International Standard 3669

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Vacuum technology — Bakable flanges — Dimensions

Technique du vide — Brides étuvables — Dimensions

First edition — 1986-02-15

UDC 533.5 : 621.643.412-181 **Ref. No. ISO 3669-1986 (E)**

Descriptors : vacuum technology, flanges, dimensions.

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 3669 was prepared by Technical Committee ISO/TC 112, *Vacuum technology*.

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.

Printed in Switzerland

Vacuum technology — Bakable flanges — Dimensions

1 Scope and field of application

This International Standard specifies the dimensions of fixed or rotatable bolted bakable flanges used in vacuum systems where pressure under steady conditions is less than 10^{-5} Pa (10^{-7} mbar). These flanges may also be used in those parts connected with the vacuum system where the vacuum is not so high.

It defines two series of bakable flanges:

— a preferred series (see figure 1 and table 1) the main dimensions of which ensure compatibility with already standardized non-bakable flanges (see ISO 1609);

— a secondary series (see figure 2 and table 2) corresponding to flanges in common use.

2 References

ISO 3, *Preferred numbers — Series of preferred numbers.*

ISO 286, *ISO system of limits and fits.* [1)]

ISO 1609, *Vacuum technology — Flange dimensions.*

3 Dimensions

3.1 General

3.1.1 The dimensions given in tables 1 and 2 do not include allowance for machining.

3.1.2 The selection of the material shall be compatible with the requirements for those flanges (baking, sealing capacity, type of seal gasket used, profile, thickness of flange) and with the dimensions indicated.

3.1.3 In order to ensure interchangeability of vacuum components, the flanges shall be aligned so that the bolt holes are spaced equidistantly about and off the symmetrical plane of the component. (This does not apply to flanges with six bolt holes used in the secondary series.)

3.2 Nominal bore

3.2.1 The nominal bores indicated in tables 1 and 2 provide a series of values intended to identify the flanges.

3.2.2 These values follow the progression of the preferred numbers of the R5 series, plus, for the secondary series of flanges, diameter 200 of the R10 series (see ISO 3).

3.2.3 Nominal bores 63 and 160 in tables 1 and 2 correspond to diameters in practice of 70 mm (or 65 mm) and 153 mm, respectively.

3.3 Mating face

3.3.1 Definition

The mating face (which is flat or in the form of a profile) is the area in the form of a ring, the surface finish or the profile of which makes effective sealing of the joint possible.

The profile of the mating face is not specified and is left to agreement between the manufacturer and the user.

3.3.2 Limits

For the preferred series, the minimum mating face area is defined by diameters E and F.

For the secondary series, the mating face area is defined by diameters F and T.

3.4 Number of bolt holes

The linear sealing loads tabulated in the annex for a given bolt stress are derived from the values of the number of bolt holes, n.

3.5 Particular requirements

For dismounting the couplings, it is recommended that the flanges be provided with a device (on the initiative of the manufacturer) to make it easier to separate them.

1) At present at the stage of draft. (Revision of ISO/R 286-1962.)

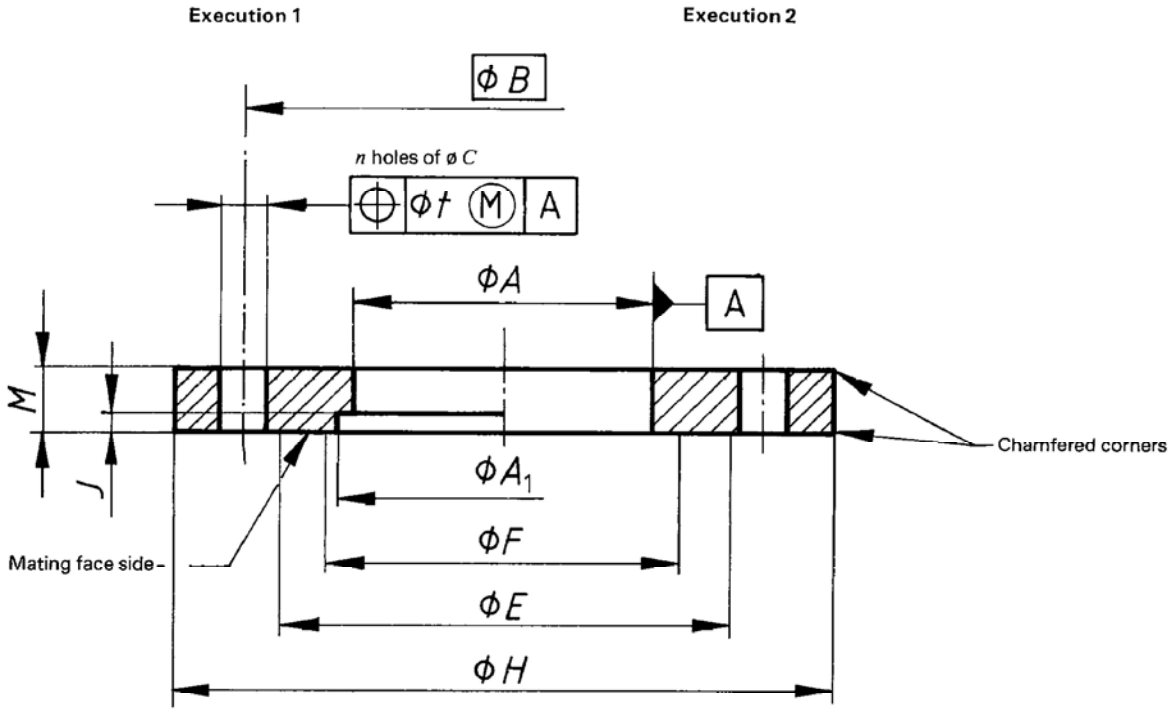


Figure 1 — Preferred series of flanges

Table 1 — Preferred series of flange dimensions

Dimensions in millimetres

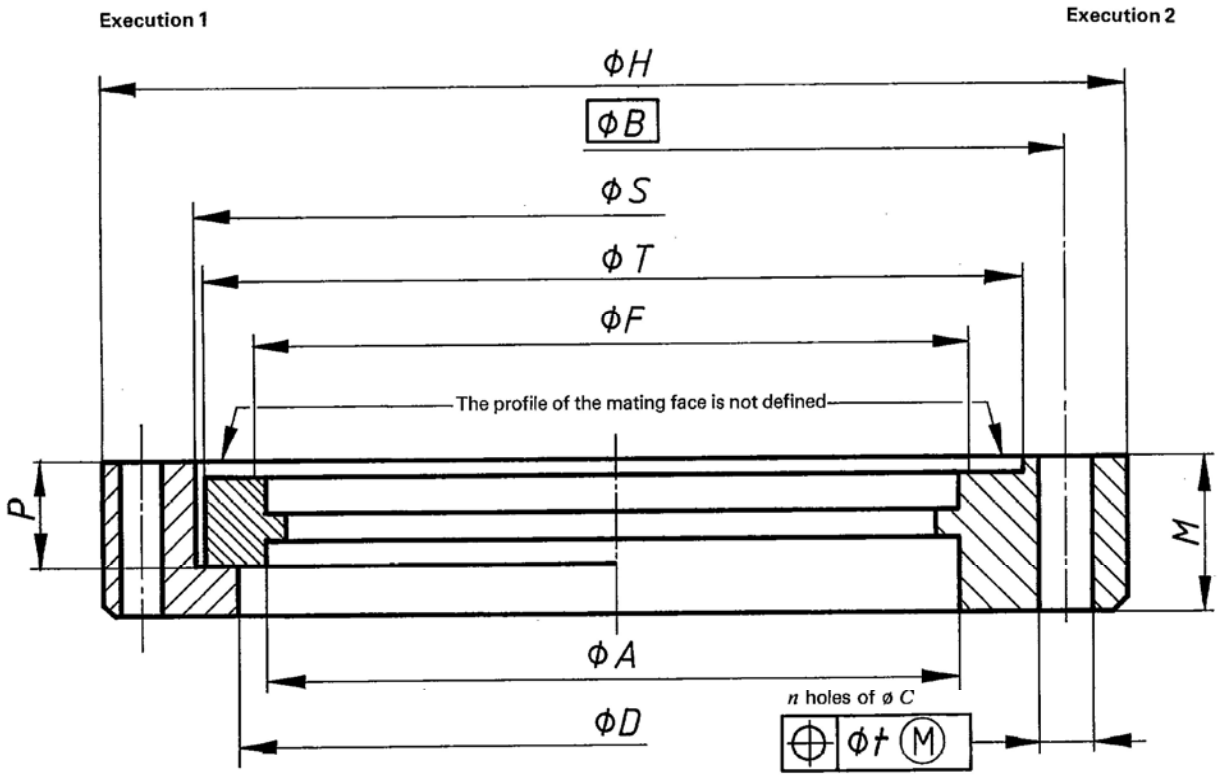
Nominal bore	$A^{1)}$	H h13	$M^{2)}$	B	Bolts		Equispaced holes C		A_1 H11	$J^{3)}$ min.	E	F
					Number	Diameter	Diameter H13	t				
10	10	55	12	40	8	6	6,6	0,6	12,2	2,5	30	12,2
16	16	60	12	45	8	6	6,6	0,6	17,2	2,5	35	17,2
25	24	70	12	55	12	6	6,6	0,6	26,2	2,5	45	26,2
40	41,2	100	16	80	12	8	9	1	41,2	2,5	65	41,2
63	70	130	16	110	16	8	9	1	70	2,5	95	70
100	102	165	20	145	24	8	9	1	102	2,5	130	102
160	153	225	20	200	24	10	11	1	153	4,5	180	153
250	261	335	24	310	36	10	11	1	261	4,5	290	261
400	400	510	24	480	48	12	14	2	400	4,5	450	400
630	651	750	30	720	80	12	14	2	651	4,5	690	651
1 000	1 000	1 120	30	1 090	96	12	14	2	1 000	4,5	1 060	1 000

1) Given for guidance only and depends on the tube and the method of welding.

2) Given for guidance only and corresponds to commonly used austenitic stainless steel flanges.

3) Minimum height over which dimension A_1 shall be respected.

NOTE — Tolerances for diameters H, C and A_1 are specified in accordance with ISO 286.



NOTE — The sealing profile shall not protrude above the plane of the rotatable and fixed flanges.

Figure 2 — Secondary series of flanges

Table 2 — Secondary series of flange dimensions

Dimensions in millimetres

Nominal bore	A[1] max.	D H14	H	M[1]	B	Number of bolts	C H13	t	P	S JS9	T c8	F
16	18,5[2]	19,3	34	8	27	6[2]	4,4[2]	0,4	5,8	21,4	21,4	18,5
40	38,5	39	70	13	58,7	6	6,6	0,6	7,6	48,3	48,3	38,5
63	66,5	67	114	18	92,1	8	8,4	0,4	12,7	82,6	82,6	66,5
100	104,5	105[3]	152	21	130,2	16	8,4	0,4	14,3[3]	120,7	120,7	104,5
160	155	155,5[3]	202	22	181	20	8,4	0,4	15,8[3]	171,5	171,5	155
200	206	206,5[3]	253	25	231,8	24	8,4	0,4	17,2[3]	222,3	222,3	206
250	256	260[3]	306	25	284	32	8,4	0,4	17,2[3]	273	273	255

1) Given for guidance only and corresponds to commonly used austenitic stainless steel flanges.

2) The bolts to be used are not standardized and should generally be ordered with the flange.

3) Attention is drawn to the precautions to be taken during welding to avoid deformation of the mating face.

NOTE — Tolerances for diameters D, C, S and T are specified in accordance with ISO 286. Tolerance for dimension P depends on the dimension and tolerance for the thickness of the fixed flange.

Annex

Linear sealing loads

(This annex does not form an integral part of the standard and is for information purposes only.)

A.1 In the case of table 1 dimensions

The values given in the tabulated form below have been calculated for each flange under the following conditions:

P_{500}/B is the linear sealing load, expressed in newtons per millimetre, exerted at the bolt circle ($\varnothing B$), by the uniform tightening of n bolts to a stress of 500 MPa, the cross-sectional area of the bolt being s (in square millimetres).

Hence

$$P_{500}/B = \frac{500ns}{\pi B}$$

Flanges are expected not to have been deformed during tightening.

In practice, it is necessary to calculate the linear sealing load on the basis of the mean diameter of the seal.

Nominal bore	P_{500}/B N/mm
10	610
16	550
25	670
40	850
63	810
100	940
160	1 070
250	1 000
400	1 300
630	1 430
1 000	1 100

A.2 In the case of table 2 dimensions

The values given in the tabulated form below correspond to the linear sealing loads, expressed in newtons per millimetre, exerted at the level of the mating face and are based on a bolt stress of 200 MPa.

Nominal bore	Linear sealing load N/mm
16	134
40	200
63	240
100	320
160	280
200	256