	5	M52	44	56	2 020	1 902	18
2 000	2 345	70	2 150	5	M56	48	62	2 230	2 106	18
2 200	2 555	74	2 360	6	M56	52	62	2 440	2 312	18

TABLE 16 WELDING NECK FLANGES

(Clauses 4.1 and 5.1)

Nominal pressure 1·6 N/mm².

All dimensions in millimetres.



*These dimensions are not to scale.

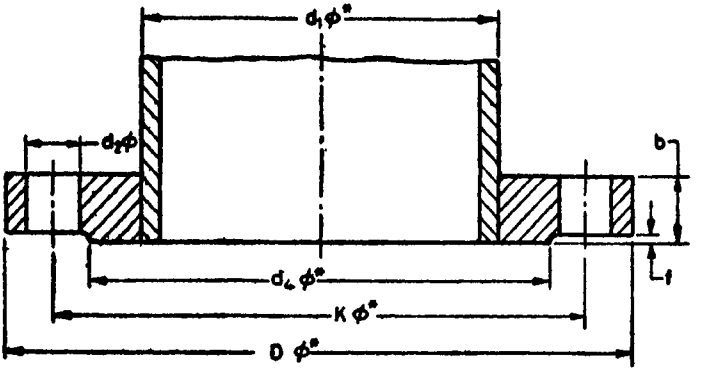
Nom Size	Pipe o. d. d_1	Flange			Raised Face		Bolting	Drilling			Neck		
		D	b	h_1	d_4	f		No.	d_2	k	d_3	h_2 min	r
10	17·2	90	14	35	40	2	M12	4	14	60	28	6	4
15	21·3	95	14	35	45	2	M12	4	14	65	32	6	4
20	26·9	105	16	38	58	2	M12	4	14	75	40	6	4
25	33·7	115	16	38	68	2	M12	4	14	85	45	6	4
32	42·4	140	16	40	78	2	M16	4	18	100	56	6	6
40	48·3	150	16	42	88	3	M16	4	18	110	64	7	6
50	60·3	165	18	45	102	3	M16	4	18	125	75	8	6
65	76·1	185	18	45	122	3	M16	4	18	145	90	10	6
80	88·9	200	20	50	138	3	M16	8	18	160	105	10	8
100	114·3	220	20	52	158	3	M16	8	18	180	131	12	8
125	139·7	250	22	55	188	3	M16	8	18	210	156	12	8
150	168·3	285	22	55	212	3	M20	8	22	240	184	12	10
175	193·7	315	24	60	242	3	M20	8	22	270	210	12	10
200	219·1	340	24	62	268	3	M20	12	22	295	235	16	10
250	273	405	26	70	320	3	M24	12	26	355	292	16	12
300	323·9	460	28	78	378	4	M24	12	26	410	344	16	12
350	355·6	520	30	82	438	4	M24	16	26	470	390	16	12
400	406·4	580	32	85	490	4	M27	16	30	525	445	16	12
500	508	715	34	90	610	4	M30	20	33	650	548	16	12
600	609·6	840	36	95	725	5	M33	20	36	770	652	18	12
700	711·2	910	36	100	795	5	M33	24	36	840	755	18	12
800	812·8	1 025	38	105	900	5	M36	24	39	950	855	20	12
900	914·4	1 125	40	110	1 000	5	M36	28	39	1 050	955	20	12
1 000	1 016	1 255	42	120	1 115	5	M39	28	42	1 170	1 058	22	16
1 200	1 220	1 485	48	130	1 330	5	M45	32	48	1 390	1 262	30	16
1 400	1 420	1 685	52	145	1 530	5	M45	36	48	1 590	1 465	30	16
1 600	1 620	1 930	58	160	1 750	5	M52	40	56	1 820	1 668	35	16
1 800	1 820	2 130	62	170	1 950	5	M52	44	56	2 020	1 870	35	16
2 000	2 020	2 345	66	180	2 150	5	M56	48	62	2 250	2 072	40	16

TABLE 17 PLATE FLANGES FOR WELDING

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 1·6 N/mm².

All dimensions in millimetres.



*These dimensions are not to scale.

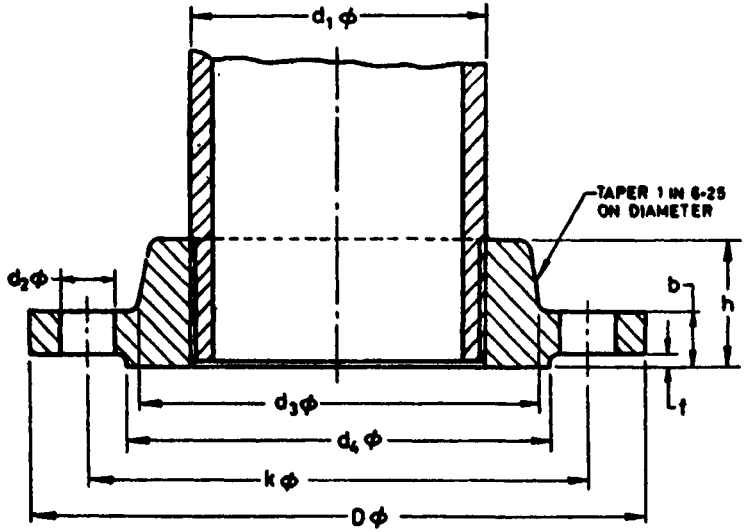
Nom Size	Pipe o. d. d_1	Flange		Raised Face		Bolting	Drilling		
		D	b	d_4	f		No.	d_2	k
10	17·2	90	14	40	2	M12	4	14	60
15	21·3	95	14	45	2	M12	4	14	65
20	26·9	105	16	58	2	M12	4	14	75
25	33·7	115	16	68	2	M12	4	14	85
32	42·4	140	16	78	2	M16	4	18	100
40	48·3	150	16	88	3	M16	4	18	110
50	60·3	165	18	102	3	M16	4	18	125
65	76·1	185	18	122	3	M16	4	18	145
80	88·9	200	20	138	3	M16	8	18	160
100	114·3	220	20	158	3	M16	8	18	180
125	139·7	250	22	188	3	M16	8	18	210
150	168·3	285	22	212	3	M20	8	22	240
175	193·7	315	24	242	3	M20	8	22	270
200	219·1	340	24	268	3	M20	12	22	295
250	273	405	26	320	3	M24	12	26	355
300	323·9	460	28	378	4	M24	12	26	410
350	355·6	520	32	438	4	M24	16	26	470
400	406·4	580	36	490	4	M27	16	30	525
500	508	715	44	610	4	M30	20	33	650
600	609·6	840	52	725	5	M33	20	36	770
700	711·2	910	58	795	5	M33	24	36	840
800	812·8	1 025	64	900	5	M36	24	39	950
900	914·4	1 125	72	1 000	5	M36	28	39	1 050
1 000	1 016	1 255	78	1 115	5	M39	28	42	1 170
1 200	1 220	1 485	94	1 330	5	M45	32	48	1 390

TABLE 18 SCREWED BOSS FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 1 and 1·6 N/mm².

All dimensions in millimetres.



Nom Size	Pipe o. d. d_1	Flange			Raised Face		Bolting	Drilling			Boss $/d_3$
	mm	D	b	h	d_4	f		No.	d_2	k	
6	10·2	75	12	18	32	2	M10	4	11	50	20
8	13·5	80	12	18	38	2	M10	4	11	55	25
10	17·2	90	14	20	40	2	M12	4	14	60	30
15	21·3	95	14	20	45	2	M12	4	14	65	35
20	26·9	105	16	24	58	2	M12	4	14	75	45
25	33·7	115	16	24	68	2	M12	4	14	85	52
32	42·4	140	16	26	78	2	M16	4	18	100	60
40	48·3	150	16	26	88	3	M16	4	18	110	70
50	60·3	165	18	28	102	3	M16	4	18	125	85
65	76·1	185	18	32	122	3	M16	4	18	145	105
80	88·9	200	20	34	138	3	M16	8	18	160	118
100	114·3	220	20	40	158	3	M16	8	18	180	140
125	139·7	250	22	44	188	3	M16	8	18	210	168
150	165·1	285	22	44	212	3	M20	8	22	240	195

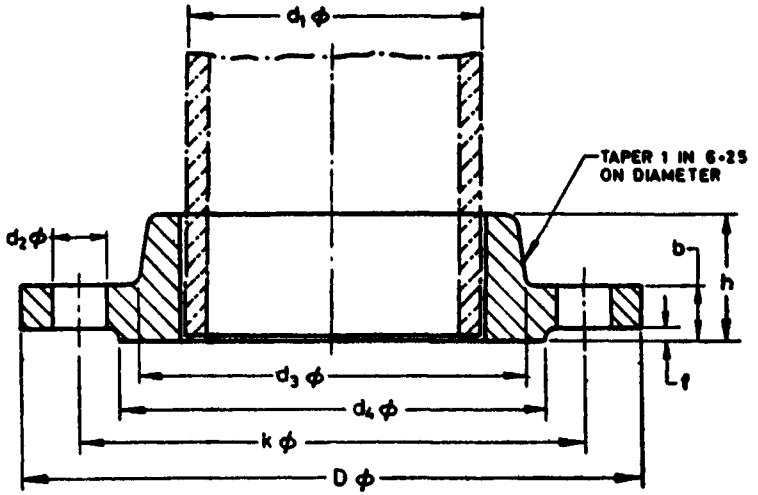
TABLE 19 SLIP-ON BOSS FLANGES FOR WELDING

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 1·6 N/mm².

All dimensions in millimetres.

NOTE — Use this table also for nominal sizes 6 to 65 mm for 1·0 N/mm² nominal pressure.



NOM SIZE	PIPE o. d. d_1 ≈	FLANGE			RAISED FACE		BOLTING	DRILLING			BOSS d_3
		D	b	h	d_4	f		No.	d_2	k	
6	10·2	75	12	18	32	2	M10	4	11	50	20
8	13·5	80	12	18	38	2	M10	4	11	55	25
10	17·2	90	14	20	40	2	M12	4	14	60	30
10	21·3	95	14	20	45	2	M12	4	14	65	35
20	26·9	105	16	24	58	2	M12	4	14	75	45
25	33·7	115	16	24	68	2	M12	4	14	85	52
32	42·4	140	16	26	78	2	M16	4	18	100	60
40	48·3	150	16	26	88	3	M16	4	18	110	70
50	60·3	165	18	28	102	3	M16	4	18	125	85
65	76·1	185	18	32	122	3	M16	4	18	145	105
80	88·9	200	20	34	138	3	M16	8	18	160	118
100	114·3	220	20	40	158	3	M16	8	18	180	140
125	139·7	250	22	44	188	3	M16	8	18	210	168
150	168·3	285	22	44	212	3	M20	8	22	240	195
200	219·1	340	24	44	268	3	M20	8	22	295	247
250	273	405	26	46	320	3	M24	12	26	355	300
300	323·9	460	28	46	378	4	M24	12	26	410	355

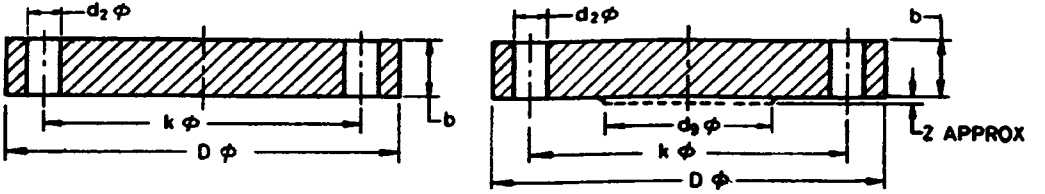
TABLE 20 PLATE BLANK FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 1·6 N/mm².

All dimensions in millimetres.

NOTE — The two types of flanges shown are alternatives at the option of the manufacturer.



NOM SIZE	FLANGE		SPIGOT d_9	BOLTING	DRILLING		
	D	b			No.	d_2	
10	90	14	—	M12	4	14	60
15	95	14	—	M12	4	14	65
20	105	16	—	M12	4	14	75
25	115	16	—	M12	4	14	85
32	140	16	—	M16	4	18	100
40	150	16	—	M16	4	18	110
50	165	18	—	M16	4	18	125
65	185	18	55	M16	4	18	145
80	200	20	70	M16	8	18	160
100	220	20	90	M16	8	18	180
125	250	22	115	M16	8	18	210
150	285	22	140	M20	8	22	240
175	315	24	165	M20	8	22	270
200	340	24	190	M20	12	22	295
250	405	26	237	M24	12	26	355
300	460	28	285	M24	12	26	410
350	520	30	332	M24	16	26	470
400	580	32	380	M27	16	30	525
500	715	36	475	M30	20	33	650

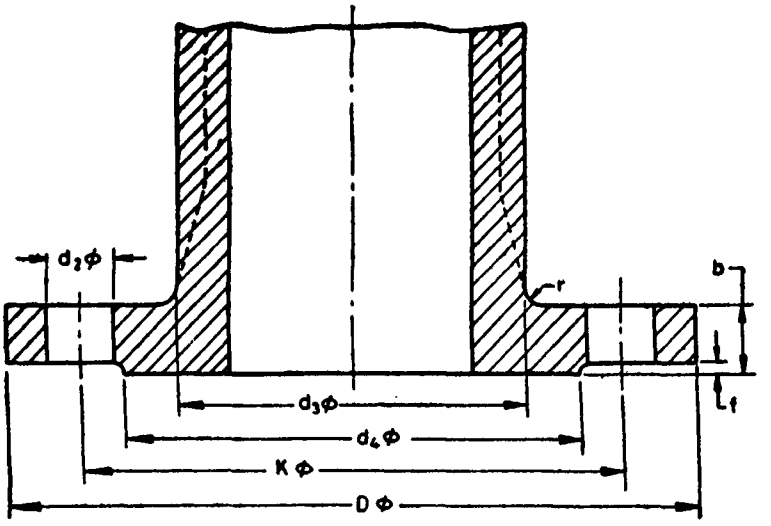
TABLE 21 INTEGRAL FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 2·5 N/mm².

All dimensions in millimetres.

NOTE — For nominal sizes 10 to 150 mm, use Table 26.



NOM SIZE	FLANGE		RAISED FACE		BOLTING	DRILLING			NECK	
	D	*b*	d_4	*f*		No.	d_2	*k*	d_3	*r*
175	330	28	248	3	M24	12	26	280	217	8
200	360	30	278	3	M24	12	26	310	246	8
250	425	32	335	3	M27	12	30	370	298	10
300	485	34	395	4	M27	16	30	430	352	10
350	555	38	450	4	M30	16	33	490	408	10
400	620	40	505	4	M33	16	36	550	460	10
500	730	44	615	4	M33	20	36	660	566	12
600	845	46	720	5	M36	20	39	770	670	12
700	960	50	820	5	M39	24	42	875	776	12
800	1 085	54	930	5	M45	24	48	990	882	15
900	1 185	58	1 030	5	M45	28	48	1 090	988	15
1 000	1 320	62	1 140	5	M52	28	56	1 210	1 094	18
1 200	1 550	70	1 350	5	M52	32	56	1 420	1 306	18
1 400	1 755	76	1 560	5	M56	36	62	1 640	1 514	18
1 600	1 975	84	1 780	5	M56	40	62	1 860	1 726	20
1 800	2 195	90	1 985	5	M64	44	70	2 070	1 936	20
2 000	2 425	96	2 210	5	M64	48	70	2 300	2 144	20

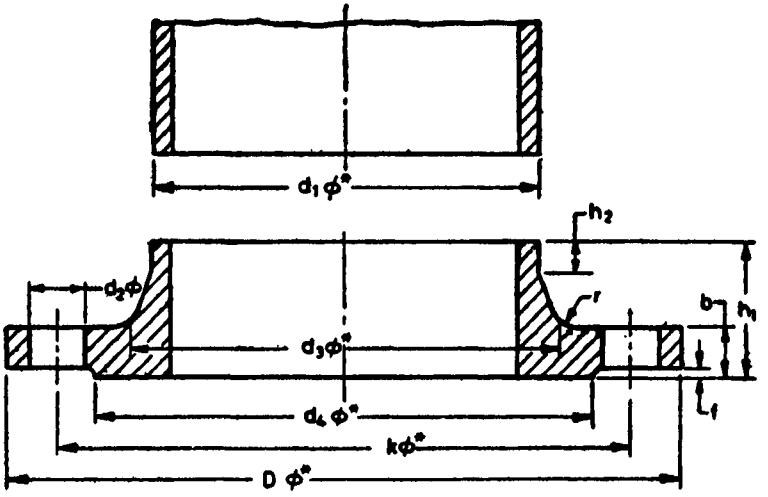
TABLE 22 WELDING NECK FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 2·5 N/mm².

All dimensions in millimetres.

NOTE — For nominal sizes 10 to 150 mm, use Table 27.



*These dimensions are not to scale.

NOM SIZE	PIPE o. d. d_1	FLANGE			RAISED FACE		BOLTING	DRILLING			NECK		
		D	b	h_1	d_4	f		No.	d_2	k	d_3	h_2 ≈	r
175	193·7	330	28	75	248	3	M24	12	26	280	218	15	10
200	219·1	360	30	80	278	3	M24	12	26	310	244	16	10
250	273	425	32	88	335	3	M27	12	30	370	298	18	12
300	323·9	485	34	92	395	4	M27	16	30	430	352	18	12
350	355·6	555	38	100	450	4	M30	16	33	490	398	20	12
400	406·4	620	40	110	505	4	M33	16	36	550	452	20	12
500	508	730	44	125	615	4	M33	20	36	660	558	20	12
600	609·6	845	46	125	720	5	M36	20	38	770	660	20	12
700	711·2	960	46	125	820	5	M39	24	42	875	760	20	12
800	812·8	1 085	50	135	930	5	M45	24	48	990	865	22	12
900	914·4	1 185	54	145	1 030	5	M45	28	48	1 090	968	24	12
1 000	1016	1 320	58	155	1 140	5	M52	28	56	1 210	1 070	24	16

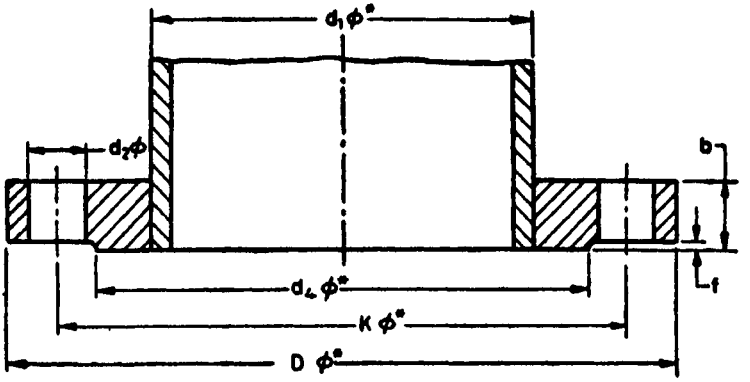
TABLE 23 PLATE FLANGES FOR WELDING

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 2·5 N/mm².

All dimensions in millimetres.

NOTE — For nominal sizes 10 to 150 mm, use Table 28.



*These dimensions are not to scale.

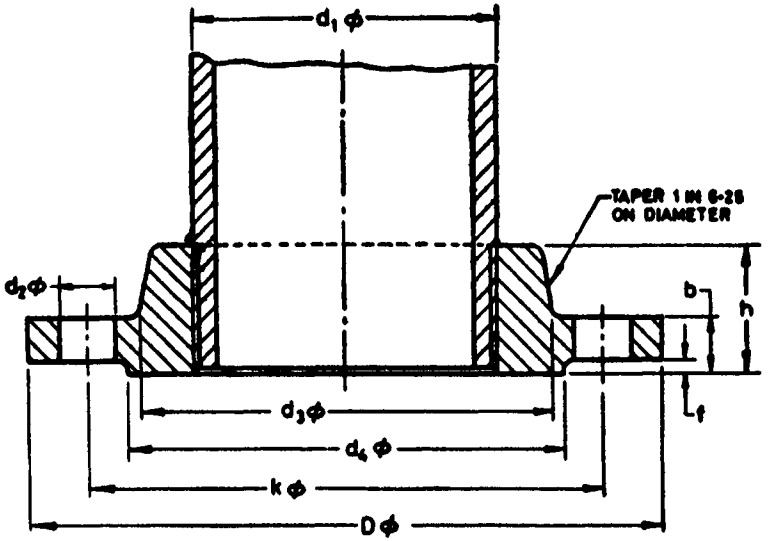
NOM SIZE	PIPE o. d. d_1	FLANGE		RAISED FACE		BOLTING	DRILLING		
		D	b	d_4	f		No.	d_2	k
175	193·7	330	26	248	3	M24	12	26	280
200	219·1	360	28	278	3	M24	12	26	310
250	273	425	32	335	3	M27	12	30	370
300	323·9	485	38	395	4	M27	16	30	430
350	355·6	555	42	450	4	M30	16	33	490
400	406·4	620	46	505	4	M33	16	36	550
500	508	730	58	615	4	M33	20	36	660
600	609·6	845	66	720	5	M36	20	39	770

TABLE 24 SLIP-ON BOSS FLANGES FOR WELDING

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 2·5 N/mm².

All dimensions in millimetres.



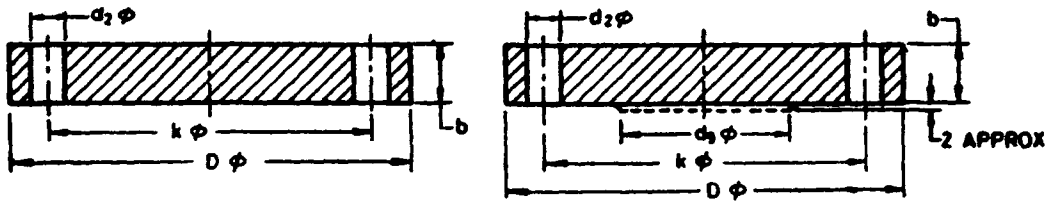
Nom Size	Pipe o. d. d_1	Flange			Raised Face		Bolting	Drilling			Boss d_3
		D	b	h	d_4	f		No.	d_2	k	
	mm										
6	10·2	75	14	20	32	2	M10	4	11	50	20
8	13·5	80	14	20	38	2	M10	4	11	55	25
10	17·2	90	16	22	40	2	M12	4	14	60	30
15	21·3	95	16	22	45	2	M12	4	14	65	35
20	26·9	105	18	26	58	2	M12	4	14	75	45
25	33·7	115	18	28	68	2	M12	4	14	85	52
32	42·4	140	18	30	78	2	M16	4	18	100	60
40	48·3	150	18	32	88	3	M16	4	18	110	70
50	60·3	165	20	34	102	3	M16	4	18	125	85
65	76·1	185	22	38	122	3	M16	8	18	145	105
80	88·9	200	24	40	138	3	M16	8	18	160	118
100	114·3	235	24	44	162	3	M20	8	22	190	145
125	139·7	270	26	48	188	3	M24	8	26	220	170
150	168·3	300	28	52	218	3	M24	8	26	250	200
200	219·1	360	32	52	278	3	M24	12	26	310	256
250	273	425	40	60	335	3	M27	12	30	370	310
300	323·9	485	48	67	395	4	M27	16	30	430	364

TABLE 25 PLATE BLANK FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 2·5 N/mm².
All dimensions in millimetres.

NOTE 1 — The two types of flanges shown are alternatives at the option of the manufacturer.
NOTE 2 — For nominal sizes 10 to 150 mm, use Table 31.



NOM SIZE	FLANGE		SPIGOT d_3	BOLTING	DRILLING		
	D	b			No.	d_2	k
175	330	28	165	M24	12	26	280
200	360	30	190	M24	12	26	310
250	425	32	237	M27	12	30	370
300	485	34	285	M27	16	30	430
350	555	38	332	M30	16	33	490
400	620	40	380	M33	16	36	550
500	730	45	475	M33	20	36	660

TABLE 26 INTEGRAL FLANGES

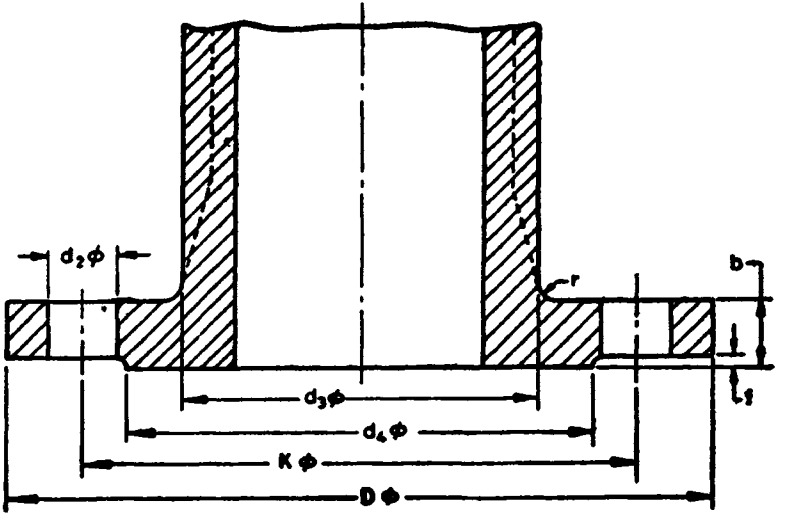
(*Clauses* 4.1 *and* 5.1)

Nominal pressure 4·0 N/mm².

All dimensions in millimetres.

NOTE — This table shall also be used in case of following sizes and pressures :

Nominal Size mm	*Pressure Size* N/mm²
10 to 50	1·6
10 ,, 150	2·5
80 ,, 150	2·5



Nom Size	Flange		Raised Face		Bolting	Drilling			Neck	
	D	b	d_4	f		No.	d_2	k	d_3	r
10	90	16	40	2	M12	4	14	60	30	4
15	95	16	45	2	M12	4	14	65	37	4
20	105	18	58	2	M12	4	14	75	44	5
25	115	18	68	2	M12	4	14	85	53	5
32	140	18	78	2	M16	4	18	100	60	5
40	150	18	88	3	M16	4	18	110	68	5
50	165	20	102	3	M16	4	18	125	80	5
65	185	22	122	3	M16	8	18	145	99	6
80	200	24	138	3	M16	8	18	160	116	6
100	235	24	162	3	M20	8	22	190	136	6
125	270	26	188	3	M24	8	26	220	165	8
150	300	28	218	3	M24	8	26	250	192	8
175	350	32	260	3	M27	12	30	295	223	10
200	375	34	285	3	M27	12	30	320	252	10
250	450	38	345	3	M30	12	33	385	308	10
300	515	42	410	4	M30	16	33	450	364	12
350	580	46	465	4	M33	16	36	510	420	12
400	660	50	535	4	M36	16	39	585	476	12
500	755	52	615	4	M39	20	42	670	578	15
600	890	60	735	5	M45	20	48	795	690	15
700	995	64	840	5	M45	24	48	900	796	18
800	1 140	72	960	5	M52	24	56	1 030	908	18
900	1 250	76	1 070	5	M52	28	56	1 140	1 014	18
1 000	1 360	80	1 180	5	M52	28	56	1 250	1 120	20
1 200	1 575	88	1 380	5	M56	32	62	1 460	1 332	20
1 400	1 795	98	1 600	5	M56	36	62	1 680	1 548	20
1 600	2 025	108	1 815	5	M64	40	70	1 900	1 762	20

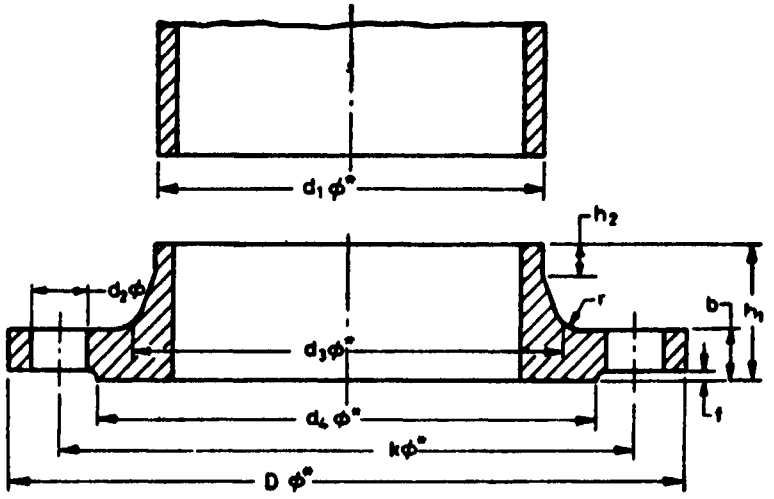
TABLE 27 WELDING NECK FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 4·0 N/mm².

All dimensions in millimetres.

NOTE — Also for nominal sizes 10 to 150 mm and 2·5 N/mm² nominal pressure, use this table.



*These dimensions are not to scale.

Nom Size	Pipe o.d. d_1	Flange			Raised Face		Bolting	Drilling			Neck		
		D	b	h_1	d_4	f		No.	d_2	k	d_3	h_2 mm	r
10	17·2	90	16	35	40	2	M12	4	14	60	28	6	4
15	21·3	95	16	38	45	2	M12	4	14	65	32	6	4
20	26·9	105	18	40	58	2	M12	4	14	75	40	6	4
25	33·7	115	18	40	68	2	M12	4	14	85	46	6	4
32	42·4	140	18	42	78	2	M16	4	18	100	56	6	6
40	48·3	150	18	45	88	3	M16	4	18	110	64	7	6
50	60·3	165	20	48	102	3	M16	4	18	125	75	8	6
65	76·1	185	22	52	122	3	M16	8	18	145	90	10	6
80	88·9	200	24	58	138	3	M16	8	18	160	105	12	8
100	114·3	235	24	65	162	3	M20	8	22	190	134	12	8
125	139·7	270	26	68	188	3	M24	8	26	220	162	12	8
150	168·3	300	28	75	218	3	M24	8	26	250	192	12	10
175	193·7	350	32	82	260	3	M27	12	30	295	218	15	10
200	219·1	375	34	88	285	3	M27	12	30	320	244	16	10
250	273	450	38	105	345	3	M30	12	33	385	306	18	12
300	323·9	515	42	115	410	4	M30	16	33	450	362	18	12
350	355·6	580	46	125	465	4	M33	16	36	510	408	20	12
400	406·4	660	50	135	535	4	M36	16	39	585	462	20	12
500	508	755	52	140	615	4	M39	20	42	670	562	20	12

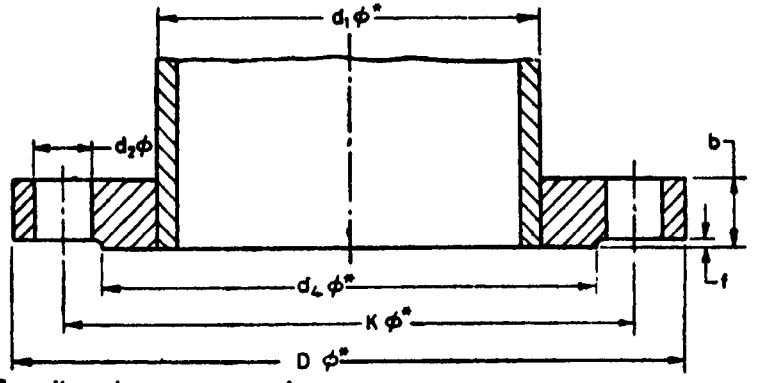
TABLE 28 PLATE FLANGES FOR WELDING

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 4·0 N/mm².

All dimensions in millimetres.

NOTE — Also for nominal sizes 10 to 150 mm and 2·5 N/mm² pressure, use this table.



*These dimensions are not to scale.

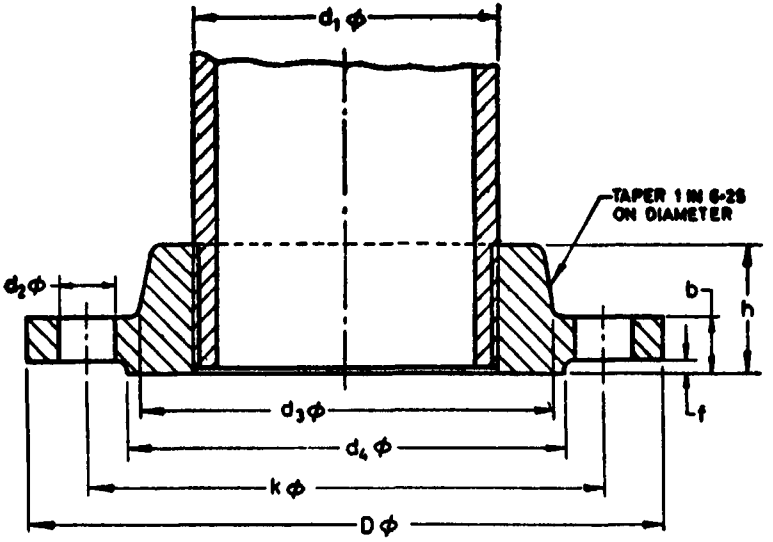
Nom Size	Pipe o. d. d_1	Flange		Raised Face		Bolting	Drilling		
		D	b	d_4	f		No.	d_2	k
10	17·2	90	16	40	2	M12	4	14	60
15	21·3	95	16	45	2	M12	4	14	65
20	26·9	105	18	58	2	M12	4	14	75
25	33·7	115	18	68	2	M12	4	14	85
32	42·4	140	18	78	2	M16	4	18	100
40	48·3	150	20	88	3	M16	4	18	110
50	60·3	165	20	102	3	M16	4	18	125
65	76·1	185	22	122	3	M16	8	18	145
80	88·9	200	24	138	3	M16	8	18	160
100	114·3	235	26	162	3	M20	8	22	190
125	139·7	270	28	188	3	M24	8	26	220
150	168·3	300	30	218	3	M24	8	26	250
175	193·7	350	32	260	3	M27	12	30	295
200	219·1	375	34	285	3	M27	12	30	320
250	273	450	42	345	3	M30	12	33	385
300	323·9	515	50	410	4	M30	16	33	450
350	355·6	580	56	465	4	M33	16	36	510
400	406·4	660	64	535	4	M36	16	39	585
500	508	755	72	615	4	M39	20	42	670

TABLE 29 SCREWED BOSS FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 2·5 and 4·0 N/mm².

All dimensions in millimetres.



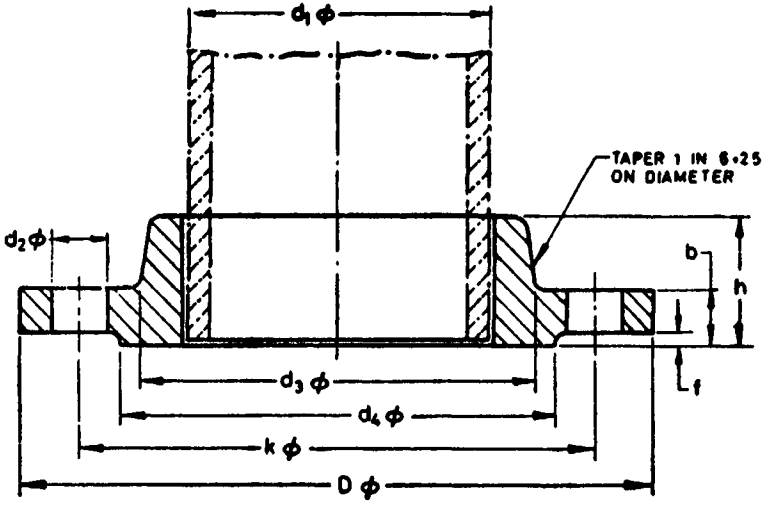
Nom Size	Pipe o. d. d_1 ≈	Flange			Raised Face		Bolting	Drilling			Boss d_3
		D	b	h	d_4	f		No.	d_2	k	
6	10·2	75	14	20	32	2	M10	4	11	50	20
8	13·5	80	14	20	38	2	M10	4	11	55	25
10	17·2	90	16	22	40	2	M12	4	14	60	30
15	21·3	95	16	22	45	2	M12	4	14	65	35
20	26·9	105	18	26	58	2	M12	4	14	75	45
25	33·7	115	18	28	68	2	M12	4	14	85	52
32	42·4	140	18	30	78	2	M16	4	18	100	60
40	48·3	150	18	32	88	3	M16	4	18	110	70
50	60·3	165	20	34	102	3	M16	4	18	125	85
65	76·1	185	22	38	122	3	M16	8	18	145	105
80	88·9	200	24	40	138	3	M16	8	18	160	118
100	114·3	235	24	44	162	3	M20	8	22	190	145
125	139·7	270	26	48	188	3	M24	8	26	220	170
150	165·1	300	28	52	218	3	M24	8	26	250	200

TABLE 30 SLIP-ON BOSS FLANGES FOR WELDING

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 4·0 N/mm².

All dimensions in millimetres.



Nom Size	Pipe o. d. d_1 ≈	Flange			Raised Face		Bolting	Drilling			Boss d_3
		D	b	h	d_4	f		No.	d_2	k	
6	10·2	75	14	20	32	2	M10	4	11	50	20
8	13·5	80	14	20	38	2	M10	4	11	55	25
10	17·2	90	16	22	40	2	M12	4	14	60	30
15	21·3	95	16	22	45	2	M12	4	14	65	35
20	26·9	105	18	26	58	2	M12	4	14	75	45
25	33·7	115	18	28	68	2	M12	4	14	85	52
32	42·4	140	18	30	78	2	M16	4	18	100	60
40	48·3	150	18	32	88	3	M16	4	18	110	70
50	60·3	165	20	34	102	3	M16	4	18	125	85
65	76·1	185	22	38	122	3	M16	8	18	145	105
80	88·9	200	24	40	138	3	M16	8	18	160	118
100	114·3	235	24	44	162	3	M20	8	22	190	145
125	139·7	270	26	48	188	3	M24	8	26	220	170
150	168·3	300	28	52	218	3	M24	8	26	250	200
200	219·1	375	32	52	285	3	M27	12	30	320	260
250	273	450	40	60	345	3	M30	12	33	385	320
300	323·9	515	48	67	410	4	M30	16	33	450	380

TABLE 31 PLATE BLANK FLANGES

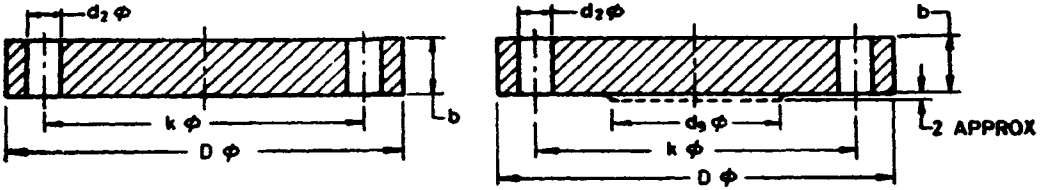
(Clauses 4.1 and 5.1)

Nominal pressure 4·0 N/mm².

All dimensions in millimetres.

NOTE 1 — The two types of flanges shown are alternatives at the option of the manufacturer.

NOTE 2 — Also for nominal sizes 10 to 150 mm and 2·5 N/mm² nominal pressure, use this table.



FORM A FORM B

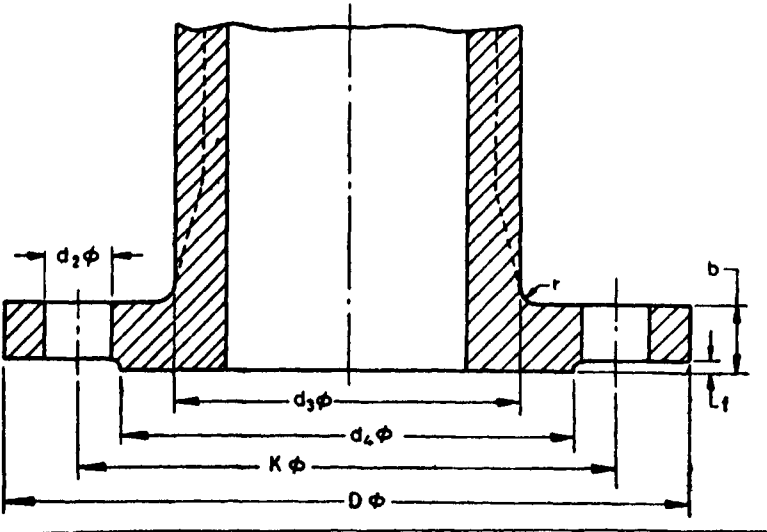
NOM SIZE	FLANGE		SPIGOT	BOLTING	DRILLING		
	D	b	d_3		No.	d_2	k
10	90	16	—	M12	4	14	60
15	95	16	—	M12	4	14	65
20	105	18	—	M12	4	14	75
25	115	18	—	M12	4	14	85
32	140	18	—	M16	4	18	100
40	150	18	—	M16	4	18	110
50	165	20	—	M16	4	18	125
65	185	22	55	M16	8	18	145
80	200	24	70	M16	8	18	160
100	235	24	90	M20	8	22	190
125	270	26	115	M24	8	26	220
150	300	28	140	M24	8	26	250
175	350	32	165	M27	12	30	295
200	375	34	190	M27	12	30	320
250	450	38	237	M30	12	33	385
300	515	42	285	M30	16	33	450
350	580	46	332	M33	16	36	510
400	660	50	380	M36	16	39	585
500	755	56	475	M39	20	42	670

TABLE 32 INTEGRAL FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 6·4 N/mm².
All dimensions in millimetres.

NOTE — For nominal sizes 10 to 40 mm, use Table 40.



NOM SIZE	FLANGE		RAISED FACE		BOLTING	DRILLING			NECK	
	D	b	d_4	f		No.	d_2	k	d_3	r
50	180	26	102	3	M20	4	22	135	90	5
65	205	26	122	3	M20	8	22	160	105	5
80	215	28	138	3	M20	8	22	170	122	5
100	250	30	162	3	M24	8	26	200	146	5
125	295	34	188	3	M27	8	30	240	177	6
150	345	36	218	3	M30	8	33	280	204	6
175	375	40	260	3	M30	12	33	310	235	8
200	415	42	285	3	M33	12	36	345	264	8
250	470	46	345	3	M33	12	36	400	320	8
300	530	52	410	4	M33	16	36	460	378	10
350	600	56	465	4	M36	16	39	525	434	10
400	670	60	535	4	M39	16	42	585	490	12
500	800	68	615	4	M45	20	48	705	602	12
600	930	76	735	4	M52	20	56	820	714	15
700	1 045	84	840	4	M52	24	56	935	826	15
800	1 165	92	960	4	M56	24	62	1 050	938	18
900	1 285	98	1 070	4	M56	28	62	1 170	1 048	18
1 000	1 415	108	1 180	4	M64	28	70	1 290	1 162	18
1 200	1 665	126	1 380	4	M72	32	78	1 530	1 390	18

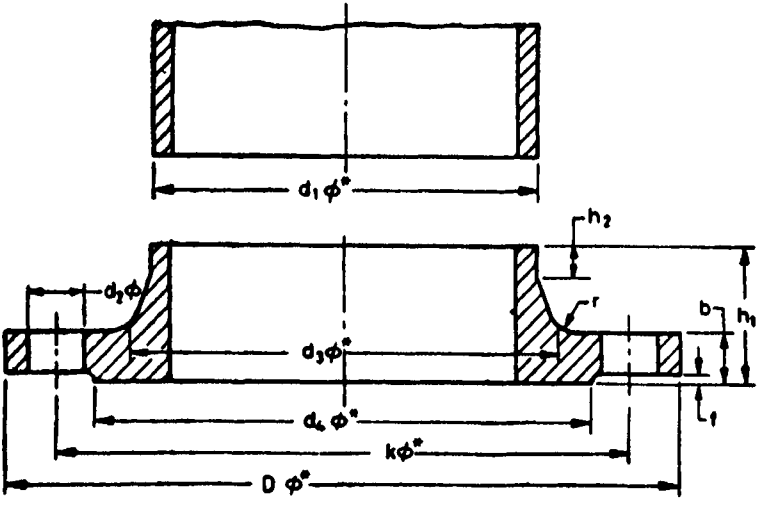
TABLE 33 WELDING NECK FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 6·4 N/mm².

All dimensions in millimetres.

NOTE — For nominal sizes 10 to 40 mm, use Table 37.



*These dimensions are not to scale.

NOM SIZE	PIPE o. d. d_1	FLANGE			RAISED FACE		BOLTING	DRILLING			NECK		
		D	b	h_1	d_4	f		No.	d_2	k	d_3	h_2 ≈	r
50	60·3	180	26	62	102	3	M20	4	22	135	82	10	6
65	76·1	205	26	68	122	3	M20	8	22	160	98	12	6
80	88·9	215	28	72	138	3	M20	8	22	170	112	12	8
100	114·3	250	30	78	162	3	M24	8	26	200	138	12	8
125	139·7	295	34	88	188	3	M27	8	30	240	168	12	8
150	168·3	345	36	95	218	3	M30	8	33	280	202	12	10
175	193·7	375	40	105	260	3	M30	12	33	310	228	16	10
200	219·1	415	42	110	285	3	M33	12	36	345	256	16	10
250	273	470	46	125	345	3	M33	12	36	400	316	18	12
300	323·9	530	52	140	410	4	M33	16	36	460	372	18	12
350	355·6	600	56	150	465	4	M36	16	39	525	420	20	12
400	406·4	670	60	160	535	4	M39	16	42	585	475	20	12

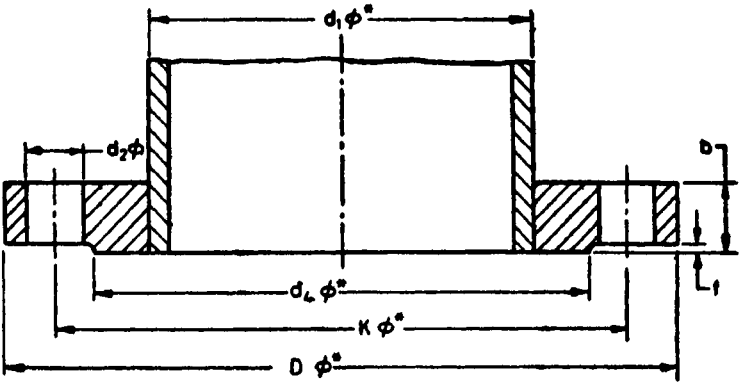
TABLE 34 PLATE FLANGES FOR WELDING

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 6·4 N/mm².

All dimensions in millimetres.

NOTE — For nominal sizes 10 to 40 mm, use Table 38.



*These dimensions are not to scale.

NOM SIZE	PIPE o. d. d_1	FLANGE		RAISED FACE		BOLTING	DRILLING		
		D	b	d_4	f		No.	d_2	k
50	60·3	180	26	102	3	M20	4	22	135
65	76·1	205	26	122	3	M20	8	22	160
80	88·9	215	30	138	3	M20	8	22	170
100	114·3	250	32	162	3	M24	8	26	200
125	139·7	295	34	188	3	M27	8	30	240
150	168·3	345	36	218	3	M30	8	33	280
175	193·7	375	40	260	3	M30	12	33	310
200	219·1	415	46	285	3	M33	12	36	345
250	273	470	54	345	3	M33	12	36	400
300	323·9	530	62	410	4	M33	16	36	460
350	355·8	600	72	465	4	M36	16	39	525
400	406·4	670	78	535	4	M39	16	42	585

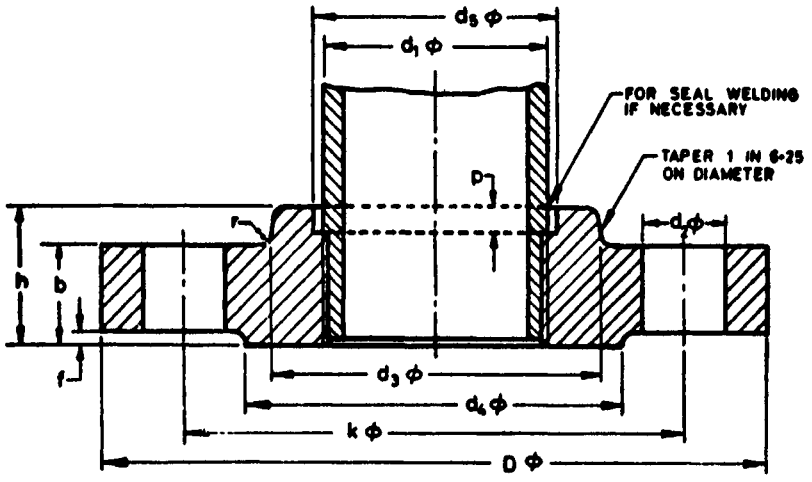
TABLE 35 SCREWED BOSS FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 6·4 N/mm².

All dimensions in millimetres.

NOTE — For nominal sizes 10 to 40 mm, use Table 39.



NOM SIZE	PIPE o. d. d_1 ≈	FLANGE			RAISED FACE		BOLTING	DRILLING			BOSS		
		D	b	h	d_4	f		No.	d_2	k	d_3	p	r
50	60·3	180	26	36	102	3	M20	4	22	135	90	7	3
65	76·1	205	26	40	122	3	M20	8	22	160	112	7	3
80	88·9	215	28	44	138	3	M20	8	22	170	125	7	3
100	114·3	250	30	52	162	3	M24	8	26	200	152	7	3
125	139·7	295	34	56	188	3	M27	8	30	240	185	7	3
150	165·1	345	36	60	218	3	M30	8	33	280	215	7	3

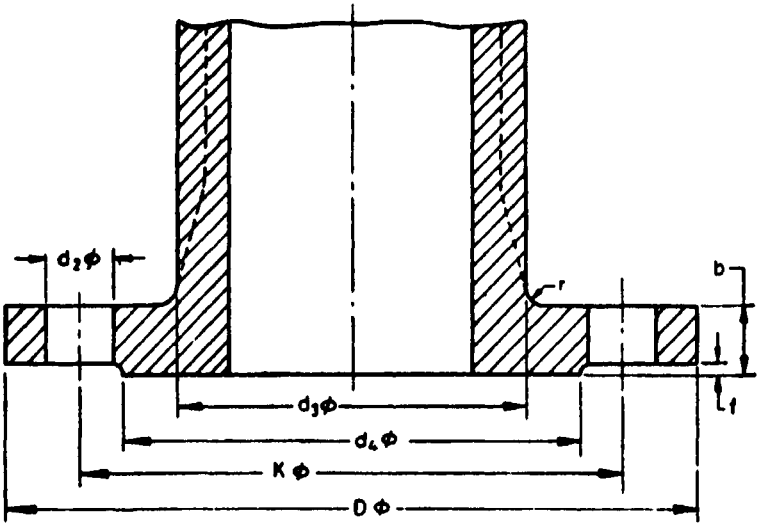
TABLE 36 INTEGRAL FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 10 N/mm^2.

All dimensions in millimetres.

NOTE — For nominal sizes 10 to 100 mm, use Table 40.



NOM SIZE	FLANGE		RAISED FACE		BOLTING	DRILLING			NECK	
	D	*b*	d_4	*f*		No.	d_2	*k*	d_3	*r*
125	315	40	188	3	M30	8	33	250	185	6
150	355	44	218	3	M30	12	33	290	216	6
175	385	48	260	3	M30	12	33	320	247	8
200	430	52	285	3	M33	12	36	360	278	8
250	505	60	345	3	M36	12	39	430	340	8
300	585	68	410	4	M39	16	42	500	402	10
350	655	74	465	4	M45	16	48	560	460	10
400	715	78	535	4	M45	16	48	620	518	12
500	870	94	615	4	M52	20	56	760	630	15
600	990	104	735	4	M56	20	62	875	740	15
700	1 145	120	840	4	M64	24	70	1 020	860	18

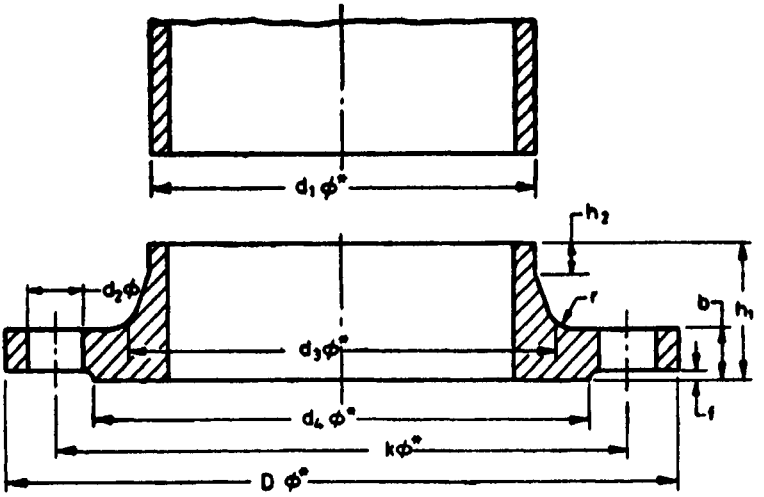
TABLE 37 WELDING NECK FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 10 N/mm².

All dimensions in millimetres.

NOTE — Also for nominal sizes 10 to 40 mm and 6·4 N/mm² nominal pressure, use this table.



*These dimensions are not to scale.

NOM SIZE	PIPE o.d. d_1	FLANGE			RAISED FACE		BOLTING	DRILLING			NECK		
		D	b	h_1	d_4	f		No.	d_2	k	d_3	h_2 min	r
10	17·2	100	20	45	40	2	M12	4	14	70	32	6	4
15	21·3	105	20	45	45	2	M12	4	14	75	34	6	4
20	26·9	130	22	58	58	2	M16	4	18	90	42	8	4
25	33·7	140	24	58	68	2	M16	4	18	100	52	8	4
32	42·4	155	24	60	78	2	M20	4	22	110	62	8	6
40	48·3	170	26	62	88	3	M20	4	22	125	70	10	6
50	60·3	195	28	68	102	3	M24	4	26	145	90	10	6
65	76·1	220	30	76	122	3	M24	8	26	170	108	12	6
80	88·9	230	32	78	138	3	M24	8	26	180	120	12	8
100	114·3	265	36	90	162	3	M27	8	30	210	150	12	8
125	139·7	315	40	105	188	3	M30	8	33	250	180	12	8
150	168·3	355	44	115	218	3	M30	12	33	290	210	12	10
175	193·7	385	48	127	260	3	M30	12	33	320	245	16	10
200	219·1	430	52	130	285	3	M33	12	36	360	278	16	10
250	273	505	60	157	345	3	M36	12	39	430	340	18	12
300	323·9	585	68	170	410	4	M39	16	42	500	400	18	12
350	355·6	655	74	189	465	4	M45	16	48	560	460	20	12

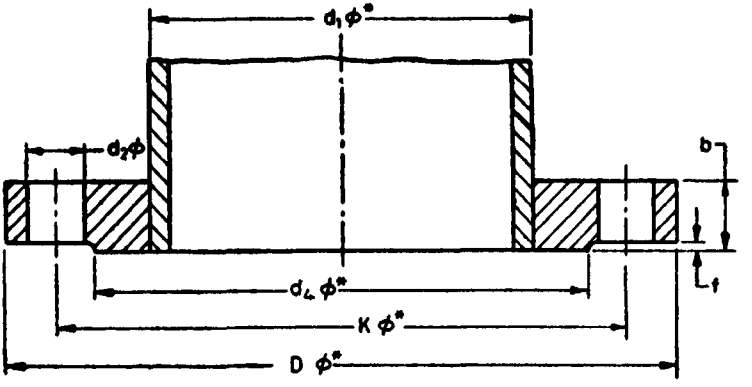
TABLE 38 PLATE FLANGES FOR WELDING

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 10 N/mm².

All dimensions in millimetres.

NOTE — Also for nominal sizes 10 to 40 mm and 6·4 N/mm² nominal pressure, use this table.



*These dimensions are not to scale.

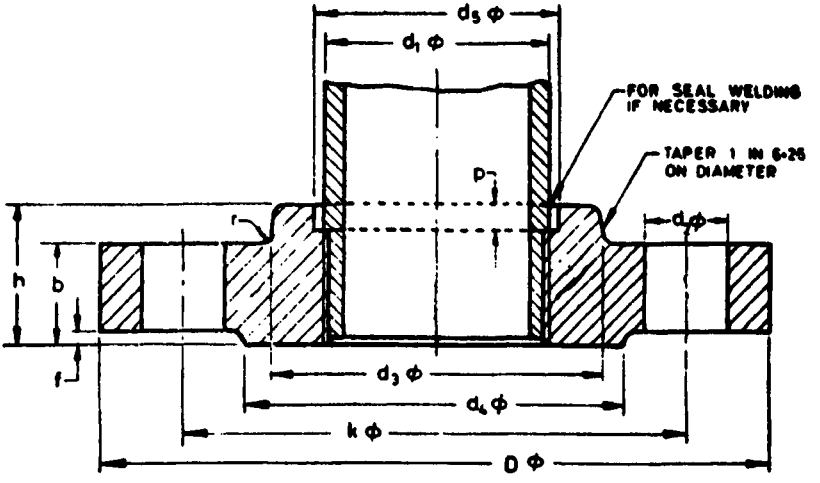
Nom Size	Pipe o. d. d_1	Flange		Raised Face		Bolting	Drilling		
		D	b	d_4	f		No	d_2	k
10	17·2	100	20	40	2	M12	4	14	70
15	21·3	105	20	45	2	M12	4	14	75
20	26·9	130	22	58	2	M16	4	18	90
25	33·7	140	24	68	2	M16	4	18	100
32	42·4	155	24	78	2	M20	4	22	110
40	48·3	170	26	88	3	M20	4	22	125
50	60·3	195	28	102	3	M24	4	26	145
65	76·1	220	30	122	3	M24	8	26	170
80	88·9	230	34	138	3	M24	8	26	180
100	114·3	265	36	162	3	M27	8	30	210
125	139·7	315	42	188	3	M30	8	33	250
150	168·3	355	48	218	3	M30	12	33	290
175	193·7	385	54	260	3	M30	12	33	320
200	219·1	430	60	285	3	M33	12	36	360
250	273	505	72	345	3	M36	12	39	430
300	323·9	585	84	410	4	M39	16	42	500
350	355·6	655	95	465	4	M45	16	48	560
400	406·4	715	106	535	4	M45	16	48	620
500	508	870	128	615	4	M52	20	56	760

TABLE 39 SCREWED BOSS FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 10 N/mm².

All dimensions in millimetres.



Nom Size	Pipe o. d. d_1 ≈	Flange			Raised Face		Bolting	Drilling			Boss		
		D	b	h	d_4	f		No.	d_2	k	d_3	p	r
10	17·2	100	20	28	40	2	M12	4	14	70	40	4	2
15	21·3	105	20	28	45	2	M12	4	14	75	43	6	2
20	26·9	130	22	30	58	2	M16	4	18	90	52	7	2
25	33·7	140	24	32	68	2	M16	4	18	100	60	7	3
32	42·4	155	24	32	78	2	M20	4	22	110	68	7	3
40	48·3	170	26	34	88	3	M20	4	22	125	80	7	3
50	60·3	195	28	36	102	3	M24	4	26	145	95	7	3
65	76·1	220	30	40	122	3	M24	8	26	170	118	7	3
80	88·9	230	32	44	138	3	M24	8	26	180	130	7	3
100	114·3	265	36	52	162	3	M27	8	30	210	158	7	3
125	139·7	315	40	56	188	3	M30	8	33	250	188	7	3
150	165·1	355	44	60	218	3	M30	12	33	290	225	7	3

TABLE 40 INTEGRAL FLANGES

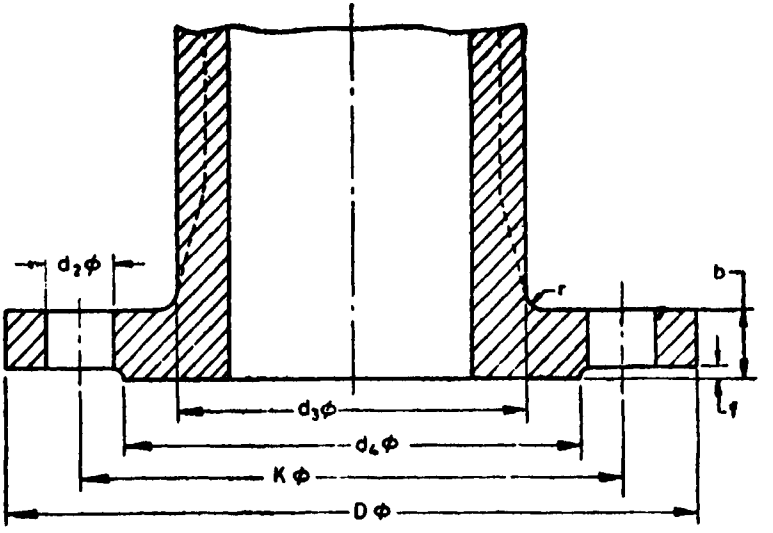
(*Clauses* 4.1 *and* 5.1)

Nominal pressure 16·0 N/mm².

All dimensions in millimetres.

NOTE — This table shall also be used in this case of following sizes and pressures:

Nominal Size mm	*Nominal Pressure* N/mm²
10 to 40	6·4 to 10·0
50 to 100	10·0



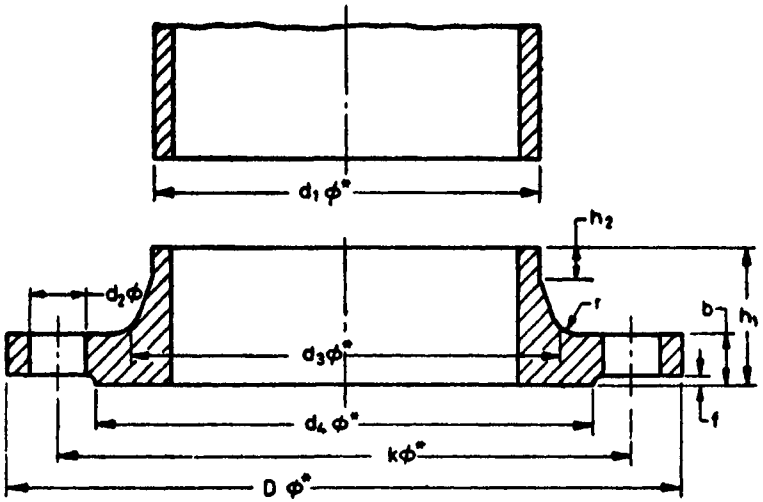
NOM SIZE	FLANGE		RAISED FACE		BOLTING	DRILLING			NECK	
	D	*b*	d_4	*f*		No.	d_2	*k*	d_3	*r*
10	100	20	40	2	M12	4	14	70	40	4
15	105	20	45	2	M12	4	14	75	45	4
20	130	22	58	2	M16	4	18	90	50	4
25	140	24	68	2	M16	4	18	100	61	4
32	155	26	78	2	M20	4	22	110	68	4
40	170	28	88	3	M20	4	22	125	82	4
50	195	30	102	3	M24	4	26	145	96	4
65	220	34	122	3	M24	8	26	170	118	5
80	230	36	138	3	M24	8	26	180	128	5
100	265	40	162	3	M27	8	30	210	150	5
125	315	44	188	3	M30	8	33	250	184	6
150	355	50	218	3	M30	12	33	290	224	6
175	390	54	260	3	M33	12	36	320	250	8
200	430	60	285	3	M33	12	36	360	288	8
250	515	68	345	3	M39	12	42	430	346	8
300	585	78	410	4	M39	16	42	500	414	10

TABLE 41 WELDING NECK FLANGES

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 16·0 N/mm².

All dimensions in millimetres.



*These dimensions are not to scale.

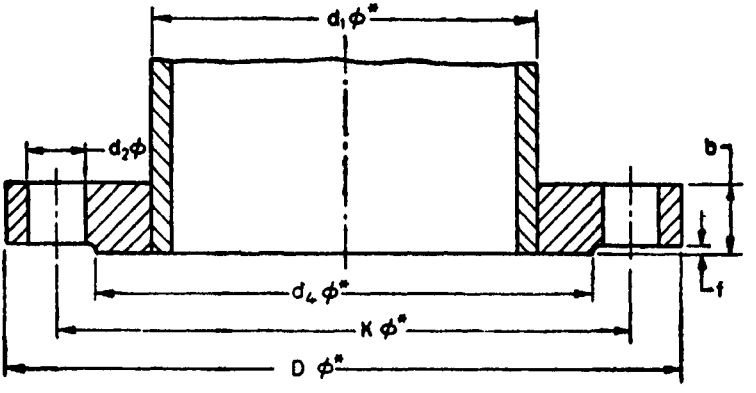
Nom Size	Pipe o. d. d_1	Flange			Raised Face		Bolting	Drilling			Neck		
		D	b	h_1	d_4	f		No.	d_2	k	d_3	h_2 ≈	r
10	17·2	100	20	45	40	2	M12	4	14	70	32	6	4
15	21·3	105	20	45	45	2	M12	4	14	75	34	6	4
20	26·9	130	22	58	58	2	M16	4	18	90	42	8	4
25	33·7	140	24	58	68	2	M16	4	18	100	52	8	4
32	42·4	155	26	60	78	2	M20	4	22	110	55	8	6
40	48·3	170	28	64	88	3	M20	4	22	125	70	10	6
50	60·3	195	30	75	102	3	M24	4	26	145	90	10	6
65	76·1	220	34	82	122	3	M24	8	26	170	108	12	6
80	88·9	230	36	86	138	3	M24	8	26	180	120	12	8
100	114·3	265	40	100	162	3	M27	8	30	210	150	12	8
125	139·7	315	44	115	188	3	M30	8	33	250	180	14	8
150	168·3	355	50	128	218	3	M30	12	33	290	210	14	10
175	193·7	390	54	138	260	3	M33	12	36	320	245	16	10
200	219·1	430	60	140	285	3	M33	12	36	360	278	16	10
250	273	515	68	155	345	3	M39	12	42	430	340	18	12
300	323·9	585	78	175	410	4	M39	16	42	500	400	18	12

TABLE 42 PLATE FLANGES FOR WELDING

(*Clauses* 4.1 *and* 5.1)

Nominal pressure 16·0 N/mm².

All dimensions in millimetres.



*These dimensions are not to scale.

Nom Size	Pipe o. d. d_1	Flange		Raised Face		Bolting	Drilling		
		D	b	d_4	f		No.	d_2	k
10	17·2	100	22	40	2	M12	4	14	70
15	21·3	105	24	45	2	M12	4	14	75
20	26·9	130	26	58	2	M16	4	18	90
25	33·7	140	26	68	2	M16	4	18	100
32	42·4	155	28	78	2	M20	4	22	110
40	48·3	170	30	88	3	M20	4	22	125
50	60·3	195	34	102	3	M24	4	26	145
65	76·1	220	36	122	3	M24	8	26	170
80	88·9	230	40	138	3	M24	8	26	180
100	114·3	265	44	162	3	M27	8	30	210
125	139·7	315	54	188	3	M30	8	33	250
150	168·3	355	62	218	3	M30	12	33	290
175	193·7	390	68	260	3	M33	12	36	320
200	219·1	430	76	285	3	M33	12	36	360
250	273	515	90	345	3	M39	12	42	430
300	323·9	585	106	410	4	M39	16	42	500

APPENDIX A

(*Clauses* 0.4 *and* 3.2.3)

A-1. HIGH TEMPERATURE PROPERTIES OF STEELS

A-1.1 The minimum yield stress or 0·2 percent proof stress values and the average stress for rupture in 100 000 hours at different temperatures for some of the steels included in Table 1 are given in Tables 43, 44 and 45.

TABLE 43 MINIMUM YIELD STRESS (R_{el}) OR 0·2 PERCENT PROOF STRESS (R_p 0·2) AT ELEVATED TEMPERATURES

(*Clause* A-1.1)

IS/Grade	Treatment	Thickness mm		R_{el} *Min*, R_p 0·2 *Min* in N/mm² at Temperature °C										
				100	150	200	250	300	350	400	450	500	550	600
IS : 2002-1962 Grade 1	N		<16	205·0	187·4	168·9	146·0	127·5	116·7	110·8	106·9	—	—	—
		>16	<40	197·2	185·4	165·7	146·0	127·5	116·7	110·8	106·9	—	—	—
		>40	<63	179·5	172·7	160·8	146·0	127·5	116·7	110·8	106·9	—	—	—
IS : 2002-1962 Grade 2A	N		<16	211·9	208·0	208·0	180·5	151·1	142·0	139·1	136·4	—	—	—
		>16	<40	201·1	199·1	192·3	172·7	151·1	142·0	139·1	136·4	—	—	—
		>40	<63	191·3	189·3	190·5	167·8	151·1	142·0	139·1	136·4	—	—	—
		>63	<100	178·5	188·5	170·7	161·8	151·1	142·0	139·1	136·4	—	—	—
IS : 2611-1964	N+T			210·9	200·1	190·3	181·5	153·0	136·4	132·4	128·5	125·6	122·6	118·7
	Q+T			338·2	326·7	315·9	303·1	293·3	284·5	280·8	273·7	263·8	251·1	239·1
IS : 4367-1967 10Cr2Mo1	N+T			259·9	252·1	244·1	235·2	229·5	223·7	216·8	204·0	188·4	167·7	143·4
	Q+T			318·8	311·0	303·1	294·3	286·4	280·6	270·7	257·0	236·2	207·0	176·6

N = normalizing,
T = tempering, and
Q = quenching.

TABLE 44 CREEP RUPTURE PROPERTIES FOR PLATES

(*Clause* A-1.1)

IS/Grade	Treatment	Estimated Average Stress (N/mm²) for Rupture in 100 000 h at Temperature °C												
		380	390	400	410	420	430	440	450	460	470	480	490	500
IS : 2002-1962 Grade 1	N	163·8	145·1	127·4	109·9	94·1	79·5	67·7	55·9	46·1	39·2	33·4	—	—
IS : 2002-1962 Grade 2	N	210·9	186·4	168·8	141·2	121·6	103·0	88·3	74·0	62·8	51·0	42·2	—	—

N = normalizing.

TABLE 45 CREEP RUPTURE PROPERTIES FOR FORGINGS

(*Clause* A-1.1)

IS/Grade	Treatment	Estimated Average Stress (N/mm²) for Rupture in 100 000 h at Temperature °C												
		470	480	490	500	510	520	530	540	550	560	570	580	590	600
IS : 2811-1964	N+Q+T	—	209·9	176·6	146·2	120·7	99·0	81·4	86·7	53·9	43·2	35·3	—	—	—
IS : 4367-1967 10Cr2Mo1	N+T Q+T	167·7	154·0	141·2	127·4	114·8	102·0	90·3	78·5	68·7	58·9	50·9	44·2	38·3	34·3

N = normalizing,
T = tempering, and
Q = quenching.

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