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Metallic flanges —

Part 3: Copper alloy and composite flanges

Brides métalliques —

Partie 3: Brides en alliages de cuivre et brides composites

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7005-3 was prepared by Technical Committee ISO/TC 5, *Ferrous metal pipes and metallic fittings*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Metallic flanges —

Part 3: Copper alloy and composite flanges

0 Introduction

Various flange systems based on differing design criteria have been in use throughout the world for many years. Given the increasing difficulties arising from such a situation, this International Standard has been based on a single series of metallic flanges. ISO 7005 will be published in four parts as follows:

- Part 1: Steel flanges
- Part 2: Cast iron flanges
- Part 3: Copper alloy and composite flanges
- Part 4: Aluminium and aluminium alloy flanges

This part of ISO 7005 is based on the American and European copper alloy flange systems which have been combined to produce one International Standard with some changes to the dimensions specified in the two systems.

The flanges specified in this part of ISO 7005 are intended, in general, for use with copper or copper alloy tubes and pipework system components. Integral flanges are also intended for use with steel and cast iron pipework system components.

In the American system, flanges are designated by a Class rating but in this part of ISO 7005 the relevant Class ratings are designated by nominal pressure (PN) ratings.

The equivalent designations are as follows:

- Class 150: ISO PN20
- Class 300: ISO PN50

The ratings for ISO PN20 and ISO PN50 flanges are those based on American standards, established for use in copper alloy pipework systems. The ratings used in the European system remain as ISO PN6, ISO PN10, ISO PN16, ISO PN25 and ISO PN40.

In this part of ISO 7005, ISO copper alloys, in wrought and cast forms, have been specified where they are comparable with the American and European materials. In addition, an American specification has been retained for a ferrous backing flange

material and work is proceeding within ISO to prepare steel material specifications suitable for flange applications.

Flange details in all four parts of ISO 7005 are such that flanges having the same PN and nominal size (DN) values and compatible flange facings will mate together.

Users of this part of ISO 7005 should satisfy themselves that the flanges comply with any statutory requirements.

1 Scope and field of application

This part of ISO 7005 for a single system of flanges specifies requirements for circular copper alloy and composite flanges in the following nominal pressure ratings:

Series 1*	Series 2*
ISO PN10	ISO PN6
ISO PN16	ISO PN25
ISO PN20	ISO PN40
ISO PN50	

Attention is drawn to the need to refer to the pressure/temperature (p/T) ratings in tables 10, 10a), 10b) and 10c) for the maximum permissible working pressures and temperatures, particularly for ISO PN20 and ISO PN50 flanges and for ISO PN6, ISO PN10, ISO PN16 and ISO PN25 flanges attached by soft solder or silver brazing.

This part of ISO 7005 specifies the types of flanges and their facings, dimensions, tolerances, bolt sizes (including copper alloy), flange face surface finish, marking, testing, inspection and materials.

NOTES

- 1 Dimensions of gaskets will be the subject of a future International Standard.
- 2 For guidance, information on the application and installation of flanges is given in the annex, which does not form an integral part of this part of ISO 7005.

* Series 1 ratings are the basic ratings; series 2 ratings have limited application.

2 Definitions and designation

2.1 Definitions

2.1.1 nominal size (DN): A numerical designation of size which is common to all components in a piping system other than components designated by outside diameters or by thread size. It is a convenient round number for reference purposes and is only loosely related to manufacturing dimensions.

NOTES

- 1 Nominal size is designated by "DN" followed by the appropriate number.
- 2 This definition is in accordance with that given in ISO 6708.

2.1.2 nominal pressure (PN): A numerical designation which is a convenient rounded number for reference purposes.

All equipment of the same nominal size (DN) designated by the same PN number shall have compatible mating dimensions.

NOTES

- 1 The maximum allowable working pressure depends on materials, design and working temperatures and should be selected from the tables of pressure/temperature ratings given in this part of ISO 7005.
- 2 In this part of ISO 7005, nominal pressure is designated by the letters "ISO PN" followed by the appropriate reference number.
- 3 This definition of nominal pressure is in accordance with that given in ISO 7268.

2.2 Designation of types and facings

Figure 1 shows the basic commonly used flanges identified according to type.

- 01 — Plate flange in copper alloy for brazing or welding.
- 02 — Loose flange in ferrous material with a plate collar in copper alloy for brazing or welding.
- 04 — Loose flange in ferrous material with a welding neck collar in copper alloy for welding.
- 05 — Blank flange in copper alloy or in ferrous material clad with the jointing face in copper alloy.
- 07 — Loose flange in ferrous material with a slip-on collar in copper alloy for soft soldering, brazing or welding.
- 11 — Welding neck flange in copper alloy.
- 12 — Hubbed slip-on flange in copper alloy for soft soldering, brazing or welding.
- 14 — Hubbed slip-on flange in copper alloy for soft soldering, brazing or welding and supplied with tube-stops, the dimensions and locations of which shall be at the discretion of the manufacturer or as specified by the purchaser. In addition, integral grooves for preplaced soft-solder or brazing alloy rings may be machined in the sockets, the dimensions and locations of which shall be at the discretion of the manufacturer or as specified by the purchaser.
- 21 — Integral flange in copper alloy as part of some other equipment or component.

3 Pressure/temperature (p/T) ratings

3.1 General

The pressure/temperature ratings of the materials specified in 4.1 shall be the maximum allowable non-shock working pressures at the temperatures given in tables 10, 10a), 10b) and 10c), as appropriate. Linear interpolation is permitted for intermediate temperatures.

3.2 Rating of flanged joints

Where two flanges in a flanged joint do not have the same pressure/temperature rating, the rating of the joint at any temperature shall not exceed the lower of the two flange ratings at that temperature.

3.3 Temperature

NOTE — The temperature shown for a corresponding pressure rating is considered to be the same as that of the contained fluid. Use of a pressure rating corresponding to a temperature other than that of the contained fluid is the responsibility of the user, subject to the requirements of any applicable code or regulation.

4 Materials

4.1 Range of materials

Flanges shall be manufactured from the materials specified in tables 11 and 11a) as appropriate.

NOTES

- 1 Each national standards organization has the responsibility of determining the national materials comparable with the materials specified in this part of ISO 7005.
- 2 Where there is an appropriate application standard, it is the responsibility of the purchaser to ensure compliance with the requirements of that standard.

4.2 Gaskets

The various types, dimensions and materials used for gaskets are not within the scope of this part of ISO 7005.

4.3 Bolting

The materials of the bolting shall be chosen by the user according to the pressure, flange material and the selected gasket so that the flanged joint remains tight under the expected operating conditions.

NOTES

- 1 For the purposes of this part of ISO 7005, either metric or inch bolting may be used for ISO PN20 and ISO PN50 flanges in conjunction with gaskets manufactured from sheet materials.
- 2 For flange types 01, 05 (when it is copper alloy only), 11, 12, 14 and 21, where copper alloy bolting is used, the recommended bolting materials are ISO 428 1/28A or 1/28B for temperatures up to and including 120 °C. (See table 11 for an explanation of the abbreviated alloy designations.)
- 3 For flange types 02, 04, 05 (when it is ferrous with copper alloy cladding) and 07, ferrous bolting should be used and reference should be made to ISO 7005-1.

5 Dimensions

5.1 Range of nominal sizes

The range of nominal sizes applicable to each flange type and to each pressure rating shall be as specified in table 2.

NOTE — The sizes of copper and copper alloy tubes are designated by reference to the outside diameter in millimetres.

5.2 Dimensional details

Dimensions of flanges shall be in accordance with the following tables, as appropriate:

- table 3 for ISO PN6 flanges
- table 4 for ISO PN10 flanges
- table 5 for ISO PN16 flanges
- table 6 for ISO PN20 flanges
- table 7 for ISO PN25 flanges
- table 8 for ISO PN40 flanges
- table 9 for ISO PN50 flanges

NOTES

- 1 The bore sizes of type 21 flanges are usually equal to the nominal size of the pipe, valve or fitting of which they form a part and the actual bore sizes are usually given in the appropriate product standard.
- 2 Where type 07, 12 and 14 flanges are for use with soft soldering techniques only, then reference should be made to ISO 2016 for socket depths.
- 3 For type 04 and 11 flanges the recommended weld preparation angle is $37,5^\circ \pm 2,5^\circ$ when butt welding to pipe with thicknesses of 3 mm and greater.

6 Joint facings and surface finish

6.1 Types 01, 11, 12, 14 and 21 flanges shall be supplied with flat faces for use with full-face gaskets.

NOTES

- 1 Notes at the foot of table 3 (ISO PN6), table 4 (ISO PN10), table 5 (ISO PN16) and table 7 (ISO PN25) indicate which sizes may be used in conjunction with inside bolt circle gaskets and type 02, 04, 05 and 07 flanges.
- 2 Where type 21 flanges in table 3 (ISO PN6), table 4 (ISO PN10), table 5 (ISO PN16) and table 7 (ISO PN25) in sizes up to and including DN 100 are required for bolting to flanges with raised faces, then the appropriate flange thickness (C_1^*) given in table 8 (ISO PN40) applies.

6.2 Where type 01, 11, 12 and 14 flanges in sizes above DN 50, and type 21 flanges in sizes above DN 100 are required to be bolted to existing raised face type steel or cast iron flanges, then the raised faces shall be removed.

6.3 Where type 01, 11, 12, 14 and 21 flanges for ISO PN20 and ISO PN50 are required to be bolted to existing raised face type steel or cast iron flanges, then the raised faces on all sizes shall be removed.

6.4 All flange jointing faces shall be finished in accordance with table 1. The faces shall be compared by visual or tactile means with reference specimens which conform to the R_a and R_z values given in table 1.

NOTES

- 1 It is not intended that instrument measurements are taken on the flange faces, and the R_a and R_z values as defined in ISO 468 relate to the reference specimens.
- 2 Other finishes may be agreed between the manufacturer and purchaser.

Table 1 — Surface finish of flanges

Values in micrometres

Manufacturing process	R_a	R_z
Turning ¹⁾	3,2 to 12,5	12,5 to 50
Other ²⁾	3,2 to 6,3	12,5 to 25

- 1) "Turning" covers any method of machine operation producing either serrated concentric or serrated spiral grooves.
- 2) Processes other than turning are permissible provided that they give a surface finish in compliance with the R_a and R_z values specified.

6.5 Flange rims are permitted to be machined or left unmachined.

6.6 Composite flanges shall be machine finished, or have a surface equivalent to that obtained by machining on all locating diameters, bores and abutment faces. The abutment faces shall be flat and square to the bore axis.

7 Drilling and spot-facing

7.1 Unless otherwise specified by the purchaser, all bolt holes shall be equally spaced on the pitch circle diameter, K . In the case of integral flanges, the bolt holes shall be positioned off-centre.

7.2 Bearing surfaces for the nuts shall be parallel to the flange jointing face within 1° and shall be capable of accepting a normal series washer complying with the requirements of ISO 887.

7.3 Any back-facing or spot-facing required to accomplish this shall not reduce the flange thickness to less than the minimum specified.

7.4 When a bossed or integral flange is back-faced, it is permissible for the fillet to be reduced but the fillet shall not be eliminated entirely.

8 Tolerances

Flanges shall be manufactured to comply with the tolerances specified in table 12.

9 Marking

Flanges other than integral shall be clearly marked as follows:

- a) the nominal size (DN) and the nominal pressure rating (ISO PN);
- b) material designation (for copper alloy and ferrous material designations, see table 11);
- c) manufacturer's name or trademark.

Examples:

Copper alloy component:
DN 300 ISO PN20 I/29A XXXX
 (e.g. for CuNi10Fe1Mn)

Ferrous component:
DN 300 ISO PN20 A105 XXXX

Copper alloy flanges shall be clearly and permanently marked by vibro or electrolytic etching or by other suitable means. Stamping with steel stamps shall not be used. The manufacturer's name or trademark together with other relevant marking may be produced during casting or forging operations.

NOTE — Ferrous flanges may be marked round the rim of the flange using round-nosed steel stamps.

10 Inspection and test

ISO PN20 and ISO PN50 flanges specified are designed to be interchangeable with, but not identical to, comparable flanges to ANSI B16.24.

NOTES

- 1 It is recommended that these flanges be accepted by inspectors as complying with the dimensions specified in ANSI B16.24.
- 2 This part of ISO 7005 does not make provision for routine inspection or pressure testing of separate flanges. However, flanges may be required to be pressure tested after attachment to a pipe or other equipment. The test pressure is then dependent on the requirements of the appropriate standard or code of practice in accordance with which the equipment has been manufactured (see the annex).

11 Information to be supplied by the purchaser

The following information should be supplied by the purchaser in the enquiry and/or order:

- a) number of this part of ISO 7005, i.e. ISO 7005-3;
- b) nominal size — DN followed by the appropriate number;
- c) nominal pressure — ISO PN followed by the appropriate number;
- d) flange type number (and whether thicker flanges are required; see 6.1);
- e) material designations (for both the copper alloy and the ferrous component, where applicable);
- f) any protective coating (galvanizing, painting) of the ferrous flanges, subject to agreement between the purchaser and manufacturer;
- g) whether flange rims are to be machined or unmachined (see 6.5);
- h) the bore of the flange and/or collar where flanges can be made to suit more than one tube diameter (see tables 3 to 9).

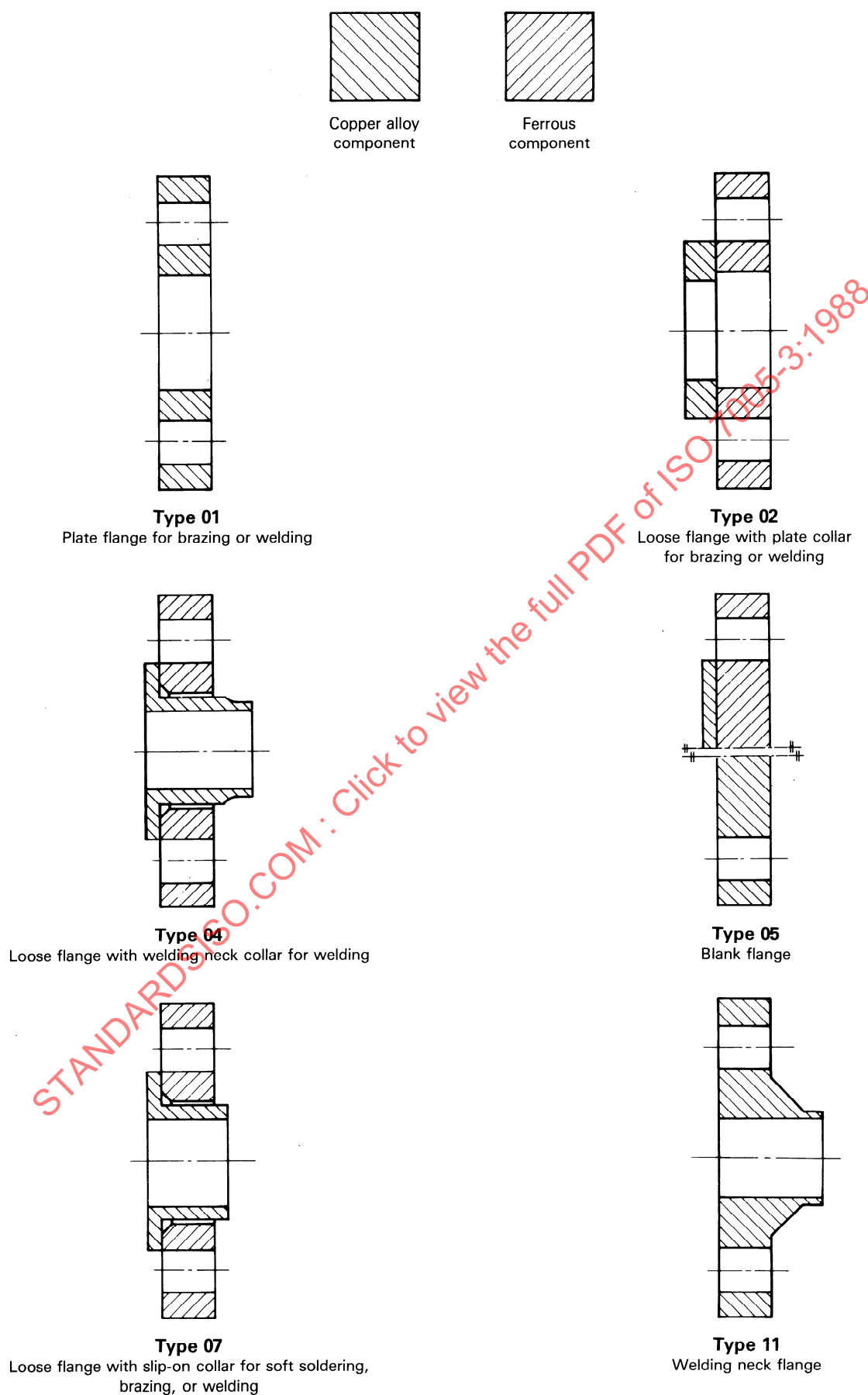
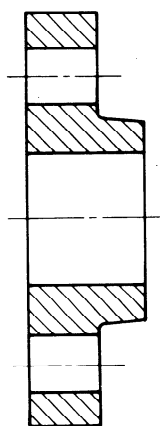
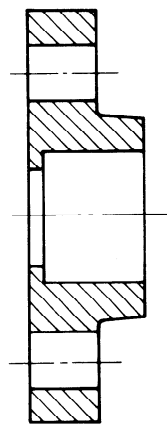


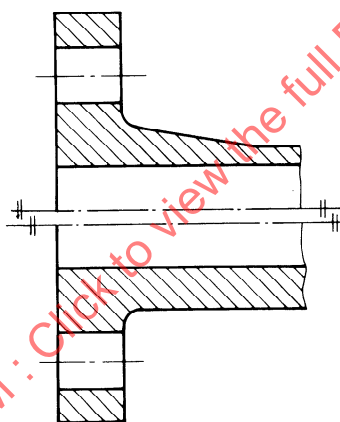
Figure 1 — Types of flanges



Type 12
Hubbed slip-on flange for soft soldering,
brazing or welding



Type 14
Hubbed slip-on flange for soft soldering,
brazing or welding with tube-stops

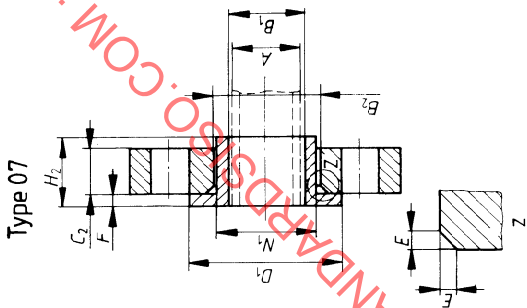
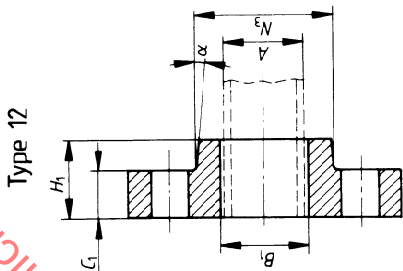
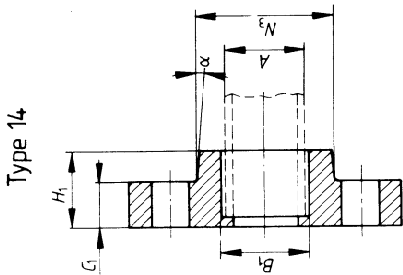
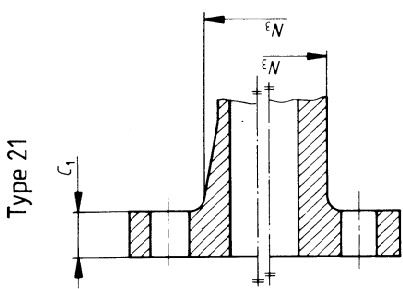
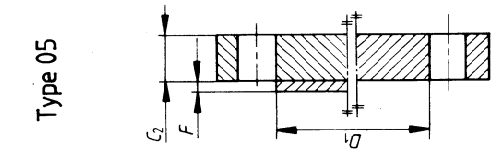


Type 21
Integral flange

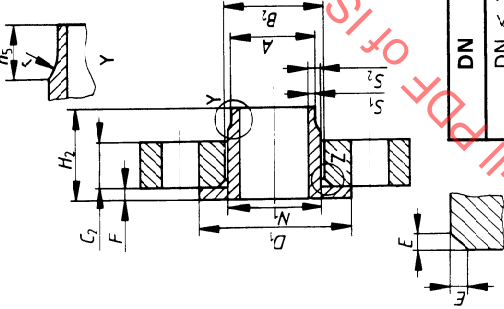
Figure 1 — Types of flanges (concluded)

Table 2 – Synoptic table for copper alloy and composite flanges

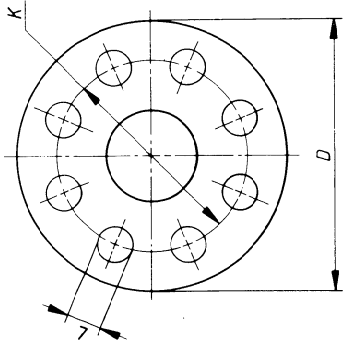
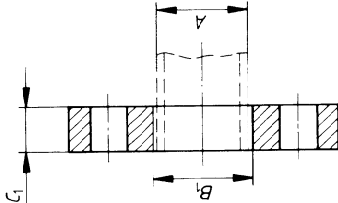
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Type 04



Type 01



This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.
Refer to the column "number of bolts" in table 3 for the actual number.

DN	h ₅	r
DN ≤ 100	15	3
125 ≤ DN ≤ 250	15	5
300 ≤ DN ≤ 350	16	5
400 ≤ DN ≤ 450	16	7
500 ≤ DN ≤ 600	20	7
700 ≤ DN ≤ 800	24	7

Table 3 — Dimensions of ISO PN6 flanges

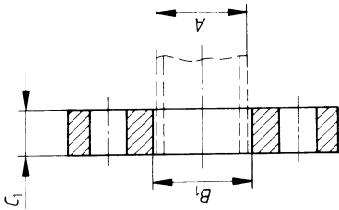
Dimensions in millimetres

Nominal size	Tube outside diameter	Mating dimensions				Outside diameter of flange	D	K	L	Number	Nominal size of bolts	Flange type										Bore of flange	Chamber																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
		Flange thickness										Hub diameter	Neck diameter	Collar diameter	Length through hub or collar				Collar thickness		Collar flange thickness			Cladding thickness	Collar or raised face diameter	Bore of flange or collar																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
		C ₂	C ₁	12	14										N ₃	04	07	12	04	07							S _{1min}	S ₂	F	D ₁	01	07	12	14	04	07																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
DN	A	15	18	20	22	25	28	30	32	35	38	40	42	44,5	54	76,1	88,9	108	125	133	159	175	193,7	219,1	250	300	350	400	450	500	600	700	800	900	1 000	1 200	1 400	1 600	1 800																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
10	16	75	50	11	4	M10	10	6	16	21	21	16	18	21	16	10	35	16	1	2	5	33	15,07	16,07	19	23	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2</

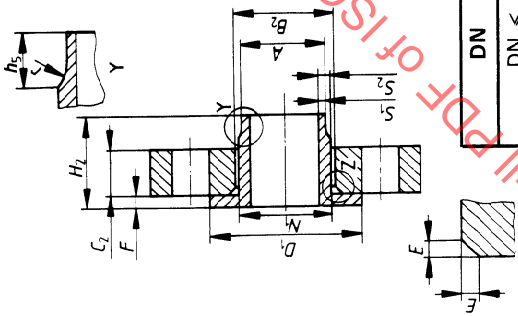
NOTES

- For type 21 flanges in sizes up to and including DN 100 and type 12 (and 14) flanges up to and including DN 50 for bolting to flanges with raised faces, the appropriate thickness (C_1^*) in table 8 (ISO PN40) shall apply. (See 6.1.)
- Type 21 flanges in sizes DN 125 to DN 1 800 may be used with inside bolt circle gaskets and type 04, 05 and 07 flanges. (See 6.2.)
- For type 12 and type 14 flanges of all nominal sizes, $\alpha = 4^\circ$ max.
- Dimension E is given for information only.

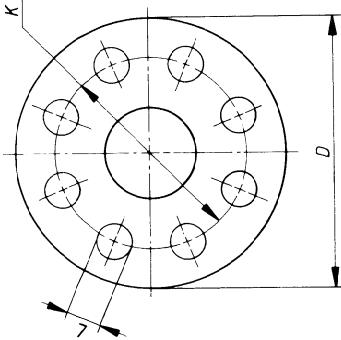
Type 01



Type 04

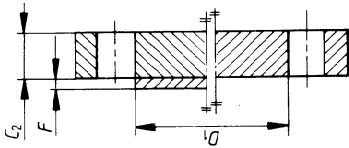


DN	r	h ₅
DN < 100	3	15
125 ≤ DN < 250	5	15
300 ≤ DN < 350	5	16
400 ≤ DN < 450	7	16
500 ≤ DN < 600	7	20
700 ≤ DN < 800	7	24
900 ≤ DN < 1 200	7	32

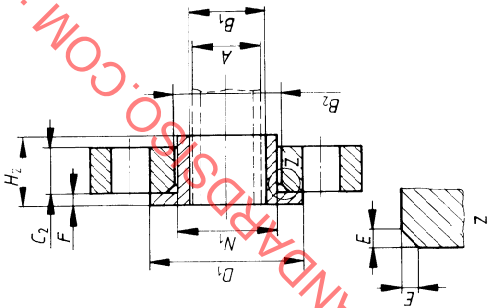


This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.
Refer to the column "number of bolts" in table 4 for the actual number.

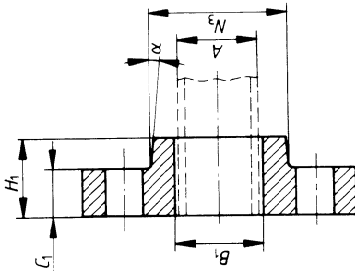
Type 05



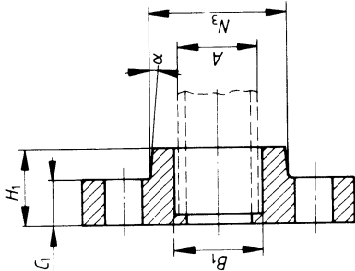
Type 07



Type 12



Type 14



Type 21

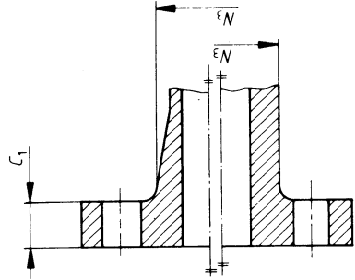


Table 4 — Dimensions of ISO PN10 flanges

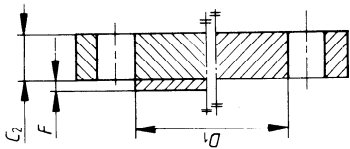
Dimensions in millimetres

Nominal size	Tube outside diameter	Mating dimensions				Flange thickness	Hub diameter	Neck diameter	Collar diameter	Length through hub or collar	Collar thickness			Collar flange thickness	Cladding thickness	Collar or raised face diameter	Bore of flange or collar	Bore of flange	Chamber		
		Outside diameter of flange	Diameter of bolt circle	Diameter of bolt holes	Number						Nominal size of bolts										
												Bolts									
DN	A	D	K	L	C ₂	C ₁			N ₃	N ₁	H ₁	H ₂	S _{1 min}	S ₂	F	F _{min}	D ₁	B ₁	B ₂	E	
						04	07	05													04
10	15	16	60	14	4	M12	14	6	16	18	21	35	16	2	5	5	41	15,07	19	23	2
15	18	20	65	14	4	M12	14	8	21	22	26	35	16	2	5	5	46	18,07	24	28	2
20	22	25	75	14	4	M12	14	8	31	27	31	40	16	1,5	5	5	56	22,08	28	33	3
25	28	30	85	14	4	M12	16	9	36	32	36	40	18	1,5	5	5	65	28,08	33	38	3
32	35	38	100	18	4	M16	16	10	45	40	45	40	18	1,5	5	5	76	35,09	41	47	3
40	42	44,5	110	18	4	M16	16	11	51	46,5	51	45	19	1,5	6	5	84	42,09	48	53	3
50	54	57	125	18	4	M16	16	13	67	59	67	45	19	1,5	6	5	99	54,09	62	69	3
65	76,1	185	145	18	4	M16	16	13	87	78	87	17	45	2	3,5	6	118	76,33	81	89	3
80	88,9	200	160	18	8	M16	18	13	104	91	104	17	50	2	4	7	132	89,13	94	106	3
100	108	220	180	18	8	M16	18	16	123	116	123	20	50	2	4	7	156	108,38	113	125	3
125	133	250	210	18	8	M16	18	18	148	159	148	22	50	2	4	7	184	133,63	138	151	4
150	159	285	240	22	8	M20	18	20	175	184	161	24	50	2	4	9	211	159,63	164	178	4
175	193,7	315	270	22	8	M20	20	22	210	211	196	26	50	3	4,5	9	242	194,63	200	213	5
200	219,1	340	295	22	8	M20	20	24	235	240	221	28	50	3	4,5	9	266	220,03	225	238	5
250	267/273	395	350	22	12	M20	22	26	285	292	269/275	30	50	3	4,5	9	319	268,13/274,13	278/284	288/296	5/7
300	323,9	445	400	22	12	M20	26	26	342	342	326	30	50	4	5,5	11	370	325,03	330	345	7
350	368	505	460	22	16	M20	28	26	386	396	370	30	50	4	5,5	11	429	369,13	374	369	7
400	419	565	515	26	16	M24	32	26	439	448	421	30	50	4	5,5	12	480	420,13	426	442	7
450	457,2	615	565	26	20	M24	34	28	477	498	459	32	50	4,5	6	12	530	458,33	465	480	7
500	508	670	620	26	20	M24	38	28	530	552	510	33	50	5	6,5	12	582	509,13	516	533	7
600	610	780	725	30	20	M27	38	31	637	654	612	49	60	6	7,5	14	629	612	619	639	9
700	711	895	840	30	24	M27	40	33	741	760	713	53	60	6,5	9,5	15	733	713	727	743	9
800	813	1 015	950	33	24	M30	44	35	844	866	815	55	60	7,5	10,5	16	836	815	829	846	9
900	914	1 115	1 050	33	28	M30	48	46	948	970	918	60	65	8,5	11,5	17	940	916	931	950	9
1 000	1 016	1 230	1 160	36	28	M33	52	50	1 076	1 018	1 051	60	70	9	12	14	1 043	1 018	1 025	1 053	9
1 200	1 220	1 455	1 380	39	32	M36	60	56	1 284	1 223	1 259	60	80	11	14	20	1 251	1 222	1 230	1 262	9
1 400	1 420	1 675	1 590	42	36	M39	66	62	1 494	—	1 465	—	88	—	—	22	1 457	1 422	—	1 468	9
1 600	1 620	1 915	1 820	48	40	M45	74	68	1 702	—	1 669	—	98	—	—	24	1 661	1 622	—	1 672	9
1 800	1 820	2 115	2 020	48	44	M45	84	70	1 906	—	1 873	—	110	—	—	26	1 865	1 822	—	1 875	9

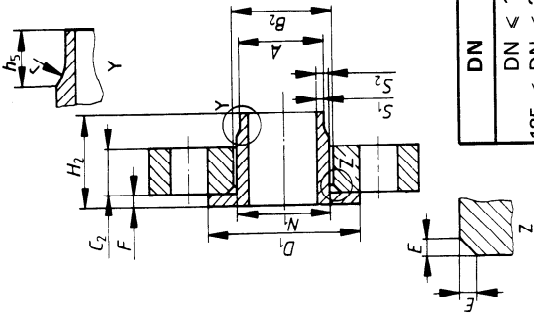
NOTES

- For type 21 flanges in sizes up to and including DN 100 and type 12 (and 14) flanges up to and including DN 50 for bolting to flanges with raised faces, the appropriate thickness (C_1^*) in table 8 (ISO PN40) shall apply. (See 6.1.)
- Type 21 flanges in sizes DN 125 to DN 1 800 may be used with inside bolt circle gaskets and type 04, 05 and 07 flanges. (See 6.2.)
- For type 12 and type 14 flanges of all nominal sizes, $\alpha = 4^\circ$ max.
- Dimension E is given for information only.

Type 05

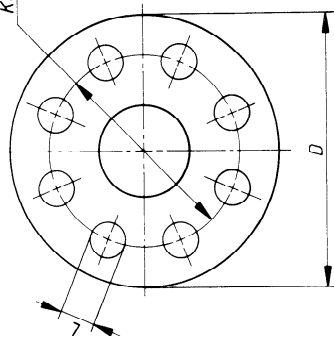
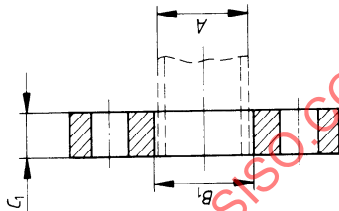


Type 04



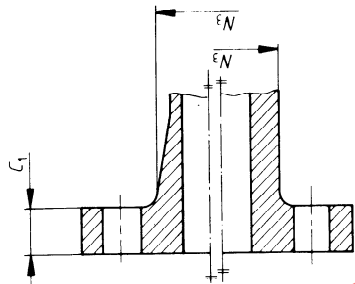
DN	h ₅	r
DN ≤ 100	15	3
125 ≤ DN ≤ 250	15	5
300 ≤ DN ≤ 350	16	5
DN = 400	16	7

Type 01

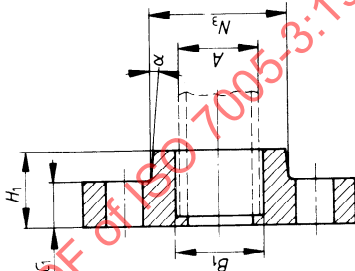


This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.
Refer to the column "number of bolts" in table 5 for the actual number.

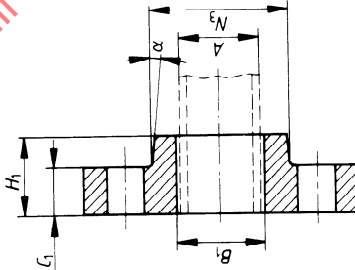
Type 21



Type 14



Type 12



Type 07

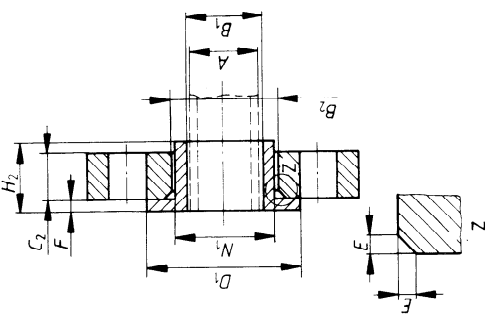
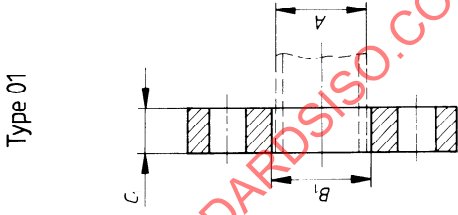
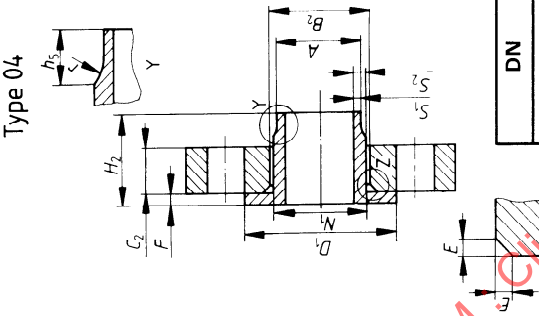
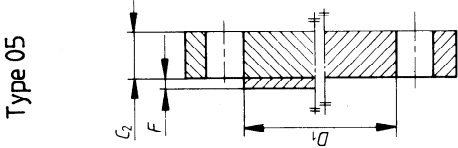
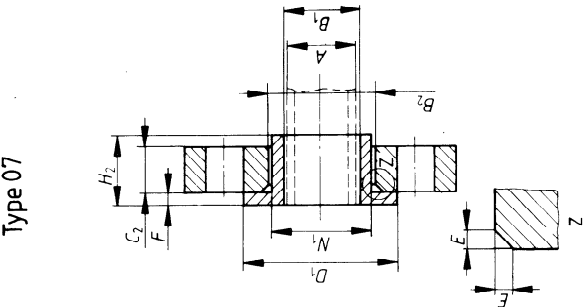


Table 5 — Dimensions of ISO PN16 flanges

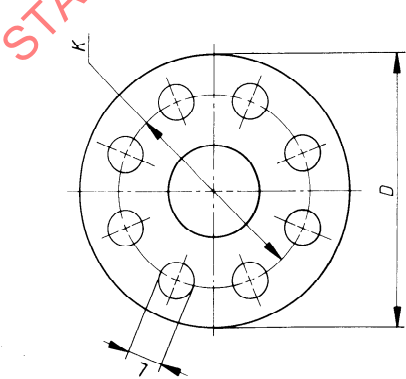
Nominal size		Tube outside diameter				Mating dimensions				Flange thickness		Hub diameter		Neck diameter		Collar diameter		Length through hub or collar		Collar thickness				Collar flange thickness		Cladding thickness		Collar or raised face diameter		Bore of flange or collar		Bore of flange		Chamber																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
						Outside diameter of flange	Diameter of bolt circle	Diameter of bolt holes	Number																											Nominal size of bolts																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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DN	A	D	K	L	C ₂	C ₁	N ₃	N ₁	04	07	H ₁	H ₂	S _{1min}	S ₂	F	D ₁	01	07	B ₁	04	07	B ₂	E																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
10	15	90	60	14	14	8	6	16	18	21	20	35	1	2.5	5	41	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16.07	19	23	23	15.07	16

NOTES

- 1 For type 21 flanges in sizes up to and including DN 100 and type 12 (and 14) flanges up to and including DN 50 for bolting to flanges with raised faces, the appropriate thickness (C_1^*) in table 8 (ISO PN40) shall apply. (See 6.1.)
- 2 Type 21 flanges in sizes DN 125 to DN 250 and type 12 (and 14) flanges in sizes DN 65 to DN 250 may be used with inside bolt circle gaskets and type 04, 05 and 07 flanges. (See 6.2.)
- 3 For type 12 and type 14 flanges of all nominal sizes, $\alpha = 4^\circ$ max.
- 4 Dimension E is given for information only.



DN	h ₅	r
DN ≤ 100	15	3
125 ≤ DN ≤ 250	15	5
300 ≤ DN ≤ 350	16	5
400 ≤ DN ≤ 450	16	7
500 ≤ DN ≤ 600	20	7
700 ≤ DN ≤ 800	24	7
DN ≥ 900	32	7



This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.
Refer to the column "number of bolts" in table 6 for the actual number.

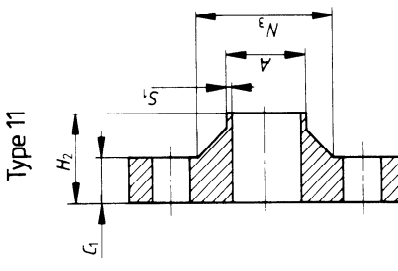
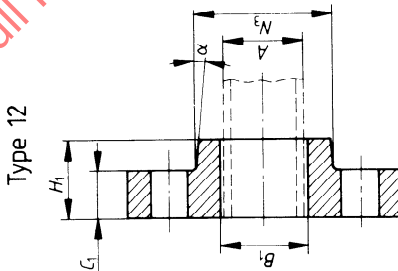
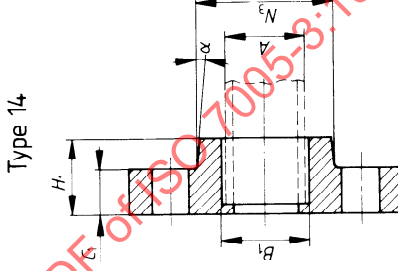
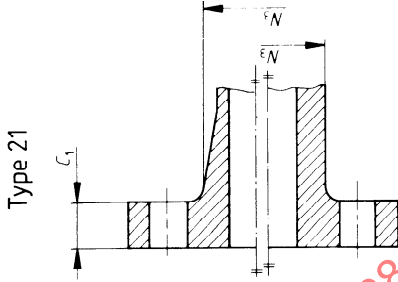


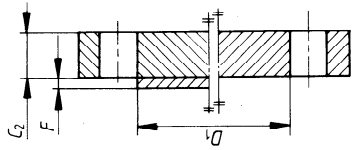
Table 6 — Dimensions of ISO PN20 flanges

Nominal size	Mating dimensions				Dimensions in millimetres																					
	Tube outside diameter	Outside diameter of flange	Diameter of bolt circle	Diameter of bolt holes	Number of bolts	Nominal size of bolts	Flange type																			
							Flange thickness		Hub diameter		Neck diameter		Collar diameter		Length through hub or collar		Inner flange collar thickness	Inner collar wall thickness	Cladding thickness	Collar or raised face diameter	Bore of flange or collar	Bore of backing flange	Chamfer			
DN	A	D	K	L	C ₁	C ₂	04	07	01	11	12	14	21	04	07	11								04	04	S _{1min}
10	16	90	60,5	16	4	M14	11,1	11,1	8	8	8	21	21	30	18	18	48	2	2	5	5	40	16,07	19	23	2
20	25	100	70	16	4	M14	12,7	12,7	8	8	9	31	31	38	27	27	52	2,5	2,5	5	5	53	25,08	28	33	2
25	30	110	79,5	16	4	M14	14,3	14,3	9	9	10	36	36	49	32	32	56	2,5	2,5	5	5	60	30,08	33	38	3
32	38	120	89	16	4	M14	15,4	15,4	10	10	10	45	45	59	40	40	57	2,5	2,5	5	5	70	38,08	41	47	3
40	44,5	130	98,5	16	4	M14	17,5	17,5	11	11	11	51	51	65	46,5	46,5	62	2,5	2,5	5	5	80	46,6	48	53	3
50	57	150	120,5	18	4	M16	19	19	13	13	13	67	67	78	59	59	64	2,5	2,5	6	6	99	57,23	62	69	3
65	76,1	180	139,5	18	4	M16	23,8	23,8	20	20	14	85	87	90	78	78	70	3	3	6	6	120	76,33	81	89	3
80	88,9	190	152,5	18	4	M16	24	24	20	20	16	103	108	91	91	91	70	3,5	3,5	7	7	130	89,18	94	—	3
100	108	230	190,5	18	8	M16	24	24	20	20	17	134	135	110	110	110	76	3,5	3,5	7	7	158	108,38	113	—	3
125	133	255	216	22	8	M20	24,4	24,4	22	22	19	159	164	135,5	135,5	135,5	89	2,5	2,5	7	7	188	133,63	138	—	4
150	159	280	241,5	22	8	M20	25,5	25,5	22	22	21	183	192	161,5	161,5	161,5	89	2,5	2,5	9	9	212	159,63	164	—	4
200	219,1	345	298,5	22	8	M20	29	29	26	26	24	238	246	222	222	222	102	3,5	5	9	9	268	220,03	225	—	5
250	267/273	405	362	26	12	M24	30,5	30,5	28	28	25	287	305	305	269/275	269/275	102	4	5,5	9	9	320	268,13/274,13	278	—	5
300	323,9	485	432	26	12	M24	32	32	40	40	27	344	365	365	327	327	114	5	6,5	11	11	370	325,03	330	—	7
350	368	535	476	29,5	12	M27	35	35	41	41	—	395	—	—	422	422	127	5,5	7	11	11	430	369,13	374	—	7
400	419	600	540	29,5	16	M27	37	37	45	45	—	446	—	—	460	460	140	7,5	8,5	12	12	482	420,13	426	—	7
450	457,2	635	578	32,5	16	M30	40	40	48	48	—	508	—	—	511	511	152	9	9	12	12	530	458,33	465	—	7
500	508	700	635	32,5	20	M30	45	45	50	50	—	559	—	—	613	613	144	10,5	10,5	14	14	585	509,13	517	—	9
600	610	815	749,5	35,5	20	M33	48	48	50	50	—	665	—	—	719	719	152	12	12	19	19	685	611,13	618	—	9
700	711	925	863	35,5	28	M33	72	72	52	52	—	775	—	—	821	821	144	16	16	20,5	20,5	800	712,13	727	—	9
800	813	1 060	978	42	28	M39	81	81	56	56	—	879	—	—	921	921	157	13,5	17,5	22	22	905	814,13	829	—	9
900	914	1 170	1 086	42	32	M39	90,5	90,5	60	60	—	988	—	—	921	921	157	17,5	17,5	—	—	1 000	915,13	921	—	9

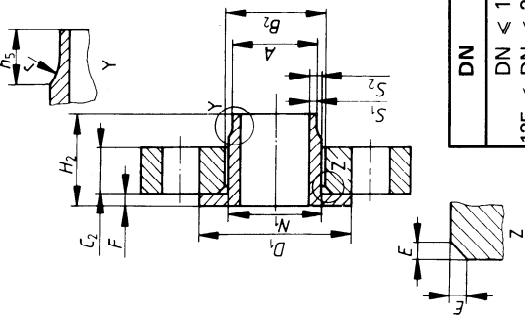
NOTES

- For type 12 and type 14 flanges of all nominal sizes, $\alpha = 4^\circ$ max.
- Dimension E is given for information only.

Type 05

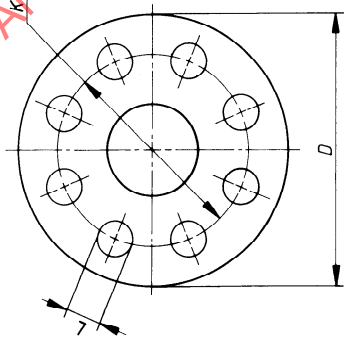
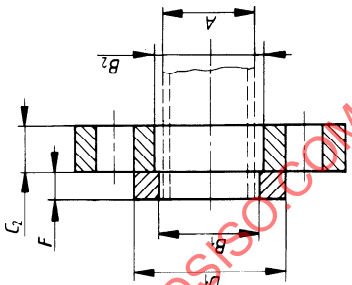


Type 04



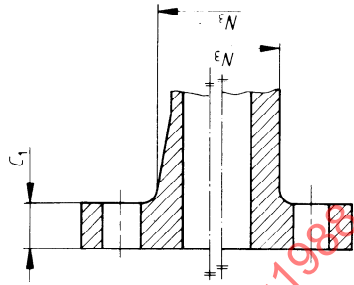
DN	h ₅	r
DN ≤ 100	15	3
125 ≤ DN ≤ 250	15	5
DN = 300	16	5

Type 02

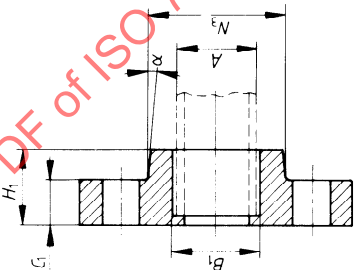


This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.
Refer to the column "number of bolts" in table 7 for the actual number.

Type 21



Type 14



Type 12

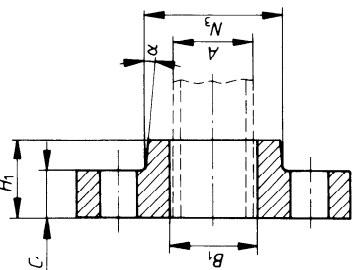


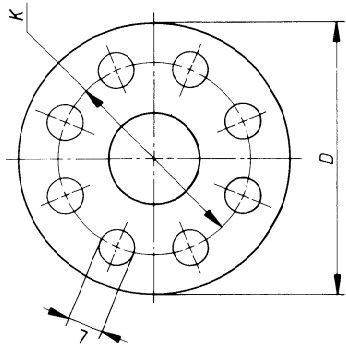
Table 7 — Dimensions of ISO PN25 flanges

Dimensions in millimetres

Nominal size DN	Tube outside diameter A			Mating dimensions				Flange thickness	Hub diameter	Neck diameter	Collar diameter	Length through hub or collar	Collar thickness	Collar flange thickness	Cladding thickness	Collar or raised face diameter	Bore of flange or collar	Bore of flange	Chamfer						
				Outside diameter of flange	Diameter of bolt circle	Diameter of bolt holes	Bolts																		
							Number													Nominal size of bolts					
Flange type																									
02 04 05		12 14	21	12 14	21	04	12 14	04	04		02 04 05	04 05	02	12 14	02 04	04									
C ₂		C ₁		N ₃		N ₁		H ₁	H ₂	S _{1min}	S _{2min}	F		D ₁	B ₁		B ₂	E							
10	15	16	90	60	14	4	M12	16	8	21	16	18	20	35	1,5	2,5	12	5	5	40	15,07	16,07	18	2	
15	18	20	95	65	14	4	M12	16	8	26	21	22	20	35	1,5	2,5	12	5	5	45	18,07	20,08	22	2	
20	22	25	105	75	14	4	M12	16	8	31	28	27	24	40	1,5	2,5	14	5	5	58	22,08	25,08	28	3	
25	28	30	115	85	14	4	M12	18	9	36	35	32	24	40	1,5	2,5	14	5	5	68	28,08	30,08	33	3	
32	35	38	140	100	18	4	M16	18	10	9	45	42	26	40	1,5	2,5	14	5	5	78	35,09	38,08	42	3	
40	42	44,5	150	110	18	4	M16	18	11		51	52	46,5	26	45	1,5	2,5	14	6	5	88	42,09	44,6	50	3
50	54	57	165	125	18	4	M16	20	13	11	67	64	59	28	45	2	3	16	6	5	102	54,09	57,23	62	3
65	76,1	185 200 235 270 300 330 360 425	185	145	18	8	M16	20	22	13	103	79	78	32	45	2,5	4	16	6	5	122	76,33 89,13 108,38 133,63 159,63		81	3
80	88,9		200	160	18	8	M16	22	24	14	114	94	91	34	50	3,5	4,5	18	7	5	138			94	3
100	108		235	190	22	8	M20	22	26	17	137	116	110	40	50	4	5	20	7	5	162			113	3
125	133		270	220	26	8	M24	24	26		160	165	135,5	44	50	5	6,3	22	7	5	188			138	4
150	159	300	250	26	8	M24	24	28	26	186	192	161,5	48	50	5	6,3	22	9	5	218		164	4		
175	193,7	330	280	26	12	M24	—	28		216	217	197	50	—	4	5,5	23	9	—	—	194,63		200	5	
200	219,1	360	310	26	12	M24	26	30		246	246	222	50	50	6	7,5	24	9	5	278	220,03		225	5	
250	267/273	425	370	30	12	M27	30	32		296	295	269/275	54	50	7	8,5	26	9	5	335	268,13/274,13		278	5/7	
300	323,9	485	430	30	16	M27	34	—	32	—	348	327	—	50	8	9,5	28	11	5	395	325,03		329	7	
350	368	555	490	33	16	M30	38	—	36	—	404	—	—	—	—	—	32	—	5	450	369,13		374	—	
400	419	620	550	36	16	M33	42	—	38	—	458	—	—	—	—	—	34	—	5	505	420,13		426	—	
500	508	730	660	36	20	M33	50	—	42	—	564	—	—	—	—	—	38	—	5	615	509,13		517	—	

NOTES

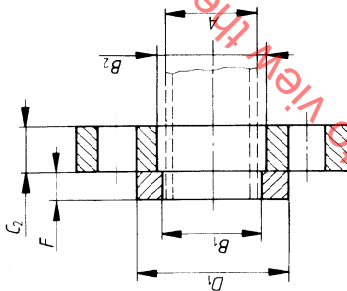
- For type 21 flanges in sizes up to and including DN 100 and type 12 (and 14) flanges up to and including DN 50 for bolting to flanges with raised faces, the appropriate thickness (C₁*) in table 8 (ISO PN40) shall apply. (See 6.1.)
- Type 21 flanges in sizes DN 125 to DN 250 and type 12 (and 14) flanges in sizes DN 65 to DN 250 may be used with inside bolt circle gaskets and type 02, 04, 05 and 07 flanges. (See 6.2.)
- For type 12 and type 14 flanges of all nominal sizes, $\alpha = 4^\circ$ max.
- Dimension E is given for information only.



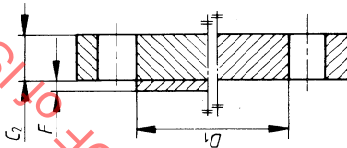
This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.

Refer to the column "number of bolts" in table 8 for the actual number.

Type 02



Type 05



Type 21

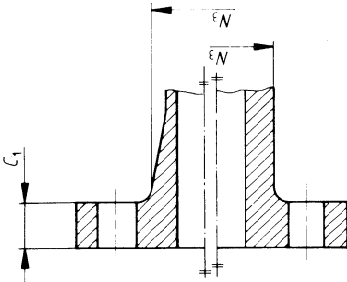


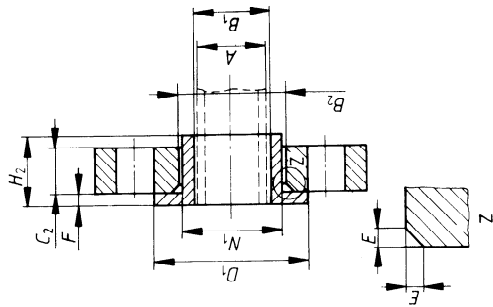
Table 8 — Dimensions of ISO PN40 flanges

Dimensions in millimetres

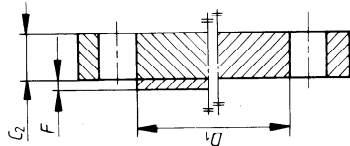
Nominal size DN	Tube outside diameter A	Mating dimensions					Flange thickness	Neck diameter	Collar flange thickness	Cladding thickness	Collar or raised face diameter	Bore of flange or collar	Bore of flange		
		Outside diameter of flange D	Diameter of bolt circle K	Diameter of bolt holes L	Bolts										
					Number	Nominal size of bolts									
														Flange type	
							02 05	21	21	02	05	02 05	02	02	
							C ₂	C ₁	C ₁ *	N ₃	F	D ₁	B ₁	B ₂	
10	16	90	60	14	4	M12	16	9	12	16	12	5	40	16,07	18
15	20	95	65	14	4	M12	16	9	12	21	12	5	45	20,08	22
20	25	105	75	14	4	M12	16	9	12	28	14	5	58	25,08	28
25	30	115	85	14	4	M12	18	11	14	35	14	5	68	30,08	33
32	38	140	100	18	4	M16	18	11	15	42	14	5	78	38,1	42
40	44,5	150	110	18	4	M16	18	13	16	52	14	5	88	44,6	50
50	57	165	125	18	4	M16	20	13	17	64	16	5	102	57,23	62
65	76,1	185	145	18	8	M16	20	14	17	79	16	5	122	76,33	81
80	88,9	200	160	18	8	M16	22	16	19	94	18	5	138	89,13	94
100	108	235	190	22	8	M20	22	19	21	116	20	5	162	108,38	113
125	133	270	220	26	8	M24	24	—	—	—	22	5	188	133,63	138
150	159	300	250	26	8	M24	24	—	—	—	22	5	218	159,63	164
200	219,1	375	320	30	12	M27	30	—	—	—	26	5	285	220,03	225
250	267/273	450	385	33	12	M30	36	—	—	—	30	5	345	268,13/274,13	278
300	323,9	515	450	33	16	M30	40	—	—	—	34	5	410	325,03	329
350	368	580	510	36	16	M33	46	—	—	—	38	5	465	369,13	374
400	419	660	585	39	16	M36	50	—	—	—	42	5	535	420,13	426

NOTE — Type 21 C₁* thicknesses shall be used when required with a raised face of 1,6 mm or when required to be used with inside bolt circle gaskets or type 04, 05 and 07 flanges. (See 6.1.)

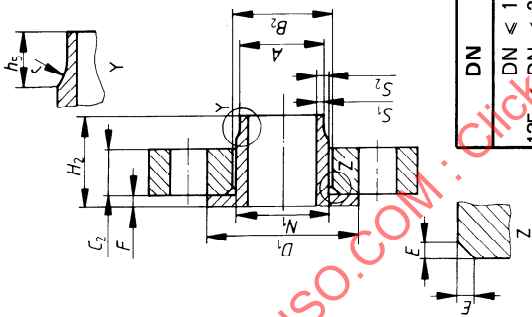
Type 07



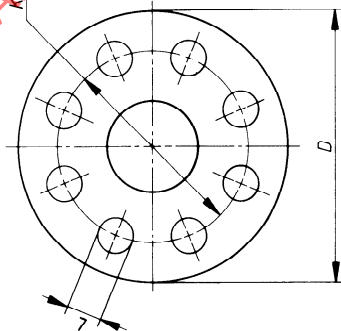
Type 05



Type 04

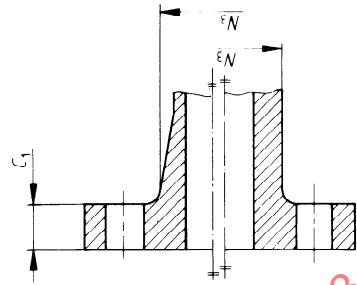


DN	h ₅	r
DN ≤ 100	15	3
125 ≤ DN ≤ 250	15	5
300 ≤ DN ≤ 350	16	5
400 ≤ DN ≤ 450	16	7
500 ≤ DN ≤ 600	20	7

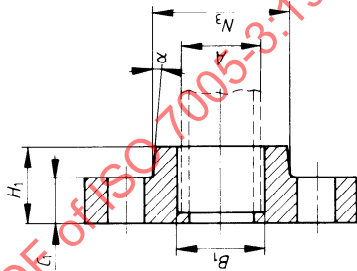


This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.
Refer to the column "number of bolts" in table 9 for the actual number.

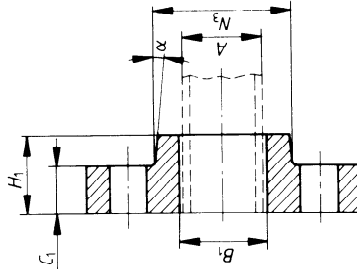
Type 21



Type 14



Type 12



Type 11

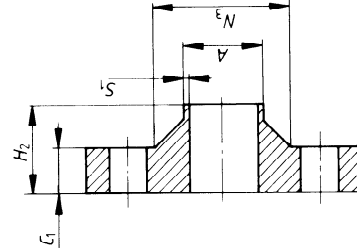


Table 9 — Dimensions of ISO PN50 flanges

Nominal size	Tube outside diameter	Mating dimensions				Dimensions in millimetres																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
		Outside diameter of flange	Diameter of bolt circle	Diameter of bolt holes	Number	Nominal size of bolts	Flange thickness		Hub diameter		Neck diameter		Collar diameter		Length through hub or collar	Inner collar flange thickness	Inner flange collar thickness	Cladding thickness	Collar or raised face diameter	Bore of flange or collar	Bore of backing flange	Chamber																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
							C ₂	C ₁	N ₃	N ₁	H ₁	H ₂	S _{1min}	S _{2min}									F	D ₁	B ₁	B ₂	E																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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DN	A	D	K	L	4	M14	14,5	16	16	11	13	21	30	18	21	35	16	52	1,5	2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

NOTES

- For type 12 and type 14 flanges of all nominal sizes, $\alpha = 4^\circ$ max.
- Dimension E is given for information only.