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

Drawing Manual in JIS (How To Use) Series **Excerpts from JIS B 0401 (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 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			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
		Light 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
		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
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 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 Path 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.			Fixing the Shaft of a Gear Pump and a Casing Together Reamer Bolts
		Driving Fit	k5	m6			Same as the above for assembling and disassembling. Precision positioning which allows no gap.			Reamer Bolts Fixing the piston of hydraulic equipment and a shaft together Fitting a Coupling Flange and a Shaft Together
	Interference Fit	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.	Shaft of a Flexible Coupling and Gear(Passive Side) Precision Fitting Insertion of a Suction Valve and Valve Guide
		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)
		Press 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.			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 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						g5	h5	js5	k5	m5										
					f6	g6	h6	js6	k6	m6	n6*	p6*								
H7					f6	g6	h6	js6	k6	m6	n6	p6*	r6*	s6	t6	u6	x6			
				e7	f7		h7	js7												
H8					f7		h7													
				e8	f8		h8													
			d9	e9																
H9			d8	e8			h8													
		c9	d9	e9			h9													
H10	b9	c9	d9																	

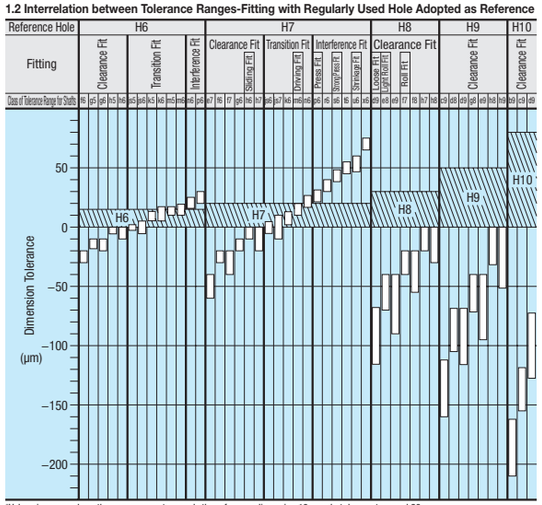
[Note]*An exception may arise according to the dimensional sectioning scheme.

2.1 Fitting, with Regularly Used Shaft Adopted as Reference

Reference Shaft	Class of Tolerance Range for Holes																			
	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													
					F8		H8													
h8			D8	E8	F8		H8													
			D9	E9			H9													
h9			D8	E8			H8													
		C9	D9	E9			H9													
	B10	C10	D10																	

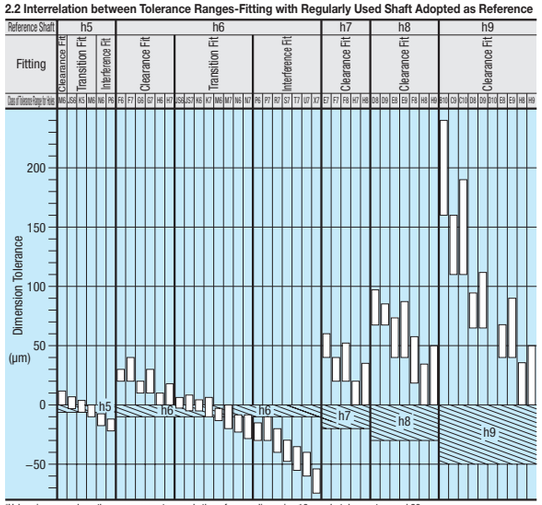
[Note]*An exception may arise according to the dimensional sectioning scheme.

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



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

[Technical Data]
Dimension Tolerance for Regularly Used Fitting

Excerpts from JIS B 0401 (1999)

Dimension Tolerance of Shaft, Regularly Used Fitting

Unit μm

Reference Dimension (mm) More than	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
14	18																																+45
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 +41	+54 +41 +61	+67 +54 +77
24	30																															+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 +2	+18 +2	+20 +9	+25 +9	+28 +17	+33 +17	+42 +26	+50 +34	+59 +43	+48 +70 +54	+60 +86 +70	–
40	50	−180 −242	−130 −192	−119	−142	−75	−89	−112	−41	−50	−64	−20	−25	−11	−16	−25	−39	−62														
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 +2	+21 +2	+24 +11	+30 +11	+33 +20	+39 +20	+51 +32	+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											+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 +3	+25 +3	+28 +13	+35 +13	+38 +23	+45 +23	+59 +37	+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											+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 +4	+36 +4	+43 +20	+52 +20	–	+66 +34	+88 +56	+126 +94	–	–	–	–
280	315	−540 −670	−330 −460	−271	−320	−162	−191	−240	−88	−108	−137	−40	−49	−23	−32	−52	−81	−130											+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 +4	+40 +4	+46 +21	+57 +21	–	+73 +37	+98 +62	+144 +108	–	–	–	–
355	400	−680 −820	−400 −540	−299	−350	−182	−214	−265	−98	−119	−151	−43	−54	−25	−36	−57	−89	−140											+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 +5	+45 +5	+50 +23	+63 +23	–	+80 +40	+108 +68	+166 +126	–	–	–	–
450	500	−840 −995	−480 −635	−327	−385	−198	−232	−290	−108	−131	−165	−47	−60	−27	−40	−63	−97	−155											+172 +132				

Dimension Tolerance of Hole, Regularly Used Fitting

Unit μm

Reference Dimension (mm) More than	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	−33 −54 −40 −61	−46 −67 −56 −77
24	30																																		
30	40	+270 +170	+182 +120	+220 +120	+119 +80	+142 +80	+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 −45 −70	−51 −76 −61 −86	–
40	50	+280 +180	+192 +130	+230 +130																															
50	65	+310 +190	+214 +140	+260 +140	+146 +100	+174 +100	+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	−55 −85	−76 −106	–
65	80	+320 +200	+224 +150	+270 +150																											−32 −62	−48 −78	−64 −94	−91 −121	
80	100	+360 +220	+257 +170	+310 +170	+174 +120	+207 +120	+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	−58 −93	−78 −113	−111 −146	–
100	120	+380 +240	+267 +180	+320 +180																											−41 −76	−66 −101	−91 −126	−131 −166	
120	140	+420 +260	+300 +200	+360 +200	+208 +145	+245 +145	+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	−77 −117	−107 −147		–	–
140	160	+440 +280	+310 +210	+370 +210																											−50 −90	−85 −125	−119 −159			
160	180	+470 +310	+330 +230	+390 +230																											−53 −93	−93 −133	−131 −171			
180	200	+525 +340	+355 +240	+425 +240	+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	−60 −106	−105 −151		–	–
200	225	+565 +380	+375 +260	+445 +260																											−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 +190	+320 +190	+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		–	–	–
280	315	+750 +540	+460 +330	+540 +330																											−78 −130				
315	355	+830 +600	+500 +360	+590 +360	+299 +210	+350 +210	+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		–	–	–
355	400	+910 +680	+540 +400	+630 +400																											−93 −150				
400	450	+1010 +760	+595 +440	+690 +440	+327 +230	+385 +230	+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		–	–	–
450	500	+1090 +840	+635 +480	+730 +480																											−109 −172				

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