



## Fittings for welding DIN 2609

### Technical delivery conditions

The with a point • signed sections contain details of declarations, which have to be mentioned

in order. The with two points •• signed sections contain details about declarations, which are additional to the order.

### 1 application area

This norm is used for delivery of fittings acc. to DIN 2605 part 1 and part 2, DIN 2615 part 1 and part 2 (currently concepts), DIN 2616 part 1 and part 2 and DIN 2617 of unalloyed and alloyed steel. If the fittings get appliance into the application area of the order for control requiring special constructions according to § 24 of the trading regulations (for example steam boiler edict, pressure tank edict), you have to keep in mind the relevant technical rules (for example technical rules for steam boiler and technical rules for pressure tank).

The same applies for other application areas, which exist for further instructions.

**Comment:** You have to keep in your mind that total demands and reaction of scale which to act up in table 2, can reduce or raise the temperature limits.

The fittings will be used for welding.

### 2 Order

The selection of order details must be commit by purchaser.

- In the order you have to act up beside the standard description of detail dimension standard always the quantity required (quantities), the kind of certification and maybe the question for additional technical rules.

- Furthermore you can arrange more particulars in the order which are according to the two points signed chapters.

### 3 Materials

The materials you have to choose from table 2.

- If fittings of other materials will be produced as in table 2 denoted, is this norm apply accordingly.

The possible form of manufacture of base material are in groups of materials combined.

The detail groups of materials have the nickname of the characterise material and a code letter for designation.

Standards committee pipes, pipe connections and pipe lines in DIN German institute for standardization registered society.



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### 4 Requirements

#### 4.1 manufacturing process

Being valid the manufacturing process according to table 1. The manufacturing process according to table 1 leave to the manufacturer. Purchaser has to be informed about it, on request.

The manufacturing plant have to command by competent personal and adequate procedure, so that they can weld, deform and handle blameless to accomplish, supervising and check.

•• If several manufacturing processes, form of base material and/or welding process get apart of, so it is necessary to agree.

If it will be welded in production process of fittings, you have to comply the requirements to chapter 4.1.1 – 4.1.3, the principles and requirements of DIN 8563 part1 must be considered.

**4.1.1** You have to weld the fittings so that the weldseam is welded through and the fittings are according to the standard of this norm. The blameless accomplishment of welding is necessary to control.

The fittings are effective for an internal pressure loading for a exploitation of the acceptable calculating range of 100%.

•• The assessment group of the weld seam according to DIN 8563 part 3 is to arrange especial between orderer and manufacturer.

**4.1.2** At Fusion-welded fittings the weldseam have to be welded of both sides as far as they are accessible from inside.

A local correction of the weldseam is permitted. The orderer can ask for a throwaway evidence of the acceptability of the correction renovation according to article 4.1.3.

The corrected parts have to undergone by a non-destructive test.

**4.1.3** •• Orderer can ask for a certificate about the discharge of the requirements according to article 4.1. The particulars about this certificate, especial about the test point, are arranging between the orderer and the manufacturer. This certificate are just considered for those steel grades, measure areas, welding processes and welding additions which get named to him.

#### 4.2 Condition of delivery

##### 4.2.1 Fabrication by cold forming

By fittings which are made by cold forming you can abdicate the heat treating if the terms of the material characteristics according to the AD-leaflet HP 7/2 rather HP7/3 are discharged.

•• If a heat treating is necessary, you have to deliver the fittings in the heat treatment according to table 3 as far as it is not denoted in the standards of the base material.

##### 4.2.2 Fabrication of hot forming

You have to deliver the fittings in the heat treatment according to table 3 as far as in the standards of the base material nothing else is denoted. The account of a appropriated heat treatment in the group of materials A – H, L – S is fulfilled when material is in good order and condition and an adequate constancy by hot forming is secured. Considering to the same requirements by the group of materials J and K can comply an annealing instead of a complete recompense.

Table 1. manufacturing process, allocated form of manufacture of base materials<sup>1)</sup>

manufacturing process	hot forming			cold deformed			to the manuf. from solid metal machin. arranged till DN 50
	bended	in the swake compressed <sup>2)</sup>	grinded, forged and machinabled arranged	bended	in the swake compressed <sup>2)</sup>	rolled <sup>2)</sup>	
fitting							
bend	1, 2, 4, 5	1, 2, 3, 4, 5	–	1, 2, 4, 5	1, 2, 3, 4, 5	–	–
T	–	1, 2, 3, 4, 5	4, 5	–	1, 2, 3, 4, 5	–	–
reducer	–	1, 2, 3, 4, 5	4, 5	–	1, 2, 3, 4, 5	1, 2, 3,	5
Cap	–	1, 2, 3, 4, 5	4, 5	–	1, 2, 3, 4, 5	1, 2, 3,	5

1) Form of manufacture of base materials

1 seamless tube

2 welded tube (just tubes with a allowance calculation range of 100% in the weldseam)

3 sheet

4 forging

5 bars

2) At this manufacturing process can be welded too.



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Table 2. base material, materials and form of manufacture

group of materials		base material	material	form of manufacture <sup>1)</sup>					base material	application temperature <sup>1)</sup>
code-letter	nickname	material	Nr.	1	2	3	4	5		•C
A	St 37.0	St 37.0	1.0254	x					DIN 1629	- 10 to 300
		St 37.0	1.0254		x				DIN 1626	
		RSt 37-2	1.0038			x	x	x	DIN 17 100	
B	St 44.0	St 44.0	1.0256	x					DIN 1629	- 10 to 300
		St44.0	1.0256		x				DIN 1626	
		St 44-2	1.0044			x	x	x	DIN 17 100	
C	St 52.0	St 52.0	1.0421	x					DIN 1629	- 10 to 300
		St 52.0	1.0421		x				DIN 1626	
		St 52-3	1.0570			x	x	x	DIN 17 100	
D	StE 290.7	StE 290.7	1.0484	x	x				DIN 17 172	- 10 to 50
E	StE 360.7	StE 360.7	1.0582	x	x				DIN 17 172	- 10 to 50
F	St 35.8 I	St 35.8 I	1.0305	x					DIN 17 175	- 10 to 420
		St 37.8 I	1.0315		x				DIN 17 177	
		H I	1.0345			x			DIN 17 155	
		H II	1.0425			x			DIN 17 155	
C		22.8	1.0460				x	x	DIN 17 243	
G	St 35.8 III	St 35.8 III	1.0305	x					DIN 17 175	- 10 to 420
		St 37.8 III	1.0315		x				DIN 17 177	
		H II	1.0425			x			DIN 17 155	
		C 22.8	1.0460				x	x	DIN 17 243	
H	15 Mo 3	15 Mo 3	1.5415	x					DIN 17 175	- 10 to 530
					x				DIN 17 177	
						x			DIN 17 155	
							x	x	DIN 17 243	
J	13 CrMo 4 4	13 CrMo 44	1.7335	x					DIN 17 175	- 10 to 570
						x			DIN 17 155	
							x	x	DIN 17 243	
K	10 CrMo 9 10	10 Cr Mo 9 10	1.7380	x					DIN 17 175	- 10 to 600
						x			DIN 17 155	
							x	x	DIN 17 243	
L	X 5 CrNi 18 11	X 5 CrNi 18 11	1.4301	x					DIN 17 458	- 200 to 550 <sup>3)</sup>
					x				DIN 17 457	
						x	x	x	DIN 17 440	
M	X 2 CrNi 19 11	X 2 CrNi 19 11	1.4306	x					DIN 17 458	- 200 <sup>3)</sup> to 550 <sup>3)</sup>
					x				DIN 17 457	
						x	x	x	DIN 17 440	
N	X 6 CrNiTi 18 10	X 6 CrNiTi 18 10	1.4541	x <sup>2)</sup>					DIN 17 458	- 200 <sup>3)</sup> to 550 <sup>3)</sup>
					x				DIN 17 457	
						x	x	x	DIN 17 440	
O	X 5 CrNiMo 17 12 2	X 5 CrNiMo 17 12 2	1.4401	x					DIN 17 458	- 200 to 550 <sup>3)</sup>
					x				DIN 17 457	
						x	x	x	DIN 17 440	
P	X 2 CrNiMo 17 13 2	X 2 CrNiMo 17 13 2	1.4404	x					DIN 17 458	- 200 to 550 <sup>3)</sup>
					x				DIN 17 457	
						x	x	x	DIN 17 440	
Q	X 6 CrNiMoTi 17 12 2	X 6 CrNiMoTi 17 12 2	1.4571	x <sup>2)</sup>					DIN 17 458	- 200 <sup>3)</sup> to 550 <sup>3)</sup>
					x				DIN 17 457	
						x	x	x	DIN 17 440	
R	WStE 355	WStE 355	1.0565	x					DIN 17 179	- 20 to 400
					x				DIN 17 178	
						x		x	DIN 17 102	
							x		DIN 17 103	





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Table 2. base material, materials and form of manufacture

group of materials		base material	material	form of manufacture <sup>1)</sup>					base material	application temperature <sup>1)</sup> •C
code-letter	nickname	material	Nr.	1	2	3	4	5		
S	TStE 355	TStE 355	1.0566	x					DIN 17 179	- 60 to 50 <sup>4)</sup>
					x				DIN 17 178	
						x		x	DIN 17 102	
							x		DIN 17 103	
									DIN 17 179	
T	TStE 285	TStE 285	1.0566	x					DIN 17 178	- 60 to 50 <sup>4)</sup>
					x				DIN 17 102	
						x		x	DIN 17 103	
							x		DIN 17 173	
									DIN 17 174	
U	10 Ni 14	10 Ni 14	1.5637	x					DIN 17 280	- 105 to 50 <sup>4)</sup>
					x					
						x	x	x		

\*) Named values are cut-off values. For dimensioning use the in the material norm stipulated values.

1) See table 1

2) The details about the acceptable utilisation factor in the dimension standard just apply at application of cold manufactured tubes. If you use hot manufactured tubes you have to arrange it between orderer and manufacturer, because of the low resistance data.

3) Until a temperature to 300°C (material group L,O) rather 350°C (material group M) rather 400°C (group of tools N, P,Q) the material has not change so much that it at the check according to DIN 50914 shows susceptibility against inter crystalline corrosion .

4) The indicated values can be overtaken for a temporary operation because at a long term application and at higher temperature can advocate a curtailing robustness attitude at lower temperatures.

5) At application temperatures lower than -200°C till -270°C check of impact work at -196°C with ISOV samples, min. account 40J for wall thickness > 10mm, at bar material and forge material of bore > 15 mm



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Table 3. test treating

condition of delivery	material group	code
normallized	A to H	N
rather transformed	R to S	
coated	J, K, U	V
solution annealing	L to Q	L
coated or normalized	T	V, N

### 4.3 chemical composition

At the chemical composition applies the, in the respective Norm of base material, denoted bounds for the ordered material.

- The product analysis which will be arranged at base material or at the fitting, can be agreed.

### 4.4 mechanical properties

The mechanical properties have to comply to the given values which are denoted in the appropriated norms of the base material (table 2). For the notched impact strength into the weld deposit applies the values of the base material across to the direction of rolling.

### 4.5 weld ability

Concerning to the weld ability you have to consider the details according to the norms of the base material (table 2).

### 4.6 surface finish

4.6.1 The fittings have to comply, to the way of manufacture, a smooth external and internal surface.

4.6.2 Irregularities on the surface, conditional to the way of manufacture, like signs of indentations and elevations or flat grooves are marginal acceptable as far as the residual wall thickness complies to the requirements.

4.6.3 The correct removal of surface defects with low-deepness is according to the application of suitable means acceptable as far as the residual wall thickness complies to the requirements.

Welded corrections are just with the acceptance of the orderer acceptable.

4.6.4 •• If you have special requirements concerning to the surface treatment, so you have to arrange it separately.

### 4.7 measurement and measurement tolerances

#### 4.7.1 measurement

For the measurement applies the details in the norms of measurement.

#### 4.7.2 measurement tolerances

4.7.2.1 For the tolerances of construction dimensions and of the wall thickness under-usage applies the details in the norms of measurement.

4.7.2.2 For the limiting sizes of external diameter at the pipe connection (at the weld seam) applies table 4 (of DIN 1629/10.84, table 6).

The upper limiting size of the wall thickness at the pipe connection ( $s, s_1, s_2$ ) amounts to 15% of the nominal wall thickness for all nominal bores.

4.7.2.3 For the safeguarding of throttling, the inner diameter will be restricted to the connecting tube. (comprised also the upper limiting sizes of wall thickness  $s_3, s_4, s_i$  and  $s_a$ ).

The theoretic inner diameter of the tube will be calculated as the following.

Theoretic inner diameter =  $d_a - 2 \cdot$  nominal wall thickness (connection of wall thickness) [nominal bore diameter]

4.7.2.4 For the circularity tolerance applies:

a) on weld-end (weld-ends) of the fitting the table 4 (acc. DIN1626/10.84, table 6)

b) for elbow according to the elbow length a difference of 4%.

The balance R of the circularity will be calculate as follows:

$$R = 200 \cdot \frac{d_{a \max} - d_{a \min}}{d_{a \max} + d_{a \min}} \text{ in } \%$$

following is  $d_a$  maximal the biggest measured external diameter,  $d_{a \min}$  minimal the smallest measured external diameter (measured in the cross-section).

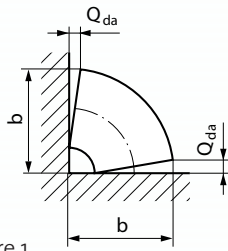
4.7.2.5 For the meanderings of the fitting-geometry applies table 5 and the pictures 1-7. You have to measure at the orthographically together standing surfaces. The allowance Q may not exceed in any place at amount. It needs to keep all measurements of the fitting. At the inspection of the measurement Q you have to look for that the construction dimensions in the tolerances of the dimension standard will be complied. The Index at the dimensional letters Q in the pictures act up to the absolute measurement of the dimension standard after which you have to calculate the value Q.

Table 4. limiting sizes of external diameter and circularity tolerance

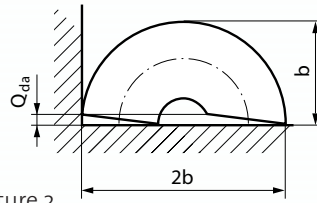
external diameter $d_a$ mm	limiting sizes of external diameter		circularity tolerance
		•• at special declaration	
$\leq 100$	$\pm 1\% d_a$ ( $\pm 0,5$ mm allowed)	$\pm 0,4$ mm	inside by legal aperture allowance
$100 > d_a \leq 200$	$\pm 1\% d_a$	$\pm 0,5\% d_a$	
$> 200$	$\pm 1\% d_a$	$\pm 0,6\% d_a$	2%



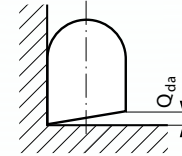
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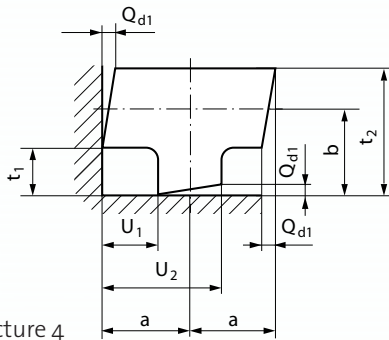
picture 1



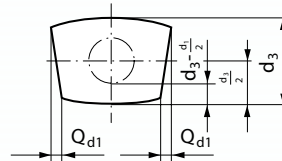
picture 2



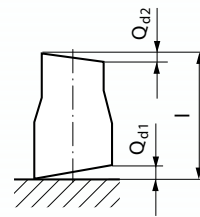
picture 3



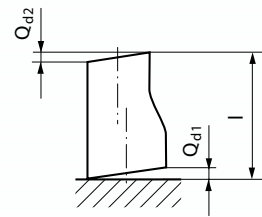
picture 4



picture 5



picture 6



picture 7

dimensions e a, b, d<sub>a</sub>, d<sub>1</sub>, d<sub>2</sub>, l, t<sub>1</sub>, t<sub>2</sub>, u<sub>1</sub> and u<sub>2</sub> see norms of measurement

Table 5. allowance Q

	allowance Q
•• standard design	1% of basic dimension (1 mm allowed)
at special declaration	0,5 % of basic dimension (0,5 mm allowed)

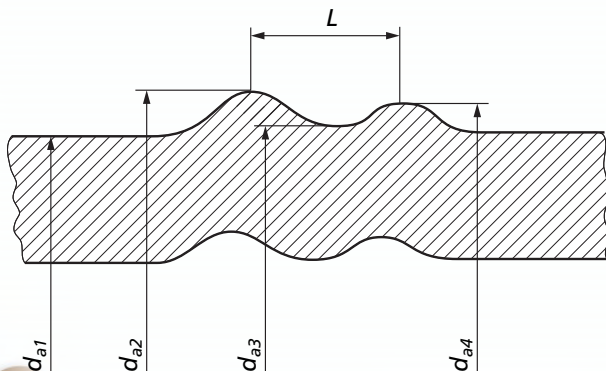
### 4.7.3 wave formation at elbows

Flat waves as in picture 8 are acceptable. The medium wave height h<sub>m</sub> may not exceed 3% of d<sub>a1</sub>.

$$h_m = \frac{d_{a2} + d_{a4} - d_{a3}}{2} \quad (2)$$

where

$$L \geq 15 \cdot h_m \quad (3)$$



### 4.7.4 Accomplishment of the weldends

Rule model of the edge form: ordered wall thickness of the weldends.

till 3 mm	face form DIN 2559-1
above 3 mm till 16 mm	face form DIN 2559-22
above 16 mm	face form DIN 2559-3

•• Other face forms needs to be agreed.

## 5 Checking and certification about material control

### 5.1 General

The fittings according to this norm can be delivered with one of the following certification about material control DIN EN 10204.

- Certification DIN 102 04 – 2.2
- Certification DIN 102 04 – 3.1 A
- Certification DIN 102 04 – 3.1 B
- Certification DIN 102 04 – 3.1 C

• The kind of the desired certification has to act up with the order.

### 5.2 Location of checking

The particles will be tested in the manufacturing plant. 5.3 scope of inspection

### 5.3 Scope of inspection

5.3.1 At the certificate according to DIN EN10204, the values for the yield point, tensile strength and breaking elongation as far as the case may be the completion of the in chapter 5.4.3 named requirements at the technological bending test due to the up on to the internal checking will be confirmed.

The nominal width of the certified fittings have to comply to the presentable production program.





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5.3.2 Fittings which are delivered with the certificate according to DIN 50049, will be tested in batches. An overview about the scope of inspection contains table 6.

For the check, the fittings must be arranged according to material and measurement, at  $d_a > 100$  mm of alloyed steels, and the same heat number in dependence of the external diameter  $d_a$  1) in batches of the following quantities:

	$d_a < 100$ mm	.....500 pieces
100 mm $\leq$	$d_a < 350$ mm	.....200 pieces
	$d_a > 350$ mm	.....100 pieces

for elbows according to DIN 2605 part 1 and part 2 construction 10 and 20 the maximal quantity per batch will be mottled.

Remaining quantity up to 50% of the batch-size can share out equable of the detail batches. Quantities and remaining quantity over 50%, also delivery quantity of less than 50% of the batch-sizes, considered as one closed batch.

For materials, which will undergo a heat treatment, the batch is bound to one heat treatment but for fittings with the same heat no. of unalloyed steel, which are apart got the same heat treatment can be checked together if the constancy of the components at a hardness test of 10% but minimal at 3 fittings, (according to the in the order specified certificate) are detected to the expert. The precondition of more evenly heat treatment deemed as fulfilled when the difference between the highest and the lowest measured hardness have not more than 30 HB

5.3.3 For the accomplishment of the assay, for the class of material A-G and R-T at a test piece, for the class of material H-Q and U at two test pieces, you have to take one assay per batch after the last heat treatment. The checkout can result at the fittings themselves, at an overlength or at a trial example. Per measurement and material - for alloyed materials with  $d_a > 100$  mm with the same

melt also – at a closed delivery quantity will be tested maximal 4 batches.

5.3.4 At delivery quantities unto 10 of the same fittings, you have to take a test piece.

5.3.5 At the test pieces will arrange the following assays will be tested:

– pull-out test at a room temperature for  $d_a > 100$  mm.

For fittings with  $d_a < 100$  mm instead of the pull-out test a hardness test will be done at 10% of the pieces but at a minimum of 3 pieces.

With the second batch of a closed delivery the scope of inspection for a hardness test can be mottled when the calculated values of the hardness are in the defined closeness range (reassessment according to Din 50150).

– At fittings which are made by welding with  $d_a > 200$  mm additional to a pull-out test across to the weld seam.

– The impact bending test 2) according to the values in the norms of the base materials

– Additional impact bending test in the middle of the weld seam at by welding manufactured fittings 2)

at the class of material D, E, T and U for  $d_a > 200$  mm and the nominal wall thickness  $> 5$  mm,

at class of material F – K for  $d_a \geq 100$  mm and a nominal wall thickness  $> 5$  mm if a sampling of a non directional assay with a width of minimal 5 mm is possible.

In class of materials R and S for  $d_a > 200$  mm and a nominal wall thickness  $> 10$  mm.

In Class of materials L – Q for  $d_a \geq 100$  mm and a nominal wall thickness  $> 12$  mm.

– technological bending test at, by welding manufactured fittings.

5.3.6 • • You have to agree in addition at the order:

– The re examination of the chemical composite (product analysis). It will, per melting, be done at a test piece or at the base material.

– Hot tensile test for  $d_a \geq 100$  mm, 1 test per batch. The test temperatures have to be arranged before 3).

– Test of inter-crystalline corrosion. This test can only be done for the class of materials L – Q.

5.3.7 Beyond that:

– all fittings of alloy steel have to undergo a test to exclude any chance of a material confusion

– all fittings have to be controlled upon the look of the surface, internal and external

– all fittings have to be confirmed in the compliance of the dimensions and tolerances of dimensions

– all, by welding manufactured fittings, have to be controlled the weld-seam of a examination assay of steel-iron-test sheet 1916.

5.3.8 At the base material carried out ultrasonic and radiographic tests, for the raw material and the weld seam, don't have to be repeated at the fitting.

5.3.9 • • An examination of the fittings can be agreed, but keep in mind that the fitting dimensions and the fitting forms can affect the test results.

5.3.10 For the chemical analysis the manufacturer has to attest the correctness of the base material, the cast analysis per melt or casting device according to the in the base material defined values and variations.

This attests can be taken over for the certificate of the fittings

1) look to table 6, gloss 7

2) look to table 6, gloss 1

3) look to table 6, gloss 2



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### 5.4 Sampling and sample preparation

#### 5.4.1 pull-out test

For the pull-out test the fitting will undergo a tensile strength test lengthwise according to DIN 50125. The assay will not be heat treated and internally of the gauge length not adjusted.

At fittings with a external diameter of  $d_a > 200$  mm can – if the test pieces allow it without being adjusted- treated round- or flat specimen (look to DIN 50125), be removed as transverse test specimen.

#### 5.4.2 Beam impact test

For the beam impact test at the fitting you take per fitting 1 set ISO-V-samples, in being of 2 specimen as transverse test specimen (if for the class of material F – K in the norms for the base material, according to table 2, not act up another specimen shape) when the fittings allow it without adjusting, otherwise you have to take longitudinal test specimen.

For the beam impact test in the middle of the weldseam, you have to take from the fitting 1 set ISO-V-samples, across the weld seam, consisting of 3 specimen.

You have to take the assays in a way that the notch axis lies vertically to the fitting surface and at the, in the weld seam to taking assays in the middle of the weld seam.

#### 5.4.3 Technological bending test

For the technological bending test, for welded fittings produced from sheet, you take per batch 2 test fittings across to weldseam, with the weldseam in the middle. Here you have to consider the details according DIN 50120 part 1.

#### 5.4.4 Chemical composition

If the chemical composition as product analysis was not tested at base material, after the agreement of the norms of the base material, you have to take an assay at a test piece of the fitting according to the steel test specification 1805.

### 5.5 Accomplishment of the assay

5.5.1 The pull-out test at the fitting is to be arranged at the fitting according to DIN 50145. The pull-out test across the weldseam is arranged with assays according to DIN 50120 part 1/09.75, picture 1 and DIN 50120 part 2/08.78, picture 2. If the certificate was agreed at 0,2%- 0,1%- of the creep limit with higher temperatures, it's ascertain according to DIN 50145.

5.5.2 The beam impact test is to be arranged according to DIN 50115, each at the for the concerning materials named lowest temperatures of norms from base material.

5.5.3 The technological bending test, at by welding manufactured fittings, is to be arrange according to DIN 50121 part 1. An Assay is to be tested at the outside of the fitting and the other at the inside of the fitting in the tensile zone.

5.5.4 The hardness test is to be arrange according to DIN 50351 once per each fitting.

5.5.5 The examination of the weldseam is to be arrange according to the steel test specification 1916.

For the non-destructive test of the fittings, consider the agreement of the steel test specification 1915 and/or 1918 and/or 1919.

•• The inspection conditions of surface crack test according to the magnetic powder test or the test method of colour introducing have to be agreed.

5.5.6 The look of the fittings is to be tested by an inspection with normal visual acuity and with adapted illumination.

5.5.7 The dimensions of the fittings have to be tested with an adapted measuring instrument.

### 5.6 Re-qualification

For re-qualification consider DIN 17010.

### 5.7 Certificate about material control

5.7.1 For fittings without inspection a certificate will be exposed according to DIN 50049 – 2.2.

5.7.2 4.1.1 For fittings with inspection will be exposed, depending on the agreement at the order (chapter 5.1) a certificate according to DIN EN 10204 3.1 or 3.2. The form and area of the assay, the competence for the accomplishment of the assays and the form the of the assay have to be considered, certificates are named in table 6.

5.7.3 The identification according to chapter 6 must be obvious on certificate. To find the affiliation of the test result to the different deliveries and test units, all features of the certificates must be obvious.

•• Details in the certificates about the manufacturing process and the heat treatment, at welded fittings additionally about the welding process and welding consumable have to be arranged separately.

## 6 Marking

The fittings have to be marked everlasting and clearly as the following:

- sign of manufacturer
- letter of the class of material and material short-name or number of base material (the details of the base material can drop to fittings with  $\leq$  \* DN 50.)
- short marks S or W for seamless accomplishment (S) or welded (W).
- association mark DIN (can be dropped at fittings with  $\leq$  DN 50) number of the piece of the respective DIN-dimension standard (except of part1)

At delivery with certificate according to DIN EN 10204 additionally:

- Heat number or short mark
- sign of the inspector

The marking normally is done by stamping. The stamping can be replaced at all fittings with the class of material L – Q with a durable marking (for example etching, engraving) and at all other class of materials with similar procedures (for example laser marking).

## 7 Complaint

For complaints consider DIN 17010.





## Fittings for welding DIN 2609

Table 6. Schema about the scope of inspection and certificate about admeasurement assay at fittings with certificate.

assay			scope of inspection for the accomplishment	proper certificate about the assays	form of material control
Nr	Art	chapter			
1	cast analysis	4.3	per melt or casting device	manufacture of the base material	DIN 10 204 – 2.2 <sup>4)</sup>
2	pull-out test at room temperature	5.3.5	per batch at two test pieces for the class of materials H – Q and U, at one test piece for class of materials A – G and R – T and at delivery quantity <10 pieces but just as from $d_a > 100\text{mm}$ . maximal 4 batches per delivery quantity will be checked. At, by welding manufactured fittings, with $d_a > 200$ additionally one assay across the weld seam.	by appointment	DIN 10 204 – 3.1 A or DIN 10 204 – 3.1 B or DIN 10 204 – 3.1 C
3	impact test <sup>1)</sup>	5.3.5	per batch according to 2 of these table, 1 set $\geq 3$ single tests, according to the details in the norms of the base material for $d_a \geq 100\text{ mm}$ . Additionally at by welding manufactured fittings 1 set = 3 single tests in the middle of the weld seam. in class of material D,E,E,U from $d_a > 200\text{mm}$ and wall thickness $\geq 5\text{mm}$ in class of material F – K from $d_a > 100\text{mm}$ and wall thickness $\geq 5\text{mm}$ when the extraction of a omnidirectional assay with minimal 5 mm breadth is possible in class of material R,S from $d_a > 200\text{mm}$ and wall thickness $\geq 10\text{mm}$ in class of material L - Q from $d_a > 100\text{mm}$ and wall thickness $\geq 12\text{mm}$	by appointment	DIN 10 204 – 3.1 A or DIN 10 204 – 3.1 B or DIN 10 204 – 3.1 C
4	technological beam impact test <sup>3)</sup>	5.3.5	per batch at one test set	by appointment	DIN 10 204 – 3.1 A oder DIN 10 204 – 3.1 B oder DIN 10 204 – 3.1 C
5	hot tensile test <sup>5),2)</sup>	5.3.6	1 test pe-batch for $d_a \geq 100\text{ mm}$	by appointment	DIN 10 204 – 3.1 A oder DIN 10 204 – 3.1 B oder DIN 10 204 – 3.1 C
6	examination of the weld beam <sup>3)</sup>	5.3.7	all fittings	manufacturer	DIN 10 204 – 3.1 B
7	spectro-chemical analysis	5.3.7	all fittings of alloyed materials	manufacturer	DIN 10 204 – 2.1 <sup>4)</sup>
8	inspection	5.3.7	all fittings	by appointment	DIN 10 204 – 3.1 A oder DIN 10 204 – 3.1 B oder DIN 10 204 – 3.1 C
9	dimensional check	5.3.7	all fittings	by appointment	DIN 10 204 – 3.1 A oder DIN 10 204 – 3.1 B oder DIN 10 204 – 3.1 C
10	product analysis <sup>3)</sup>	5.3.6	1 productanalysis per melting	Manufacturer of the material or the fittings	DIN 10 204 – 3.1 B
11	examination of the base material <sup>5)</sup>	5.3.9	per melt by agreement	manufacturer	DIN 10 204 – 3.1 B
12	assay of intercrystalline corrosion <sup>5), 6)</sup>	5.3.6	according to agreement	manufacturer	DIN 10 204 – 3.1 B
13	hardness test	5.3.5	just at $d_a < 100\text{ mm}$ at 10% per batch, 1 stamp but minimal at 3 pieces. From the 2. batch of a closed scope of inspection reduce of the half when the values are inside of the strength range (translation according to DIN 50150).	manufacturer	DIN 10 204 – 3.1 B

1) For the group of materials A – C will not arrange beam impact tests.

2) Variables for the heat pull-out test are defined in the base material norms just for the group of materials F – S.

Normally the heat pull-out test will be arranged just at class of materials of these groups.

3) Just at by welding manufactured fittings.

4) This certificate can be contain in the respectively higher detection too.

5) Just at agreement between manufacturer and orderer.

6) Assay of inter-crystalline corrosion just in the group of material L-Q.

7) All details  $d_a$  applies to reduce and tee-pieces of the in the respective dimension standards bigger thread diameter  $d_1$ .



## Fittings for welding DIN 2609

### Cited norms and other documents

DIN 1626	Welded circularly tubes of unalloyed steels for special requirements; technical conditions of delivery
DIN 1629	Seamless circularly tubes of unalloyed steels for special requirements; technical conditions of delivery
DIN 2559 part 1	Preparation of the weld seam, guidelines for face form, melt welding of scarf joints at steel tubes
DIN 2605 part 1	Fittings for welding, Elbows, reduced utilisation
DIN 2605 part 2	Fittings for welding, Elbows, full utilisation
DIN 2615 part 1	Fittings for welding, Tees, reduced utilisation
DIN 2615 part 2	Fittings for welding, Tees, full utilisation
DIN 2616 part 1	Fittings for welding, Reducer, reduced utilisation
DIN 2616 part 2	Fittings for welding, Reducer, full utilisation
DIN 2617	Fittings for welding, caps
DIN 8563 part 1	Safeguarding of quality from welding, general fundamentals
DIN 8563 part 2	Safeguarding of quality from welding, requirements of the company
DIN 8563 part 3	Safeguarding of quality from welding, fusion welded joint at steel (unless steel welding), requirements, assessment group
DIN 17010	General technical conditions of delivery for steel and steel products
DIN 17100	General steel, quality standard
DIN 17102	Fine grained steel which is able to weld, normalized, technical conditions of delivery for sheet, band steel, wide flat steel, sections and bars
DIN 17103	Forgings of fine grained steel which is able to weld, technical conditions of delivery
DIN 17155	Sheets and bands of heat resisting steels, technical conditions of delivery
DIN 17172	Steel tubes for pipelines for flammable fluid and gases, technical conditions of delivery
DIN 17173	Seamless circularly tubes of low-temperature steels, technical conditions of delivery
DIN 17174	Seamless circularly tubes of heat resisting steels, technical conditions of delivery
DIN 17175	Seamless tubes of heat resisting steels, technical conditions of delivery
DIN 17177	Electrical pressure-welded tubes of heat resisting steels, technical conditions of delivery
DIN 17178	Welded circularity tubes of fine grained steels for special requirements, technical conditions of delivery
DIN 17179	Seamless circularity circularity tubes of fine grained steels for special requirements, technical conditions of delivery
DIN 17243	Forgings and rolled and forged bars of heat resisting steels which is able to weld, technical conditions of delivery
DIN 17280	Low-temperature steels, technical conditions of delivery for sheets, band steel, wide flat steel, sections, bars and forgings
DIN 17440	Non-rusting steels, technical conditions of delivery for sheets, hot rolled strip, wire rod, drawn wire, bars, forgings and half finished products

DIN 17457	Welded circularly tubes of austenitic stainless steels for special requirements, technical conditions of delivery
DIN 17458	Seamless circularly tubes of austenitic stainless steel steels for special requirements, technical conditions of delivery
DIN 10204	Certificate of material control
DIN 50115	Assay of metallic materials, beam impact test
DIN 50120 part 1	Assay of steel, pull-out test at welded connections, melt welded butt joints
DIN 50120 part 2	Assay of steel, pull-out test at welded connections, pressure welded butt joints
DIN 501121 part 1	Assay of metallic materials, technical pull-out test at welded connections and welded plating, melt welded connections
DIN 50125	Assay of metallic materials, tensile specimen
DIN 50145	Assay of metallic materials, pull-out test
DIN 50150	Assay of steels and cast steel, table of reassessment for Vickers hardness, Brinell hardness, Rockwell hardness and tensile strength
DIN 50351	Assay of metallic materials, hardness test according Brinell
DIN 50914	Assay of non-rusting steels of consistency forward inter-crystalline corrosion, copper sulphate-sulphuric mode, Strauß-test

AD-data sheet HP7/2 \*) heat treatment, ferritic steels  
 AD-Merkblatt HP7/3 \*) heat treatment, austenitic steels  
 Steel test specification 1805 \*\*) sampling and sample preparation for product analysis of steels  
 Steel test specification 1915 \*\*) ultrasonic test of longitudinal imperfection of tubes at heat resisting steels  
 Steel test specification 1916 \*\*) non-destructive test of melt welded pipelines for flammable fluids and gases  
 Steel test specification 1918 \*\*) ultrasonic test of transverse defect of tubes of heat resisting steels  
 Steel test specification 1919 \*\*) ultrasonic test of lamination at tubes of heat resisting steels  
 Technical rules pressure tank (TRB \*)  
 Technical rules for steam boiler (TRD \*)  
 Establishment about pressure tank, compressed gas container and charging annex  
 (Pressure tank establishment and general administrative instructions\*)  
 Establishment about steam boiler constructions (steam boiler establishment) and general administrative instructions \*)

### International patent classification

B 23 K  
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 16 S 1/00

\*) To referring by: Beuth Verlag GmbH/ Berlin

\*\*) To referring by: Verlag Stahleisen mbH/Düsseldorf