Description of Fits／Graphical Representation of Standard Fits

"Drawing Manual" in JIS "How to Use" Series　Excerpt from JIS B0401 (1999)

			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 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 / Long		Piston Ring and 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
				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 Crankshaft 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 Bush Link Device Lever and Bush
		Fine Roll Fit	g5	g6			Continuously rotating 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
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/re-assembled 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 h6	js6			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.			Fitting Coupling Flanges Together Governor Shaft and Pin Fitting a Gear Rim and a Boss Together
		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.			Reamer Bolt to Fix the Shaft of a Gear Pump and a Casing Together
			k5	m6			Requires an iron hammer or hand press for assembling／disassembling. Precision positioning which allows no gap.			Reamer Bolt Fixing the piston of hydraulic equipment and a shaft together Fitting a Coupling Flange and a Shaft Together
		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)		Slight force can be transmitted by the fitting force alone.	Flexible-Axis Coupling and Gear (Passive Side) Precision Fitting Insertion of a Suction Valve and Valve Guide
	Interference Fit	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.	Hard to disassemble without damaging component parts.		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)
			p5	r6			Fitting which requires much force for assembling／disassembling. Shrinkage press fitting, cold press fitting or forced press fitting is required for large component parts.			Coupling and Shaft
		Strong Press Fit, Shrinkage Fit, Freeze Fit	r5	s6 t6 u6 x6			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.		Considerable force can be transmitted by the fitting force alone.	Attaching and Fixing a Bearing Bush Insertion of a Suction Valve and Valve Guide 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 Bush

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						g5	h5	js5	k5	m5												
H7					f6	g6	h6	js6	k6	m6	n6 *		p6 *		r6 *		s6	t6	u6	x6		
					f6	g6	h6	js6	k6	m6	n6		p6 *		r6 *		s6	t6	u6	x6		
				e7	f7		h7	js7														
H8					f7		h7															
				e8	f8		h8															
H9			d9	e9			h8															
		c9	d9	e9			h9															
H10	b9	c9	d9																			

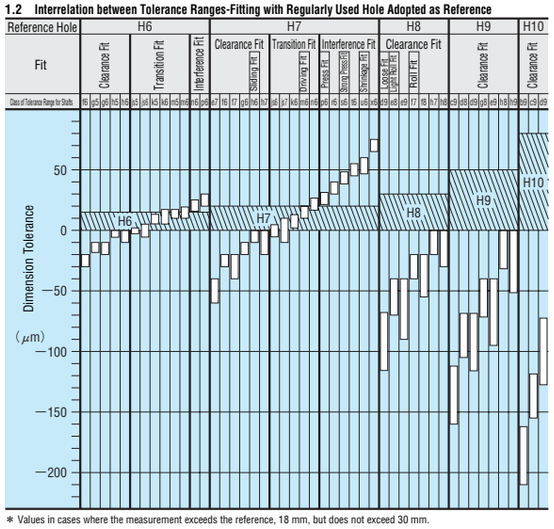
Note：＊An exception may arise according to the dimensional sectioning scheme.

2.1　Fitting, with Regularly Used Shaft Adopted as Reference

Reference Shaft	Class of Tolerance Range for Shafts																					
	Clearance Fit							Transition Fit			Interference Fit											
h5							H6	JS6	K6	M6	N6 *		P6									
h6						F6	G6	H6	JS6	K6	M6	N6		P6 *								
						F7	G7	H7	JS7	K7	M7	N7		P7 *	R7	S7	T7	U7	X7			
h7					E7	F7		H7														
h8				D8	E8	F8		H8														
			D8	E9				H8														
h9			D8	E8				H8														
		C9	D9	E9				H9														
	B10	C10	D10																			

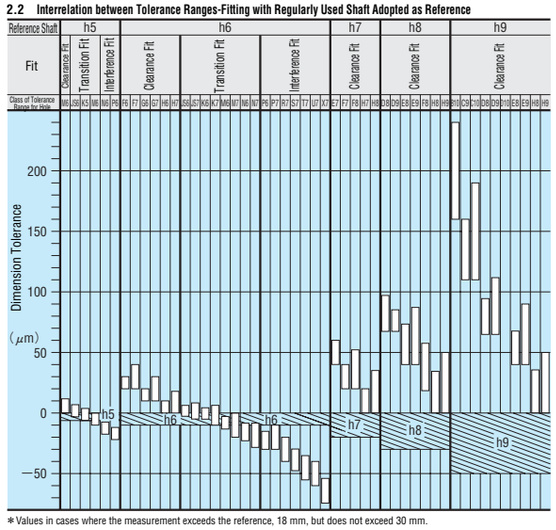
Note：＊An exception may arise according to the dimensional sectioning scheme.

1.2　Interrelation between Tolerance Ranges-Fitting with Regularly Used Hole Adopted as Reference



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

2.2　Interrelation between Tolerance Ranges-Fitting with Regularly Used Shaft Adopted as Reference



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

Tolerance Table for Regularly Used Fits

Excerpt from JIS B 0401 (1999)

Dimensional Tolerances of Shaft, Regularly Used Fitting

Unit μm

Basic Size (mm)		Class of Tolerance Range for Shafts																												
Beyond	or Less	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
—	3	−140 −165	−60 −85	−20 −34	−20 −45	−14 −24	−14 −28	−14 −39	−6 −12	−6 −16	−6 −20	−2 −6	−2 −8	0 −4	0 −6	0 −10	0 −14	0 −25	±2	±3	±5	+4 0	+6 0	+6 +2	+8 +2	+8 +4	+10 +4	+12 +6	+16 +10	+20 +14	—	+24 +18	+26 +20
3	6	−140 −170	−70 −100	−30 −48	−30 −60	−20 −32	−20 −38	−20 −50	−10 −18	−10 −22	−10 −28	−4 −9	−4 −12	0 −5	0 −8	0 −12	0 −18	0 −30	±2.5	±4	±6	+6 +1	+9 +1	+9 +4	+12 +4	+13 +8	+16 +8	+20 +12	+23 +15	+27 +19	—	+31 +23	+36 +28
6	10	−150 −186	−80 −116	−40 −62	−40 −76	−25 −40	−25 −47	−25 −61	−13 −22	−13 −28	−13 −35	−5 −11	−5 −14	0 −6	0 −9	0 −15	0 −22	0 −36	±3	±4.5	±7.5	+7 +1	+10 +1	+12 +6	+15 +6	+16 +10	+19 +10	+24 +15	+28 +19	+32 +23	—	+37 +28	+43 +34
10	14	−150 −193	−95 −138	−50 −77	−50 −93	−32 −50	−32 −59	−32 −75	−16 −27	−16 −34	−16 −43	−6 −14	−6 −17	0 −8	0 −11	0 −18	0 −27	0 −43	±4	±5.5	±9	+9 +1	+12 +1	+15 +7	+18 +7	+20 +12	+23 +12	+29 +18	+34 +23	+39 +28	—	+44 +33	+51 +40 +56 +45
14	18																																
18	24	−160 −212	−110 −162	−65 −98	−65 −117	−40 −61	−40 −73	−40 −92	−20 −33	−20 −41	−20 −53	−7 −16	−7 −20	0 −9	0 −13	0 −21	0 −33	0 −52	±4.5	±6.5	±10.5	+11 +2	+15 +2	+17 +8	+21 +8	+24 +15	+28 +15	+35 +22	+41 +28	+48 +35	— +54	+54 +41 +61	+67 +54 +77
24	30																													+41	+48	+64	
30	40	−170 −232	−120 −182	−80	−80	−50	−50	−50	−25	−25	−25	−9	−9	0	0	0	0	0	±5.5	±8	±12.5	+13	+18	+20	+25	+28	+33	+42	+50	+59	+48 +70	+60 +86	+64 +76 +60	—
40	50	−180 −242	−130 −192	−119	−142	−75	−89	−112	−41	−50	−64	−20	−25	−11	−16	−25	−39	−62				+2	+2	+9	+9	+17	+17	+26	+34	+43	+54	+70	
50	65	−190 −264	−140 −214	−100	−100	−60	−60	−60	−30	−30	−30	−10	−10	0	0	0	0	0	±6.5	±9.5	±15	+15	+21	+24	+30	+33	+39	+51	+60 +41	+72 +53	+85 +66	+106 +87	—
65	80	−200 −274	−150 −224	−146	−174	−90	−106	−134	−49	−60	−76	−23	−29	−13	−19	−30	−46	−74				+2	+2	+11	+11	+20	+20	+32	+62 +43	+78 +59	+94 +75	+121 +102	
80	100	−220 −307	−170 −257	−120	−120	−72	−72	−72	−36	−36	−36	−12	−12	0	0	0	0	0	±7.5	±11	±17.5	+18	+25	+28	+35	+38	+45	+59	+73 +51	+93 +71	+113 +91	+146 +124	—
100	120	−240 −327	−180 −267	−174	−207	−107	−126	−159	−58	−71	−90	−27	−34	−15	−22	−35	−54	−87				+3	+3	+13	+13	+23	+23	+37	+76 +54	+101 +79	+126 +104	+166 +144	
120	140	−260 −360	−200 −300																										+88 +63	+117 +92	+147 +122		
140	160	−280 −380	−210 −310	−145 −208	−145 −245	−85 −125	−85 −148	−85 −185	−43 −68	−43 −83	−43 −106	−14 −32	−14 −39	0 −18	0 −25	0 −40	0 −63	0 −100	±9	±12.5	±20	+21 +3	+28 +3	+33 +15	+40 +15	—	+52 +27	+68 +43	+90 +65	+125 +100	+159 +134	—	—
160	180	−310 −410	−230 −330																										+93 +68	+133 +108	+171 +146		
180	200	−340 −455	−240 −355																										+106 +77	+151 +122			
200	225	−380 −495	−260 −375	−170 −242	−170 −285	−100 −146	−100 −172	−100 −215	−50 −79	−50 −96	−50 −122	−15 −35	−15 −44	0 −20	0 −29	0 −46	0 −72	0 −115	±10	±14.5	±23	+24 +4	+33 +4	+37 +17	+46 +17	—	+60 +31	+79 +50	+109 +80	+159 +130	—	—	—
225	250	−420 −535	−280 −395																										+113 +84	+169 +140			
250	280	−480 −610	−300 −430	−190	−190	−110	−110	−110	−56	−56	−56	−17	−17	0	0	0	0	0	±11.5	±16	±26	+27	+36	+43	+52	—	+66	+88	+126 +94	—	—	—	—
280	315	−540 −670	−330 −460	−271	−320	−162	−191	−240	−88	−108	−137	−40	−49	−23	−32	−52	−81	−130				+4	+4	+20	+20		+34	+56	+130 +98				
315	355	−600 −740	−360 −500	−210	−210	−125	−125	−125	−62	−62	−62	−18	−18	0	0	0	0	0	±12.5	±18	±28.5	+29	+40	+46	+57	—	+73	+98	+144 +108	—	—	—	—
355	400	−680 −820	−400 −540	−299	−350	−182	−214	−265	−98	−119	−151	−43	−54	−25	−36	−57	−89	−140				+4	+4	+21	+21		+37	+62	+150 +114				
400	450	−760 −915	−440 −595	−230	−230	−135	−135	−135	−68	−68	−68	−20	−20	0	0	0	0	0	±13.5	±20	±31.5	+32	+45	+50	+63	—	+80	+108	+166 +126	—	—	—	—
450	500	−840 −995	−480 −635	−327	−385	−198	−232	−290	−108	−131	−165	−47	−60	−27	−40	−63	−97	−155				+5	+5	+23	+23		+40	+68	+172 +132				

Dimensional Tolerances of Shaft, Regularly Used Fitting

Unit μm

Basic Size (mm)		Class of Tolerance Range for Holes																												
Beyond	or Less	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 +140	+85 +60	+100 +60	+34 +20	+45 +20	+60 +20	+24 +14	+28 +14	+39 +14	+12 +6	+16 +6	+20 +6	+8 +2	+12 +2	+6 0	+10 0	+14 0	+25 0	+40 0	±3	±5	0 −6	0 −10	−2 −8	−2 −12	−4 −10	−4 −14	−6 −12	−6 −16	−10 −20	−14 −24	—	−18 −28	−20 −30
3	6	+188 +140	+100 +70	+118 +70	+48 +30	+60 +30	+78 +30	+32 +20	+38 +20	+50 +20	+18 +10	+22 +10	+28 +10	+12 +4	+16 +4	+8 0	+12 0	+18 0	+30 0	+48 0	±4	±6	+2 −6	+3 −9	−1 −9	0 −12	−5 −13	−4 −16	−9 −17	−8 −20	−11 −23	−15 −27	—	−19 −31	−24 −36
6	10	+208 +150	+116 +80	+138 +80	+62 +40	+76 +40	+98 +40	+40 +25	+47 +25	+61 +25	+22 +13	+28 +13	+35 +13	+14 +5	+20 +5	+9 0	+15 0	+22 0	+36 0	+58 0	±4.5	±7.5	+2 −7	+5 −10	−3 −12	0 −15	−7 −16	−4 −19	−12 −21	−9 −24	−13 −28	−17 −32	—	−22 −37	−28 −43
10	14	+220 +150	+138 +95	+165 +95	+77 +50	+93 +50	+120 +50	+50 +32	+59 +32	+75 +32	+27 +16	+34 +16	+43 +16	+17 +6	+24 +6	+11 0	+18 0	+27 0	+43 0	+70 0	±5.5	±9	+2 −9	+6 −12	−4 −15	0 −18	−9 −20	−5 −23	−15 −26	−11 −29	−16 −34	−21 −39	—	−26 −44	−33 −51 −38 −56
14	18																																		
18	24	+244 +160	+162 +110	+194 +110	+98 +65	+117 +65	+149 +65	+61 +40	+73 +40	+92 +40	+33 +20	+41 +20	+53 +20	+20 +7	+28 +7	+13 0	+21 0	+33 0	+52 0	+84 0	±6.5	±10.5	+2 −11	+6 −15	−4 −17	0 −21	−11 −24	−7 −28	−18 −31	−14 −35	−20 −41	−27 −48	—	−33 −54	−46 −67
24	30																															−54	−61	−40 −77	−56
30	40	+270 +170	+182 +120	+220 +120	+119	+142	+180 +80	+75 +50	+89 +50	+112 +50	+41 +25	+50 +25	+64 +25	+25 +9	+34 +9	+16 0	+25 0	+39 0	+62 0	+100 0	±8	±12.5	+3 −13	+7 −18	−4 −20	0 −25	−12 −28	−8 −33	−21 −37	−17 −42	−25 −50	−34 −59	−39 −64	−51 −76	—
40	50	+280 +180	+192 +130	+230 +130	+80	+80	+80	+50	+50	+50	+25	+25	+25	+9	+9	0	0	0	0	0												−70	−86		
50	65	+310 +190	+214 +140	+260 +140	+146	+174	+220 +100	+90 +60	+106 +60	+134 +60	+49 +30	+60 +30	+76 +30	+29 +10	+40 +10	+19 0	+30 0	+46 0	+74 0	+120 0	±9.5	±15	+4 −15	+9 −21	−5 −24	0 −30	−14 −33	−9 −39	−26 −45	−21 −51	−30 −60	−42 −72	−45 −85	−76 −106	—
65	80	+320 +200	+224 +150	+270 +150	+100	+100	+100	+60	+60	+60	+30	+30	+30	+10	+10	0	0	0	0	0											−64 −94	−91 −121		
80	100	+360 +220	+257 +170	+310 +170	+174	+207	+260 +120	+107 +72	+126 +72	+159 +72	+58 +36	+71 +36	+90 +36	+34 +12	+47 +12	+22 0	+35 0	+54 0	+87 0	+140 0	±11	±17.5	+4 −18	+10 −25	−6 −28	0 −35	−16 −38	−10 −45	−30 −52	−24 −59	−38 −73 −41 −76	−58 −93 −66 −101	−78 −113 −91 −126	−111 −146 −131 −166	—
100	120	+380 +240	+267 +180	+320 +180	+120	+120	+120	+72	+72	+72	+36	+36	+36	+12	+12	0	0	0	0	0															
120	140	+420 +260	+300 +200	+360 +200	+245	+285	+305 +145	+125 +85	+148 +85	+185 +85	+68 +43	+83 +43	+106 +43	+39 +14	+54 +14	+25 0	+40 0	+63 0	+100 0	+160 0	±12.5	±20	+4 −21	+12 −28	−8 −33	0 −40	−20 −45	−12 −52	−36 −61	−28 −68	−48 −88 −50 −90	−77 −117 −85 −125	−107 −147 −119 −159	—	—
140	160	+440 +280	+310 +210	+370 +210																															
160	180	+470 +310	+330 +230	+390 +230																									−53 −93	−93 −133	−131 −171		
180	200	+525 +340	+355 +240	+425 +240																									−60 −106	−105 −151			
200	225	+565 +380	+375 +260	+445 +260	+242 +170	+285 +170	+355 +170	+146 +100	+172 +100	+215 +100	+79 +50	+96 +50	+122 +50	+44 +15	+61 +15	+29 0	+46 0	+72 0	+115 0	+185 0	±14.5	±23	+5 −24	+13 −33	−8 −37	0 −46	−22 −51	−14 −60	−41 −70	−33 −79	−63 −109	−113 −159	—	—	—
225	250	+605 +420	+395 +280	+465 +280																									−67 −113	−123 −169			
250	280	+690 +480	+430 +300	+510 +300	+271	+320	+400 +190	+162 +110	+191 +110	+240 +110	+88 +56	+108 +56	+137 +56	+49 +17	+69 +17	+32 0	+52 0	+81 0	+130 0	+210 0	±16	±26	+5 −27	+16 −36	−9 −41	0 −52	−25 −57	−14 −66	−47 −79	−36 −88	−74 −126 −78 −130	—	—	—	—
280	315	+750 +540	+460 +330	+540 +330	+190	+190																													
315	355	+830 +600	+500 +360	+590 +360	+299	+350	+440 +210	+182 +125	+214 +125	+265 +125	+98 +62	+119 +62	+151 +62	+54 +18	+75 +18	+36 0	+57 0	+89 0	+140 0	+230 0	±18	±28.5	+7 −29	+17 −40	−10 −46	0 −57	−26 −62	−16 −73	−51 −87	−41 −98	−87 −144 −93 −150	—	—	—	—
355	400	+910 +680	+540 +400	+630 +400	+210	+210																													
400	450	+1010 +760	+595 +440	+690 +440	+327	+385	+480 +230	+198 +135	+232 +135	+290 +135	+108 +68	+131 +68	+165 +68	+60 +20	+83 +20	+40 0	+63 0	+97 0	+155 0	+250 0	±20	±31.5	+8 −32	+18 −45	−10 −50	0 −63	−27 −67	−17 −80	−55 −95	−45 −108	−103 −166 −109 −172	—	—	—	—
450	500	+1090 +840	+635 +480	+730 +480	+230	+230																													

In each column, the upper value is the upper dimensional tolerance, and the lower figure is the lower dimensional tolerance.　Note：＊n5 is the previous version of JIS. Presented here because many Misumi products conform to this version.