

Limits & Fits Chart (ISO 286)

Standard tolerance grades and fundamental deviations in micrometres (um), nominal sizes 1-250 mm, hole-basis system. Shaft cells show upper/lower deviation.

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Standard tolerance grades IT (um)

Grade	>1-3	>3-6	>6-10	>10-18	>18-30	>30-50	>50-80	>80-120	>120-180	>180-250
IT6	6	8	9	11	13	16	19	22	25	29
IT7	10	12	15	18	21	25	30	35	40	46
IT8	14	18	22	27	33	39	46	54	63	72
IT9	25	30	36	43	52	62	74	87	100	115
IT11	60	75	90	110	130	160	190	220	250	290

Hole deviations (um) - ES / EI

Grade	>1-3	>3-6	>6-10	>10-18	>18-30	>30-50	>50-80	>80-120	>120-180	>180-250
H7	+10 / 0	+12 / 0	+15 / 0	+18 / 0	+21 / 0	+25 / 0	+30 / 0	+35 / 0	+40 / 0	+46 / 0
H8	+14 / 0	+18 / 0	+22 / 0	+27 / 0	+33 / 0	+39 / 0	+46 / 0	+54 / 0	+63 / 0	+72 / 0
H9	+25 / 0	+30 / 0	+36 / 0	+43 / 0	+52 / 0	+62 / 0	+74 / 0	+87 / 0	+100 / 0	+115 / 0
H11	+60 / 0	+75 / 0	+90 / 0	+110 / 0	+130 / 0	+160 / 0	+190 / 0	+220 / 0	+250 / 0	+290 / 0

Shaft deviations (um) - es / ei

Grade	>1-3	>3-6	>6-10	>10-18	>18-30	>30-50	>50-80	>80-120	>120-180	>180-250
d9	-20 / -45	-30 / -60	-40 / -76	-50 / -93	-65 / -117	-80 / -142	-100 / -174	-120 / -207	-145 / -245	-170 / -285
e8	-14 / -28	-20 / -38	-25 / -47	-32 / -59	-40 / -73	-50 / -89	-60 / -106	-72 / -126	-85 / -148	-100 / -172
f7	-6 / -16	-10 / -22	-13 / -28	-16 / -34	-20 / -41	-25 / -50	-30 / -60	-36 / -71	-43 / -83	-50 / -96
g6	-2 / -8	-4 / -12	-5 / -14	-6 / -17	-7 / -20	-9 / -25	-10 / -29	-12 / -34	-14 / -39	-15 / -44
h6	+0 / -6	+0 / -8	+0 / -9	+0 / -11	+0 / -13	+0 / -16	+0 / -19	+0 / -22	+0 / -25	+0 / -29
h7	+0 / -10	+0 / -12	+0 / -15	+0 / -18	+0 / -21	+0 / -25	+0 / -30	+0 / -35	+0 / -40	+0 / -46
h9	+0 / -25	+0 / -30	+0 / -36	+0 / -43	+0 / -52	+0 / -62	+0 / -74	+0 / -87	+0 / -100	+0 / -115
h11	+0 / -60	+0 / -75	+0 / -90	+0 / -110	+0 / -130	+0 / -160	+0 / -190	+0 / -220	+0 / -250	+0 / -290
k6	+6 / +0	+9 / +1	+10 / +1	+12 / +1	+15 / +2	+18 / +2	+21 / +2	+25 / +3	+28 / +3	+33 / +4
n6	+10 / +4	+16 / +8	+19 / +10	+23 / +12	+28 / +15	+33 / +17	+39 / +20	+45 / +23	+52 / +27	+60 / +31
p6	+12 / +6	+20 / +12	+24 / +15	+29 / +18	+35 / +22	+42 / +26	+51 / +32	+59 / +37	+68 / +43	+79 / +50
s6	+20 / +14	+27 / +19	+32 / +23	+39 / +28	+48 / +35	+59 / +43	-	-	-	-

Preferred fits (hole basis)

- H9/d9 - Loose running: Very free rotation, dirt-tolerant - agricultural shafts, loose pulleys
- H8/f7 - Close running: General rotating shafts in plain bushings, gearbox shafts
- H7/g6 - Sliding: Accurate sliding and guiding - spool valves, sliding gears, guide pins
- H7/h6 - Locational clearance: Parts that assemble by hand and stay put - spigots, locating rings
- H7/k6 - Locational transition: Snug, light press - pulleys, gears keyed to shafts, bearing seats
- H7/n6 - Transition (tight): Rigid location, press assembled, transmits light loads with a key
- H7/p6 - Locational interference: True press fit - bushings into housings, bearing rings
- H7/s6 - Medium drive (<=50 mm): Permanent assembly, transmits torque by friction - press + heat