

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

## Drawing Manual in JIS (How To Use) Series Excerpted and edited from JIS B0401-1, -2 (1998)

		H6	H7	H8	H9	Applicable Part	Functional Classification	Application Example			
Can be Moved Relatively	Clearance Fit	Loose Fit			c9	Part which accommodates a wide gap or movable 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		d9	d9	Part which accommodates or needs a gap.	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		
		Roll Fit		e7	e8	e9	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		
			Fine 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	
Cannot be Moved Relatively	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	Can be disassembled, reassembled without damaging component parts.	Force cannot be transmitted by the fitting force alone.	Fitting a rim and a boss together Fitting the gear of a precision gear device
								Push Fit			h5
		Driving Fit	js5	k6	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.	Fixing the Shaft of a Gear Pump and a Casing Together Reamer Bolts					
		Light Press Fit			m5	n6	Fitting which requires considerable force for assembling, disassembling. Precision stationary fitting (a key or the like is necessary for high torque transmission purposes)	Reamer Bolts Fixing the piston of hydraulic equipment and a shaft together Fitting a Coupling Flange and a Shaft Together			
			Press Fit	n5			n6	p6			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.
	Interference Fit	Shrink Press Fit, Shrinkage Fit, Freeze Fit	p5		r6	Same as the above for assembling and disassembling Shrinkage press fitting, cold press fitting or forced press fitting is required for large component parts.			Hard to disassemble without damaging component parts.	Considerable force can be transmitted by the fitting force alone.	Coupling and Shaft
				Shrink Press Fit, Shrinkage Fit, Freeze Fit		r5	s6	t6			Firmly coupled together and requires shrinkage press fitting, cold press fitting or forced press fitting. Permanent assembly, which can not be disassembled any further. Press fitting or the like is required for light alloy members.
		Shrink Press Fit, Shrinkage Fit, Freeze Fit	r5		u6						x6
				Shrink Press Fit, Shrinkage Fit, Freeze Fit		r5	u6	x6			

1.1 Generally Used Hole-basis System of Fits

Reference Hole	Class of Tolerance Range for Shafts																			
	Clearance Fit			Transition Fit			Interference Fit													
H6				g5	h5	js5	k5	m5	n6*	p6*										
H7				f6	g6	h6	js6	k6	m6	n6	p6*	f6*	s6	t6	u6	x6				
H8				e7	f7	g7	h7	js7												
H9				d8	e8	f8	g8	h8												
H10				c9	d9	e9	f9	g9	h9											

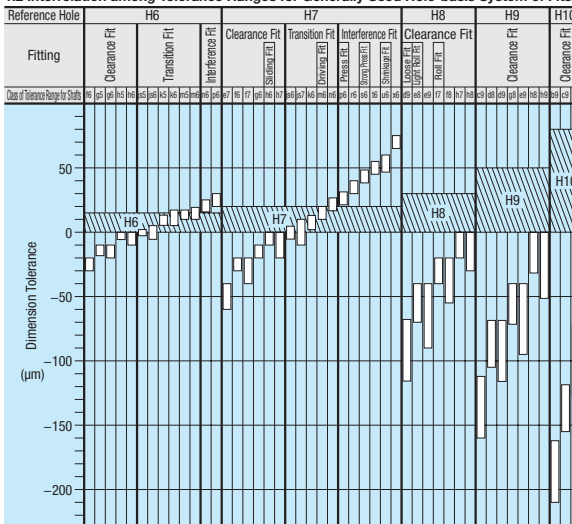
[Note]\* An exception may arise according to the dimensional sectioning scheme.

2.1 Generally Used Shaft-basis System of Fits

Reference Shaft	Class of Tolerance Range for Holes																			
	Clearance Fit			Transition Fit			Interference Fit													
h5				F6	G6	H6	JS6	K6	M6	N6*	P6									
h6				F7	G7	H7	JS7	K7	M7	N7	P7*	R7	S7	T7	U7	X7				
h7				E7	F7	G7	H7													
h8				D8	E8	F8	G8	H8												
h9				D9	E9	F9	G9	H9												
				C9	D9	E9	F9	G9	H9											

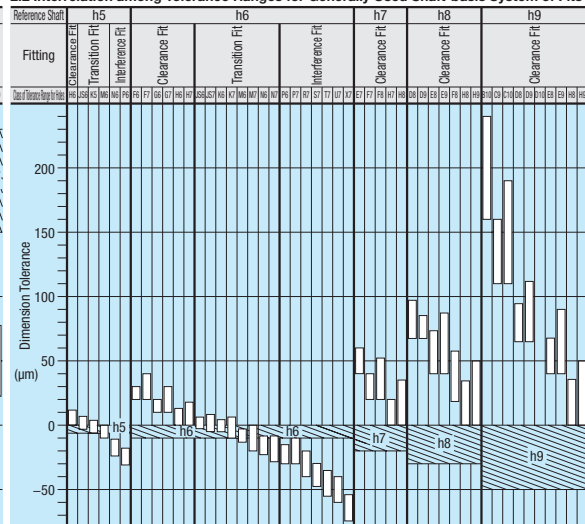
[Note]\* An exception may arise according to the dimensional sectioning scheme.

1.2 Interrelation among Tolerance Ranges for Generally Used Hole-basis System of Fits



\* Values in cases where the measurement exceeds the reference dimension 18 mm, but does not exceed 30 mm.

2.2 Interrelation among Tolerance Ranges for Generally Used Shaft-basis System of Fits



\* Values in cases where the measurement exceeds the reference dimension 18 mm, but does not exceed 30 mm.

# [Technical Data]

## Dimension Tolerance for Regularly Used Fitting

Excerpted and edited from JIS B0401-2 (1998)

### Dimension Tolerance for Generally Used Hole Fits

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	x6					
		μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm	μm		
3	~	-140	-60	-20	-20	-14	-14	-14	-6	-6	-6	-2	-2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	-	-165	-85	-34	-45	-24	-28	-39	-12	-16	-20	-6	-4	-4	-4	-6	-10	-14	-25	±2	±3	±5	±4	±6	±8	±8	±8	±10	±12	±16	±20	±20	±14	±14	±20	±20	±24	±26
6	3	-140	-70	-30	-20	-20	-20	-10	-10	-10	-4	-4	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6	-170	-100	-40	-32	-38	-50	-18	-22	-28	-8	-9	-12	-5	-6	-12	-18	-30	±2.5	±4	±6	±6	±9	±9	±12	±13	±16	±23	±27	±15	±19	-	-	-	-	-	-	
10	6	-150	-80	-40	-40	-25	-25	-13	-13	-13	-5	-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	10	-186	-116	-62	-76	-40	-47	-61	-22	-28	-35	-11	-14	-6	-9	-15	-22	-36	±3	±4.5	±7.5	±7	±10	±12	±15	±16	±19	±24	±28	±32	±23	±23	-	-	-	-	-	-
14	10	-150	-95	-50	-50	-32	-32	-16	-16	-16	-6	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	14	-193	-138	-77	-93	-50	-59	-75	-27	-34	-43	-14	-17	-8	-11	-18	-27	-43	±4	±5.5	±9	±1	±1	±7	±7	±12	±12	±18	±23	±29	±34	±39	±39	±28	±28	-	-	-
18	14	-160	-110	-65	-65	-40	-40	-20	-20	-20	-7	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	18	-212	-162	-98	-117	-61	-73	-92	-33	-41	-53	-16	-20	-9	-13	-21	-33	-52	±4.5	±6.5	±10.5	±2	±2	±8	±8	±15	±15	±22	±28	±35	±41	±48	±48	±35	±35	-	-	-
24	18	-170	-120	-80	-80	-50	-50	-25	-25	-25	-9	-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	24	-232	-182	-119	-142	-75	-89	-112	-41	-50	-64	-20	-25	-11	-16	-25	-39	-62	±5.5	±8	±12.5	±3	±3	±9	±9	±17	±17	±26	±34	±43	±50	±59	±59	±43	±43	-	-	-
30	24	-180	-130	-90	-90	-60	-60	-30	-30	-30	-10	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	30	-242	-192	-129	-152	-85	-101	-134	-49	-60	-76	-23	-29	-13	-19	-30	-46	-74	±6.5	±9.5	±15	±4	±4	±11	±11	±20	±20	±32	±42	±51	±61	±61	±45	±45	-	-	-	-
40	30	-190	-140	-100	-100	-70	-70	-30	-30	-30	-10	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	40	-254	-204	-146	-174	-106	-134	-49	-60	-76	-23	-29	-13	-19	-30	-46	-74	±7.5	±11	±17.5	±5	±5	±15	±15	±24	±24	±36	±46	±56	±66	±76	±86	±86	±66	±66	-	-	-
50	40	-220	-170	-120	-120	-72	-72	-36	-36	-36	-12	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	50	-282	-232	-174	-207	-107	-126	-159	-58	-71	-90	-27	-34	-15	-22	-35	-54	-87	±7.5	±11	±17.5	±6	±6	±18	±18	±28	±38	±48	±58	±68	±78	±88	±88	±68	±68	-	-	-
60	50	-240	-180	-140	-140	-85	-85	-43	-43	-43	-14	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	60	-300	-240	-208	-245	-125	-148	-185	-68	-83	-106	-32	-39	-18	-25	-40	-63	-100	±9	±12.5	±20	±7	±7	±21	±21	±33	±43	±53	±63	±73	±83	±93	±93	±73	±73	-	-	-
80	60	-260	-200	-160	-160	-100	-100	-50	-50	-50	-17	-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	80	-320	-260	-228	-265	-145	-168	-205	-83	-106	-143	-41	-49	-20	-27	-44	-72	-115	±10	±14.5	±23	±8	±8	±24	±24	±36	±46	±56	±66	±76	±86	±96	±96	±76	±76	-	-	-
100	80	-280	-220	-180	-180	-110	-110	-56	-56	-56	-17	-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	100	-340	-280	-248	-285	-146	-172	-215	-79	-96	-122	-35	-44	-20	-29	-46	-72	-115	±11.5	±16	±26	±9	±9	±27	±27	±40	±50	±60	±70	±80	±90	±100	±100	±80	±80	-	-	-
120	100	-300	-240	-200	-200	-110	-110	-62	-62	-62	-18	-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	120	-360	-300	-268	-305	-150	-176	-219	-87	-110	-147	-43	-54	-22	-31	-48	-74	-117	±12.5	±18	±28.5	±10	±10	±30	±30	±44	±54	±64	±74	±84	±94	±104	±104	±84	±84	-	-	-
140	120	-320	-260	-220	-220	-120	-120	-68	-68	-68	-18	-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	140	-380	-320	-288	-325	-160	-186	-229	-99	-122	-159	-45	-58	-24	-33	-50	-76	-119	±13.5	±20	±31.5	±11	±11	±33	±33	±48	±58	±68	±78	±88	±98	±108	±108	±88	±88	-	-	-
160	140	-340	-280	-240	-240	-140	-140	-74	-74	-74	-19	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	160	-400	-340	-300	-300	-160	-186	-229	-109	-132	-169	-47	-62	-26	-35	-52	-78	-121	±15	±22	±34.5	±12	±12	±36	±36	±52	±62	±72	±82	±92	±102	±112	±112	±92	±92	-	-	-
180	160	-360	-300	-260	-260	-160	-160	-80	-80	-80	-19	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	180	-420	-360	-320	-320	-180	-206	-249	-119	-142	-179	-49	-66	-28	-37	-54	-80	-123	±16.5	±24	±37.5	±13	±13	±39	±39	±56	±66	±76	±86	±96	±106	±116	±116	±96	±96	-	-	-
200	180	-380	-320	-280	-280	-180	-180	-90	-90	-90	-19	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	200	-440	-380	-340	-340	-200	-226	-269	-129	-152	-189	-51	-68	-30	-39	-56	-82	-125	±18	±26	±40.5	±14	±14	±42	±42	±60	±70	±80	±90	±100	±110	±110	±90	±90	-	-	-	-
250	200	-420	-360	-320	-320	-220	-246	-289	-139	-162	-209	-53	-70	-32	-41	-58	-84	-127	±19.5	±28	±43.5	±15	±15	±45	±45	±64	±74	±84	±94	±104	±114	±114	±94	±94	-	-	-	-
	250	-480	-420	-380	-380	-240	-266	-309	-149	-172	-219	-57	-74	-34	-43	-60	-86	-129	±21	±30	±46.5	±16	±16	±48	±48	±68	±78	±88	±98	±108	±118	±118	±98	±98	-	-	-	-
280	250	-460	-400	-360	-360	-260	-286	-329	-159	-182	-229	-59	-76	-36	-45	-62	-88	-131	±22.5	±32	±49.5	±17	±17	±51	±51	±72	±82	±92	±102	±112	±112	±102	±102	-	-	-	-	-
	280	-520	-460	-420	-420	-280	-306	-349	-169	-192	-239	-63	-80	-38	-47	-64	-90	-133	±24	±34	±52.5	±18	±18	±54	±54	±76	±86	±96	±106	±116	±116	±106	±106	-	-	-	-	-
350	280	-500	-440	-400	-400	-300	-326	-369	-179	-202	-249	-67	-84	-40	-49	-66	-92	-135	±25.5	±36	±55.5	±19	±19	±57	±57	±80	±90	±100	±110	±110	±100	±100	-	-	-	-	-	-
	350	-560	-500	-460	-460	-320	-346	-389	-189	-212	-259	-71	-88	-42	-51	-68	-94	-137	±27	±38	±58.5	±20	±20	±60	±60	±84	±94	±104	±114	±114	±104	±104	-	-	-	-	-	-
400	350	-540	-480	-440	-440	-340	-366	-409	-199	-222	-269	-75	-92	-44	-53	-70	-96	-139	±28.5	±40	±61.5	±21	±21	±63	±63	±88	±98	±108	±118	±118	±108	±108	-	-	-	-	-	-
	400	-600	-540	-500	-500	-360	-386	-429	-209	-232	-279	-79	-96	-46	-55	-72	-98	-141	±30</																			