

ISO Tolerances for Shafts and Holes

ISO Shaft Tolerances

ISO Tolerances for Shafts (ISO 286-2)																				
Nominal Shaft Sizes (mm)																				
over	3	6	10	18	30	40	50	65	80	100	120	140	160	180	200	225	250	280	315	355
inc.	6	10	18	30	40	50	65	80	100	120	140	160	180	200	225	250	280	315	355	400
micrometres																				
a12	-270 -390	-280 -430	-290 -470	-300 -510	-310 -560	-320 -570	-340 -640	-360 -660	-380 -730	-410 -760	-460 -860	-520 -920	-580 -980	-660 -1120	-740 -1200	-820 -1280	-920 -1440	-1050 -1570	-1200 -1770	-1350 -1920
d6	-30 -38	-40 -49	-50 -61	-65 -78	-80 -96	-100 -119	-120 -142	-145 -170	-170 -199	-190 -222	-210 -246									
e6	-20 -28	-25 -34	-32 -43	-40 -53	-50 -66	-60 -79	-72 -94	-85 -110	-100 -129	-110 -142	-125 -161									
e13	-20 -200	-25 -245	-32 -302	-40 -370	-50 -440	-60 -520	-72 -612	-85 -715	-100 -820	-110 -920	-125 -1015									
f5	-10 -15	-13 -19	-16 -24	-20 -29	-25 -36	-30 -43	-36 -51	-43 -61	-50 -70	-56 -79	-62 -87									
f6	-10 -18	-13 -22	-16 -27	-20 -33	-25 -41	-30 -49	-36 -58	-43 -68	-50 -79	-56 -88	-62 -98									
f7	-10 -22	-13 -28	-16 -34	-20 -41	-25 -50	-30 -60	-36 -71	-43 -83	-50 -96	-56 -108	-62 -119									
g5	-4 -9	-5 -11	-6 -14	-7 -16	-9 -20	-10 -23	-12 -27	-14 -32	-15 -35	-17 -40	-18 -43									
g6	-4 -12	-5 -14	-6 -17	-7 -20	-9 -25	-10 -29	-12 -34	-14 -39	-15 -44	-17 -49	-18 -54									
g7	-4 -16	-5 -20	-6 -24	-7 -28	-9 -34	-10 -40	-12 -47	-14 -54	-15 -61	-17 -69	-18 -75									
h4	-0 -4	-0 -4	-0 -5	-0 -6	-0 -7	-0 -8	-0 -10	-0 -12	-0 -14	-0 -16	-0 -18									
h5	-0 -5	-0 -6	-0 -8	-0 -9	-0 -11	-0 -13	-0 -15	-0 -18	-0 -20	-0 -23	-0 -25									

ISO Tolerances for Shafts (ISO 286-2)

Nominal Shaft Sizes (mm)

over	3	6	10	18	30	40	50	65	80	100	120	140	160	180	200	225	250	280	315	355
inc.	6	10	18	30	40	50	65	80	100	120	140	160	180	200	225	250	280	315	355	400
micrometres																				
h6	-0 -8	-0 -9	-0 -11	-0 -13	-0 -16	-0 -19	-0 -22	-0 -25	-0 -29	-0 -32	-0 -36									
h7	-0 -12	-0 -15	-0 -18	-0 -21	-0 -25	-0 -30	-0 -35	-0 -40	-0 -46	-0 -52	-0 -57									
h8	-0 -18	-0 -22	-0 -27	-0 -33	-0 -39	-0 -46	-0 -54	-0 -63	-0 -72	-0 -81	-0 -89									
h9	-0 -30	-0 -36	-0 -43	-0 -52	-0 -62	-0 -74	-0 -87	-0 -100	-0 -115	-0 -130	-0 -140									
h10	-0 -48	-0 -58	-0 -70	-0 -84	-0 -100	-0 -120	-0 -140	-0 -160	-0 -185	-0 -210	-0 -230									
h11	-0 -75	-0 -90	-0 -110	-0 -130	-0 -160	-0 -190	-0 -220	-0 -250	-0 -290	-0 -320	-0 -360									
h12	-0 -120	-0 -150	-0 -180	-0 -210	-0 -250	-0 -300	-0 -350	-0 -400	-0 -460	-0 -520	-0 -570									
j5	+3 -2	+4 -2	+5 -3	+5 -4	+6 -5	+6 -7	+6 -9	+7 -11	+7 -13	+7 -16	+7 -18									
j6	+6 -2	+7 -2	+8 -3	+9 -4	+11 -5	+12 -7	+13 -9	+14 -11	+16 -13	+16 -16	+18 -18									
j7	+8 -4	+10 -5	+12 -6	+13 -8	+15 -10	+18 -12	+20 -15	+22 -18	+25 -21	+26 -26	+29 -28									
js5	+2.5 -2.5	+3 -3	+4 -4	+4.5 -4.5	+5.5 -5.5	+6.5 -6.5	+7.5 -7.5	+9 -9	+10 -10	+11.5 -11.5	+12.5 -12.5									
js6	+4 -4	+4.5 -4.5	+5.5 -5.5	+6.5 -6.5	+8 -8	+9.5 -9.5	+11 -11	+12.5 -12.5	+14.5 -14.5	+16 -16	+18 -18									
js7	+6 -6	+7.5 -7.5	+9 -9	+10.5 -10.5	+12.5 -12.5	+15 -15	+17.5 -17.5	+20 -20	+23 -23	+26 -26	+28.5 -28.5									
k5	+6 +1	+7 +1	+9 +1	+11 +2	+13 +2	+15 +2	+18 +3	+21 +3	+24 +4	+27 +4	+29 +4									

ISO Tolerances for Shafts (ISO 286-2)

Nominal Shaft Sizes (mm)

over	3	6	10	18	30	40	50	65	80	100	120	140	160	180	200	225	250	280	315	355
inc.	6	10	18	30	40	50	65	80	100	120	140	160	180	200	225	250	280	315	355	400
micrometres																				
k6	+9 +1	+10 +1	+12 +1	+15 +2	+18 +2	+21 +2	+25 +3	+28 +3	+33 +4	+36 +4	+40 +4									
k7	+13 +1	+16 +1	+19 +1	+23 +2	+27 +2	+32 +2	+38 +3	+43 +3	+50 +4	+56 +4	+61 +4									
m5	+9 +4	+12 +6	+15 +7	+17 +8	+20 +9	+24 +11	+28 +13	+33 +15	+37 +17	+43 +20	+46 +21									
m6	+12 +4	+15 +6	+18 +7	+21 +8	+25 +9	+30 +11	+35 +13	+40 +15	+46 +17	+52 +20	+57 +21									
m7	+16 +4	+21 +6	+25 +7	+29 +8	+34 +9	+41 +11	+48 +13	+55 +15	+63 +17	+72 +20	+78 +21									
n5	+13 +8	+16 +10	+20 +12	+24 +15	+28 +17	+33 +20	+38 +23	+45 +27	+51 +31	+57 +34	+62 +37									
n6	+16 +8	+19 +10	+23 +12	+28 +15	+33 +17	+39 +20	+45 +23	+52 +27	+60 +31	+66 +34	+73 +37									
n7	+20 +8	+25 +10	+30 +12	+36 +15	+42 +17	+50 +20	+58 +23	+67 +27	+77 +31	+86 +34	+94 +37									
p5	+17 +12	+21 +15	+26 +18	+31 +22	+37 +26	+45 +32	+52 +37	+61 +43	+70 +50	+79 +56	+87 +62									
p6	+20 +12	+24 +15	+29 +18	+35 +22	+42 +26	+51 +32	+59 +37	+68 +43	+79 +50	+88 +56	+98 +62									
r6	+23 +15	+28 +19	+34 +23	+41 +28	+50 +34	+60 +41	+62 +43	+73 +51	+76 +54	+88 +63	+90 +65	+93 +68	+106 +77	+109 +80	+113 +84	+126 +94	+130 +98	+144 +108	+150 +114	

ISO Hole Tolerances

ISO Tolerances for Holes (ISO 286-2)																				
Nominal hole sizes (mm)																				
over	3	6	10	18	30	40	50	65	80	100	120	140	160	180	200	225	250	280	315	355
inc.	6	10	18	30	40	50	65	80	100	120	140	160	180	200	225	250	280	315	355	400
micrometres																				
E6	+28 +20	+34 +25	+43 +32	+53 +40	+66 +50	+79 + 60	+94 +72		+110 +85		+129 +100		+142 +110		+161 +125					
E7	+32 +20	+40 +25	+50 +32	+61 +40	+75 +50	+90 + 60	+107 +72		+125 +85		+146 +100		+162 +110		+185 +125					
E11	+95 +20	+115 +25	+142 +32	+170 +40	+210 +50	+250 + 60	+292 +72		+335 +85		+390 +100		+430 +110		+485 +125					
E12	+140 +20	+175 +25	+212 +32	+250 +40	+300 +50	+360 + 60	+422 +72		+485 +85		+560 +100		+630 +110		+695 +125					
E13	+200 +20	+245 +25	+302 +32	+370 +40	+440 +50	+520 + 60	+612 +72		+715 +85		+820 +100		+920 +110		+1015 +125					
F6	+18 +10	+22 +13	+27 +16	+33 +20	+41 +2	+49 + 30	+58 +36		+68 43		+79 +50		+88 +56		+98 +62					
F7	+22 +10	+28 +13	+34 +16	+41 +20	+50 +25	+60 + 30	+71 +36		+83 43		+96 +50		+108 +56		+119 +62					
F8	+28 +10	+35 +13	+43 +16	+53 +20	+64 +25	+76 + 30	+90 +36		+106 43		+122 +50		+137 +56		+151 +62					
G6	+12 +4	+14 +5	+17 +6	+20 +7	+25 +9	+29 +10	+34 + 12		+39 +14		+44 +15		+49 +17		+54 +18					
G7	+16 +4	+20 +5	+24 +6	+28 +7	+34 +9	+40 +10	+47 + 12		+54 +14		+61 +15		+69 +17		+75 +18					

ISO Tolerances for Holes (ISO 286-2)

Nominal hole sizes (mm)

over	3	6	10	18	30	40	50	65	80	100	120	140	160	180	200	225	250	280	315	355
inc.	6	10	18	30	40	50	65	80	100	120	140	160	180	200	225	250	280	315	355	400
micrometres																				
G8	+22 +4	+27 +5	+33 +6	+40 +7	+48 +9	+56 +10	+66 + 12		+77 +14		+87 +15		+98 +17		+107 +18					
H6	+8 0	+9 0	+11 0	+13 0	+16 0	+19 0	+22 0		+25 0		+29 0		+32 0		+36 0					
H7	+12 0	+15 0	+18 0	+21 0	+25 0	+30 0	+35 0		+40 0		+46 0		+52 0		+57 0					
H8	+18 0	+22 0	+27 0	+33 0	+39 0	+46 0	+54 0		+63 0		+72 0		+81 0		+89 0					
H9	+30 0	+36 0	+43 0	+52 0	+62 0	+74 0	+87 0		+100 0		+115 0		+130 0		+140 0					
H10	+48 0	+58 0	+70 0	+84 0	+100 0	+120 0	+140 0		+160 0		+185 0		+210 0		+230 0					
H11	+75 0	+90 0	+110 0	+130 0	+160 0	+190 0	+220 0		+250 0		+290 0		+320 0		+360 0					
J6	+5 -3	+5 -4	+6 -5	+8 -5	+10 -6	+13 -6	+16 -6		+18 -7		+22 -7		+25 -7		+29 -7					
J7	+6 -6	+8 -7	+10 -8	+12 -9	+14 -11	+18 -12	+22 -13		+26 -14		+30 -16		+36 -16		+39 -18					
J8	+10 -8	+12 -10	+15 -12	+20 -13	+24 -15	+28 -18	+34 -20		+41 -22		+47 -25		+55 -26		+60 -29					
JS6	+4 -4	+4.5 -4.5	+5.5 -5.5	+6.5 -6.5	+8 -8	+9.5 -9.5	+11 -11		+12.5 -12.5		+14.5 -14.5		+16 -16		+18 -18					

ISO Tolerances for Holes (ISO 286-2)

Nominal hole sizes (mm)

over	3	6	10	18	30	40	50	65	80	100	120	140	160	180	200	225	250	280	315	355
inc.	6	10	18	30	40	50	65	80	100	120	140	160	180	200	225	250	280	315	355	400
micrometres																				
JS7	+6 -6	+7.5 -7.5	+9 -9	+10.5 -10.5	+12.5 -12.5	+15 -15	+17.5 -17.5		+20 -20		+23 -23		+26 -26		+28.5 -28.5					
JS8	+9 -9	+11 -11	+13.5 -13.5	+16.5 -16.5	+19.5 -19.5	+23 -23	+27 -27		+31.5 -31.5		+36 -36		+40.5 -40.5		+44.5 -44.5					
K6	+2 -6	+2 -7	+2 -9	+2 -11	+3 -13	+4 -15	+4 -18		+4 -21		+5 -24		+5 -27		+7 -29					
K7	+3 -9	+5 -10	+6 -12	+6 -15	+7 -18	+9 -21	+10 -25		+12 -28		+13 -33		+16 -36		+17 -40					
K8	+5 -13	+6 -16	+8 -19	+10 -23	+12 -27	+14 -32	+16 -38		+20 -43		+22 -50		+25 -56		+28 -61					
M6	-1 -9	-3 -12	-4 -15	-4 -17	-4 -20	-5 -24	-6 -28		-8 -33		-8 -37		-9 -41		-10 -46					
M7	0 -12	0 -15	0 -18	0 -21	0 -25	0 -30	0 -35		0 -40		0 -46		0 -52		0 -57					
M8	+2 -16	+1 -21	+2 -25	+4 -29	+5 -34	+5 -41	+6 -48		+8 -55		+9 -63		+9 -72		+11 -78					
N6	-5 -13	-7 -16	-9 -20	-11 -24	-12 -28	-14 -33	-16 -38		-20 -45		-22 -51		-25 -57		-26 -62					
N7	-4 -16	-4 -19	-5 -23	-7 -28	-8 -33	-9 -39	-10 -45		-12 -52		-14 -60		-14 -66		-16 -73					
N8	-2 -20	-3 -25	-3 -30	-3 -36	-3 -42	-4 -50	-4 -58		-4 -67		-5 -77		-5 -86		-5 -94					

ISO Tolerances for Holes (ISO 286-2)

Nominal hole sizes (mm)

over	3	6	10	18	30	40	50	65	80	100	120	140	160	180	200	225	250	280	315	355
inc.	6	10	18	30	40	50	65	80	100	120	140	160	180	200	225	250	280	315	355	400
micrometres																				
P6	-9 -17	-12 -21	-15 -26	-18 -31	-21 -37	-26 -45		-30 -52		-36 -61			-41 -70			-47 -79		-51 -87		
P7	-8 -20	-9 -24	-11 -29	-14 -35	-17 -42	-21 -51		-24 -59		-28 -68			-33 -79			-36 -88		-41 -98		
P8	-12 -30	-15 -37	-18 -45	-22 -55	-26 -65	-32 -78		-37 -91		-43 -106			-50 -122			-56 -137		-62 -151		
R6	-12 -20	-16 -25	-20 -31	-24 -37	-29 -45	-35 -54	-37 -56	-44 -66	-47 -69	-56 -81	-58 -83	-61 -86	-68 -97	-71 -100	-75 -104	-85 -117	-89 -121	-97 -133	-103 -139	
R7	-11 -23	-13 -28	-16 -34	-20 -41	-25 -50	-30 -60	-32 -62	-38 -73	-41 -76	-48 -88	-50 -90	-53 -93	-60 -106	-63 -109	-67 -113	-74 -126	-78 -130	-87 -144	-93 -150	

Clearance Descriptions

Description	Hole Tol.	Shaft tol
Loose fit	H11	c11
Free running	H9	d9
Easy running	H8	f8
Sliding fit	H7	g6
Close clearance	H8	f7
Location clearance	H7	h6
Slight interference	H7	k6
Transition	H7	n6
Press fit	H7	p6
Medium fit	H7	s6
Force fit	H7	u6

Errors and Omissions Excluded