

Butler Fasteners

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Dowel Pins & Extractable Dowels

Dowels are solid pins, usually precision ground to narrow limits to permit accurate fitting. Precision dowels are traditionally used to hold parts together in a fixed alignment, relying on the tightness of fit to stay in place. However, some applications for solid pins require clearance or transition fits on at least one of the components to be fastened. There are three factors that determine the size of hole needed; the tolerance on the dowel itself, the tightness of fit required (interference, transition or clearance) and the hardness of the components into which the dowel is fitted.



TOLERANCES AND FITS

Dowels are normally precision ground to produce a close tolerance diameter.

The m6 tolerance is a 'plus tolerance' range and is normally used for interference fits. Also available are h7 or h8, which are minus tolerance ranges.

The tolerance to which a dowel is ground however is not directly related to the fit. As mentioned above, the fit (interference, transition or clearance) relates to the difference between the dowel diameter and the hole diameter.

The following table gives general guidance on hole tolerances but there are graduations within each category.

HOLE MATERIAL	Hardened Steel	Mild Steel	Aluminium/Zinc/Brass
INTERFERENCE FIT	Pin Ø less 5 microns	Pin Ø less 25 microns	Pin Ø less 35
TRANSITION FIT	Pin Ø less 2 microns	Pin Ø less 5 microns	Pin Ø less 5
CLEARANCE FIT	Pin Ø plus 25–60 microns	Pin Ø plus 25–60 microns	Pin Ø plus 25–60

FITTING DOWELS INTO BLIND HOLES

When a dowel is interference-fitted into a blind hole, it increases the pressure of the air trapped in the hole. It is strongly advised to specify that the dowel should have an air release flat ground along its full length to prevent the dowel being ejected under the pressure of compressed air, or bursting the component into which it is driven.

MATERIALS

The material specifications of our standard ranges are as follows. Others are listed under 'special pins'. See page 36 for material compositions.

THROUGH HARDENED STEEL
MILD STEEL, UNHARDENED
STAINLESS A2
STAINLESS A4

SIZE RANGE – DOWEL PINS TO DIN 6325 m6 TOLERANCE

Nominal Diameter, DIN 6325	1	1.5	2	2.5	3	4	5	6	8	10	12	14	16	20	
Available Materials	Steel, Through Hardened and Ground to m6 tolerance														
Double Shear Strengths – tested to ISO 8749, kN (see also Page 37)	1.5	3.4	5.5	8	13	22	31	53	88	132	210	260	350	485	
Lengths															
4															
5															
6															
8															
10															
12															
14															
16															
18															
20															
24															
28															
30															
32															
36															
40															
45															
50															
55															
60															
70															
80															
90															
100															
110															
120															
Length Tolerances to js 14															

SIZE RANGE – DOWEL PINS TO DIN 7 m6 AND h8 TOLERANCE

Nominal Diameter, DIN 7	0.8	1	1.5	2	2.5	3	4	5	6	8	10	12	14	16	20	25	30
Dimension C	0.12	0.15	0.23	0.3	0.4	0.45	0.6	0.75	0.9	1.2	1.5	1.8	2	2.5	3	4	4.5
Available Materials	Mild Steel ground to m6 or h8 tolerance A2 Stainless, Grade 1.4305 ground to m6 or h8, up to 25 mm Ø A4 Stainless, Grade 1.4571 ground to m6, from 1 to 25 mm Ø																
Double Shear Strengths – tested to ISO 8749, kN (see also Page 37)																	
Mild Steel	0.4	0.7	1.6	2.85	4.25	6.15	10.6	16.5	22.8	40.5	63.2	91	124	156	220	300	390
Stainless Steel A2	0.4	0.7	1.7	2.9	4.4	6.6	11.7	18.1	26.0	47.0	64.1	92					
Lengths																	
3																	
4																	
5																	
6																	
8																	
10																	
12																	
14																	
16																	
18																	
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32																	
36																	
40																	
45																	
50																	
55																	
60																	
70																	
80																	
90																	
100																	
110																	
120																	
Length Tolerances	3 – 10 mm long +0.3, -0					12 – 50 mm long +0.5, -0					Over 50 mm long +0.8, -0						

SIZE RANGE – DOWEL PINS TO ISO 2338 (1998)

Nominal Diameter, ISO 2338 (1998)	0.8	1	1.5	2	2.5	3	4	5	6	8	10	12	16	20	25	30	
Available Materials	Mild Steel ground to m6 or h8 tolerance A2 Stainless, Grade 1.4305 ground to m6 or h8, up to 25 mm Ø																
Double Shear Strengths – tested to ISO 8749, kN (see also Page 37)																	
Mild Steel	0.4	0.7	1.6	2.85	4.25	6.15	10.6	16.5	22.8	40.5	63.2	91	156	220	300	390	
Stainless Steel A2	0.4	0.7	1.7	2.9	4.4	6.6	11.7	18.1	26.0	47.0	64.1	92	160				
Lengths																	
3																	
4																	
5																	
6																	
8																	
10																	
12																	
14																	
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70																	
80																	
90																	
100																	
110																	
120																	
Length Tolerances	3 – 10 mm long ± 0.25					12 – 50 mm long ± 0.5					Over 50 mm long ± 0.75						

Longer Lengths Available in Diameters 5 – 20mm

Selection Kit Also Available

SIZE RANGE – EXTRACTABLE DOWELS TO DIN 7979 WITH AIR RELEASE FLAT

Nominal Diameter, DIN 7979D with Air Release	4	5	6	8	10	12	14	16	20
Available Materials	Through Hardened Steel Grade WS 1.3505, ground to m6 tolerance A2 Stainless Steel Grade 1.4305, ground to m6								
Thread Size	M2.5	M3	M4	M5	M6	M6	M8	M8	M10
Lengths									
10									
12									
14									
16									
18									
20									
24									
28									
30									
32									
36									
40									
45									
50									
55									
60									
70									
80									
90									
100									
120									
Length Tolerances	to js 15								