DIN 2916 Bending radii for Seamless and Welded Steel Tubes

Scope

This Standard is intended as a design sheet for the selection of bending radii for bending seam-less and welded steel tubes according to DIN 2448 and DIN 2458 to angles of up to 180°, primarily in the construction of steam generators, appliances and containers.

Application

In Table 1 (see page 2), the radii in Series 1 are based on the preferred numbers according to DIN 323, Basic Series R 20. Radii marked with an × vary slightly from the preferred numbers. They are rounded off in accordance with usual practice. Series 2 includes supplementary radii which are widely used.

In Table 1, the appropriate bending radii for the individual tube diameters are marked by means of identification numbers in the body of the Table under the heading "Ranges of application".

These radii should be preferentially used. They correspond approximately to increment R 10 according to DIN 323 Part 1 for each diameter of tube. This specification should make it possible to achieve a logical gradation of bending tools.

Intermediate radii should be used only in exceptional cases, selecting first those in Series 1 and then those in Series 2.

The identification numbers are preferred numbers and represent the multiple of the tube diameter for the relevant radius. Example: Radius 80 for tube diameter 20, identification number 40 x. For further explanations see Table 2.

Effects of the bending process and the nature of the material on tube bends, such as roundness of cross-section, increase in hardness of the material and reduction in wall thickness, which are particularly noticeable in the case of, for example, cold bending and small radii, should be allowed for during manufacture. Special measures such as supplementary heat-treatment are to be recommended where not in any case specified by corresponding regulations, for example VGB (Association of Large Boiler Owners), in the manufacture of bent tube for steam generators.

For standardized tube bends for welding-in, the radii are specified in DIN 2605 and DIN 2606; these specifications correspond to those of ISO Recommendations R 285 and R 1128.

Table 1. Bending radii

Bending radius *r*		Outside diameter of tube *d*																														
Series 1	Series 2	20	21.3*)	25	26.9*)	30	31.8	33.7*)	38	42.4*)	44.5	48.3*)	51	57	60.3*)	63.5	70	76.1*)	82.5	88.9	101.6*)	108	114.3*)	121	127	133	139.7*)	152.4	159
		Ranges of application, preferably use radii marked with identification numbers																														
		x 1 d to 10 d													x 2 d to 10 d				x 2.5 d to 10 d					x 3.15 d to 10 d								
20		10																														
22.5 ×			10																													
25		12		10																												

27.5 ×			12		10																											
30 ×		16		12		10																										
	32.5																															
35 ×			16		12		10	10																								
	37.5																															
40		20		16		12	12	12	10																							
45			20		16					10	10																					
50		25		20		16	16		12			10																				
55 ×			25		20			16		12	12		10																			
60 ×		32		25		20	20		16			12	12	10																		
	65																															
70 ×			32		25			20		16	16			12																		
	75																															
80		40		32	32	25	25	25	20	20		16	16																			
90			40			32					20			16																		
100		50		40			32		25			20	20																			
110 ×			50		40			32		25	25			20																		
	120																															
125		63		50		40	40		32			25	25		20	20																
	130																															
140			63		50			40		32	32			25			20															
	150																															
160		80		63	63	50	50	50	40	40		32	32		25	25		20														
180			80			63					40			32	32		25															
200		100		80			63	63	50	50		40	40			32		25	25													
225			100		80						50			40			32			25												
250				100		80	80		63			50	50		40	40		32	32		25											
280					100			80		63		63		50			40			32		25	25									
	300																															
315						100	100		80		63		63		50	50		40	40		32											

350								100		80	80			63			50			40		32	32							
400									100	100		80	80		63	63		50	50		40				32	32	32				
450											100			80			63			50		40	40				32			
500												100	100		80	80		63	63		50			40	40			32	32		
560														100			80			63		50	50			40	40			
	600																													
630															100	100		80	80		63			50	50	50		40	40	
	650																													
710																	100			80		63	63				50			
	750																													
800																		100	100		80			63	63	63		50	50	
900																				100		80	80				63			
1000																					100			80	80			63	63	
1100																						100	100			80	80			
1250																								100	100			80	80	
1400																										100	100			
1600																												100	100	
*) These outside diameters of tube correspond to the tubes on which thread R 7 according to ISO Recommendation can be cut.																														

Table 2. Explanation of identification numbers

Marking	for r x	Remarks
10	1d	Rounded off to a radius in Series 1
12	1.25d	Rounded off (up or down) to the next radius in Series 1. In border-line cases, rounded off to the next higher number.
16	1.6d	
20	2d	
25	2.5d	
32	3.15d	

40	4d	
50	5d	
63	6.3d	
80	8d	
100	10d	