

1. Regular Cut Dimension Tolerance B 0405-1991-

Tolerances in Respect of Length Excluding Chamfered Portion

Unit: mm

Tolerance Class		Classification of Reference Dimension							
Symbol	Description	0.5 (¹) or More 3 or Less	More than 3 6 or Less	More than 6 30 or Less	More than 30 120 or Less	More than 120 400 or Less	More than 400 1000 or Less	More than 1000 2000 or Less	More than 2000 4000 or Less
Tolerance									
f	Precision Grade	±0.05	±0.05	±0.1	±0.15	±0.2	±0.3	±0.5	—
m	Medium	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2
c	Coarse	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3	±4
v	Extremely Coarse	—	±0.5	±1	±1.5	±2.5	±4	±6	±8

Note (¹) : A reference dimension less than 0.5 mm is followed by a tolerance.2. Tolerances in Respect of the Length of the Chamfered Portion
(Radius of rounding for edges and edge chamfering dimension)

Unit: mm

Tolerance Class		Classification of Reference Dimension		
Symbol	Description	0.5 (²) or More 3 or Less	More than 3 6 or Less	More than 6
Tolerance				
f	Precision Grade	±0.2	±0.5	±1
m	Medium			
c	Coarse	±0.4	±1	±2
v	Extremely Coarse			

Note (²) : A reference dimension less than 0.5 mm is followed by a tolerance.

3. Angle Tolerance

Tolerance Class		Length of Shorter Side (Unit: mm)				
Symbol	Description	10 or Less	More than 10 50 or Less	More than 50 120 or Less	More than 120 400 or Less	More than 400
Tolerance						
f	Precision Grade	±1°	±30'	±20'	±10'	± 5'
m	Medium					
c	Coarse	±1°30'	± 1°	±30'	±15'	±10'
v	Extremely Coarse	±3°	± 2°	± 1°	±30'	±20'

4. Regular Perpendicularity Tolerance B 0419-1991-

Unit: mm

Tolerance Class	Nominal Length of Shorter Side			
	100 or Less	More than 100 300 or Less	More than 300 1000 or Less	More than 1000 3000 or Less
	Perpendicularity Tolerance			
H	0.2	0.3	0.4	0.5
K	0.4	0.6	0.8	1
L	0.6	1	1.5	2

5. Regular Straightness and Flatness Tolerance

Unit: mm

Tolerance Class	Nominal Length					
	10 or Less	More than 10 30 or Less	More than 30 100 or Less	More than 100 300 or Less	More than 300 1000 or Less	More than 1000 3000 or Less
	Regular Straightness and Flatness Tolerance					
H	0.02	0.05	0.1	0.2	0.3	0.4
K	0.05	0.1	0.2	0.4	0.6	0.8
L	0.1	0.2	0.4	0.8	1.2	1.6

6. Regular Symmetry Tolerance

Unit: mm

Tolerance Class	Nominal Length			
	100 or Less	More than 100 300 or Less	More than 300 1000 or Less	More than 1000
	Symmetry Tolerance			
H	0.5			
K	0.6		0.8	1
L	0.6	1	1.5	2

[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	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
	Roll Fit	f6	f7	f7	f8	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					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(spligot 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	Sliding Fit	h5	h6	h7	h8	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
	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)			Shaft of a Flexible Coupling and Gear(Passive Side) Precision Fitting Insertion of a Suction Valve and Valve Guide
	Press Fit	n5	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.	Slight force can be transmitted by the fitting force alone.	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
	Shrink Press Fit, Shrinkage Fit, Freeze Fit		s6						Attaching and Fixing a Bearing Bushing
	Shrink Press Fit, Shrinkage Fit, Freeze Fit		t6			Firmly coupled together and requires shrinkage press fitting, cold press fitting or forced press fitting. Permanent assembly, which can not come apart.			Insertion of a Suction Valve and Valve Box Fixing a Coupling Flange and a Shaft Together(High Torque)
	Shrink Press Fit, Shrinkage Fit, Freeze Fit		u6			Press fitting or the like is required for light alloy members.			Fixing the Rim of a Drive Gear and a Boss Together Attaching and Fixing a Bearing Bushing
	Shrink Press Fit, Shrinkage Fit, Freeze Fit		x6						

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*				
					f6	g6	h6	js6	k6	m6	n6	p6*	r6*	s6	t6	u6
H7					e7	f7	g7	h7	js7							
					f7	g7	h7	js7								
H8					e8	f8	g8	h8								
					d9	e9										
H9					d8	e8		h8								
					c9	d9	e9	h9								
H10	b9	c9	d9													

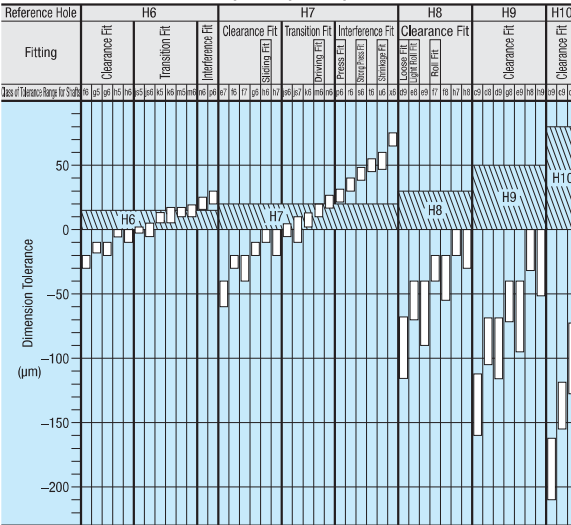
[Note]*An exception may arise according to the dimensional sectioning scheme.

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						
					F6	G6	H6	JS6	K6	M6	N6	P6*				
h6					F7	G7	H7	JS7	K7	M7	N7	P7*	R7	S7	T7	U7
					E7	F7	G7	H7								
h7					F7	G7	H7	JS7	K7	M7	N7	P7*	R7	S7	T7	U7
					F7	G7	H7	JS7	K7	M7	N7	P7*	R7	S7	T7	U7
h8					D8	E8	F8	G8	H8							
					D8	E8	F8	G8	H8							
h9					D8	E8	F8	G8	H8							
					D8	E8	F8	G8	H8							
					C9	D9	E9	F9	G9	H9						
					B10	C10	D10	E10	F10	G10	H10					

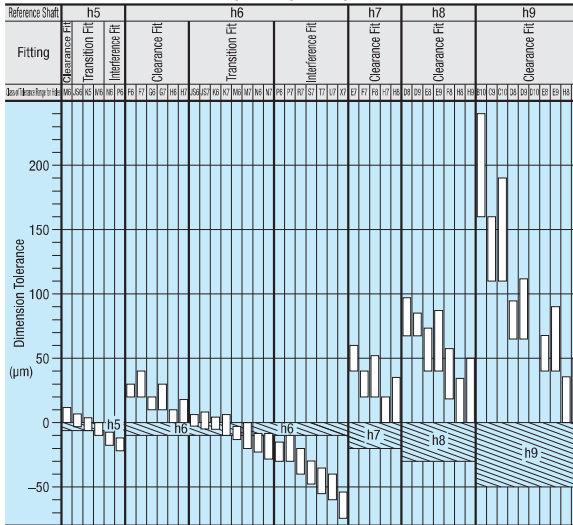
[Note]*An exception may arise according to the dimensional sectioning scheme.

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)

Reference Dimension (mm)		Class of Tolerance Range for Shafts																														Unit μm			
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	-4 -8	0 -6	0 -10	0 -14	0 -25	±2	±3	±5	+4 0	+6 0	+6 +2	+6 +2	+8 +4	+8 +4	+10 +6	+12 +10	+16 +14	+20 +18	+20 +18	-	+24 +18	+26 +20
3	6	-140 -170	-70 -100	-30 -48	-30 -60	-20 -32	-20 -38	-20 -30	-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 +23	+32 +19	-	+37 +28	+43 +34		
10	14	-185 -193	-116 -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 +45		
14	18	-193 -212	-138 -162	-77 -98	-93 -117	-50 -61	-59 -73	-75 -92	-27 -33	-34 -41	-43 -53	-14 -16	-17 -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	+67 +54		
18	24	-212 -232	-162 -182	-98 -119	-117 -142	-61 -75	-73 -89	-92 -112	-33 -41	-41 -50	-53 -64	-16 -20	-19 -25	0 -11	0 -16	0 -25	0 -39	0 -62	±5.5	±8	±12.5	+13 +2	+18 +2	+20 +9	+25 +9	+28 +17	+33 +17	+42 +26	+50 +34	+59 +43	+64 +43	-	+76 +64		
24	30	-232 -242	-182 -192	-119 -119	-142 -142	-75 -75	-89 -89	-112 -112	-41 -41	-50 -50	-64 -64	-20 -20	-25 -25	0 -11	0 -16	0 -25	0 -39	0 -62	±5.5	±8	±12.5	+13 +2	+18 +2	+20 +9	+25 +9	+28 +17	+33 +17	+42 +26	+50 +34	+59 +43	+64 +43	-	+76 +64		
30	40	-242 -264	-192 -214	-119 -146	-142 -174	-75 -90	-89 -106	-112 -134	-41 -49	-50 -60	-64 -76	-20 -23	-25 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±6.5	±9.5	±15	+15 +2	+21 +2	+24 +11	+30 +11	+33 +20	+39 +20	+51 +32	+60 +43	+72 +59	+85 +66	+106 +87	-	+137 +106	
40	50	-264 -274	-214 -230	-146 -146	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±6.5	±9.5	±15	+15 +2	+21 +2	+24 +11	+30 +11	+33 +20	+39 +20	+51 +32	+60 +43	+72 +59	+85 +66	+106 +87	-	+137 +106	
50	65	-274 -290	-230 -250	-146 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±6.5	±9.5	±15	+15 +2	+21 +2	+24 +11	+30 +11	+33 +20	+39 +20	+51 +32	+60 +43	+72 +59	+85 +66	+106 +87	-	+137 +106	
65	80	-290 -300	-250 -270	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±7.5	±11	±17.5	+18 +3	+25 +3	+28 +13	+35 +13	+38 +23	+45 +23	+59 +37	+73 +54	+93 +68	+113 +84	+146 +104	-	+168 +146	
80	100	-300 -310	-270 -290	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±7.5	±11	±17.5	+18 +3	+25 +3	+28 +13	+35 +13	+38 +23	+45 +23	+59 +37	+73 +54	+93 +68	+113 +84	+146 +104	-	+168 +146	
100	120	-310 -320	-290 -300	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±7.5	±11	±17.5	+18 +3	+25 +3	+28 +13	+35 +13	+38 +23	+45 +23	+59 +37	+73 +54	+93 +68	+113 +84	+146 +104	-	+168 +146	
120	140	-320 -330	-300 -310	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±7.5	±11	±17.5	+18 +3	+25 +3	+28 +13	+35 +13	+38 +23	+45 +23	+59 +37	+73 +54	+93 +68	+113 +84	+146 +104	-	+168 +146	
140	160	-330 -340	-310 -320	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±9	±12.5	±20	+21 +3	+28 +3	+33 +15	+40 +15	-	+52 +27	+68 +43	+88 +65	+108 +84	+138 +104	-	+199 +169		
160	180	-340 -350	-320 -330	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±9	±12.5	±20	+21 +3	+28 +3	+33 +15	+40 +15	-	+52 +27	+68 +43	+88 +65	+108 +84	+138 +104	-	+199 +169		
180	200	-350 -360	-330 -340	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±9	±12.5	±20	+21 +3	+28 +3	+33 +15	+40 +15	-	+52 +27	+68 +43	+88 +65	+108 +84	+138 +104	-	+199 +169		
200	225	-360 -375	-340 -355	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±10	±14.5	±23	+24 +4	+33 +4	+37 +17	+46 +17	-	+60 +31	+79 +50	+109 +80	+159 +130	+199 +169	-	+249 +219		
225	250	-375 -390	-355 -370	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±10	±14.5	±23	+24 +4	+33 +4	+37 +17	+46 +17	-	+60 +31	+79 +50	+109 +80	+159 +130	+199 +169	-	+249 +219		
250	280	-390 -410	-370 -395	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±11.5	±16	±26	+27 +4	+36 +4	+43 +20	+52 +20	-	+66 +34	+88 +56	+116 +88	+146 +108	+176 +146	-	+279 +249		
280	315	-410 -430	-395 -420	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±11.5	±16	±26	+27 +4	+36 +4	+43 +20	+52 +20	-	+66 +34	+88 +56	+116 +88	+146 +108	+176 +146	-	+279 +249		
315	355	-430 -450	-420 -445	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±12.5	±18	±28.5	+29 +4	+40 +4	+46 +21	+57 +21	-	+73 +37	+98 +62	+128 +114	+158 +128	+188 +158	-	+309 +279		
355	400	-450 -480	-445 -470	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±12.5	±18	±28.5	+29 +4	+40 +4	+46 +21	+57 +21	-	+73 +37	+98 +62	+128 +114	+158 +128	+188 +158	-	+309 +279		
400	450	-480 -515	-470 -505	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±13.5	±20	±31.5	+32 +5	+45 +5	+50 +23	+63 +23	-	+80 +40	+108 +68	+138 +108	+168 +138	+198 +168	-	+339 +309		
450	500	-515 -545	-505 -540	-174 -174	-174 -174	-90 -90	-106 -106	-134 -134	-49 -49	-60 -60	-76 -76	-23 -23	-29 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±13.5	±20	±31.5	+32 +5	+45 +5	+50 +23	+63 +23	-	+80 +40	+108 +68	+138 +108	+168 +138	+198 +168	-	+339 +309		

Dimension Tolerance of Hole, Regularly Used Fitting																																	Unit μm			
Reference Dimension (mm)		Class of Tolerance Range for Holes																																		
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	+24 +20	+28 +14	+39 +14	+12 +6	+16 +2	+20 +2	+8 +2	+12 +2	+16 +2	+6 0	+10 0	+14 0	+25 +40	±3	±5	±6 -6	±10 -10	±8 -12	±10 -10	±14 -12	±12 -16	±16 -20	±10 -24	±14 -28	-	-	-14 -20	-	-18 -20	-20
3	6	+188 +140	+100 +70	+118 +170	+48 +30	+60 +30	+78 +20	+32 +20	+38 +20	+50 +10	+18 +10	+22 +10	+28 +14	+42 +4	+58 +4	+8 0	+12 0	+18 0	+30 +48	±4	±6	+2 -6	+3 -9	±1 -12	0 -13	-4 -12	-5 -16	-4 -17	-8 -20	-3 -27	-11 -23	-15 -27	-19 -31	-22 -34	-24	
6	10	+208 +150	+116 +80	+138 +80	+62 +40	+76 +30	+98 +25	+40 +25	+48 +13	+64 +13	+84 +13	+104 +5	+144 +5	+204 +4	+284 +4	+40 0	+60 0	+84 0	+124 +58	±4.5	±7.5	+2 -7	+3 -10	+4 -12	+5 -15	+6 -16	+7 -19	+8 -21	+9 -24	+12 -28	+13 -32	+17 -38	+19 -42	+22 -45	+27 -50	
10	14	+220 +150	+136 +95	+165 +95	+77 +50	+93 +50	+120 +32	+59 +32	+75 +32	+93 +16	+117 +16	+144 +16	+174 +6	+204 +6	+244 +6	+284 0	+324 0	+364 0	+404 +18	±18	±27	+43 +70	±5.5	±9	+2 -9	+6 -12	+4 -15	0 -18	-5 -20	-11 -23	-15 -26	-19 -29	-21 -34	-26 -39	-31 -44	-36 -49
16	24	+244 +160	+162 +110	+194 +110	+98 +65	+117 +65	+149 +65	+174 +40	+204 +40	+244 +20	+284 +20	+324 +7	+364 +7	+404 0	+444 0	+484 0	+524 0	+564 0	+604 +33	±33	±52	+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 -53	-39 -61
24	30	+270 +170	+182 +120	+220 +120	+119 +80	+142 +80	+180 +80	+214 +50	+244 +50	+284 +25	+324 +25	+364 +25	+404 +9	+444 +9	+484 0	+524 0	+564 0	+604 +39	±39	±62	+100 0	±8	±12.5	+3 -13	+7 -18	-4 -20	0 -25	-12 -28	-8 -33	-21 -42	-25 -50	-34 -59	-41 -61	-48 -70	-54 -86	
30	40	+270 +170	+182 +120	+220 +120	+119 +80	+142 +80	+180 +80	+214 +50	+244 +50	+284 +25	+324 +25	+364 +25	+404 +9	+444 +9	+484 0	+524 0	+564 0	+604 +39	±39	±62	+100 0	±8	±12.5	+3 -13	+7 -18	-4 -20	0 -25	-12 -28	-8 -33	-21 -42	-25 -50	-34 -59	-41 -61	-48 -70	-54 -86	
40	50	+280 +180	+192 +130	+230 +130	+124 +80	+146 +80	+174 +80	+204 +50	+244 +50	+284 +25	+324 +25	+364 +25	+404 +9	+444 +9	+484 0	+524 0	+564 0	+604 +39	±39	±62	+100 0	±8	±12.5	+3 -13	+7 -18	-4 -20	0 -25	-12 -28	-8 -33	-21 -42	-25 -50	-34 -59	-41 -61	-48 -70	-54 -86	
50	65	+310 +190	+214 +140	+260 +140	+146 +100	+174 +100	+204 +100	+244 +60	+284 +60	+324 +30	+364 +30	+404 +10	+444 +10	+484 0	+524 0	+564 0	+604 +39	±39	±62	+100 0	±8	±12.5	+3 -15	+7 -21	-4 -24	0 -33	-14 -38	-9 -45	-26 -51	-21 -45	-30 -55	-37 -62	-42 -67	-49 -74	-56 -81	
65	80	+320 +200	+224 +150	+270 +150	+146 +100	+174 +100	+204 +100	+244 +60	+284 +60	+324 +30	+364 +30	+404 +10	+444 +10	+484 0	+524 0	+564 0	+604 +39	±39	±62	+100 0	±8	±12.5	+3 -15	+7 -21	-4 -24	0 -33	-14 -38	-9 -45	-26 -51	-21 -45	-30 -55	-37 -62	-42 -67	-49 -74	-56 -81	
80	100	+360 +220	+257 +170	+310 +170	+174 +120	+207 +120	+260 +72	+310 +72	+360 +72	+404 +136	+444 +136	+484 +136	+524 +12	+564 +12	+604 +12	+644 0	+684 0	+724 0	+764 +54	±54	±87	+140 0	±11	±17.5	+4 -18	+10 -25	-6 -28	0 -35	-16 -45	-10 -52	-30 -59	-42 -74	-47 -91	-53 -93	-58 -98	
100	120	+380 +240	+267 +190	+320 +180	+174 +120	+207 +120	+260 +72	+310 +72	+360 +72	+404 +136	+444 +136	+484 +136	+524 +12	+564 +12	+604 +12	+644 0	+684 0	+724 0	+764 +54	±54	±87	+140 0	±11	±17.5	+4 -18	+10 -25	-6 -28	0 -35	-16 -45	-10 -52	-30 -59	-42 -74	-47 -91	-53 -93	-58 -98	
120	140	+420 +260	+300 +200	+360 +200	+208 +145	+245 +145	+305 +145	+360 +85	+420 +85	+484 +85	+548 +85	+604 +85	+668 +43	+724 +43	+784 +43	+844 +14	+904 +14	+964 +14	+1024 +14	±14	±100	+160 0	±12.5	±20	+4 -21	+12 -28	-8 -33	0 -40	-20 -45	-12 -52	-36 -61	-28 -68	-50 -93	-64 -125	-76 -159	
140	160	+440 +280	+310 +210	+370 +210	+208 +145	+245 +145	+305 +145	+360 +85	+420 +85	+484 +85	+548 +85	+604 +85	+668 +43	+724 +43	+784 +43	+844 +14	+904 +14	+964 +14	+1024 +14	±14	±100	+160 0	±12.5	±20	+4 -21	+12 -28	-8 -33	0 -40	-20 -45	-12 -52	-36 -61	-28 -68	-50 -93	-64 -125	-76 -159	
160	180	+470 +310	+330 +230	+390 +230	+208 +145	+245 +145	+305 +145	+360 +85	+420 +85	+484 +85	+548 +85	+604 +85	+668 +43	+724 +43	+784 +43	+844 +14	+904 +14	+964 +14	+1024 +14	±14	±100	+160 0	±12.5	±20	+4 -21	+12 -28	-8 -33	0 -40	-20 -45	-12 -52	-36 -61	-28 -68	-50 -93	-64 -125	-76 -159	
180	200	+525 +340	+355 +240	+425 +240	+208 +145	+245 +145	+305 +145	+360 +85	+420 +85	+484 +85	+548 +85	+604 +85	+668 +43	+724 +43	+784 +43	+844 +14	+904 +14	+964 +14	+1024 +14	±14	±100	+160 0	±12.5	±23	+5 -24	+13 -33	-9 -37	0 -46	-22 -51	-14 -60	-41 -70	-33 -79	-63 -109	-81 -159	-105 -199	
200	225	+565 +380	+375 +260	+445 +260	+208 +145	+245 +145	+305 +145	+360 +85	+420 +85	+484 +85	+548 +85	+604 +85	+668 +43	+724 +43	+784 +43	+844 +14	+904 +14	+964 +14	+1024 +14	±14	±100	+160 0	±14.5	±23	+5 -24	+13 -33	-9 -37	0 -46	-22 -51	-14 -60	-41 -70	-33 -79	-63 -109	-81 -159	-105 -199	
225	250	+605 +420	+395 +280	+465 +280	+208 +145	+245 +145	+305 +145	+360 +85	+420 +85	+484 +85	+548 +85	+604 +85	+668 +43	+724 +43	+784 +43	+844 +14	+904 +14	+964 +14	+1024 +14	±14	±100	+160 0	±14.5	±23	+5 -24	+13 -33	-9 -37	0 -46	-22 -51	-14 -60	-41 -70	-33 -79	-63 -109	-81 -159	-105 -199	
250	280	+680 +480	+430 +300	+510 +300	+208 +145	+245 +145	+305 +145	+360 +85	+420 +85	+484 +85	+548 +85	+604 +85	+668 +43	+724 +43	+784 +43	+844 +14	+904 +14	+964 +14	+1024 +14	±14	±100	+160 0	±16	±26	+5 -27	+16 -36	-9 -41	0 -52	-25 -57	-14 -66	-47 -79	-38 -88	-68 -116	-93 -130	-117 -169	
280	315	+750 +540	+460 +330	+540 +330	+208 +145	+245 +145	+305 +145	+360 +85	+420 +85	+484 +85	+548 +85	+604 +85	+668 +43	+724 +43	+784 +43	+844 +14	+904 +14	+964 +14	+1024 +14	±14	±100	+160 0	±16	±26	+5 -27	+16 -36	-9 -41	0 -52	-25 -57	-14 -66	-47 -79	-38 -88	-68 -116	-93 -130	-117 -169	
315	355	+830 +600	+500 +360	+580 +360	+208 +145	+245 +145	+305 +145	+360 +85	+420 +85	+484 +85	+548 +85	+604 +85	+668 +43	+724 +43	+784 +43	+844 +14	+904 +14	+964 +14	+1024 +14	±14	±100	+160 0	±18	±28.5	+7 -29	+17 -40	-10 -46	0 -57	-26 -62	-16 -73	-51 -87	-41 -88	-61 -109	-81 -159	-105 -199	
355	400	+910 +680	+540 +400	+630 +400	+208 +145	+245 +145	+305 +145	+360 +85	+420 +85	+484 +85	+548 +85	+604 +85	+668 +43	+724 +43	+784 +43	+844 +14	+904 +14	+964 +14	+1024 +14	±14	±100	+160 0	±18	±28.5	+7 -29	+17 -40	-10 -46	0 -57	-26 -62	-16 -73	-51 -87	-41 -88	-61 -109	-81 -159	-105 -199	
400	450	+1010 +760	+595 +440	+690 +440	+208 +145	+245 +145	+305 +145	+360 +85	+420 +85	+484 +85	+548 +85	+604 +85	+668 +43	+724 +43	+784 +43	+844 +14	+904 +14	+964 +14	+1024 +14	±14	±100	+160 0	±20	±31.5	+8 -32	+16 -45	-10 -50	0 -63	-27 -67	-17 -80	-55 -95	-45 -108	-66 -109	-86 -172	-103 -172	
450	500	+1090 +840	+635 +480	+730 +480	+208 +145	+245 +145	+305 +145	+360 +85	+420 +85	+484 +85	+548 +85	+604 +85	+668 +43	+724 +43	+784 +43	+844 +14	+904 +14	+964 +14	+1024 +14	±14	±100	+160 0	±20	±31.5	+8 -32	+16 -45	-10 -50	0 -63	-27 -67	-17 -80	-55 -95	-45 -108	-66 -109	-86 -172	-103 -172	