

Pipe fittings and joint assemblies for pressure pipes
made from types PE 80 and PE 100 polyethylene
Dimensions of bushings, flanges and sealing elements,
for socket welding

DIN
16963-11

ICS 23.040.45; 23.040.60; 23.040.80

Supersedes
August 1980 edition.

Rohrverbindungen und Formstücke für Druckrohrleitungen
aus Polyethylen (PE) – PE 80 und PE 100 – Teil 11: Bunde,
Flansche, Dichtringe für Muffenschweißung – Maße

In keeping with current practice in standards published by the International Organization for Standardization (ISO), a comma has been used throughout as the decimal marker.

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Foreword

This standard has been prepared by Technical Committee *Fittings für Druckrohre aus Thermoplasten* of the *Normenausschuss Kunststoffe* (Plastics Standards Committee).

Amendments

This standard differs from the August 1980 edition as follows:

- Some bushing dimensions have been changed to comply with those of welding necks.
- Specifications for the thickness of gaskets and for marking bushings have been included.
- In the case of bushings with an outside diameter of 90 mm, dimension d_5 has been amended.
- Material designation now conforms to DIN 16963-5 and table 5 has been revised accordingly.

Previous edition

DIN 16963-11: 1980-08.

All dimensions are in millimetres.

Continued on pages 2 to 8.

Translation by DIN-Sprachendienst.

In case of doubt, the German-language original should be consulted as the authoritative text.

1 Scope

This standard specifies dimensions and tolerances for injection-moulded bushings with a standard dimension ratio (SDR*) of 11, and flanges for socket welding, including flanged assemblies as in DIN 16963-5, and for the appropriate sealing elements, for jointing pressure pipes made from type PE 100 or PE 80 polyethylene, as specified in DIN 8074 and DIN 8075, or for jointing such pipes with pipes made of different materials.

NOTE: Any relevant European Standards which cover such applications shall also be observed.

2 Normative references

This standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the titles of the publications are listed below. For dated references, subsequent amendments to or revisions of any of these publications apply to this standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

DIN 2501-1	Flanges – Mating dimensions
DIN 8063-4	Pipe fittings and joint assemblies for unplasticized polyvinyl chloride (PVC-U) pressure pipes – Bushings, flanges and seals – Dimensions
DIN 8063-5	Pipe fittings and joint assemblies for unplasticized polyvinyl chloride (PVC-U) pressure pipes – General quality requirements and testing
DIN 8074	Polyethylene (PE) pipes – Dimensions
DIN 8075	Polyethylene (PE) pipes – General quality requirements and testing
DIN 16872	Glass fibre reinforced polyester resin (UP-GRP) flanges for use with thermoplastics pipe fittings – Dimensions
DIN 16901	Plastics mouldings – Tolerances and acceptance conditions for linear dimensions
DIN 16963-4	Pipe fittings and joint assemblies for high-density polyethylene (PE-HD) pressure pipes – Adaptors for heated tool butt welding, flanges and sealing elements – Dimensions
DIN 16963-5	Pipe fittings and joint assemblies for pressure pipes made from types PE 80 and PE 100 polyethylene – General quality requirements and testing
DIN 28091-1	Sheet gasket materials – General
DIN 28091-2	Sheet gasket materials – Technical delivery conditions for compressed fibre gasket materials
DIN EN 573-3	Chemical composition and form of aluminium and aluminium alloy wrought products – Chemical composition
DIN EN 681-1	Elastomeric seals – Material requirements for pipe joint seals used in water and drainage applications – Part 1: Vulcanized rubber
DIN EN 1092-1	Flanges and their joints – Circular flanges for pipes, valves, fittings and accessories ¹⁾
DIN EN 1561	Founding – Grey cast iron
DIN EN 10025	Hot rolled unalloyed structural steel products – Technical delivery conditions (includes Amendment A1 : 1993)
DIN EN 10088-1	Stainless steels – Part 1: List of stainless steels
DIN EN 60893-1	Specification for industrial rigid laminated sheets based on thermosetting resins for electrical purposes – Part 1: Definitions, designations and general requirements (IEC 60893-1 : 1987)
ISO 4065 : 1996	Thermoplastics pipes – Universal wall thickness

3 Dimensions and designation

The item numbers given in brackets refer to the assemblies shown in clause 5.3.1.

3.1 General

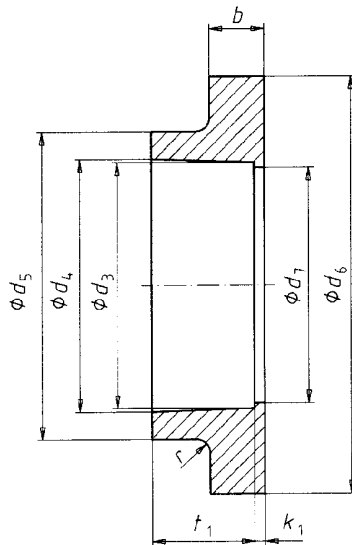
The designs shown are for illustrative purposes only; however, the dimensions of bushings, flanges and sealing elements shall be as specified. Tolerances shall be as specified in DIN 16901, corresponding to tolerance class 150.

*) SDR – nominal value of diameter/wall thickness ratio of fittings as specified in DIN 8074.

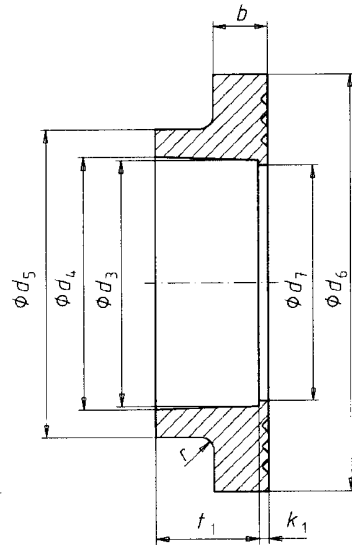
¹⁾ Currently at draft stage.

3.2 Flanged bushings

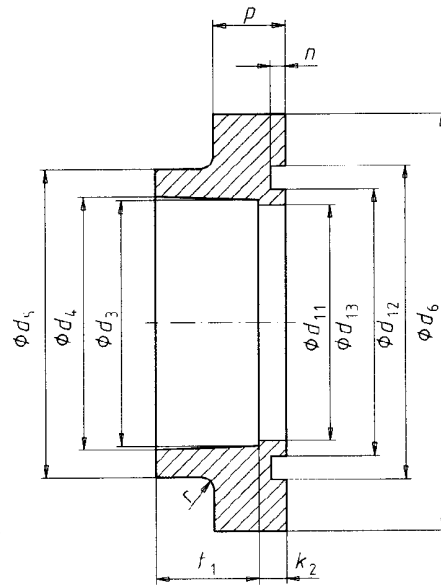
Flanged bushing with flat face (no. 9)



Flanged bushing with ribbed face (no. 9A)



Flanged bushing with grooved face (no. 12)



Designation of a flanged bushing with flat face for type A socket welding (9), made from type PE 80 polyethylene, for use with pipes with an outside diameter, d_1 , of 75 mm:

Bushing DIN 16963 – 9 – A75 – PE 80

Designation of a flanged bushing with ribbed face for type A socket welding (9A), made from type PE 100 polyethylene, for use with pipes with an outside diameter, d_1 , of 75 mm:

Bushing DIN 16963 – 9A – A75 – PE 100

Designation of a flanged bushing with grooved face for type B socket welding (12), made from type PE 100 polyethylene, for use with pipes with an outside diameter, d_1 , of 75 mm:

Bushing DIN 16963 – 12 – B75 – PE 100

Table 1: Flanged bushings (nos. 9, 9A and 12)

Pipe outside diameter, d_1	b	$d_3^{1)}$				$d_4^{1)}$				Maximum ovality ²⁾	d_5	
		Type A		Type B		Type A		Type B			Limit deviations	
		Limit deviations		Limit deviations		Limit deviations		Limit deviations				
16	6	15,4	—	0	—	15,5	—	0	—	0,4	22	$\pm 0,1$
20	7	19,3	—	-0,3	—	19,5	—	-0,3	—	0,4	27	$\pm 0,15$
25	9	24,3	—	0	—	24,5	—	-0,4	—	0,4	33	$\pm 0,15$
32	10	31,3	—			31,5	—			0,5	41	
40	11	39,2	—	-0,4	—	39,4	—	-0,4	—	0,5	50	$\pm 0,2$
50	12	49,2	—			49,4	—			0,6	61	
63	14	62,1	—	0	—	62,5	—	-0,5	—	0,6	76	$\pm 0,3$
75	16	73,7	73,9	-0,5	—	74,9	74,2	-0,5	—	1	90	
90	17	88,5	88,8	0	—	89,9	89,2	-0,6	—	1	108	
110	18	108,3	108,6	-0,6	—	110	109	-0,6	—	1	131	

- 1) The average inside diameter is to be calculated as the arithmetic mean of two measurements taken at right angles to each other in the same plane.
 2) Ovality is the difference between the maximum and minimum inside diameter, measured in the same plane.
 3) For type A, where d_1 is 63 mm or less, $t_1 = 0,3 d_1 + 8,5$ mm.
 For type A, where d_1 is 75 mm or more, $t_1 = 0,2 d_1 + 15$ mm.
 For type B, where d_1 is 75 mm or more, $t_1 = 0,3 d_1 + 8,5$ mm.

(continued)

Table 1 (concluded)

Pipe outside diameter, d_1	d_6	d_7	d_{11}	d_{12}		d_{13}		n	p	r	t_1 min. ³⁾		k_1	k_2
				Limit deviations	Limit deviations	± 0,1	Type A				Type B	min.		
16	40	13	13	25	0	16,2	-0,1	2,8	9	3	13	—	3	6
20	45	16	16	29,7		20,9		2,8	10	3	14,5	—	3	6
25	58	21	21	34,5		25,7		2,8	12	3	16	—	3	6
32	68	28	28	42,4		33,6		2,8	13	3	18	—	3	6
40	78	36	36	53,7	0	40,1	-0,2	4,3	16	3	20,5	—	3	8
50	88	45	45	63,2		49,6		4,3	17	3	23,5	—	3	8
63	102	57	57	78,9		65,3		4,3	19	4	27,5	—	3	8
75	122	69	69	91,6		78		4,3	21	4	30	31	3	8
90	138	84	84	110,5	0	96,9	-0,3	4,3	22	4	33	35,5	5	10
110	158	102	102	132,8		114,8		5,6	24	4	37	41,5	5	10

3.3 Flanges (no. 11)

Dimensions of flanges for use with pipes with an outside diameter, d_1 , of from 20 mm to 75 mm shall be in accordance with DIN 16963-4 and those for flanges for use with pipes with outside diameters of 16 mm, 90 mm or 110 mm shall be in accordance with DIN 16963-11 (cf. table 2). The flange thickness, t_2 , shall be left to the manufacturer's choice, taking account of the material used (cf. table 5).

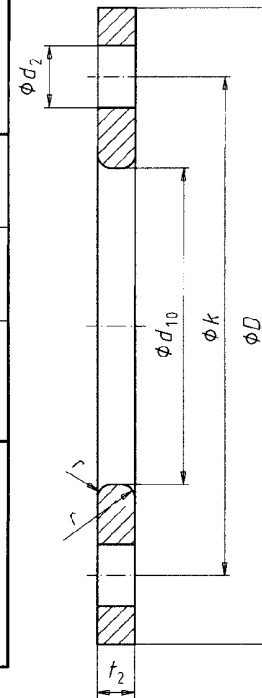
Designation of a flange (no. 11) made from steel as in DIN EN 10025 (St), for use with pipes of outside diameter 90 mm, rated for a nominal pressure of 16 bar (PN 16):

Flange DIN 16963 – 11 – 90 – 16 – St

Table 2: Flanges (no. 11)

Pipe outside diameter, d_1	Nominal flange size DN	d_{10}		PN 16 ¹⁾					r	Flange type
		Limit deviations	D	k	Bolts		d_2			
					Number	Thread size				
16	10	23	0 -0,5	90	60	4	M12	14	3	DIN 16963-11-16-16 ^{3) 4)}
20	15	28		95	65	4	M12	14	3	DIN 16963-2-20-10 ^{1) 3) 4)}
25	20	34		105	75	4	M12	14	3	DIN 16963-2-25-10 ^{1) 3) 4)}
32	25	42	0 -0,5	115	85	4	M12	14	3	DIN 16963-2-32-10 ^{1) 3) 4)}
40	32	51		140	100	4	M16	18	3	DIN 16963-2-40-10 ^{1) 3) 4)}
50	40	62		150	110	4	M16	18	3	DIN 16963-2-50-10 ^{1) 3) 4)}
63	50	78	0 -1	165	125	4	M16	18	3	DIN 16963-2-63-10 ^{1) 3) 4)}
75	65	92		185	145	4 ²⁾	M16	18	3	DIN 16963-2-75-10 ^{1) 3) 4)}
90	80	110		200	160	8	M16	18	3	DIN 16963-11-90-16 ^{3) 4)}
110	100	133		220	180	8	M16	18	3	DIN 16963-11-110-16 ^{3) 4)}

- 1) Dimensions and other details have been taken from DIN 2501-1 and DIN EN 1092-1 for PN 16.
- 2) The number of bolts is as specified in DIN 2501-1.
- 3) Material selection and designation as specified in table 5.
- 4) Flanges to be used for pipes with an outside diameter of 20 mm or greater, and made from glass fibre reinforced polyester resin shall be designated as in DIN 16872.



3.4 Sealing elements

3.4.1 Gaskets (no. 10)

Dimensions of gaskets shall be in accordance with DIN 16963-11 (cf. table 3).

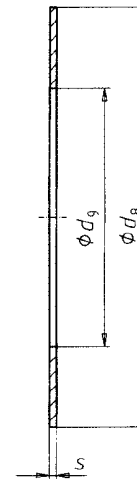
Designation of a gasket (no. 10) with an outside diameter, d_1 , of 50 mm:

Gasket DIN 16963 – 10 – 50

Table 3: Gasket (no. 10)

Pipe outside diameter, d_1	d_8 ¹⁾	d_9 ²⁾	s ³⁾	Gasket designation
16	40	16	2	DIN 16963-10-16
20	45	20	2	DIN 16963-10-20
25	58	25	2	DIN 16963-10-25
32	68	32	2	DIN 16963-10-32
40	78	40	2	DIN 16963-10-40
50	88	50	2	DIN 16963-10-50
63	102	63	2	DIN 16963-10-63
75	122	75	2	DIN 16963-10-75
90	138	90	2	DIN 16963-10-90
110	158	110	3	DIN 16963-10-110

- 1) Identical with collar diameter, d_6 .
- 2) Identical with pipe outside diameter, d_1 .
- 3) Thickness for fibre-reinforced gasket materials as in DIN 28091-1 and DIN 28091-2. In the case of rubber gaskets, their thickness shall be selected on the basis of their hardness class (e.g. for rubber hardness class IRHD 60 (cf. DIN EN 681-1) a gasket thickness of 5 mm is recommended).

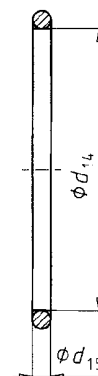


3.4.2 O-rings (no. 13)

Dimensions of O-rings shall be in accordance with DIN 8063-4 (cf. table 4).

Table 4: O-rings (no. 13)

Pipe outside diameter, d_1	d_{14}		d_{15}		O-ring designation
		Limit deviations		Limit deviations	
16	18,6	± 0,3	3,5	± 0,1	DIN 8063-16-16
20	23,4	± 0,4	3,5	± 0,1	DIN 8063-16-20
25	28,2	± 0,4	3,5	± 0,1	DIN 8063-16-25
32	36,1	± 0,4	3,5	± 0,1	DIN 8063-16-32
40	43,8	± 0,5	5,3	± 0,13	DIN 8063-16-40
50	53,3	± 0,5	5,3	± 0,13	DIN 8063-16-50
63	69,2	± 0,7	5,3	± 0,13	DIN 8063-16-63
75	81,9	± 0,7	5,3	± 0,13	DIN 8063-16-75
90	101	± 0,7	5,3	± 0,13	DIN 8063-16-90
110	120	± 0,7	7	± 0,15	DIN 8063-16-110



4 Material

Table 5: Material to be used

Item no.	Component	Material								
		GG	St	X	Al	Sp	PVC-U	UP-GF	PP/F/St	PE 80 PE 100
9	Flanged bushing with flat face	-	-	-	-	-	-	-	-	+
9A	Flanged bushing with ribbed face	-	-	-	-	-	-	-	-	+
10	Gasket	As appropriate for type, concentration and temperature of fluid conveyed.								
11	Flange	+	+	+	+	+	+	+	+	-
12	Flanged bushing with grooved face	-	-	-	-	-	-	-	-	+
13	O-ring	As appropriate for type, concentration and temperature of fluid conveyed.								

Key:

- GG grey cast iron
- St steel as in DIN EN 10025
- X stainless steel as in DIN EN 10088-1
- Al aluminium or aluminium alloys as in DIN EN 573-3
- Sp laminated material as in DIN EN 60893-1
- PVC-U unplasticized polyvinyl chloride as in DIN 8063-5
- UP-GF glass fibre reinforced polyester resin as in DIN 16872
- PP/F/St steel reinforced polypropylene (in accordance with manufacturer's specifications)
- PE 80 } polyethylene as in DIN 16963-5
- PE 100 }
- + suitable
- unsuitable

5 Flanged assemblies

Table 6: Correlation of nominal sizes with pipe outside diameters

Nominal size			Mean pipe outside diameter, d_1		
Type F 4	Type F 4A	Type F 5	Nominal size	Limit deviations	
				Pipe unpeeled Type A	Pipe peeled Type B
10	10	10	16	+0,3 0	0 -0,2
15	15	15	20		
20	20	20	25		
25	25	25	32		
32	32	32	40		
40	40	40	50	+0,4 0	0 -0,3
50	50	50	63		
65	65	65	75		
80	80	80	90		
100	100	100	110	+0,6 0	0 -0,4

Assemblies of the following types can be produced using the bushings, flanges and sealing elements dealt with in clause 3.

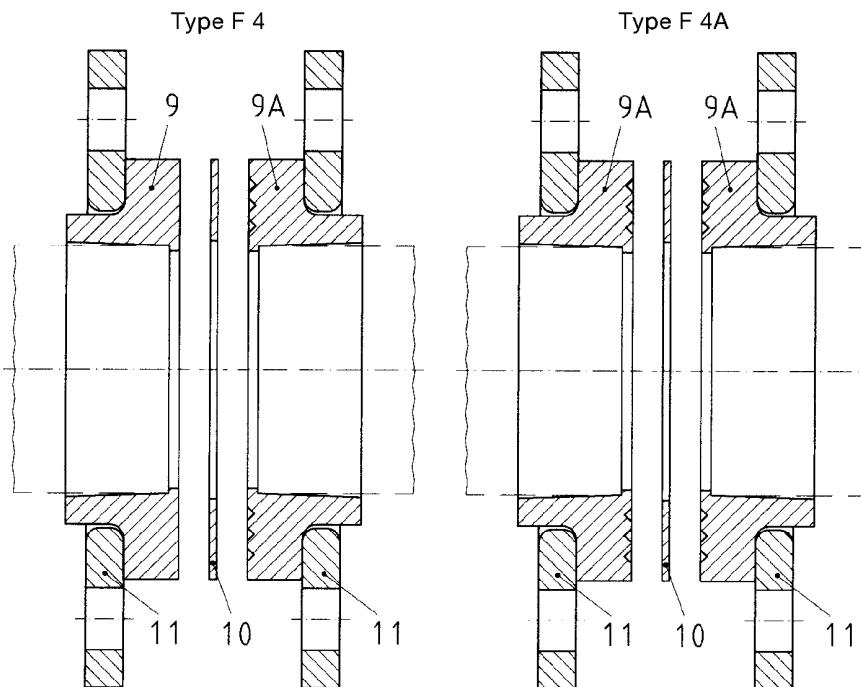


Table 7: Parts list for type F 4

No.	Name
9	Flanged bushing with flat face
9A	Flanged bushing with ribbed face
10	Gasket
11	Flange

Table 8: Parts list for type F 4A

No.	Name
9A	Flanged bushing with ribbed face
10	Gasket
11	Flange

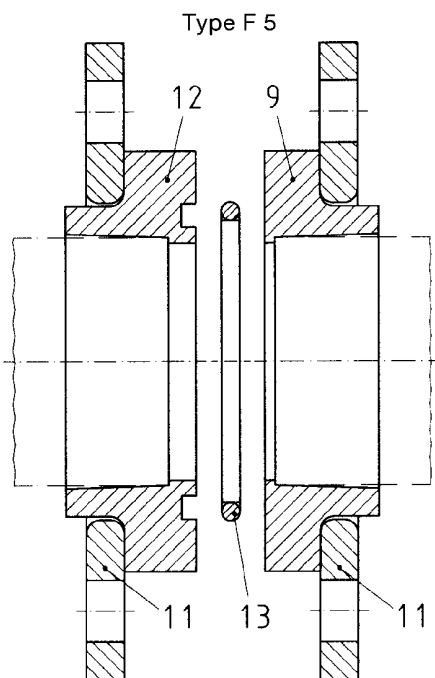


Table 9: Parts list for type F 5

No.	Name
9	Flanged bushing with flat face
11	Flange
12	Flanged bushing with grooved face
13	O-ring

6 Marking

Flanged bushings which conform to this standard shall be marked indelibly with the information specified in table 10.

Table 10: Marking flanged bushings (example)

Manufacturer's mark	xyz
Material symbol	PE 100
Production details ¹⁾	
SDR series	SDR 11 ²⁾
Pipe outside diameter (nominal size)	32
¹⁾ Information in coded or uncoded form shall identify the production period and manufacturer's works. ²⁾ Alternatively, pipe series S 5 as in ISO 4065 may be given.	

Marking as in clause 6 shall also be used for fittings which are not covered by other relevant standards or codes of practice.

Other relevant standards

DIN 7728-1 Plastics – Symbols for polymers and their special characteristics
 DIN EN ISO 1043-1 Plastics – Symbols and abbreviated terms – Part 1: Basic polymers and their special characteristics (ISO 1043-1 : 1997)