

[Technical Data] Basis of Fitting Selection/Dimensional Tolerances and Fitting

Drawing Manual in JIS (How To Use) Series Excerpts from JIS B 0401 (1998)

[Technical Data] Dimensional Tolerance for Regularly Used Fitting

Excerpts from JIS B 0401(1999)

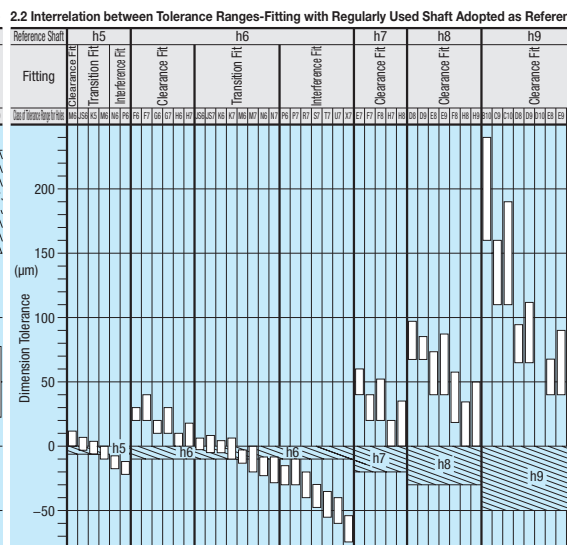
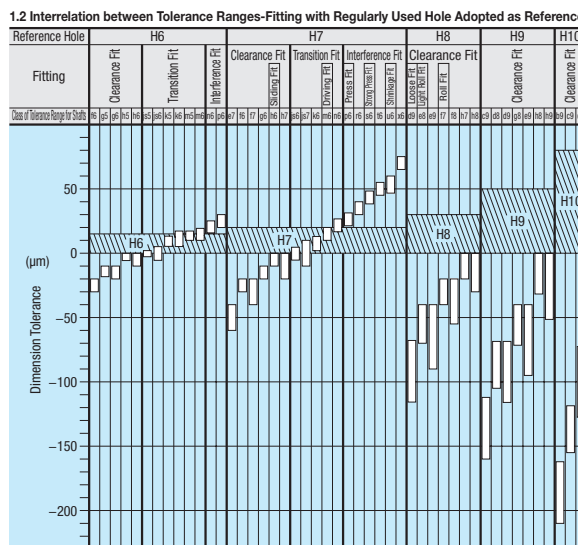
	H6	H7	H8	H9	Applicable Part	Functional Classification	Application Example			
								Can be Moved Relatively	Cannot be Moved Relatively	
Clearance Fit	Loose Fit	d9	d9	c9	Part which accommodates a wide gap or moving part which needs a gap. Part which accommodates a wide gap to facilitate assembling. Part which needs an appropriate gap even at a high temperature.	Part whose structure needs a gap. Inflates. Large position error Fitting length is long.	Piston Ring and the Ring Groove Fitting by means of a loose set pin.			
					Light Roll Fit	e7	e8	Cost needs to be reduced. Manufacturing Cost Maintenance Cost	Crank Web and Pin Bearing(Side) Exhaust Valve Box and the Sliding Part of a Spring Bearing Piston Ring and the Ring Groove	
								Part which accommodates a wide gap or needs a gap. Fairly wide gap, well greased bearing. Bearing subjected to a high temperature, high speed and heavy load(high-degree forced lubrication).	Regular Rotary or Sliding Part (Must be well greased.)	Fitting of the Exhaust Valve Box Main Bearing for the Crank Shaft Regular Sliding Part
Roll Fit	f6	f7	f7	f8	Fitting so as to provide an appropriate gap to permit movement(high-quality fitting). Regular normal temperature bearing lubricated with grease or oil.	Regular Fitting (Often comes apart.)	Part in which a cooled exhaust valve box is inserted. Regular Shaft and Bushing Link Device Lever and Bushing			
					Fine Roll Fit	g5	g6	Continuously revolving part of a precision machine under a light load. Fitting with a narrow gap so as to permit movement(spigot and positioning). Precision sliding part.	Part required to make a precision motion with virtually no play.	Link Device Pin and Lever Key and its Groove Precision Control Valve Rod
Transition Fit	Sliding Fit	h5	h6	h7				h8	h9	Fitting so as to permit movement by hand, with a lubricant applied.(high-quality positioning) Special High Precision Sliding Part Unimportant Stationary Part
					Fitting which accommodates a light gap. Precision fitting which locks both parts while the unit is used. Fitting which allows assembling and disassembling with a wooden or lead hammer.	Can be disassembled, reassembled without damaging component parts.	Fitting Coupling Flanges Together Governor Path and Pin Fitting a Gear Rim and a Boss Together			
					Fitting which requires an iron hammer or hand press for assembling, disassembling(a key or the like is necessary to prevent inter-part shaft rotation). Precision positioning.	Slight force can be transmitted by the fitting force alone.	Fixing the Shaft of a Gear Pump and a Casing Together Reamer Bolts			
					Same as the above for assembling and disassembling. Precision positioning which allows no gap.	Hard to disassemble without damaging component parts.	Reamer Bolts Fixing the piston of hydraulic equipment and a shaft together Fitting a Coupling Flange and a Shaft Together			
					Fitting which requires considerable force for assembling, disassembling. Precision stationary fitting(a key or the like is necessary for high torque transmission purposes)	Considerable force can be transmitted by the fitting force alone.	Shaft of a Flexible Coupling and Gear(Passive Side) Precision Fitting Insertion of a Suction Valve and Valve Guide			
Interference Fit	Shrink Press Fit, Shrinkage Fit, Press Fit	n5	n6	p6	r5	r6	r6	Fitting which requires much force for assembling, disassembling(a key or the like is necessary for high torque transmission). Light press fitting or the like is necessary for non-ferrous component parts. Standard press fitting is required for iron component parts and a bronze part and a copper part.		Insertion of a Suction Valve and Valve Guide Fixing a Gear and a Shaft Together(Low Torque) Shaft of a Flexible Coupling and a Gear(Drive Side)
								Same as the above for assembling and disassembling Shrinkage press fitting, cold press fitting or forced press fitting is required for large component parts.		Coupling and Shaft
								Firmly coupled together and requires shrinkage press fitting, cold press fitting or forced press fitting. Permanent assembly, which can not come apart. Press fitting or the like is required for light alloy members.		Attaching and Fixing a Bearing Bushing Insertion of a Suction Valve and Valve Box Fixing a Coupling Flange and a Shaft Together(High Torque) Fixing the Rim of a Drive Gear and a Boss Together Attaching and Fixing a Bearing Bushing

1.1 Fitting, with Regularly Used Hole Adopted as Reference

Reference Hole	Class of Tolerance Range for Shafts									
	Clearance Fit			Transition Fit			Interference Fit			
H6										
H7										
H8										
H9										
H10										

2.1 Fitting, with Regularly Used Shaft Adopted as Reference

Reference Shaft	Class of Tolerance Range for Holes									
	Clearance Fit			Transition Fit			Interference Fit			
h5										
h6										
h7										
h8										
h9										



Dimension Tolerance of Shaft, Regularly Used Fitting

Reference Dimension (mm)	More than or Less	Class of Tolerance Range for Shafts																								Unit μm							
		b9	c9	d8	d9	e7	e8	e9	f6	f7	f8	g5	g6	h5	h6	h7	h8	h9	js5	js6	js7	k5	k6	m5	m6		n5 [†]	n6	p6	r6	s6	t6	u6
3	-	140	-60	-20	-20	-14	-14	-14	-6	-6	-6	-2	-2	0	0	0	0	0	±2	±3	±5	+4	+6	+6	+8	+8	+10	+12	+16	+20	+20	+24	+26
6	180	-70	-30	-30	-20	-20	-20	-10	-10	-10	-4	-4	0	0	0	0	0	0	±2.5	±4	±6	+6	+9	+9	+12	+13	+16	+20	+23	+27	+31	+36	
10	170	-80	-40	-40	-25	-25	-25	-13	-13	-13	-5	-5	0	0	0	0	0	0	±2.5	±4	±7.5	+7	+10	+12	+15	+16	+19	+24	+28	+32	+37	+43	
14	186	-116	-62	-76	-40	-47	-61	-22	-28	-35	-11	-14	-6	-9	-15	-22	-36	±3	±4.5	±7.5	+11	+15	+18	+20	+23	+29	+34	+39	+44	+49	+54	+60	
18	193	-138	-77	-93	-50	-59	-75	-27	-34	-43	-14	-17	-8	-11	-18	-27	-43	±4	±5.5	±9	+11	+15	+18	+20	+23	+29	+34	+39	+44	+49	+54	+60	
24	212	-162	-98	-117	-61	-73	-92	-33	-41	-53	-16	-20	-9	-13	-21	-33	-52	±4.5	±6.5	±10.5	+11	+15	+17	+21	+24	+28	+35	+41	+48	+54	+61	+67	
30	232	-182	-119	-142	-75	-89	-112	-41	-50	-64	-20	-25	-11	-16	-25	-39	-62	±5.5	±8	±12.5	+13	+18	+20	+25	+28	+33	+42	+50	+59	+64	+76	+86	
40	242	-192	-140	-170	-85	-100	-128	-51	-60	-76	-25	-30	-12	-17	-26	-40	-64	±6.5	±9.5	±15	+15	+21	+24	+30	+33	+39	+51	+60	+72	+85	+106	+127	
50	252	-202	-160	-190	-95	-110	-140	-61	-70	-88	-30	-35	-13	-18	-27	-41	-65	±7.5	±11	±17.5	+18	+25	+28	+35	+38	+45	+59	+71	+81	+94	+114	+146	
65	274	-224	-184	-224	-105	-120	-150	-71	-80	-100	-35	-40	-15	-20	-29	-43	-67	±8.5	±12.5	±20	+21	+28	+33	+40	+43	+51	+66	+79	+94	+111	+134	+166	
80	290	-240	-200	-240	-115	-130	-160	-81	-90	-110	-40	-45	-16	-21	-30	-44	-68	±9.5	±14.5	±23	+24	+33	+37	+46	+49	+57	+73	+87	+104	+124	+144	+166	
100	310	-260	-220	-260	-125	-140	-170	-91	-100	-120	-45	-50	-17	-22	-31	-45	-69	±11.5	±16.5	±26	+27	+36	+40	+49	+52	+60	+77	+91	+108	+128	+148	+166	
120	330	-280	-240	-280	-135	-150	-180	-101	-110	-130	-50	-55	-18	-23	-32	-46	-70	±12.5	±18.5	±28	+29	+38	+42	+51	+54	+62	+79	+93	+110	+130	+150	+166	
140	350	-300	-260	-300	-145	-160	-190	-111	-120	-140	-55	-60	-19	-24	-33	-47	-71	±13.5	±19.5	±30	+31	+40	+44	+53	+56	+64	+81	+95	+112	+132	+152	+166	
160	370	-320	-280	-320	-155	-170	-200	-121	-130	-150	-60	-65	-20	-25	-34	-48	-72	±14.5	±21.5	±32	+33	+42	+46	+55	+58	+66	+83	+97	+114	+134	+154	+166	
180	390	-340	-300	-340	-165	-180	-210	-131	-140	-160	-65	-70	-21	-26	-35	-49	-73	±15.5	±22.5	±34	+35	+44	+48	+57	+60	+68	+85	+99	+116	+136	+156	+166	
200	410	-360	-320	-360	-175	-190	-220	-141	-150	-170	-70	-75	-22	-27	-36	-50	-74	±16.5	±23.5	±36	+37	+46	+50	+59	+62	+70	+87	+101	+118	+138	+158	+166	
225	430	-380	-340	-380	-185	-200	-230	-151	-160	-180	-75	-80	-23	-28	-37	-51	-75	±17.5	±24.5	±38	+39	+48	+52	+61	+64	+72	+89	+103	+120	+140	+160	+166	
250	450	-400	-360	-400	-195	-210	-240	-161	-170	-190	-80	-85	-24	-29	-38	-52	-76	±18.5	±25.5	±40	+41	+50	+54	+63	+66	+74	+91	+105	+122	+142	+162	+166	
280	470	-420	-380	-420	-205	-220	-250	-171	-180	-200	-85	-90	-25	-30	-39	-53	-77	±19.5	±26.5	±42	+43	+52	+56	+65	+68	+76	+93	+107	+124	+144	+164	+166	
315	490	-440	-400	-440	-215	-230	-260	-181	-190	-210	-90	-95	-26	-31	-40	-54	-78	±20.5	±27.5	±44	+45	+54	+58	+67	+70	+78	+95	+109	+126	+146	+166	+166	
355	510	-460	-420	-460	-225	-240	-270	-191	-200	-220	-95	-100	-27	-32	-41	-55	-79	±21.5	±28.5	±46	+47	+56	+60	+69	+72	+80	+97	+111	+128	+148	+168	+166	
400	530	-480	-440	-480	-235	-250	-280	-201	-210	-230	-100	-105	-28	-33	-42	-56	-80	±22.5	±29.5	±48	+49	+58	+62	+71	+74	+82	+99	+113	+130	+150	+170	+166	
450	550	-500	-460	-500	-245	-260	-290	-211	-220	-240	-105	-110	-29	-34	-43	-57	-81	±23.5	±30.5	±50	+51	+60	+64	+73	+76	+84	+101	+115	+132	+152	+172	+166	
500	570	-520	-480	-520	-255	-270	-300	-221	-230	-250	-110	-115	-30	-35	-44	-58	-82	±24.5	±31.5	±52	+53	+62	+66	+75	+78	+86	+103	+117	+134	+154	+174	+166	

Dimension Tolerance of Hole, Regularly Used Fitting

Reference Dimension (mm)	More than or Less	Class of Tolerance Range for Holes																								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
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	-4	-6	-8	-10	-14	-18	-20	
6	188	+100	+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
10	170	+80	+98	+38	+50	+68	+22	+28	+40	+14	+18	+24	+8	+12	+6	+10	+16	+30	+48	±4	±6	-6	-9	-9	-12	-13	-16	-17	-20	-23	-27	-31	-36
14	186	+106	+124	+44	+56	+74	+28	+34	+46	+16	+20	+26	+10	+14	+8	+12	+18	+36	+54	±4.5	±7.5	-2	+5	-3	0	-7	-4	-12	-9	-13	-17	-22	-28
18	193	+113	+131	+41	+53	+71	+25	+31	+43	+15	+19	+25	+9	+13	+7	+11	+17	+34	+52	±5.5	±9	+2	+6	-4	0	-9	-5	-15	-11	-16	-21	-26	-33
24	212	+132	+150	+38	+50	+68	+22	+28	+40	+14	+18	+24	+8	+12	+6	+10	+16	+30	+48	±6.5	±10.5	+2	+6	-4	0	-11	-7	-18	-14	-20	-27	-34	-41
30	232	+152	+170	+35	+47	+65	+19	+25	+37	+13	+17	+23	+7	+11	+5	+9	+15	+30	+48	±7.5	±12.5	+2	+6	-4	0	-11	-7	-18	-14	-20	-27	-34	-41
40	252	+172	+190	+32	+44	+62	+16	+22	+34	+10	+14	+20	+6	+10	+4	+8	+14	+28	+46	±8.5	±14.5	+3	+7	-4	0	-12	-8	-21	-17	-25	-34	-43	-51
50	274	+192	+210	+29	+41	+59	+13	+19	+31	+11	+15	+21	+5	+9	+3	+7	+13	+26	+44	±9.5	±15.5	+4	+8	-4	0	-13							