

Steel butt-welding pipe fittings
Eccentric reducers with reduced pressure factor

DIN
2616
Part 1

Formstücke zum Einschweißen; Reduzierstücke; verminderter Ausnutzungsgrad

This standard, together with February 1991 edition of DIN 2616 Part 2, supersedes June 1964 edition of DIN 2616.

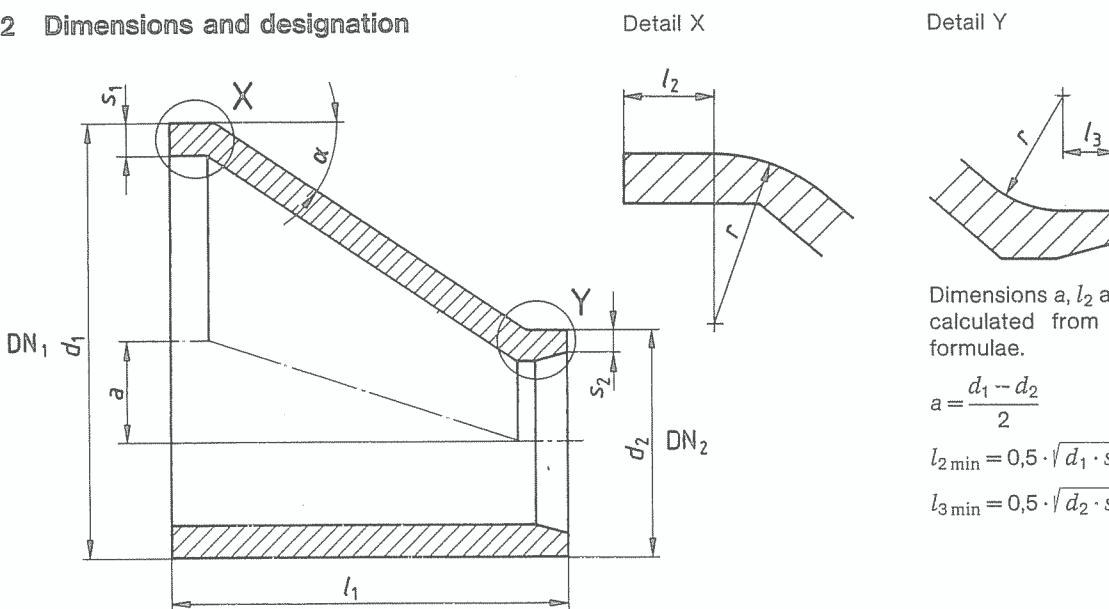
In keeping with current practice in standards published by the International Organization for Standardization (ISO), a comma has been used throughout as the decimal marker.

Dimensions in mm

1 Field of application

This standard specifies seamless and welded eccentric steel reducers that are intended to be butt welded to pipes. Although the wall thicknesses specified correspond to those of the pipes, these reducers do not permit operation at the same internal pressure as the pipe welded to the larger end of the reducer, i.e. they have a reduced pressure factor (cf. table 2 and clause 4). See DIN 2616 Part 2 for specifications regarding concentric reducers.

2 Dimensions and designation



Dimensions a, l₂ and l₃ are to be calculated from the following formulae.

$$a = \frac{d_1 - d_2}{2}$$

$$l_{2\min} = 0,5 \cdot \sqrt{d_1 \cdot s_1}$$

$$l_{3\min} = 0,5 \cdot \sqrt{d_2 \cdot s_2}$$

Figure 1. Eccentric reducer

Designation of a seamless (S), eccentric (E) reducer in accordance with this standard (1), where d₁ is equal to 114,3 mm, s₁ is equal to 3,6 mm, d₂ is equal to 60,3 mm and s₂ is equal to 2,9 mm, made from material belonging to material group G as in DIN 2609 (G):

Reducer DIN 2616-1-E-114,3 x 3,6-60,3 x 2,9 S-G

Table 1. Minimum transition radii

Nominal size DN	Minimum radius, r
15 to 50	20
65 to 300	30
350 to 600	100
700 or more	120

Continued on pages 2 to 7

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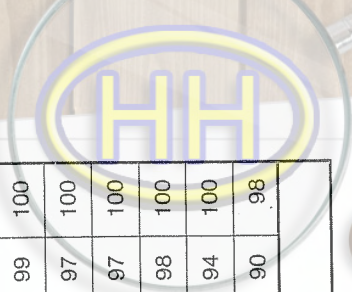


Table 2. Dimensions and pressure factor as a function of size

Nominal size DN ₁	Diameter, d ₁	Wall thickness, s ₁ , for series					Nominal size DN ₂	Diameter, d ₂	Wall thickness, s ₂ , for series					l ₁	Maximum pressure factor, as a percentage, for series				
		1	2	3	4	5			1	2	3	4	5		1	2	3	4	5
15	21,3	1,6	2,0	3,2	4,0	10	17,2	1,6	1,8	2,9	—	38	97	—	95	91	—		
																		15	21,3
20	26,9	1,6	2,3	3,2	4,0	10	17,2	1,6	1,8	2,9	—	38	100	—	100	100	—		
																		20	26,9
25	33,7	2,0	2,6	3,2	4,0	15	21,3	1,6	2,0	3,2	4,0	50	100	—	100	100	100		
																		25	33,7
32	42,4	2,0	2,6	3,6	4,0	20	26,9	1,6	2,3	3,2	4,0	50	100	—	100	100	100		
																		32	42,4
40	48,3	2,0	2,6	4,0	5,0	25	33,7	2,0	2,6	3,2	4,0	64	99	—	99	98	100		
																		40	48,3
50	60,3	2,0	2,9	4,5	5,6	20	26,9	1,6	2,3	3,2	4,0	76	97	—	98	99	100		
																		50	60,3
65	76,1	2,3	2,9	5,0	7,1	25	33,7	2,0	2,6	3,6	4,0	90	95	—	96	99	100		
																		65	76,1
80	88,9	2,3	3,2	5,6	8,0	25	33,7	2,0	2,6	3,6	4,0	90	93	—	94	97	100		
																		80	88,9
						32	42,4	2,0	2,6	3,6	4,0		83	—	85	90	98		
																		32	42,4

A dash in a box indicates a size that has not been standardized.



Table 2 (continued).

Nominal size DN ₁	Diameter, d ₁	Wall thickness, s ₁ , for series					α α° max.	Nominal size DN ₂	Diameter, d ₂	Wall thickness, s ₂ , for series					l ₁	Maximum pressure factor, as a percentage, for series				
		1	2	3	4	5				1	2	3	4	5		1	2	3	4	5
100	114,3	2,6	—	3,6	6,3	8,8	24	80	88,9	2,3	—	3,2	5,6	8,0	100	97	—	98	98	100
										2,3	—	2,9	5,0	7,1		91	—	92	94	99
										2,0	—	2,9	4,5	5,6		79	—	80	84	94
125	139,7	2,6	—	4,0	6,3	10,0	35	80	88,9	2,6	—	3,6	6,3	8,8	127	98	—	98	98	100
										2,3	—	3,2	5,6	8,0		91	—	92	94	97
										2,3	—	2,9	5,0	7,1		85	—	86	88	88
150	168,3	2,6	4,0	4,5	7,1	11,0	43	65	76,1	2,0	—	2,9	4,5	5,6	140	76	—	78	81	83
										2,6	4,0	4,0	6,3	10,0		98	98	98	98	100
										2,6	3,6	3,6	6,3	8,8		91	92	92	92	97
200	219,1	2,9	4,5	6,3	8,0	12,5	48	80	88,9	2,3	3,2	3,2	5,6	8,0	152	78	79	80	82	88
										2,3	2,9	2,9	5,0	7,1		73	75	75	78	83
										2,6	4,0	4,5	7,1	11,0		92	92	93	94	97
250	273,0	2,9	5,0	6,3	8,8	14,2	52	65	76,1	2,6	4,0	4,0	6,3	8,8	178	79	81	82	83	88
										2,6	3,6	3,6	6,3	8,8		67	68	70	71	76
										2,3	3,2	3,2	5,6	8,0		58	59	61	62	67
300	323,9	2,9	5,6	7,1	10,0	16,0	28	200	219,1	2,9	4,5	6,3	8,0	12,5	203	93	94	94	95	97
										2,6	4,0	4,0	6,3	8,8		75	76	77	79	83
										2,6	4,0	4,0	6,3	10,0		65	67	68	70	74
300	323,9	2,9	5,6	7,1	10,0	16,0	48	150	168,3	2,6	3,6	3,6	6,3	8,8	203	58	59	60	62	66
										2,6	3,6	3,6	6,3	8,8		58	59	60	62	66
										2,9	5,0	6,3	8,8	14,2		95	96	96	96	98
300	323,9	2,9	5,6	7,1	10,0	16,0	55	125	139,7	2,9	4,5	6,3	8,0	12,5	203	78	80	81	82	86
										2,6	4,0	4,0	6,3	8,8		64	66	67	70	73
										2,6	4,0	4,0	6,3	10,0		57	59	60	61	65

A dash in a box indicates a size that has not been standardized.

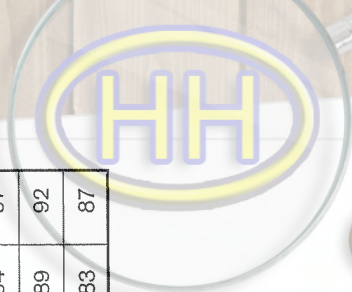


Table 2 (continued).

Nominal size DN ₁	Diameter, d ₁	Wall thickness, s ₁ , for series					α α _{max} , °	Nominal size DN ₂	Diameter, d ₂	Wall thickness, s ₂ , for series					l ₁	Maximum pressure factor, as a percentage, for series				
		1	2	3	4	5				1	2	3	4	5		1	2	3	4	5
350	355,6	3,2	5,6	8,0	11,0	17,5	8	300	323,9	2,9	5,6	7,1	10,0	16,0	330	99	99	99	98	99
										2,9	5,0	6,3	8,8	14,2		96	97	97	97	100
										2,9	4,5	6,3	8,0	12,5		89	90	91	93	96
400	406,4	3,2	6,3	8,8	12,5	20,0	15	350	355,6	3,2	5,6	8,0	11,0	17,5	355	99	99	99	99	100
										2,9	5,6	7,1	10,0	16,0		96	97	97	97	100
										2,9	5,0	6,3	8,8	14,2		89	90	91	92	96
450	457,0	4,0	6,3	10,0	14,2	22,2	11	400	406,4	3,2	6,3	8,8	12,5	20,0	381	99	99	99	98	99
										3,2	5,6	8,0	11,0	17,5		96	96	97	97	99
										2,9	5,6	7,1	10,0	16,0		92	93	94	95	97
500	508,0	4,0	6,3	11,0	16,0	25,0	18	450	457,0	4,0	6,3	10,0	14,2	22,2	508	99	99	99	98	99
										3,2	6,3	8,8	12,5	20,0		98	98	98	98	100
										3,2	5,6	8,0	11,0	17,5		94	94	95	96	98
500	508,0	4,0	6,3	11,0	16,0	25,0	27	350	355,6	3,2	5,6	8,0	11,0	17,5	508	91	92	93	94	97
										2,9	5,6	7,1	10,0	16,0		85	86	87	89	92
										2,9	5,0	6,3	8,8	14,2		78	80	82	83	87
500	508,0	4,0	6,3	11,0	16,0	25,0	40	250	273,0	2,9	5,0	6,3	8,8	14,2	508	85	86	87	89	92
										2,9	5,0	6,3	8,8	14,2		78	80	82	83	87
										2,9	4,5	6,3	8,0	12,5		75	76	78	80	84



Table 2 (continued).

Nominal size DN ₁	Diameter, d ₁	Wall thickness, s ₁ , for series					α α _{max} , °	Nominal size DN ₂	Diameter, d ₂	Wall thickness, s ₂ , for series					l ₁	Maximum pressure factor, as a percentage, for series				
		1	2	3	4	5				1	2	3	4	5		1	2	3	4	5
600	610,0	5,0	6,3	12,5	17,5	30,0	17	500	508,0	4,0	6,3	11,0	16,0	25,0	508	98	98	98	98	98
										4,0	6,3	10,0	14,2	22,2		94	94	95	95	97
										3,2	6,3	8,8	12,5	20,0		88	89	90	91	93
										3,2	5,6	8,0	11,0	17,5		82	82	84	86	89
										2,9	5,6	7,1	10,0	16,0		78	78	80	82	85
2,9	5,0	6,3	8,8	14,2	72	72	75	76	80											
700	711,0	5,0	7,1	12,5	20,0	32,0	19	600	610,0	5,0	6,3	12,5	17,5	30,0	610	97	97	98	98	98
										4,0	6,3	11,0	16,0	25,0		89	89	91	92	94
										4,0	6,3	10,0	14,2	22,2		84	84	86	87	90
										3,2	6,3	8,8	12,5	20,0		79	79	81	83	86
										3,2	5,6	8,0	11,0	17,5		73	74	75	77	80
2,9	5,6	7,1	10,0	16,0	70	71	73	75	78											
800	813,0	5,6	8,0	12,5	22,2	36,0	19	700	711,0	5,0	7,1	12,5	20,0	32,0	610	97	97	97	98	98
										5,0	6,3	12,5	17,5	30,0		88	89	90	91	93
										4,0	6,3	11,0	16,0	25,0		78	79	80	82	85
										4,0	6,3	10,0	14,2	22,2		72	73	74	77	80
										3,2	6,3	8,8	12,5	20,0		68	69	70	73	76
3,2	5,6	8,0	11,0	17,5	62	63	65	67	70											
900	914,0	6,3	10,0	12,5	25,0	40,0	19	800	813,0	5,6	8,0	12,5	22,2	36,0	610	97	97	97	98	98
										5,0	7,1	12,5	20,0	32,0		88	89	89	91	93
										5,0	6,3	12,5	17,5	30,0		78	79	79	82	84
										4,0	6,3	11,0	16,0	25,0		68	69	69	72	75
										4,0	6,3	10,0	14,2	22,2		63	65	65	68	71
3,2	6,3	8,8	12,5	20,0	59	59	61	63	67											



Table 2 (concluded).

Nominal size DN ₁	Diameter, d ₁	Wall thickness, s ₁ , for series					Nominal size DN ₂	Diameter, d ₂	Wall thickness, s ₂ , for series					l ₁	Maximum pressure factor, as a percentage, for series				
		1	2	3	4	5			1	2	3	4	5		1	2	3	4	5
1000	1016,0	6,3	10,0	12,5	28,0	45,0	900	914,0	6,3	10,0	12,5	25,0	40,0	610	97	97	97	98	98
							800	813,0	5,6	8,0	12,5	22,2	36,0		88	88	89	91	92
							700	711,0	5,0	7,1	12,5	20,0	32,0		77	78	79	81	84
							600	610,0	5,0	6,3	12,5	17,5	30,0		66	67	67	70	73
							500	508,0	4,0	6,3	11,0	16,0	25,0		55	56	57	60	63
1200	1220,0	6,3	12,5	-	-	-	1000	1016,0	6,3	10,0	-	-	-	711	90	91	-	-	-
							900	914,0	6,3	10,0	-	-	-		81	82	-	-	-
							800	813,0	5,6	8,0	-	-	-		71	73	-	-	-
							700	711,0	5,0	7,1	-	-	-		63	65	-	-	-
							600	610,0	5,0	6,3	-	-	-		56	57	-	-	-

A dash in a box indicates a size that has not been standardized.



3 Tolerances

Table 3. Lower limit deviations for wall thickness
(See DIN 2609 for upper limit deviations.)

Nominal size DN	Wall thickness	Lower limit deviation
Up to 600	All sizes	- 12,5 %
Above 600	Up to 10	- 0,35 mm
	Above 10	- 0,50 mm

Table 4. Limit deviations for dimension l_1

Nominal size DN	Limit deviations for dimension l_1
15 to 65	$\pm 2,5$
80 to 100	$\pm 3,0$
125 to 200	$\pm 3,5$
250	$\pm 4,0$
300 to 450	$\pm 5,0$
500 to 800	$\pm 6,0$
900 or more	$\pm 8,0$

Standards and other documents referred to

DIN 2609	Steel butt-welding fittings; technical delivery conditions
DIN 2616 Part 2	Steel butt-welding fittings; reducers for use at full service pressure
AD-Merkblatt B 2 ^{*)}	Kegelförmige Mäntel unter innerem und äußerem Überdruck (Conical shells subject to internal and external pressure)

Previous edition

DIN 2616: 06.64.

Amendments

In comparison with the June 1964 edition of DIN 2616, the following amendments have been made.

- DIN 2616 has been divided into Parts 1 and 2.
- The standard has been editorially revised.

International Patent Classification

B 23 K
F 16 L 41/00
F 16 S 1/00

4 Pressure factor and design assumptions

The pressure factor is defined as the ratio of permissible working pressure of the reducer to that of the connecting pipe (the former being lower than the latter), and is expressed as a percentage.

The wall thicknesses of reducers have been designed so that the reducers can accommodate the same pressure as the connecting pipe having a wall thickness, s_1 , as in table 2, in accordance with AD-Merkblatt (AD Instruction sheet) B 2, the following assumptions also having been made:

- lower limit deviations for pipe and reducer dimensions, as given in table 3;
- identical material;
- identical welding factor for longitudinal welds;
- identical outside diameters;
- no allowance for corrosion.

5 Other wall thicknesses

Reducers with wall thicknesses other than those specified in table 2 may also be ordered in accordance with this standard.

6 Welding end preparation

Where required, the inside of welding ends may be bevelled to an angle of 15° to 18°, or the outside to an angle of 27° to 30°, relative to the fitting axis.

7 Technical delivery conditions

See DIN 2609 for technical delivery conditions for reducers as covered here.

^{*)} Obtainable from Beuth Verlag GmbH, Burggrafenstraße 6, D-1000 Berlin 30.