

Steel butt-welding pipes fittings  
**Tees with reduced pressure factor**

**DIN**  
**2615**  
 Part 1

Formstücke zum Einschweißen; T-Stücke; verminderter Ausnutzungsgrad

This standard, together with DIN 2615 Part 2, May 1992 edition, supersedes DIN 2615, June 1964 edition.

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

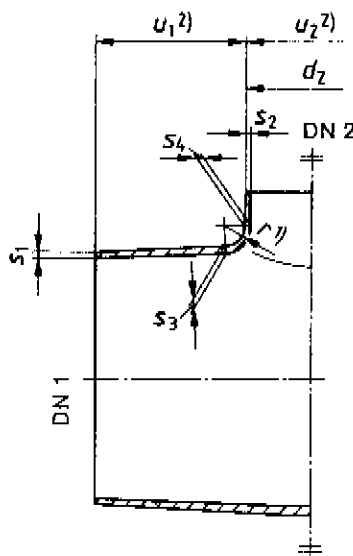
This standard specifies seamless and welded steel tees that are intended to be butt welded to pipes. Although the wall thicknesses specified correspond to those of the pipes, these fittings do not permit operation at the same internal pressure as the pipe welded on, i.e. they have a reduced pressure factor (cf. table 1 and clause 5).

### 2 Types and designation

Tees are not expected to conform to the designs illustrated here; compliance is only required in the case of the dimensions specified. The particular type (A or B) shall be up to the manufacturer.

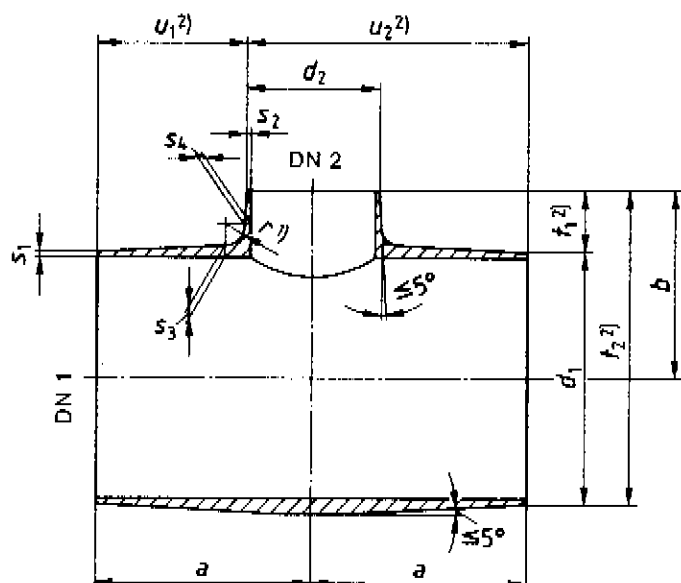
**Type A**

(see type B for other dimensions)



**Type B**

(with dimensions as illustrated for type A)



For both types,  $s_3$  shall not be less than  $s_1$ , and  $s_4$  shall not be less than  $s_2$ .

Designation of a seamless (S) tee in accordance with this standard (1), where  $d_1 = 168,3$  mm,  $s_1 = 4,5$  mm,  $d_2 = 88,9$  mm, and  $s_2 = 3,2$  mm, made from material belonging to material group F as in DIN 2609 (F):

**Tee DIN 2615 – 1 – 168,3 × 4,5 – 88,9 × 3,2 S – F**

For 1), see subclause 7.1.

For 2), see clause 4.

Continued on pages 2 to 10

**18.3.06.1**

**3 Dimensions**

**Table 1: Dimensions and pressure factor\*)**

Nominal size DN 1	Outside diameter $d_1$	Wall thickness, $s_1$ , for series					Nominal size DN 2	Outside diameter $d_2$	Wall thickness, $s_2$ , for series					a	b	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	15	21,3	1,6	-	2,0	3,2	4,0	25	25	52	-	-	55	62	66
								17,2	1,6	-	1,8	2,9	-			25	60	-	-	59	73
20	26,9	1,6	-	2,3	3,2	4,0	20	26,9	1,6	-	2,3	3,2	4,0	29	29	49	-	-	54	59	62
								21,3	1,6	-	2,0	3,2	4,0			29	57	-	-	57	69
25	33,7	2,0	-	2,6	3,2	4,0	25	33,7	2,0	-	2,6	3,2	4,0	38	38	49	-	-	52	55	59
								26,9	1,6	-	2,3	3,2	4,0			38	49	-	-	56	64
32	42,4	2,0	-	2,6	3,6	4,0	32	42,4	2,0	-	2,6	3,6	4,0	48	48	46	-	-	49	54	55
								26,9	1,6	-	2,3	3,2	4,0			48	53	-	-	57	58
40	48,3	2,0	-	2,6	4,0	5,0	40	48,3	2,0	-	2,6	4,0	5,0	57	57	44	-	-	47	53	57
								21,3	1,6	-	2,0	3,2	4,0			57	48	-	-	52	54
50	60,3	2,0	-	2,9	4,5	5,6	50	60,3	2,0	-	2,9	4,5	5,6	64	64	41	-	-	46	52	55
								48,3	2,0	-	2,6	4,0	5,0			64	48	-	-	49	55
50	60,3	2,0	-	2,9	4,5	5,6	32	42,4	2,0	-	2,6	3,6	4,0	64	57	52	-	-	54	56	56
								33,7	2,0	-	2,6	3,2	4,0			57	55	-	-	60	58
50	60,3	2,0	-	2,9	4,5	5,6	25	33,7	2,0	-	2,6	3,2	4,0	64	51	59	-	-	61	60	64
								26,9	1,6	-	2,3	3,2	4,0			64	52	-	-	54	56
50	60,3	2,0	-	2,9	4,5	5,6	20	33,7	2,0	-	2,6	3,2	4,0	64	44	58	-	-	64	68	72
								26,9	1,6	-	2,3	3,2	4,0			64	52	-	-	54	56

\*) The series specified have been taken from ISO 4200.

(continued)

Table 1 (continued)

Nominal size DN 1	Outside diameter $d_1$	Wall thickness, $s_1$ , for series					Nominal size DN 2	Outside diameter $d_2$	Wall thickness, $s_2$ , for series					a	b	Maximum pressure factor, as a percentage, for series				
		1	2	3	4	5			1	2	3	4	5			1	2	3	4	5
65	76,1					65	76,1	2,3	—	2,9	5,0	7,1	76	40	—	43	50	55		
						50	60,3	2,0	—	2,9	4,5	5,6							70	42
80	76,1	2,3	—	2,9	5,0	7,1	40	48,3	2,0	—	2,6	4,0	5,0	76	49	—	53	58	59	
																				32
80	88,9	2,3	—	3,2	5,6	8,0	25	33,7	2,0	—	2,6	3,2	4,0	86	60	—	65	63	65	
																				80
80	88,9	2,3	—	3,2	5,6	8,0	65	76,1	2,3	—	2,9	5,0	7,1	88	42	—	44	51	56	
																				50
100	114,3	2,6	—	3,6	6,3	8,8	40	48,3	2,0	—	2,6	4,0	5,0	105	73	51	—	54	60	
																				32
100	114,3	2,6	—	3,6	6,3	8,8	100	114,3	2,6	—	3,6	6,3	8,8	105	105	37	—	40	48	
																				80
100	114,3	2,6	—	3,6	6,3	8,8	65	76,1	2,3	—	2,9	5,0	7,1	105	95	44	—	46	53	
																				50
125	139,7	2,6	—	4,0	6,3	10,0	40	48,3	2,0	—	2,6	4,0	5,0	124	86	53	—	58	61	
																				125
125	139,7	2,6	—	4,0	6,3	10,0	100	114,3	2,6	—	3,6	6,3	8,8	117	39	—	42	52	54	
																				80
125	139,7	2,6	—	4,0	6,3	10,0	65	76,1	2,3	—	2,9	5,0	7,1	108	46	—	47	57	61	
																				50

(continued)

Table 1 (continued)

Nominal size DN 1	Outside diameter $d_1$	Wall thickness, $s_1$ , for series					Nominal size DN 2	Outside diameter $d_2$	Wall thickness, $s_2$ , for series					a	b	Maximum pressure factor, as a percentage, for series																		
		1	2	3	4	5			1	2	3	4	5			1	2	3	4	5														
150	168,3	2,6	4,0	4,5	7,1	11,0	150	168,3	2,6	4,0	4,5	7,1	11,0	143	143	32	37	38	44	50														
																					125	139,7	2,6	-	4,0	6,3	10,0	137	137	36	-	40	46	53
80	88,9	2,3	-	3,2	5,6	8,0	124	124	44	-	47	57	61																					
65	76,1	2,3	-	2,9	5,0	7,1	65	76,1	2,3	-	2,9	5,0	7,1	121	121	49	-	49	58	62														
200	219,1	2,9	4,5	6,3	8,0	12,5	200	219,1	2,9	4,5	6,3	8,0	12,5	178	178	30	35	39	42	48														
																					150	168,3	2,6	4,0	4,5	7,1	11,0	168	168	34	39	41	46	53
100	114,3	2,6	-	3,6	6,3	8,8	156	156	43	-	44	55	58																					
80	88,9	2,3	-	3,2	5,6	8,0	80	88,9	2,3	-	3,2	5,6	8,0	152	152	46	-	48	59	63														
250	273,0	2,9	5,0	6,3	8,8	14,2	250	273,0	2,9	5,0	6,3	8,8	14,2	216	216	28	34	37	41	47														
																					200	219,1	2,9	4,5	6,3	8,0	12,5	203	203	32	37	42	44	50
125	139,7	2,6	-	4,0	6,3	10,0	191	191	40	-	43	51	57																					
100	114,3	2,6	-	3,6	6,3	8,8	100	114,3	2,6	-	3,6	6,3	8,8	184	184	45	-	47	56	60														
300	323,9	2,9	5,6	7,1	10,0	16,0	300	323,9	2,9	5,6	7,1	10,0	16,0	254	254	26	33	36	40	46														
																					250	273,0	2,9	5,0	6,3	8,8	14,2	241	241	30	34	37	41	48
150	168,3	2,6	4,0	4,5	7,1	11,0	219	219	37	41	42	49	55																					
125	139,7	2,6	-	4,0	6,3	10,0	125	139,7	2,6	-	4,0	6,3	10,0	216	216	42	-	45	52	59														

(continued)

Table 1 (continued)

Nominal size DN 1	Outside diameter $d_1$	Wall thickness, $s_1$ , for series					Nominal size DN 2	Outside diameter $d_2$	Wall thickness, $s_2$ , for series					a	b	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					350	355,6	3,2	5,6	8,0	11,0	17,5	279	279	26	32	36	40	46														
																				300	323,9	2,9	5,6	7,1	10,0	16,0	270	270	26	34	37	40	46
200	219,1	2,9	4,5	6,3	8,0	12,5	248	248	34	38	43	45	51																				
														150	168,3	2,6	4,0	4,5	7,1	11,0	238	238	38	42	43	50	56						
400	408,4	3,2	6,3	8,8	12,5	20,0	305	305	25	32	36	40	46																				
														350	355,6	3,2	5,6	8,0	11,0	17,5	305	305	27	32	37	40	46						
300	323,9	2,9	5,6	7,1	10,0	16,0	295	295	27	34	36	40	46																				
														250	273,0	2,9	5,0	6,3	8,8	14,2	283	283	31	36	38	42	48						
200	219,1	2,9	4,5	6,3	8,0	12,5	273	273	35	39	43	46	52																				
														150	168,3	2,6	4,0	4,5	7,1	11,0	264	264	39	43	44	51	57						
450	457,0	4,0	6,3	10,0	14,2	22,2	343	343	26	31	36	40	46																				
														400	406,4	3,2	6,3	8,8	12,5	20,0	330	330	27	34	36	40	46						
350	355,6	3,2	5,6	8,0	11,0	17,5	330	330	27	34	37	40	47																				
														300	323,9	2,9	5,6	7,1	10,0	16,0	321	321	27	36	36	41	47						
250	273,0	2,9	5,0	6,3	8,8	14,2	308	308	30	37	38	43	49																				
														200	219,1	2,9	4,5	6,3	8,0	12,5	298	298	35	40	44	47	53						

(continued)

Table 1 (continued)

Nominal size DN 1	Wall thickness, $s_1$ , for series					Outside diameter $d_1$	Nominal size DN 2	Outside diameter $d_2$	Wall thickness, $s_2$ , for series					a	b	Maximum pressure factor, as a percentage, for series				
	1	2	3	4	5				1	2	3	4	5			1	2	3	4	5
500						508,0	500	508,0	4,0	6,3	11,0	16,0	25	381	25	30	36	40	46	
						457,0	450	457,0	4,0	6,3	10,0	14,2	22,2	368	27	32	36	41	46	
						406,4	400	406,4	3,2	6,3	8,8	12,5	20,0	356	25	34	36	41	46	
		4,0	6,3	11,0	16,0	25	350	355,6	3,2	5,6	8,0	11,0	17,5	381	27	35	37	41	47	
							300	323,9	2,9	5,6	7,1	10,0	16,0	346	28	37	37	42	47	
600						273,0	250	273,0	2,9	5,0	6,3	8,8	14,2	333	31	38	39	43	50	
						219,1	200	219,1	2,9	4,5	6,3	8,0	12,5	324	36	41	45	48	54	
						610,0	600	610,0	5,0	6,3	12,5	17,5	-	482	25	28	35	39	-	
						508,0	500	508,0	4,0	6,3	11,0	16,0	-	432	26	31	36	42	-	
						457,0	450	457,0	4,0	6,3	10,0	14,2	-	419	27	34	37	41	-	
700						406,4	400	406,4	3,2	6,3	8,8	12,5	-	406	27	36	37	42	-	
						355,6	350	355,6	3,2	5,6	8,0	11,0	-	406	28	36	39	42	-	
						323,9	300	323,9	2,9	5,6	7,1	10,0	-	397	29	39	39	43	-	
						273,0	250	273,0	2,9	5,0	6,3	8,8	-	384	32	40	41	46	-	
						711,0	700	711,0	5,0	7,1	12,5	-	521	25	28	35	-	-		
700						610,0	600	610,0	5,0	6,3	12,5	-	508	26	29	36	-	-		
						508,0	500	508,0	4,0	6,3	11,0	-	483	26	21	37	-	-		
						457,0	450	457,0	4,0	6,3	10,0	-	470	28	33	38	-	-		
		5,0	7,1	12,5	-	406,4	400	406,4	3,2	6,3	8,8	-	457	27	36	38	-	-		
						355,6	350	355,6	3,2	5,6	8,0	-	457	29	36	40	-	-		
					323,9	300	323,9	2,9	5,6	7,1	-	448	30	39	40	-	-			

(continued)

Table 1 (continued)

Nominal size DN 1	Outside diameter $d_1$	Wall thickness, $s_1$ , for series					Nominal size DN 2	Outside diameter $d_2$	Wall thickness, $s_2$ , for series					a	b	Maximum pressure factor, as a percentage, for series				
		1	2	3	4	5			1	2	3	4	5			1	2	3	4	5
800	813,0					800	813,0	5,6	8,0	12,5	-	-	-	597	597	24	30	33	-	-
						700	711,0	5,0	7,1	12,5	-	-	-	572	572	25	28	36	-	-
						600	610,0	5,0	6,3	12,5	-	-	-	559	559	26	29	37	-	-
						500	508,0	4,0	6,3	11,0	-	-	-	533	533	26	31	39	-	-
450	457,0					450	457,0	4,0	6,3	10,0	-	-	-	521	521	28	34	39	-	-
						400	406,4	3,2	6,3	8,8	-	-	-	508	508	28	36	40	-	-
						350	355,6	3,2	5,6	8,0	-	-	-	508	508	30	37	42	-	-
						900	914,0	6,3	10,0	12,5	-	-	-	673	673	24	29	32	-	-
800	813,0					800	813,0	5,6	8,0	12,5	-	-	-	648	648	24	30	34	-	-
						700	711,0	5,0	7,1	12,5	-	-	-	622	622	25	31	37	-	-
						600	610,0	5,0	6,3	12,5	-	-	-	610	610	26	33	39	-	-
						500	508,0	4,0	6,3	11,0	-	-	-	584	584	27	32	40	-	-
450	457,0					450	457,0	4,0	6,3	10,0	-	-	-	572	572	29	34	41	-	-
						400	406,4	3,2	6,3	8,8	-	-	-	559	559	29	37	41	-	-
						1000	1016,0	6,3	10,0	12,5	-	-	-	749	749	23	28	31	-	-
						900	914,0	6,3	10,0	12,5	-	-	-	737	737	25	30	33	-	-
800	813,0					800	813,0	5,6	8,0	12,5	-	-	-	711	711	25	28	35	-	-
						700	711,0	5,0	7,1	12,5	-	-	-	673	673	25	29	39	-	-
						600	610,0	5,0	6,3	12,5	-	-	-	660	660	27	30	40	-	-
						500	508,0	4,0	6,3	11,0	-	-	-	635	635	28	33	41	-	-
450	457,0					450	457,0	4,0	6,3	10,0	-	-	-	622	622	30	35	42	-	-

(continued)

Table 1 (concluded)

Nominal size DN 1	Outside diameter $d_1$	Wall thickness, $s_1$ , for series					Nominal size DN 2	Outside diameter $d_2$	Wall thickness, $s_2$ , for series					a	b	Maximum pressure factor, as a percentage, for series							
		1	2	3	4	5			1	2	3	4	5			1	2	3	4	5			
1 200	1 220,0	6,3	12,5	-	-	-	1 200	1 220,0	6,3	12,5	-	-	-	-	838	22	29	-	-	-			
							1 000	1 016,0	6,3	10,0	-	-	-	-	813	25	29	-	-	-	-	-	
							900	914,0	6,3	10,0	-	-	-	-	787	27	30	-	-	-	-	-	-
							800	813,0	5,6	8,0	-	-	-	-	787	26	30	-	-	-	-	-	-
							700	711,0	5,0	7,1	-	-	-	-	762	27	31	-	-	-	-	-	-
						600	610,0	5,0	6,3	-	-	-	-	737	29	33	-	-	-				

\*) The series specified have been taken from ISO 4200.



## 4 Tolerances

**Table 2: Lower limit deviations for wall thickness**

(See DIN 2609 for upper limit deviations.)

Nominal size DN	Nominal wall thickness	Lower limit deviation
≤ 600	All sizes	- 12,5%
> 600	≤ 10,0	- 0,35 mm
	> 10,0	- 0,50 mm

Dimensions *a* and *b* shall be calculated based on the following equations:

$$a = \frac{u_1 + u_2}{2}$$

$$b = \frac{t_1 + t_2}{2}$$

**Table 3: Limit deviations for dimensions *a* and *b***

Nominal size DN	<i>a</i>	<i>b</i>
15 to 200	± 2,0	± 2,0
250 to 700	± 3,0	± 3,0
≥ 800	± 5,0	± 5,0

## 5 Pressure factor and design assumptions

The pressure factor is defined as the ratio of permissible working pressure of the tee to that of the connecting pipe (the former being lower than the latter), and is expressed as a percentage. The relevant pipe working pressure is the lower of the connected pipes (one on the branch and two on the run of the tee). The wall thicknesses of fittings

have been designed in accordance with *Technische Regeln für Dampfkessel* (Code of practice for steam boilers) TRD 301, the following assumptions also having been made:

- lower limit deviations for the wall thickness of pipes and tees as given in table 2;
- identical material;
- identical welding factor for longitudinal welds;
- identical outside diameters;
- no allowance for corrosion.

The permissible pressure factor may otherwise be verified on an individual basis.

The loadbearing cross-sectional areas have been multiplied by a factor of 0,9 to account for the radii between run and branch resulting from the manufacturing process.

## 6 Other wall thicknesses

Tees with wall thicknesses other than those specified in table 1 may be ordered, provided they comply with all other relevant requirements.

## 7 Design requirements

### 7.1 Transition between run and branch

The transition between run and branch shall be produced to have a radius, *r*, not less than the value of *s*<sub>1</sub>, and be large enough so that the straight portion of the run has a length not less than the value of *s*<sub>1</sub> or *s*<sub>2</sub> (as measured between the end of the radius and the welding end).

The above requirement may be disregarded in the case of tees produced by forging or drilling.

### 7.2 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.

## 8 Technical delivery conditions

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

### **Standards and other documents referred to**

DIN 2609	Steel butt-welding pipe fittings; technical delivery conditions
DIN 2615 Part 2	Steel butt-welding pipe fittings; tees for use at full service pressure
ISO 4200 : 1991	Plain end steel tubes, welded and seamless; general tables of dimensions and masses per unit length
TRD 301	<i>Zylinderschalen unter innerem Überdruck (Cylindrical shells subject to internal pressure) *</i>

### **Previous edition**

DIN 2615: 06.64.

### **Amendments**

In comparison with the June 1964 edition of DIN 2615, the specifications have been revised and updated and are now covered in DIN 2615 Parts 1 and 2.

### **International Patent Classification**

F 16 L 41/02

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\*) Obtainable from *Deutsches Informationszentrum für Technische Regeln (DITR) im DIN, D-10772 Berlin.*