

The accuracy under VDG - Merkblatt P690

Length tolerances (in mm)

Attainable degree of accuracy for the dimensions of precision castings depends on maximum size and shape of casting (GTA – required dimension).

Nominal value range	D1		D2		D3	
	Field	GTA	Field	GTA	Field	GTA
to 6	0,30	14	0,24	13,5	0,20	13
6 to 10	0,36		0,28		0,22	
10 to 18	0,44		0,34		0,28	
18 to 30	0,52		0,40		0,34	
30 to 50	0,80	14,5	0,62	14	0,50	13,5
50 to 80	0,90		0,74		0,60	
80 to 120	1,10		0,88		0,70	
120 to 180	1,60	15	1,30	14,5	1,00	14
180 to 250	2,40	15,5	1,90	15	1,50	14,5

D 1 degree of accuracy – applies to all dimensions not tolerated.

D 2 degree of accuracy – applies to all tolerated dimensions.

D 3 degree of accuracy – able to be observed with selected dimensions and subject to approval with supplier

Precision casting roughness

Roughness value	CLA	R _a ¹⁾	R _z ¹⁾	R _t ¹⁾
	[μ inch]	[μm]	[μm]	[μ m]
N 7	63	1,6	5,9 - 8,0	6,3 - 10,0
N 8	125	3,2	12- 16	13,0 - 19,5
N 9	250	6,3	23 - 32	25 - 38

Unless otherwise stated the N9 roughness is considered the standard

Angular tolerance

Degree of accuracy	Nominal value range ¹⁾					
	Up to 30 mm		30 to 100 mm		100 to 200 mm	
	Admissible deviation					
	Angular minutes	mm per 100 mm	Angular minutes	mm per 100 mm	Angular minutes	mm per 100 mm
D ₁	30 ²⁾	0,87	30 ²⁾	0,87	30 ²⁾	0,87
D ₂	30 ²⁾	0,87	20 ²⁾	0,58	15 ²⁾	0,44
D ₃	20 ²⁾	0,58	15 ²⁾	0,44	10 ²⁾	0,29

¹⁾ As for nominal value range the length of shorter arm is governing one.
²⁾ Deviation may occur in both directions.

< 50	± 0.25
50 to 100	± 0.30

Shortest length	Wall thickness tolerance
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Wall thickness tolerance

100 to 180	± 0.40
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Wall thickness tolerance depends on the following:

- dimension of (ceramic) formwalls of the mould
- surface of continuous surfaces
- their thermal deformation
- metal-static pressure of fluid metal

Due to the reasons above the thickness tolerance does not depend on the degree of accuracy. It has been reduced with crossing of thicker walls, breaks (holes), grids, used to make wall thickness lightened).

Dimensions for holes, blind holes and channels

Diameter or similar dimension d (mm)	Longest length or depth	
	Through-hole l	Blind hole t
≥ 2 to 4	$\approx 1 \times b$	$\approx 1.0 \times b$
> 4 to 6	$\approx 2 \times b$	
> 6 to 10	$\approx 3 \times b$	$\approx 1.6 \times b$
> 10	$\approx 4 \times b$	$\approx 2.0 \times b$

Dimensions of holes and grooves

Depth b (mm)	Maximum depth/bottom	
	Open l	Closed t
≥ 2 to 4	$\approx 1 \times d$	$\approx 0.6 \times d$
> 4 to 6	$\approx 2 \times d$	$\approx 1.0 \times d$
> 6 to 10	$\approx 3 \times d$	$\approx 1.6 \times d$
> 10	$\approx 4 \times d$	$\approx 1.6 \times d$

7.1 Inside radii

Radii at inner corners and edges help to reduce casting defects and reduce notch tensions in castings during their usage. Minimal radius should be round 20% of maximum wall thickness, however not less than 0.5 mm. Ideal inside radius should correspond at least to the thickness of thinnest wall.

7.2 Outside radii & outside chamfer

Precision castings shall have no sharp corners of $R = 0$. On this account the maximal radii shall be specified, e.g. $R \leq 0.5$