

[TECHNICAL DATA]
FIT SELECTION BASICS

EXCERPT FROM "USAGE OF JIS SERIES"
MANUAL FOR DESIGNING (PRECISION VER.)

Applicable part	Applicable part	Functional classification	Application example
H9	c9	The part which allows a large clearance space or the part requires clearance space. The part which can be enlarged to make clearance space to make assembly easier. The part which requires proper clearance space in the high temperature.	Piston ring and piston ring groove Fit of loosening safety pin
H8	d9	The part which allows a large clearance space or the part requires clearance space.	Crank web and pin bearing side surface) Exhaust valve cage and traveling part of spring sheet Piston ring and piston ring groove
H7	e8	The part which allows a slight clearance space or the part requires clearance space (high grade fit). The bearing part which has slight clearance space and good lubrication. The bearing part which is working under the condition of high temperature, high speed and high load (high grade pressure need lubrication).	Fit of exhaust valve seat Shoulder Bolts MSB (e9) Main bearing for crankshaft Stopper Bolts STBG (e9) General traveling part Puller Bolts PBNT (e9)
H6	f7	Fit which can be mobile due to proper clearance space (high grade fit). The general cold bearing part of grease or oil lubrication.	Insertion part of cooling exhaust valve cage Retum Pins (f6) General shaft and bushing Runner Lock Pins (f6) Lever for link system and bushing
H5	f8	The continuous rotary part of light load precision machine. Fit which can be mobile in spite of small clearance space (spigot and positioning). Precision traveling part.	Pin for link system and lever Key and key groove Valve stem of precision control valve Pusher Pins PSP (g6)
H4	h7	Fit which can be moved manually with using a lubricator (high grade positioning). Special precision traveling part. Stationary part which is not of great importance.	Fit of rim and boss Fit of toothed gear of precision gear mechanism Dowel Pins MSTH (h7) Sprue Bushings (h6)
H3	h8	Mounting part which is given a little leeway. High-precision positioning where both are immobile. Fit which can be assembled and disassembled by wood or lead hammer.	Fit between joint flanges Governor way and pin Fit of rim of toothed gear and boss
H2	js6	Fit which can be assembled and disassembled by an iron hammer or hand press (key or such items are required to prevent other components from rotating). High-precision positioning.	Fixation of gear pump shaft and casing Reamer bolt Press-fit Section of Tapered Pin Sets (k6)
H1	k6	Same as the above for assembling and disassembling High-precision positioning which does not tolerate any clearance space.	Reamer bolt Dowel Pins MSTM (m6) Fixation of piston of hydraulic system and shaft Ball Buttons BBT (k5) Fit of joint flange and shaft
H0	m6	Fit which requires considerable power for assembling and disassembling. High-precision fixed mounting. (Key or such items are required for large torque transmission.)	Flexible plate coupling and gear passive side) Precision fit Leader Pins & Bushings (m5) Insertion of valve guide for inlet valve Angular Pins (m5)
H-1	n6	Fit which requires much power for assembling and disassembling. (Key or such items are required for large torque transmission.) However, when non-ferrous components are fitted together, press fit power will be activated. Standard press fit fixing between iron and iron or between bronze and copper.	Insertion of valve guide for inlet valve Dowel Pins MST (p6) Fixation of gear and shaft (small torque) Stopper Pins STPN (p6) Flexible plate coupling and gear active side)
H-2	p6	Same as the above for assembling and disassembling Shrinkage fit, cooling fit and strong press fit for large dimension components.	Joint and shaft
H-3	r6	Shrinkage fit, cooling fit and strong press fit for large dimension components.	Fixation of bushing for bearing
H-4	s6	Fixed firmly together, so that permanent assembling can be sought with shrinkage fit, cooling fit and strong press fit for assembling. Press fit for light alloy.	Insertion of valve guide for inlet valve Fixation of joint flange and shaft (large torque)
H-5	t6		Fixation of driving gear and boss
H-6	u6		Fixation of bushing for bearing
H-7	x6		

Printed in red are listed with applicable examples of mold parts.

[TECHNICAL DATA]
DIMENSIONAL TOLERANCE AND FITS EXCERPT FROM JIS B 0401(1986)

1.1 Commonly used hole-basis fits

Basic hole	Tolerance zone class of shaft			
	Clearance fit	Transition fit	Interference fit	Interference fit
H6	g5, g6, h6, js6, k5, k6, m6, n6, p6, r6, s6, t6, u6, x6	h5, js5, k5, m5	n6*, p6*	p6*
H7	e7, f7, g7, js7, k7, m7, n7, p7, r7, s7, t7, u7, x7	h7, js7, k7, m7, n7, p7, r7, s7, t7, u7, x7	r6*, s6*	r6*, s6*
H8	e8, f8, g8, js8, k8, m8, n8, p8, r8, s8, t8, u8, x8	h8, js8, k8, m8, n8, p8, r8, s8, t8, u8, x8		
H9	e9, f9, g9, js9, k9, m9, n9, p9, r9, s9, t9, u9, x9	h9, js9, k9, m9, n9, p9, r9, s9, t9, u9, x9		
H10	e10, f10, g10, js10, k10, m10, n10, p10, r10, s10, t10, u10, x10	h10, js10, k10, m10, n10, p10, r10, s10, t10, u10, x10		

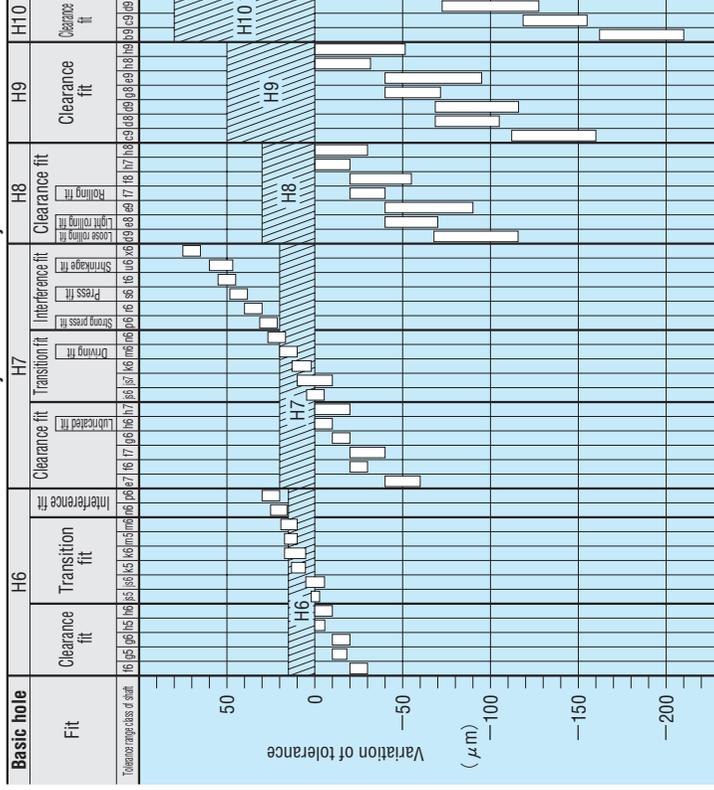
Notice * Fits will make exceptions according to the size steps.

2.1 Commonly used shaft-basis system of fits

Basic shaft	Tolerance zone class of hole			
	Clearance fit	Transition fit	Interference fit	Interference fit
h5	F6, G6, H6, JS6, K6, M6, N6, P6, R6, S6, T6, U6, X6	H6, JS6, K6, M6, N6, P6, R6, S6, T6, U6, X6	N6*, P6*	P6*
h6	F7, G7, H7, JS7, K7, M7, N7, P7, R7, S7, T7, U7, X7	H7, JS7, K7, M7, N7, P7, R7, S7, T7, U7, X7	N7*, P7*	P7*
h7	F8, G8, H8, JS8, K8, M8, N8, P8, R8, S8, T8, U8, X8	H8, JS8, K8, M8, N8, P8, R8, S8, T8, U8, X8		
h8	F9, G9, H9, JS9, K9, M9, N9, P9, R9, S9, T9, U9, X9	H9, JS9, K9, M9, N9, P9, R9, S9, T9, U9, X9		
h9	F10, G10, H10, JS10, K10, M10, N10, P10, R10, S10, T10, U10, X10	H10, JS10, K10, M10, N10, P10, R10, S10, T10, U10, X10		

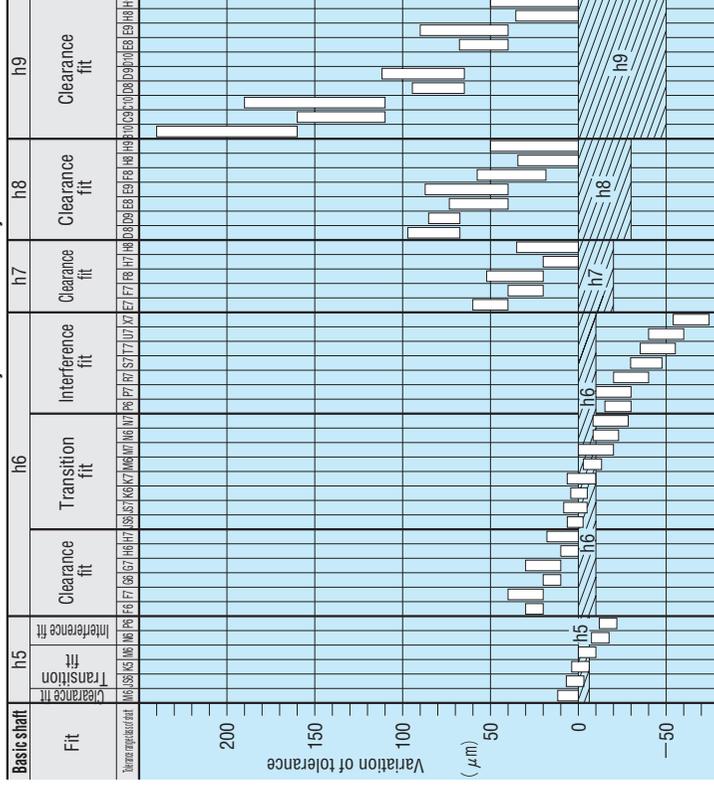
Notice * Fits will make exceptions according to the size steps.

1.2 Mutual relations of tolerance zone in commonly used hole-basis system of fits



* This table shows the case when basic size is over 18mm to 30mm.

2.2 Mutual relations of tolerance zone in commonly used shaft-basis system of fits



* This table shows the case when basic size is over 18mm to 30mm.

TOLERANCE OF COMMONLY USED HOLE FITS

EXCERPT FROM JIS B 0401 (1986)

TOLERANCE OF COMMONLY USED SHAFT FITS

EXCERPT FROM JIS B 0401 (1986)

Deviations of holes to be used in commonly used fits

Basic size step (mm)	Tolerance zone class of hole																				Unit μm														
	B10	C9	C10	D8	D9	D10	E7	E8	E9	F6	F7	F8	G6	G7	H6	H7	H8	H9	H10	JS6		JS7	K6	K7	M6	M7	N6	N7	P6	P7	R7	S7	T7	U7	X7
3	+180	+85	+100	+34	+45	+60	+24	+28	+39	+12	+16	+20	+8	+12	+6	+10	+14	+25	+40	±3	±5	0	0	-2	-2	-4	-4	-6	-6	-10	-14	-14	-18	-20	
6	+140	+60	+118	+48	+60	+78	+32	+38	+50	+18	+22	+28	+12	+16	+8	+12	+18	+30	+48	±4	±6	+2	+3	-1	0	-5	-4	-9	-8	-11	-15	-19	-24	-30	
10	+140	+70	+130	+60	+70	+90	+30	+40	+20	+10	+10	+10	+4	+4	+4	+4	0	0	0	0	0	0	-6	-9	-9	-12	-13	-16	-17	-23	-27	-31	-36	-42	
14	+150	+80	+138	+62	+76	+98	+40	+47	+61	+22	+28	+35	+14	+20	+9	+15	+22	+36	+58	±7	±10	+2	+5	-3	0	-7	-4	-12	-9	-13	-17	-22	-28	-33	
20	+170	+120	+165	+77	+93	+120	+50	+59	+75	+27	+34	+43	+17	+24	+11	+18	+27	+43	+70	±9	±12	+3	+7	-4	0	-12	-8	-21	-17	-25	-34	-44	-51	-56	
30	+200	+150	+200	+100	+120	+160	+60	+75	+95	+32	+40	+50	+20	+28	+13	+21	+33	+52	+84	±10	±15	+2	+6	-4	0	-11	-7	-18	-14	-20	-27	-33	-40	-46	
40	+240	+180	+240	+140	+170	+220	+80	+100	+125	+40	+50	+60	+25	+35	+17	+25	+37	+55	+95	±11	±16	+3	+9	-5	0	-14	-9	-26	-21	-30	-39	-48	-57	-66	
50	+280	+210	+280	+180	+220	+280	+120	+150	+190	+50	+60	+70	+30	+40	+20	+30	+40	+60	+100	±12	±18	+4	+10	-6	0	-16	-10	-30	-24	-33	-43	-53	-64	-74	-84
60	+320	+250	+320	+220	+270	+340	+160	+200	+250	+60	+70	+80	+40	+50	+30	+40	+60	+100	+150	±13	±20	+5	+13	-8	0	-22	-14	-41	-33	-43	-53	-64	-74	-84	-94
80	+360	+290	+360	+260	+310	+390	+200	+250	+320	+80	+90	+100	+50	+60	+40	+50	+70	+110	+160	±14	±22	+6	+16	-9	0	-25	-14	-47	-36	-46	-56	-66	-76	-86	-96
100	+400	+330	+400	+300	+350	+440	+240	+290	+370	+100	+110	+120	+60	+70	+50	+60	+80	+130	+200	±15	±24	+7	+17	-10	0	-26	-16	-51	-41	-51	-61	-71	-81	-91	-101
120	+440	+370	+440	+340	+390	+490	+280	+340	+430	+120	+130	+140	+70	+80	+60	+70	+90	+140	+220	±16	±26	+8	+18	-11	0	-27	-17	-55	-45	-55	-65	-75	-85	-95	-105
140	+480	+410	+480	+380	+430	+540	+320	+380	+480	+140	+150	+160	+80	+90	+70	+80	+100	+150	+240	±17	±28	+9	+19	-12	0	-28	-18	-57	-47	-57	-67	-77	-87	-97	-107
160	+520	+450	+520	+420	+470	+580	+360	+420	+520	+160	+170	+180	+90	+100	+80	+90	+110	+160	+260	±18	±30	+10	+20	-13	0	-29	-19	-61	-51	-61	-71	-81	-91	-101	-111
180	+560	+490	+560	+460	+510	+620	+400	+460	+560	+180	+190	+200	+100	+110	+90	+100	+120	+170	+280	±19	±32	+11	+21	-14	0	-30	-20	-65	-55	-65	-75	-85	-95	-105	-115
200	+600	+530	+600	+500	+550	+660	+440	+500	+600	+200	+210	+220	+110	+120	+100	+110	+130	+180	+300	±20	±34	+12	+22	-15	0	-31	-21	-69	-59	-69	-79	-89	-99	-109	-119
225	+640	+570	+640	+540	+590	+700	+480	+540	+640	+220	+230	+240	+120	+130	+110	+120	+140	+190	+320	±21	±36	+13	+23	-16	0	-32	-22	-71	-61	-71	-81	-91	-101	-111	-121
250	+680	+610	+680	+580	+630	+740	+520	+580	+680	+240	+250	+260	+130	+140	+120	+130	+150	+200	+340	±22	±38	+14	+24	-17	0	-33	-23	-73	-63	-73	-83	-93	-103	-113	-123
280	+720	+650	+720	+620	+670	+780	+560	+620	+720	+260	+270	+280	+140	+150	+130	+140	+160	+210	+360	±23	±40	+15	+25	-18	0	-34	-24	-75	-65	-75	-85	-95	-105	-115	-125
315	+760	+690	+760	+660	+710	+820	+600	+660	+760	+280	+290	+300	+150	+160	+140	+150	+170	+220	+380	±24	±42	+16	+26	-19	0	-35	-25	-77	-67	-77	-87	-97	-107	-117	-127
355	+800	+730	+800	+700	+750	+860	+640	+700	+800	+300	+310	+320	+160	+170	+150	+160	+180	+230	+400	±25	±44	+17	+27	-20	0	-36	-26	-79	-69	-79	-89	-99	-109	-119	-129
400	+840	+770	+840	+740	+790	+900	+680	+740	+840	+320	+330	+340	+170	+180	+160	+170	+190	+240	+420	±26	±46	+18	+28	-21	0	-37	-27	-81	-71	-81	-91	-101	-111	-121	-131
450	+880	+810	+880	+780	+830	+940	+720	+780	+880	+340	+350	+360	+180	+190	+170	+180	+200	+250	+440	±27	±48	+19	+29	-22	0	-38	-28	-83	-73	-83	-93	-103	-113	-123	-133
500	+920	+850	+920	+820	+870	+980	+760	+820	+920	+360	+370	+380	+190	+200	+180	+190	+210	+260	+460	±28	±50	+20	+30	-23	0	-39	-29	-85	-75	-85	-95	-105	-115	-125	-135

Note: This table shows that the upper figures are the upper deviation and the lower figures are the lower deviation.

Deviations of shafts to be used in commonly used fits

Basic size step (mm)	Tolerance Zone class of shaft																				Unit μm															
	b9	c9	d8	d9	e7	e8	e9	f6	f7	f8	g5	g6	h5	h6	h7	h8	h9	h9	js5	js6		js7	k5	k6	m5	m6	n5*	n6	p6	r6	s6	t6	u6	x6		
3	-140	-60	-20	-20	-14	-14	-14	-6	-6	-6	-2	-2	0	0	0	0	0	0	0	±2	±3	±5	+4	+6	+6	+8	+8	+10	+12	+16	+20	+20	+24	+26		
6	-165	-85	-34	-45	-24	-28	-39	-12	-16	-20	-6	-8	-4	-6	-10	-14	-25	-25	±2	±3	±5	+6	+9	+9	+12	+12	+13	+16	+20	+23	+27	+31	+36	+36	+40	
10	-170	-100	-48	-60	-32	-38	-50	-18	-22	-28	-9	-12	-5	-8	-12	-18	-30	-30	±2.5	±4	±6	+6	+9	+9	+12	+12	+13	+16	+20	+23	+27	+31	+36	+40	+44	
14	-180	-110	-58	-70	-35	-42	-55	-20	-25	-32	-10	-14	-6	-9	-14	-21	-33	-33	±3	±4.5	±7	+7	+10	+10	+12	+12	+13	+16	+20	+23	+27	+31	+36	+40	+44	
20	-190	-120	-68	-80	-38	-45	-58	-22	-28	-36	-12	-16	-7	-10	-16	-24	-36	-36	±4	±5.5	±9	+8	+12	+12	+15	+15	+16	+20	+23	+27	+31	+36	+40	+44	+48	
30	-200	-130	-78	-90	-40	-48	-60	-24	-30	-38	-14	-18	-8	-11	-18	-27	-43	-43	±4.5	±6.5	±10	+9	+13	+13	+16	+16	+17	+21	+24	+28	+32	+36	+40	+44	+48	
40	-210	-140	-88	-100	-42	-50	-62	-26	-32	-40	-16	-20	-9	-13	-21	-33	-52	-52	±5	±7	±12	+10	+14	+14	+17	+17	+18	+22	+26	+30	+34	+38	+42	+46	+50	
50	-220	-150	-98	-110	-44	-52	-64	-28	-34	-42	-18	-22	-10	-14	-22	-34	-54	-54	±5.5	±8	±15	+11	+15	+15	+18	+18	+19	+23	+27	+31	+35	+39	+43	+47	+51	
65	-230	-160	-108	-120	-46	-54	-66	-30	-36	-44	-20	-24	-11	-15	-24	-36	-56	-56	±6	±8	±16	+12	+16	+16	+19	+19	+20	+24	+28	+32	+36	+40	+44	+48	+52	
80	-240	-170	-118	-130	-48	-56	-68	-32	-38	-46	-22	-26	-12	-16	-26	-38	-58	-58	±6.5	±9	±18	+13	+17	+17	+20	+20	+21	+25	+29	+33	+37	+41	+45	+49	+53	
100	-250	-180	-128	-140	-50	-58	-70	-34	-40	-48	-24	-28	-13	-17	-28	-40	-60	-60	±7	±10	±20	+14	+18	+18	+21	+21	+22	+26	+30	+34	+38	+42	+46	+50	+54	
120	-260	-190	-138	-150	-52	-60	-72	-36	-42	-50	-26	-30	-14	-18	-30	-42	-62	-62	±7.5	±11	±22	+15	+19	+19	+22	+22	+23	+27	+31	+35	+39	+43	+47	+51	+55	
140	-270	-200	-148	-160	-54	-62	-74	-38	-44	-52	-28	-32	-15	-19	-32	-44	-64	-64	±8	±11.5	±24	+16	+20	+20	+23	+23	+24	+28	+32	+36	+40	+44	+48	+52	+56	
160	-280	-210	-158	-170	-56	-64	-76	-40	-46	-54	-30	-34	-16	-20	-34	-46	-66	-66	±8.5	±12.5	±26	+17	+21	+21	+24	+24	+25	+29	+33	+37	+41	+45	+49	+53	+57	
180	-290	-220	-168	-180	-58	-66	-78	-42	-48	-56	-32	-36	-17	-21	-36	-48	-68	-68	±9	±14	±28	+18	+22	+22	+25	+25	+26	+30	+34	+38	+42	+46	+50	+54	+58	
200	-300	-230	-178	-190	-60	-68	-80	-44	-50	-58	-34	-38	-18	-22	-38	-50	-70	-70	±9.5	±15	±30	+19	+23	+23	+26	+26	+27	+31	+35	+39	+43	+47	+51	+55	+59	+63
225	-310	-240	-188	-200	-62	-70	-82	-46	-52	-60	-36	-40	-19	-23	-40	-52	-72	-72	±10	±16	±32	+20	+24	+24	+27	+27	+28	+32	+36	+40	+44	+48	+52	+56	+60	
250	-320	-250	-198	-210	-64	-72	-84	-48	-54	-62	-38	-42	-20	-24	-42	-54	-74	-74	±10.5	±17	±34	+21	+25	+25	+28	+28	+29	+33	+37	+41	+45	+49	+53	+57	+61	
280	-330	-260	-208	-220	-66	-74	-86	-50	-56	-64	-40	-44	-21	-25	-44	-56	-76	-76	±11	±18	±36	+22	+26</													