



# 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

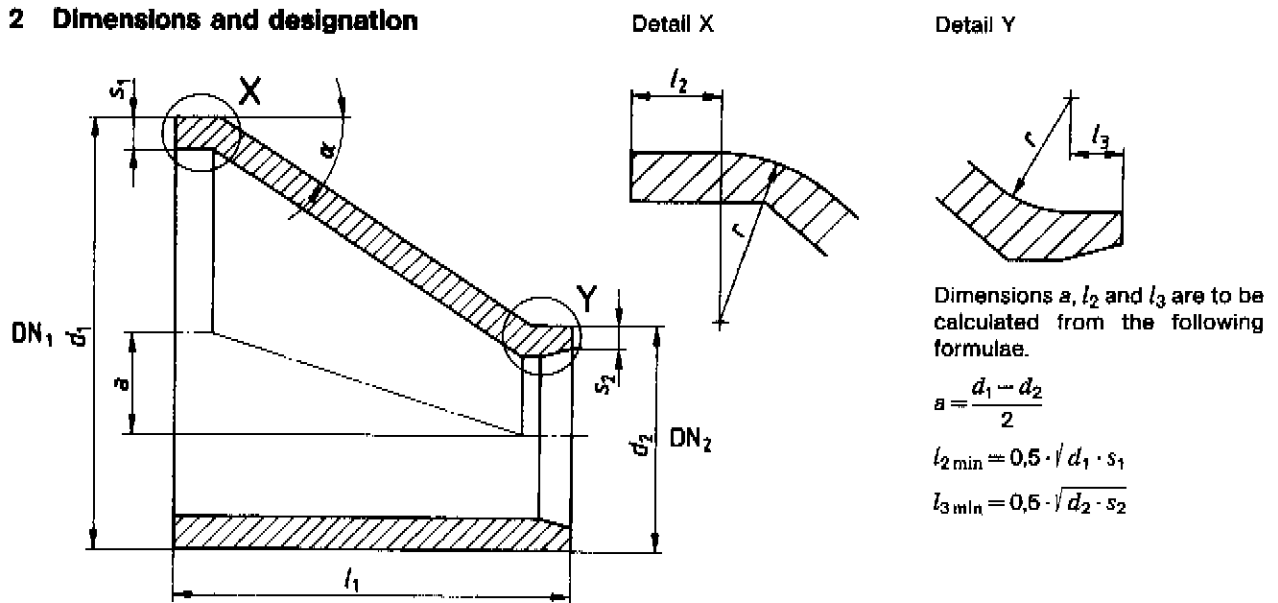


Figure 1. Eccentric reducer

Designation of a seamless (S), eccentric (E) reducer in accordance with this standard (1), where  $d_1$  is equal to 114,3 mm,  $s_1$  is equal to 3,6 mm,  $d_2$  is equal to 60,3 mm and  $s_2$  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 × 3,6-60,3 × 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

**18.3.03.1**

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

Nominal size DN <sub>1</sub>	Diameter, d <sub>1</sub>	Wall thickness, s <sub>1</sub> , for series					α, ° max	Nominal size DN <sub>2</sub>	Diameter, d <sub>2</sub>	Wall thickness, s <sub>2</sub> , for series					l <sub>1</sub>	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	-	
																				100
20	26,9	1,6	-	2,3	3,2	4,0	15	21,3	1,6	-	2,0	3,2	4,0	38	99	-	98	96	100	
																				100
25	33,7	2,0	-	2,6	3,2	4,0	20	26,9	1,6	-	2,3	3,2	4,0	50	98	-	97	96	100	
																				100
32	42,4	2,0	-	2,6	3,6	4,0	25	33,7	2,0	-	2,6	3,2	4,0	50	99	-	99	97	100	
																				100
40	48,3	2,0	-	2,6	4,0	5,0	32	42,4	2,0	-	2,6	3,6	4,0	64	99	-	99	96	100	
																				100
50	60,3	2,0	-	2,9	4,5	5,6	40	48,3	2,0	-	2,6	4,0	5,0	76	99	-	98	97	100	
																				100
65	76,1	2,3	-	2,9	5,0	7,1	50	60,3	2,0	-	2,9	4,5	5,6	90	99	-	99	98	97	
																				100
80	88,9	2,3	-	3,2	5,6	8,0	65	76,1	2,3	-	2,9	5,0	7,1	90	99	-	98	97	100	
																				100
100	108	2,3	-	3,2	5,6	8,0	80	88,9	2,0	-	2,6	4,0	5,0	90	92	-	97	98	100	
																				100
125	139	2,3	-	3,2	5,6	8,0	100	108	2,0	-	2,6	3,6	4,0	90	89	-	90	94	100	
																				100
150	165	2,3	-	3,2	5,6	8,0	125	139	2,0	-	2,6	3,6	4,0	90	83	-	85	90	98	
																				100

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

Table 2 (continued).

Nominal size DN <sub>1</sub>	Diameter, d <sub>1</sub>	Wall thickness, s <sub>1</sub> , for series					α α <sup>o</sup> max.	Nominal size DN <sub>2</sub>	Diameter, d <sub>2</sub>	Wall thickness, s <sub>2</sub> , for series					l <sub>1</sub>	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
																91	-	92	94	99
																79	-	80	84	94
125	139,7	2,6	-	4,0	6,3	10,0	35	80	88,9	2,3	-	3,2	5,6	8,0	127	91	-	92	94	97
																85	-	86	88	88
																76	-	78	81	83
150	168,3	2,6	4,0	4,5	7,1	11,0	18	125	139,7	2,6	4,0	4,0	6,3	10,0	140	98	98	98	98	100
																91	92	92	92	97
																78	79	80	82	88
200	219,1	2,9	4,5	6,3	8,0	12,5	45	125	139,7	2,6	4,0	4,0	6,3	10,0	152	79	81	82	83	88
																67	68	70	71	76
																58	59	61	62	67
250	273,0	2,9	5,0	6,3	8,8	14,2	28	200	219,1	2,9	4,5	6,3	8,0	12,5	178	93	94	94	95	97
																75	76	77	79	83
																65	67	68	70	74
300	323,9	2,9	5,6	7,1	10,0	16,0	44	200	219,1	2,9	4,5	6,3	8,0	12,5	203	95	96	96	96	98
																78	80	81	82	86
																64	66	67	70	73
							60	125	139,7	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 <sub>1</sub>	Diameter, d <sub>1</sub>	Wall thickness, s <sub>1</sub> , for series					Nominal size DN <sub>2</sub>	Diameter, d <sub>2</sub>	Wall thickness, s <sub>2</sub> , for series					l <sub>1</sub>	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	300	323,9	2,9	5,6	7,1	10,0	16,0	390	99	99	98	98	99
									2,9	5,0	6,3	8,8	14,2		96	97	97	100	
									2,9	4,5	6,3	8,0	12,5		89	90	91	93	96
									2,6	4,0	4,5	7,1	11,0		80	82	83	85	90
									3,2	5,6	8,0	11,0	17,5		99	99	99	99	100
400	406,4	3,2	6,3	8,8	12,5	20,0	300	323,9	2,9	5,6	7,1	10,0	16,0	355	96	97	97	97	100
									2,9	5,0	6,3	8,8	14,2		89	90	91	92	96
									2,9	4,5	6,3	8,0	12,5		80	82	83	85	89
									2,6	4,0	4,5	7,1	11,0		69	71	73	75	80
									3,2	6,3	8,8	12,5	20,0		99	99	99	99	99
450	457,0	4,0	6,3	10,0	14,2	22,2	300	323,9	3,2	5,6	8,0	11,0	17,5	381	96	96	97	97	99
									2,9	5,6	7,1	10,0	16,0		92	93	94	95	97
									2,9	5,0	6,3	8,8	14,2		84	85	87	88	92
									2,9	4,5	6,3	8,0	12,5		75	76	78	80	84
									4,0	6,3	10,0	14,2	22,2		99	99	99	99	99
500	508,0	4,0	6,3	11,0	16,0	25,0	400	406,4	3,2	6,3	8,8	12,5	20,0	508	98	98	98	98	100
									3,2	5,6	8,0	11,0	17,5		94	94	95	96	96
									2,9	5,6	7,1	10,0	16,0		91	92	93	94	97
									2,9	5,0	6,3	8,8	14,2		85	86	87	89	92
									4,0	6,3	11,0	16,0	25,0		78	80	82	83	87

Table 2 (continued).

Nominal size DN <sub>1</sub>	Diameter, d <sub>1</sub>	Wall thickness, s <sub>1</sub> , for series					Nominal size DN <sub>2</sub>	Diameter, d <sub>2</sub>	Wall thickness, s <sub>2</sub> , for series					l <sub>1</sub>	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	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	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
									2,9	5,0	7,1	12,5	20,0		32,0	97	97	97	98
800	813,0	5,6	8,0	12,5	22,2	36,0	600	810,0	5,0	6,3	12,5	17,5	30,0	610	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
									2,9	5,6	8,0	11,0	17,5		97	97	97	98	98
									2,9	5,0	7,1	12,5	22,2		36,0	88	89	91	93
900	914,0	6,3	10,0	12,5	25,0	40,0	700	911,0	5,0	7,1	12,5	20,0	32,0	610	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	60	61	63	67

Table 2 (concluded).

Nominal size DN <sub>1</sub>	Diameter, d <sub>1</sub>	Wall thickness, s <sub>1</sub> , for series					α, ° max.	Nominal size DN <sub>2</sub>	Diameter, d <sub>2</sub>	Wall thickness, s <sub>2</sub> , for series					I <sub>1</sub>	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	19	900	914,0	6,3	10,0	12,5	25,0	40,0	610	97	97	97	96	98			
										5,6	8,0	12,5	22,2	36,0		88	88	89	91	92			
										5,0	7,1	12,5	20,0	32,0		77	78	79	81	84			
										5,0	6,3	12,5	17,5	30,0		66	67	67	70	73			
										4,0	6,3	11,0	16,0	25,0		55	56	57	60	63			
1200	1220,0	6,3	12,5	-	-	-	64	450	457,0	4,0	6,3	10,0	14,2	22,2	711	50	51	52	55	58			
										30	1000	1016,0	6,3	10,0		-	-	-	90	91	-	-	-
										41	900	914,0	6,3	10,0		-	-	-	81	82	-	-	-
										49	800	813,0	5,6	8,0		-	-	-	71	73	-	-	-
										55	700	711,0	5,0	7,1		-	-	-	63	65	-	-	-
						60	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 <sup>*)</sup>	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.

- a) DIN 2616 has been divided into Parts 1 and 2.
- b) 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:

- a) lower limit deviations for pipe and reducer dimensions, as given in table 3;
- b) identical material;
- c) identical welding factor for longitudinal welds;
- d) identical outside diameters;
- e) 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.

<sup>\*)</sup> Obtainable from Beuth Verlag GmbH, Burggrafenstraße 6, D-1000 Berlin 30.