



No machine? No operator? No material? **Contact Witec!**

Your second capacity!

Witec PRECISION INDUSTRY CO., LTD.
Taiwan

Tel: +886229831315
Email 1: nina@witecsp.com
Email 2: witec.sp@msa.hinet.net
Web: www.witecsp.com/en

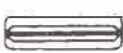










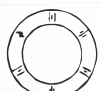


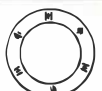







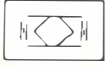



























Website



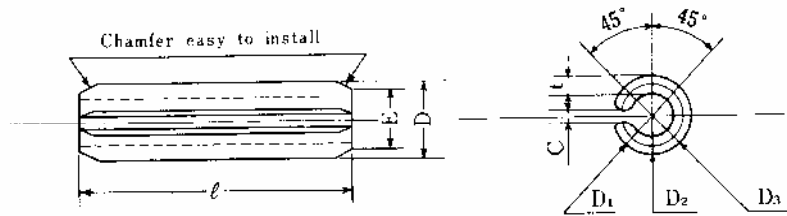
WhatsApp

INDEX — by Type

產品及名稱		頁次	產品及名稱		頁次	產品及名稱		頁次
	SPP	2		CSTW	23		JZ	38
	NP	6		CRTW	24		AZ	38
	RTW	7		CSN	25		AZV	39
	STW	9		HCS	26		WW	40
	IRTW	11		FSN	27		BWW	41
	ISTW	12		JSN	28		MB	42
	MT	13		USN	29		DB	43
	NT	14		PSN	30		SSP	44
	ETW	15		WS	31		RCP	45
	BETW	16		DS	32		COT	46
	GTW	17		ALN	33		CCN	47
	CTW	18		TPN	34		OCN	48
	UTW	19		AW	35		HS	49
	5304	20		BW	35		CNUT	50
	SPN	21		CW	36		ETS	51
	RPN	22		ABW	37		ETH	52

SPP Spring Pins (For general use)

(JIS B 2808)



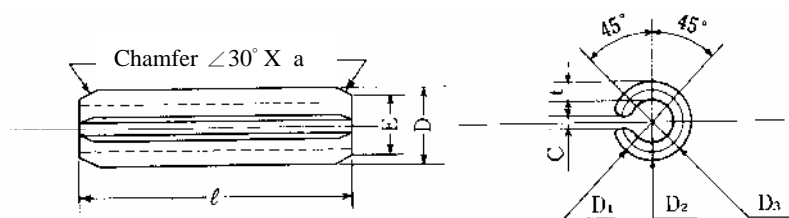
Unit:mm

SPP		1	1.2	1.5	1.6	2	2.5	3	※3.5	4	※4.5	5	6	8	10	※12	13				
Dimension	D	Max.	1.2	1.4	1.7	1.8	2.25	2.75	3.25	3.84	4.4	4.84	5.4	6.4	8.6	10.6	12.6	13.7			
		Min.	1.1	1.3	1.6	1.7	2.15	2.65	3.15	3.7	4.2	4.7	5.2	6.2	8.3	10.3	12.3	13.4			
	t	Basic	0.2	0.25	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.5	2.0	2.0	2.5			
	E	Max.	0.9	1.1	1.4	1.5	1.9	2.4	2.9	3.4	3.9	4.3	4.8	5.8	7.8	9.8	11.7	12.7			
Double shear strength	kgf	70	104	158	171	281	440	633	861	1,130	1,425	1,760	2,532	4,500	7,030	8,790	11,500				
	KN	0.69	1.02	1.55	1.68	2.8	4.3	6.2	8.4	11.1	14.0	17.3	24.8	44.1	68.9	86.2	112.8				
Hole size	Basic	1	1.2	1.5	1.6	2	2.5	3	3.5	4	4.5	5	6	8	10	12	13				
	Tol.		+0.08			+0.09			+0.12			+0.15			+0.20						
Length l		Nominal diameter																			
Basic	Tol.	1	1.2	1.5	1.6	2	2.5	3	3.5	4	4.5	5	6	8	10	12	13				
4	+0.5 -0.0	○	○	○	○																
5		○	○	○	○	○	○														
6		○	○	○	○	○	○	○													
8		○	○	○	○	○	○	○	○	○											
10		○	○	○	○	○	○	○	○	○	○	○									
12	+1.0 -0.0		○	○	○	○	○	○	○	○	○	○	○								
14			○	○	○	○	○	○	○	○	○	○	○	○							
16			○	○	○	○	○	○	○	○	○	○	○	○	○						
18				○	○	○	○	○	○	○	○	○	○	○	○	○					
20					○	○	○	○	○	○	○	○	○	○	○	○	○				
22						○	○	○	○	○	○	○	○	○	○	○	○				
24							○	○	○	○	○	○	○	○	○	○	○				
25								○	○	○	○	○	○	○	○	○	○				
28									○	○	○	○	○	○	○	○	○				
32										○	○	○	○	○	○	○	○				
36											○	○	○	○	○	○	○				
40												○	○	○	○	○	○				
45												○	○	○	○	○					
50													○	○	○	○					
55	+1.5 -0.0													○	○	○	○				
56														○	○	○	○				
60														○	○	○	○				
63														○	○	○	○				
70															○	○	○				
80																○	○				
90																	○				
100																		○			
110																			○		
120																				○	
125																					○
140																					

- Material=Carbon steel, Stainless steel.
- Hardness=HRC45~50.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- Max.D shall be checked by a "Go" gage.
- Min. D shall be the average of the D1, D2, and D3 diameter. ※ marks are according to our company's specification
- For ordering please write nominal diameter and length, for example : "SPP 4 x 20"

SPP Spring Pins (For general use)

(DIN 1481)



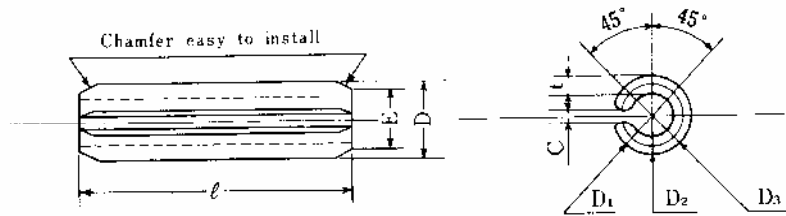
Unit:mm

SPPd			1	1.5	2	2.5	3	3.5	4	4.5	5	6	8	10	12	13
Before Insertion Dimension	D	Max.	1.3	1.8	2.4	2.9	3.5	4.0	4.6	5.1	5.6	6.7	8.8	10.8	12.8	13.8
		Min.	1.2	1.7	2.3	2.8	3.3	3.8	4.4	4.9	5.4	6.4	8.5	10.5	12.5	13.5
	E	$\frac{E}{100}$	0.8	1.1	1.5	1.8	2.1	2.3	2.8	2.9	3.4	3.9	5.5	6.5	7.5	8.5
	t		0.2	0.3	0.4	0.5	0.6	0.75	0.8	1.0	1.0	1.25	1.5	2.0	2.5	2.5
	a		0.15	0.25	0.35	0.4	0.5	0.6	0.65	0.8	0.9	1.2	2.0	2.0	2.0	2.0
shear strength(KN)	Double		0.7	1.58	2.82	4.38	6.32	9.06	11.24	15.36	17.54	26.04	42.76	70.16	104.1	115.1
	Single		0.35	0.79	1.41	2.19	3.16	4.53	5.62	7.68	8.77	13.02	21.38	35.08	52.07	57.55
Length \downarrow			Nominal diameter													
Basic	Tol.		1	1.5	2	2.5	3	3.5	4	4.5	5	6	8	10	12	13
4	+0.5 -0.0		○	○	○	○	○	○	○							
5		○	○	○	○	○	○	○	○	○						
6		○	○	○	○	○	○	○	○	○	○					
8		○	○	○	○	○	○	○	○	○	○	○				
10	+1.0 -0.0	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
12		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
14		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
16		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
18		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
20		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
22				○	○	○	○	○	○	○	○	○	○	○	○	○
24				○	○	○	○	○	○	○	○	○	○	○	○	○
25					○	○	○	○	○	○	○	○	○	○	○	○
28					○	○	○	○	○	○	○	○	○	○	○	○
30					○	○	○	○	○	○	○	○	○	○	○	○
32							○	○	○	○	○	○	○	○	○	○
36							○	○	○	○	○	○	○	○	○	○
40							○	○	○	○	○	○	○	○	○	○
45								○	○	○	○	○	○	○	○	
50									○	○	○	○	○	○	○	
55	+1.5 -0.0										○	○	○	○	○	○
60											○	○	○	○	○	○
65											○	○	○	○	○	○
70											○	○	○	○	○	○
75											○	○	○	○	○	○
80											○	○	○	○	○	○
85												○	○	○	○	○
90												○	○	○	○	○
95												○	○	○	○	○
100												○	○	○	○	○
110													○	○	○	○
120													○	○	○	○
140														○	○	○
160															○	○
180															○	

- Material=Carbon steel, Stainless steel.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- Min. D shall be the average of the D1, D2, and D3.
- For ordering please write nominal diameter and length, for example : "SPPd 4 x 20"
- Hardness=HRC45~50.
- Max.D shall be checked by a "Go" gage.

SPP Spring Pins (For general use)

(ISO 8752)

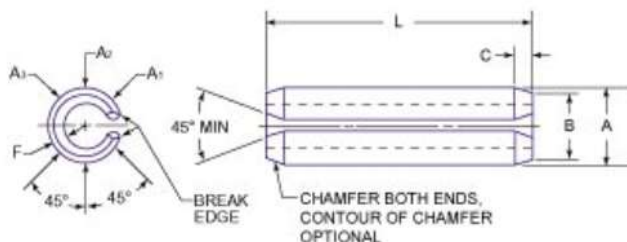


Unit:mm

SPP(ISO)			1	1.5	2	2.5	3	3.5	4	4.5	5	6	8	10	12	13
Before Insertion Dimension	D	Max.	1.3	1.8	2.4	2.9	3.5	4.0	4.6	5.1	5.6	6.7	8.8	10.8	12.8	13.8
		Min.	1.2	1.7	2.3	2.8	3.3	3.8	4.4	4.9	5.4	6.4	8.5	10.5	12.5	13.5
	E	\pm	0.8	1.1	1.5	1.8	2.1	2.3	2.8	2.9	3.4	4.0	5.5	6.5	7.5	8.5
Wall Thickness	t		0.2	0.3	0.4	0.5	0.6	0.70	0.8	1.0	1.0	1.2	1.5	2.0	2.5	2.5
Chamfer Length	a		0.15	0.25	0.35	0.40	0.50	0.60	0.65	0.80	0.90	1.20	1.40	2.00	2.00	2.00
shear strength(KN)	Double		0.7	1.58	2.82	4.38	6.32	9.06	11.24	15.36	17.54	26.04	42.76	70.16	104.1	115.1
	Single		0.35	0.79	1.41	2.19	3.16	4.53	5.62	7.68	8.77	13.02	21.38	35.08	52.07	57.55
Length l			Nominal diameter													
Basic	Tol.		1	1.5	2	2.5	3	3.5	4	4.5	5	6	8	10	12	13
4	± 0.25		○	○	○	○	○	○	○							
5		○	○	○	○	○	○	○	○	○						
6		○	○	○	○	○	○	○	○	○	○					
8		○	○	○	○	○	○	○	○	○	○					
10		○	○	○	○	○	○	○	○	○	○	○				
12	± 0.50	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
14		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
16		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
18		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
20		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
22				○	○	○	○	○	○	○	○	○	○	○	○	○
24				○	○	○	○	○	○	○	○	○	○	○	○	○
25				○	○	○	○	○	○	○	○	○	○	○	○	○
28				○	○	○	○	○	○	○	○	○	○	○	○	○
30				○	○	○	○	○	○	○	○	○	○	○	○	○
32						○	○	○	○	○	○	○	○	○	○	○
36						○	○	○	○	○	○	○	○	○	○	○
40						○	○	○	○	○	○	○	○	○	○	○
45							○	○	○	○	○	○	○	○	○	○
50								○	○	○	○	○	○	○	○	○
55	± 0.75									○	○	○	○	○	○	
60										○	○	○	○	○	○	
65											○	○	○	○	○	
70											○	○	○	○	○	
75											○	○	○	○	○	
80											○	○	○	○	○	
85												○	○	○	○	
90												○	○	○	○	
95												○	○	○	○	
100												○	○	○	○	
110													○	○	○	
120													○	○	○	
140													○	○		
160														○		
180															○	

- Material=Carbon steel, Stainless steel.
- Hardness=HRC45~50.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- Max.D shall be checked by a "Go" gage.
- Min. D shall be the average of the D1, D2, and D3 diameter.
- For ordering please write nominal diameter and length, for example : "SPPd 4 x 20"

SPP Spring Pins (inch size) (ANSI B18.8.2)



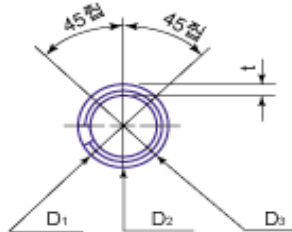
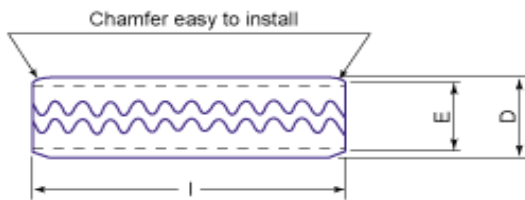
Unit:inch

SPP(inch)		0.062	0.078	0.094	0.125	0.156	0.187	0.219	0.250	0.312	0.375	0.437	0.500
A	Max.	0.069	0.086	0.103	0.135	0.167	0.199	0.232	0.264	0.328	0.362	0.456	0.521
(D1+D2+D3)/3	Min	0.066	0.083	0.099	0.131	0.162	0.194	0.226	0.258	0.321	0.385	0.448	0.513
B	Max.	0.059	0.075	0.091	0.122	0.151	0.182	0.214	0.245	0.306	0.368	0.430	0.485
C	Nom.	0.011	0.014	0.018	0.024	0.028	0.036	0.042	0.042	0.060	0.060	0.060	0.060
Thickness	Nom.	0.012	0.018	0.022	0.028	0.032	0.042	0.050	0.050	0.062	0.077	0.077	0.094
I.D.	Min.	0.062	0.078	0.094	0.125	0.156	0.187	0.219	0.250	0.312	0.375	0.437	0.500
	Max.	0.065	0.081	0.097	0.129	0.160	0.192	0.224	0.256	0.318	0.382	0.445	0.510
Double Shear Strength	Lbs	425	650	1,000	2,100	3,000	4,400	5,700	7,700	11,500	17,600	20,000	25,800
SPP(inch)	Length	0.062	0.078	0.094	0.125	0.156	0.187	0.219	0.250	0.312	0.375	0.437	0.500
	0.187	○	○										
	0.25	○	○	○									
	0.312	○	○	○									
	0.375	○	○	○	○								
	0.437	○	○	○	○	○							
	0.50	○	○	○	○	○	○						
	0.562	○	○	○	○	○	○	○	○				
	0.625	○	○	○	○	○	○	○	○				
	0.687	○	○	○	○	○	○	○	○				
	0.75	○	○	○	○	○	○	○	○	○			
	0.812	○	○	○	○	○	○	○	○	○			
	0.875	○	○	○	○	○	○	○	○	○			
	0.937	○	○	○	○	○	○	○	○	○	○		
	1.00	○	○	○	○	○	○	○	○	○	○	○	
	1.125		○	○	○	○	○	○	○	○	○	○	○
	1.25		○	○	○	○	○	○	○	○	○	○	○
	1.375		○	○	○	○	○	○	○	○	○	○	○
	1.50		○	○	○	○	○	○	○	○	○	○	○
	1.625				○	○	○	○	○	○	○	○	○
	1.75				○	○	○	○	○	○	○	○	○
	1.875				○	○	○	○	○	○	○	○	○
	2.00				○	○	○	○	○	○	○	○	○
	2.25					○	○	○	○	○	○	○	○
	2.50					○	○	○	○	○	○	○	○
	2.75						○	○	○	○	○	○	○
	3.00							○	○	○	○	○	○
	3.25								○	○	○	○	○
	3.50									○	○	○	○
	3.75										○	○	○
	4.00											○	○

- Material=Carbon steel, Stainless steel.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- Min. D shall be the average of the D1, D2, and D3 diameter.
- For ordering please write nominal diameter and length, for example : "SPP 0.125 x 0.625"
- Hardness=HRC45~50.
- Max.D shall be checked by a "Go" gage.
- ※ marks are according to our company's specification

NP Spring Pins (For light duty use)

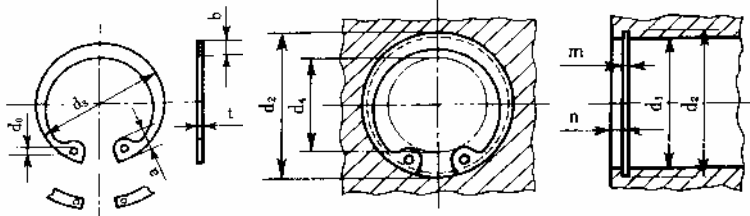
(JIS B2808)



Unit:mm

NP		1.6	2	2.5	3	4
D	Max.	1.8	2.25	2.75	3.25	4.4
	Min.	1.7	2.15	2.65	3.15	4.2
t		0.15	0.2	0.25	0.3	0.4
E	Max.	1.5	1.9	2.4	2.9	3.9
	Double shear strength	kgf	95	158	247	356
	(KN)	0.93	1.55	2.42	3.49	6.16
Adaptable Hole		1.6 +0.08 -0.00	2 +0.09 -0.00	2.5 +0.09 -0.00	3 +0.09 -0.00	4 +0.12 -0.00
Length	tol.	Nominal Size				
		1.6	2	2.5	3	4
4	+0.5 -0.0	○				
5		○	○	○		
6		○	○	○	○	
8		○	○	○	○	○
10		○	○	○	○	○
12	+1.0 -0.0	○	○	○	○	○
14		○	○	○	○	○
16		○	○	○	○	○
18			○	○	○	○
20			○	○	○	○
22				○	○	○
25				○	○	○
28					○	○
32					○	○
36						○
40						○

- Material=Carbon steel, Stainless steel.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- Min. D shall be the average of the D1, D2, and D3 diameter.
- ※ marks are according to our company's specification
- Max. value for "D" is outside diameter. Min. value for "d" is the average value of D1, D2, D3.
- Hardness=HRC45~50.
- Max.D shall be checked by a "Go" gage.



RTW-rings can be supplied in tape wrapped or banded. Size No.10 through 48 tape wrapped. Size No. 50 through 125 tape wrapped or banded.

Size No. Great than 170

The dimension d4 is the minimum diameter of inner periphery when the retaining ring is set in the hole.

Unit:mm

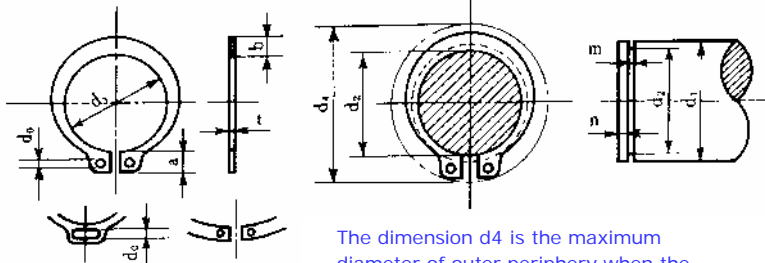
RTW		Ring dimension						D4	Groove dimension					
		d3		t		b	a		d0	d1	d2		m	
Nominal Size	Bas.	Tol.	Bas.	Tol.	Ref.	Ref.	Min.	Ref.	Bas.		Tol.	Bas.	Tol.	Min.
※ 6	6.7	±0.18	0.4	±0.03	0.7	1.6	0.8	2.5	6	6.25	+0.04	0.50	+0.10	0.5
※ 7	7.7				0.8	1.7		3.0	7	7.3	-0.00			
※ 8	8.8				0.9	1.7		3.5	8	8.4	+0.06			
※ 9	9.8				1.1	2.2		4.0	9	9.4	-0.00			
※ 10	10.7	±0.18	1.0	±0.05	1.5	2.8	1.2	3.0	10	10.4	+0.11	1.15	-0.00	1.5
※ 11	11.8				1.5	3.0		4.0	11	11.4				
※ 12	13.0				1.7	3.1	5.0	12	12.5					
※ 13	14.1				1.7	3.1	6.0	13	13.6					
※ 14	15.1				1.9	3.6	7.0	14	14.6					
※ 15	16.2				1.9	3.6	8.0	15	15.7					
※ 16	17.3				1.9	3.7	8.0	16	16.8					
※ 17	18.3				1.9	3.8	9.0	17	17.8					
※ 18	19.5				2.4	4.0	10.0	18	19.0					
19	20.5				±0.20	1.2	±0.06	2.5	4.0	2.0				
20	21.5	2.5	4.0	12.0				20	21.0					
21	22.5	2.5	4.1	12.0				21	22.0					
22	23.5	2.5	4.1	13.0				22	23.0					
24	25.9	2.5	4.3	15.0				24	25.2					
25	26.9	3.0	4.4	16.0				25	26.2					
26	27.9	3.0	4.6	16.0				26	27.2					
28	30.1	3.0	4.6	18.0				28	29.4					
30	32.1	±0.25	1.5	±0.06	3.0	4.7	2.5	20.0	30	31.4	+0.25	1.65	-0.00	2.0
32	34.4				3.5	5.2		21.0	32	33.7				
34	36.5				3.5	5.2		23.0	34	35.7				
35	37.8				3.5	5.2		24.0	35	37.0				
36	38.8				3.5	5.2		25.0	36	38.0				
37	39.8				3.5	5.2		26.0	37	39.0				
38	40.8				4.0	5.3		27.0	38	40.0				
39	42.0				±0.40	1.75		±0.07	4.0	5.4				
40	43.5	4.0	5.7	28.0			40		42.5					
42	45.5	4.0	5.8	30.0			42		44.5					
45	48.5	4.5	5.9	33.0			45		47.5					
※ 46	49.7	5.0	5.7	33.0			46		48.5					
47	50.5	4.5	6.1	34.0			47		49.5					
48	51.5	4.5	6.2	35.0			48		50.5					
50	54.2	±0.45	2.0	±0.07			4.5		6.5	2.5	37.0	50	53.0	+0.30
52	56.2				5.1	6.5	39.0	52	55.0					
55	59.2				5.1	6.5	41.0	55	58.0					
56	60.2				5.1	6.6	42.0	56	59.0					
58	62.2				5.1	6.8	44.0	58	61.0					
60	64.2				5.5	6.8	46.0	60	63.0					
62	66.2				5.5	6.9	48.0	62	65.0					
63	67.2				5.5	6.9	49.0	63	66.0					

RTW	Ring dimension								Ref. d4	Groove dimension					
	d3		t		b	a	do	d1		d2		m		Ref.n	
	Basic	Tol.	Basic	Tol.	Approx.	Approx.	Min.			Basic	Tol.	Basic	Tol.		Min.
RTW-	65	69.2	±0.45	2.5	±0.08	5.5	7.0	2.5	50	65	68	+0.30 -0.00	2.7	+0.14 -0.00	2.5
	68	72.5				6.0	7.4		53	68	71				
	70	74.5				6.0	7.4		55	70	73				
	72	76.5				6.6	7.4		57	72	75				
	75	79.5				6.6	7.8		60	75	78				
	78	82.5				6.6	8.0		62	78	81				
	80	85.5	7.0	8.0	64	80	83.5								
	82	87.5	7.0	8.0	66	82	85.5								
	85	90.5	±0.55	3	±0.09	7.0	8.0	3	69	85	88.5	+0.35 -0.00	3.2	+0.18 -0.00	3.0
	88	93.5				7.6	8.2		71	88	91.5				
	90	95.5				7.6	8.3		73	90	93.5				
	92	97.5				8.0	8.3		74	92	95.5				
	95	100.5				8.0	8.5		77	95	98.5				
	98	103.5				8.3	8.7		80	98	101.5				
	100	105.5				8.3	8.8		82	100	103.5				
	102	108				8.9	9.0		83	102	106				
	105	112				8.9	9.1		86	105	109				
	108	115				8.9	9.5		87	108	112				
	110	117				8.9	10.2		89	110	114				
	112	119				8.9	10.2		90	112	116				
	115	122	±0.65	4	±0.09	9.5	10.2	3.5	94	115	119	+0.54 -0.00	4.2	+0.20 -0.00	4.0
	120	127				9.5	10.7		98	120	124				
	125	132				10.0	10.7		103	125	129				
	130	137				10.0	10.7		108	130	134				
	135	142				10.8	11.0		113	135	139				
	140	147				10.8	11.0		118	140	144				
	145	152	+1.26 -0.63	5	±0.15	10.8	11.0	4	123	145	149	+0.63 -0.00	5.2	+0.25 -0.00	6.0
	150	158				11.5	11.8		126	150	155				
	155	164				11.5	11.8		130	155	160				
	160	169				12.0	12.5		134	160	165				
165	174.5	12.0				12.7	139		165	170					
170	179.5	12.0				-	145		170	175					
175	184.5	+1.44 -0.72	6	±0.15	12.5	-	4	149	175	180	+0.72 -0.00	5.2	+0.25 -0.00	7.5	
180	189.5				13.0	-		153	180	185					
185	194.5				13.5	-		157	185	190					
190	199.5				13.5	-		162	190	195					
195	204.5				13.5	-		167	195	200					
200	209.5				14.0	-		171	200	205					
210	222				14.0	-		181	210	216					
220	232				14.0	-		191	220	226					
230	242				14.0	-		201	230	236					
240	252				14.0	-		211	240	246					
250	262				14.0	-		221	250	256					
260	275				+1.62 -0.81	7		±0.15	16.0	-					4
270	285	16.0	-	237			270		278						
280	295	16.0	-	247			280		288						
290	305	16.0	-	257			290		298						
300	315	16.0	-	267			300		308						
		16.0	-	277			310		318						

- Material=Carbon steel, Stainless steel.
- Hardness=HRC44~52
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- ※mark and size No.great than 130 are according to our company's specification.

STW Retaining Rings (External)

(JIS B 2804)



Under Size No.9
 Above Size No.170

The dimension d4 is the maximum diameter of outer periphery when the retaining ring is set on the shaft.

STW-rings can be supplied in tape wrapped or banded. Size No.10 through 48 tape wrapped. Size No. 50 through 125 tape wrapped or banded.

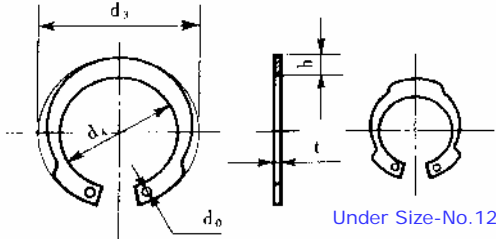
Unit:mm

STW	Ring dimension										Groove dimension				
	d3		t		b	a	do	d4	d1	d2		m		n	
	Basic	Tol.	Basic	Tol.	Approx.	Approx.	Min.	Ref.		Basic	Tol.	Basic	Tol.	Min.	
※ 3	2.7	+0.04	0.25	±0.025	0.5	1.7	0.7	7	3	2.85		0.35			
※ 4	3.7	-0.15	0.40	±0.03	0.9	2.2	0.8	9	4	3.8	+0.00	0.50		0.3	
※ 5	4.7		0.60		1.1	2.4		10.5	5	4.8	-0.04	0.70	+0.10		
※ 6	5.6		0.70		1.3	2.8		12	6	5.7		0.80	-0.00	1.5	
※ 7	6.5	+0.06	0.80	±0.04	1.4	3.0	1.0	14	7	6.7	+0.00	0.90			
※ 8	7.4	-0.20			1.6	3.0		15	8	7.6	-0.06			0.6	
※ 9	8.4				1.8	3.2		16	9	8.6					
※ 10	9.3	±0.15			1.8	3.0	1.2	17	10	9.6	+0.00				
※ 11	10.2				2.0	3.1		18	11	10.5					
※ 12	11.1		1.00	±0.05	2.1	3.2	1.5	19	12	11.5		1.15			
※ 13	12.0				2.1	3.3		20	13	12.4					
※ 14	12.9				2.2	3.4		22	14	13.4	+0.00				
※ 15	13.8	±0.18			2.2	3.5		23	15	14.3	-0.11				
16	14.7				2.2	3.6	1.7	24	16	15.2					
17	15.7				2.2	3.7		25	17	16.2					
18	16.5				2.6	3.8		26	18	17.0					
19	17.5				2.7	3.8		27	19	18.0					
20	18.5				2.7	3.9		28	20	19.0					
21	19.5				2.7	4.0		30	21	20.0					
22	20.5		1.20		2.7	4.1		31	22	21.0				1.5	
※ 23	21.4				2.9	4.5		32.5	23	22.0		1.35			
24	22.2				3.1	4.2	2.0	33	24	22.9	+0.00				
25	23.2	±0.20		±0.06	3.1	4.3		34	25	23.9	-0.21				
26	24.2				3.1	4.4		35	26	24.9			+0.14		
※ 27	25.0				3.3	4.5		36	27	25.8			-0.00		
28	25.9				3.1	4.6		38	28	26.6					
29	26.9				3.5	4.7		39	29	27.6					
30	27.9		1.50		3.5	4.8		40	30	28.6					
32	29.6				3.5	5.0		43	32	30.3					
34	31.5				4.0	5.3		45	34	32.3					
35	32.2				4.0	5.4		46	35	33.0					
36	33.2	±0.25			4.0	5.4		47	36	34.0					
38	35.2				4.5	5.6		50	38	36.0					
40	37.0				4.5	5.8		53	40	38.0	+0.00				
42	38.5		1.75		4.5	6.2	2.5	55	42	39.5	-0.25		1.90		
45	41.5				4.8	6.3		58	45	42.5					
※ 47	43.4	±0.40		±0.07	5.0	6.6		61	47	44.5				2	
48	44.5				4.8	6.5		62	48	45.5					
50	45.8				4.8	6.5		64	50	47.0					
52	47.8		2.00		5.0	6.8		66	52	49.0			2.20		
55	50.8	±0.45			5.0	7.0		70	55	52.0	+0.00				
56	51.8				5.0	7.0		71	56	53.0	-0.30				

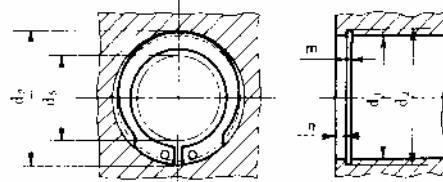
STW	Ring dimension								Ref. d4	Groove dimension					Ref.n	
	d3		t		b	a	do	d1		d2		m				
	Basic	Tol.	Basic	Tol.	Appr	Appr	Min.			Basic	Tol.	Basic	Tol.	Min.		
STW-	58	53.8	2	±0.07	5.5	7.1	2.5	73	58	55	+0.00 -0.30	2.2	+0.14 -0.00	2		
	60	55.8			5.5	7.2		75	60	57						
	62	57.8			5.5	7.2		77	62	59						
	63	58.8			5.5	7.3		78	63	60						
	65	60.8			2.5	±0.08		6.4	7.4	81					65	62
	68	63.5						6.4	7.8	84					68	65
	70	65.5						6.4	7.8	86					70	67
	72	67.5						7	7.9	88					72	69
	75	70.5						7	7.9	92					75	72
	78	73.5						7.4	8.1	95					78	75
	80	74.5	7.4	8.2	97	80	76.5									
	82	76.5	7.4	8.3	99	82	78.5									
	85	79.5	3	±0.09	8	8.4	3	103	85	81.5	+0.00 -0.35	3.2	+0.18 -0.00	3		
	88	82.5			8	8.6		106	88	84.5						
	90	84.5			8	8.7		108	90	86.5						
	95	89.5			8.6	9.1		114	95	91.5						
	100	94.5			9	9.5		119	100	96.5						
	105	98			9.5	9.8		125	105	101						
	110	103			9.5	10		131	110	106						
	115	108			9.5	10.5		137	115	111						
	120	113			10.3	10.9		143	120	116						
	125	118			10.3	11.3		148	125	121						
	130	123	4	±0.09	11	11.5	3.5	154	130	126	+0.00 -0.63	4.2	+0.20 -0.00	6		
	135	128			11	11.5		159	135	131						
	140	133			11	11.8		164	140	136						
	145	138			11.6	11.8		170	145	141						
	150	142			11.6	12.3		175	150	145						
	155	146			12.2	12.7		181	155	150						
	160	151			12.2	12.9		186	160	155						
	165	156			12.9	13.1		192	165	160						
	170	161			12.9	-		197	170	165						
	175	166			12.9	-		202	175	170						
	180	171	13.5	-	208	180	175									
	185	176	5	±0.15	13.5	-	4	213	185	180	+0.00 -0.72	5.2	+0.25 -0.00	9		
	190	181			14	-		219	190	185						
	195	186			14	-		224	195	190						
	200	191			14	-		229	200	195						
	210	198			14	-		239	210	204						
	220	208			14	-		249	220	214						
	230	218			14	-		259	230	224						
	240	228			14	-		269	240	234						
	250	238			14	-		279	250	244						
	260	245			16	-		293	260	252						
	270	255	16	-	303	270	262									
	280	265	5	±0.15	16	-	4	313	280	272	+0.00 -0.81	5.2	+0.25 -0.00	12		
	290	275			16	-		323	290	282						
	300	285			16	-		333	300	292						
					16	-										

- Material=Carbon steel, Stainless steel.
- Hardness=HRC44~52
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- ※mark and size No.great than 130 are according to our company's specification.

IRTW Inverted Retaining Rings (Internal)



Under Size-No.12



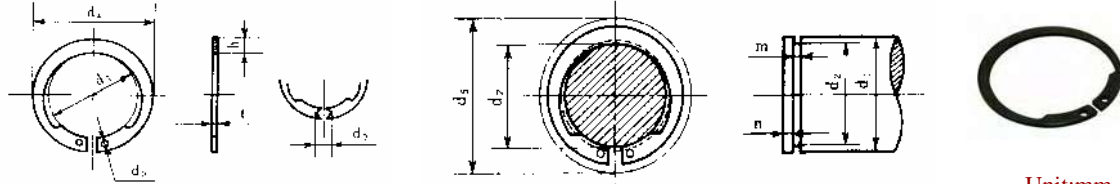
The dimension d5 is the minimum diameter of inner periphery when the retaining ring is set in the hole.
 d5: Clearance Diameter



Unit:mm

IRTW	Ring dimension										Groove dimension				
	d3		d4	t		h	do	Gen. Tol.	d5	d1	d2		m	n	
	Bas.	Tol.		Bas.	Tol.						Bas.	Tol.			Bas.
	10	11.1	7.7			1.7			5.9	10	10.4				
	11	12.2	8.6			1.8			6.6	11	11.4				
	12	13.3	9.7			1.8			7.6	12	12.5				
	13	14.1	10.9			1.6	0.9		9.0	13	13.6	+0.11			
	14	15.1	11.7			1.7			9.8	14	14.6	-0.00			
	15	16.2	12.6			1.8		±0.3	10.6	15	15.7				
	16	17.3	13.5	1.0	±0.05	1.9			11.4	16	16.8		1.15		
	17	18.3	14.3			2.0			12.2	17	17.8				
	18	19.5	15.3			2.1			13.0	18	19.0				
	19	20.5	16.1			2.2	1.0		13.8	19	20.0			1.5	
	20	21.5	16.9			2.3			14.5	20	21.0				
	21	22.5	17.7			2.4			15.0	21	22.0	+0.21			
	22	23.5	18.7			2.4			16.0	22	23.0	-0.00			
	24	25.9	20.7			2.6			17.5	24	25.2				
	25	26.9	21.5			2.7	1.2		18.5	25	26.2				
	26	27.9	22.3			2.8			19.0	26	27.2		1.35		
	28	30.1	24.1			3.0			20.5	28	29.4				
	30	32.1	25.7			3.2	1.4	±0.4	22.5	30	31.4				
	32	34.4	27.4		±0.06	3.5			23.5	32	33.7				
	34	36.5	29.1			3.7			25.0	34	35.7				
	35	37.8	30.0			3.9			26.0	35	37.0				
	36	38.8	30.8	1.5		4.0	1.6		26.5	36	38.0	+0.25	1.65	+0.14	
	37	39.8	31.6			4.1			27.5	37	39.0	-0.00		-0.00	
	38	40.8	32.4			4.2			28.0	38	40.0				
	40	43.5	34.7			4.4			30.0	40	42.5				
	42	45.5	36.3			4.6			31.0	42	44.5				
	45	48.5	38.9	1.8		4.8	2.0		33.0	45	47.5		1.90		
	47	50.5	40.7			4.9			35.0	47	49.5				
	48	51.5	41.5			5.0			36.0	48	50.5			2.0	
	50	54.2	44.0			5.1			38.0	50	53.0				
	52	56.2	45.8		±0.07	5.2	2.2		40.0	52	55.0				
	55	59.2	48.0			5.6			42.0	55	58.0				
	56	60.2	48.8			5.7		±0.5	43.0	56	59.0				
	58	62.2	50.4	2.0		5.9	2.5		44.0	58	61.0		2.20		
	60	64.2	52.0			6.1			46.0	60	63.0	+0.30			
	62	66.2	53.6			6.3			47.0	62	65.0	-0.00			
	63	67.2	54.4			6.4	2.8		48.0	63	66.0				
	65	69.2	55.8			6.7			49.0	65	68.0				
	68	72.5	58.5			7.0			52.0	68	71.0				
	70	74.5	60.1			7.2			53.0	70	73.0				
	72	76.5	61.7			7.4			55.0	72	75.0		2.70	2.5	
	75	79.5	63.9	2.5	±0.08	7.8	3.2		57.0	75	78.0				
	78	82.5	66.3			8.1			59.0	78	81.0				
	80	85.5	68.9			8.3		±0.7	61.0	80	83.5				
※	82	87.5	70.5			8.5			62.0	82	85.5				
	85	90.5	72.7			8.9			64.0	85	88.5				
※	88	93.5	75.1			9.2			67.0	88	91.5	+0.35			
	90	95.5	76.7			9.4			68.0	90	93.5	-0.00			
※	92	97.5	78.3	3.0	±0.09	9.6	4.0		70.0	92	95.5		3.20	+0.18	
※	95	100.5	80.5			10.0			72.0	95	98.5			-0.00	
※	98	103.5	82.9			10.3			75.0	98	101.5				
	100	105.5	84.5			10.5			76.0	100	103.5				

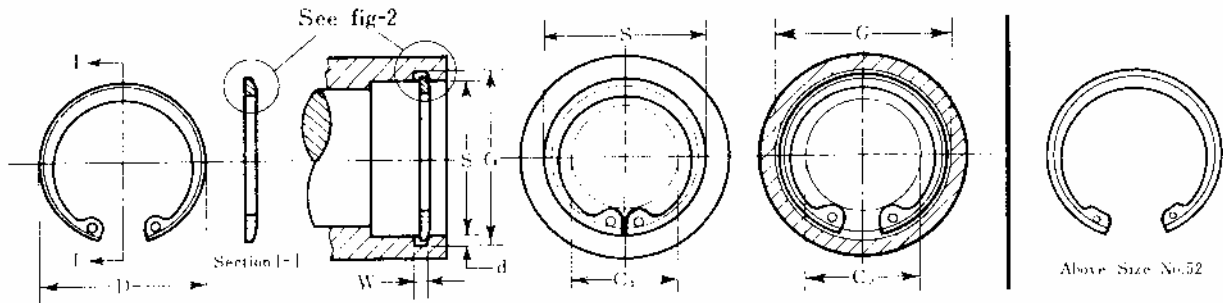
- Material=Carbon steel, Stainless steel.
- Hardness=HRC44~52
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- ※mark are according to our company's specification.



Unit:mm

ISTW	Ring dimension										Groove dimension					
	d3		d4	t		h	d0	Gen. Tol.	d5	d1	d2		m		n	
	Bas	Tol.		Bas	Tol.						Bas	Tol.	Bas	Tol.		Bas
※ 6	5.6	+0.10 -0.20	8.0	0.5	±0.03	1.2	2.2	±0.2	8.9	6	5.7	-0.04	0.60	+0.10 -0.00	1.5	
※ 7	6.5		9.3	0.6	±0.04	1.4	2.4		10.3	7	6.7	+0.00	0.70			
※ 8	7.4		10.6	0.7		1.6	3.0		11.7	8	7.6	-0.06	0.80			
※ 9	8.4	12.0	0.8	1.8		3.4	13.1	9	8.6	-0.09	0.95					
10	9.3	±0.15	13.3	1.0	±0.05	2.0	1.2	±0.3	14.5	10	9.6	+0.00 -0.11	1.15	1.5		
11	10.2		14.4			2.1			16.0	11	10.5					
12	11.1		15.5			2.2			17.2	12	11.5					
13	12.0	±0.18	16.6	1.2	±0.06	2.3	1.5	±0.4	18.4	13	12.4	+0.00 -0.21	1.35	1.5		
14	12.9		17.5			2.3			19.4	14	13.4					
15	13.8		18.6			2.4			20.6	15	14.3					
16	14.7	±0.25	19.7	1.5	±0.06	2.5	1.8	±0.5	21.8	16	15.2	+0.00 -0.25	1.65	1.5		
17	15.7		20.9			2.6			23.0	17	16.2					
18	16.5		21.9			2.7			24.2	18	17.0					
19	17.5	±0.25	23.1	1.8	±0.07	2.8	2.0	±0.7	25.4	19	18.0	+0.00 -0.30	1.90	2.0		
20	18.5		24.3			2.9			27.0	20	19.0					
21	19.5		25.5			3.0			28.0	21	20.0					
22	20.5	±0.25	26.5	2.0	±0.07	3.0	2.5	±0.5	29.0	22	21.0	+0.00 -0.30	2.20	2.0		
24	22.2		28.6			3.2			31.5	24	22.9					
25	23.2		29.8			3.3			33.0	25	23.9					
26	24.2	±0.4	31.0	2.5	±0.07	3.4	3.0	±0.7	34.0	26	24.9	+0.00 -0.30	2.70	2.5		
28	25.9		33.1			3.6			36.5	28	26.6					
※ 29	26.9		34.1			3.6			37.5	29	27.6					
30	27.9	±0.25	35.3	3.0	±0.08	3.7	3.5	±0.7	38.5	30	28.6	+0.00 -0.30	3.20	3.0		
32	29.6		37.4			3.9			41.0	32	30.3					
34	31.5		39.7			4.1			43.5	34	32.3					
35	32.2	±0.45	40.6	3.5	±0.09	4.2	4.0	±0.7	45.0	35	33.0	+0.00 -0.35	3.20	3.0		
36	33.2		41.6			4.2			46.0	36	34.0					
38	35.2		44.0			4.4			48.0	38	36.0					
40	37.0	±0.4	46.2	4.0	±0.07	4.6	4.5	±0.7	51.0	40	38.0	+0.00 -0.30	2.70	2.5		
42	38.5		48.1			4.8			54.0	42	39.5					
45	41.5		51.3			4.9			57.0	45	42.5					
48	44.5	±0.45	55.1	4.5	±0.07	5.3	5.0	±0.7	61.0	48	45.5	+0.00 -0.30	3.20	3.0		
50	45.8		56.8			5.5			63.0	50	47.0					
52	47.8		59.0			5.6			65.0	52	49.0					
55	50.8	±0.45	62.6	5.0	±0.07	5.9	5.5	±0.7	69.0	55	52.0	+0.00 -0.30	3.20	3.0		
※ 56	51.8		63.8			6.0			70.0	56	53.0					
58	53.8		66.0			6.1			72.0	58	55.0					
60	55.8	±0.55	68.4	5.5	±0.08	6.3	6.0	±0.7	75.0	60	57.0	+0.00 -0.35	3.20	3.0		
62	57.8		70.8			6.5			77.0	62	59.0					
63	58.8		72.0			6.6			78.0	63	60.0					
65	60.8	±0.55	74.4	6.0	±0.08	6.8	6.5	±0.7	81.0	65	62.0	+0.00 -0.35	3.20	3.0		
※ 68	63.5		77.5			7.0			84.0	68	65.0					
70	65.5		79.9			7.2			87.0	70	67.0					
※ 72	67.5	±0.55	82.1	6.5	±0.08	7.3	7.0	±0.7	89.0	72	69.0	+0.00 -0.35	3.20	3.0		
75	70.5		85.7			7.6			92.0	75	72.0					
※ 78	73.5		89.3			7.9			96.0	78	75.0					
※ 80	74.5	±0.55	90.5	7.0	±0.08	8.0	7.5	±0.7	98.0	80	76.5	+0.00 -0.35	3.20	3.0		
※ 82	76.5		92.9			8.2			101.0	82	78.5					
※ 85	79.5		96.5			8.5			104.0	85	81.5					
※ 88	82.5	±0.55	99.9	7.5	±0.09	8.7	8.0	±0.7	108.0	88	84.5	+0.00 -0.35	3.20	3.0		
※ 90	84.5		102.3			8.9			110.0	90	86.5					
※ 95	89.5		108.1			9.3			116.0	95	91.5					
※ 100	94.5	113.9	9.7	122.0	100	96.5										

- Material=Carbon steel, Stainless steel.
- Hardness=HRC44~52
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- ※mark are according to our company's specification.

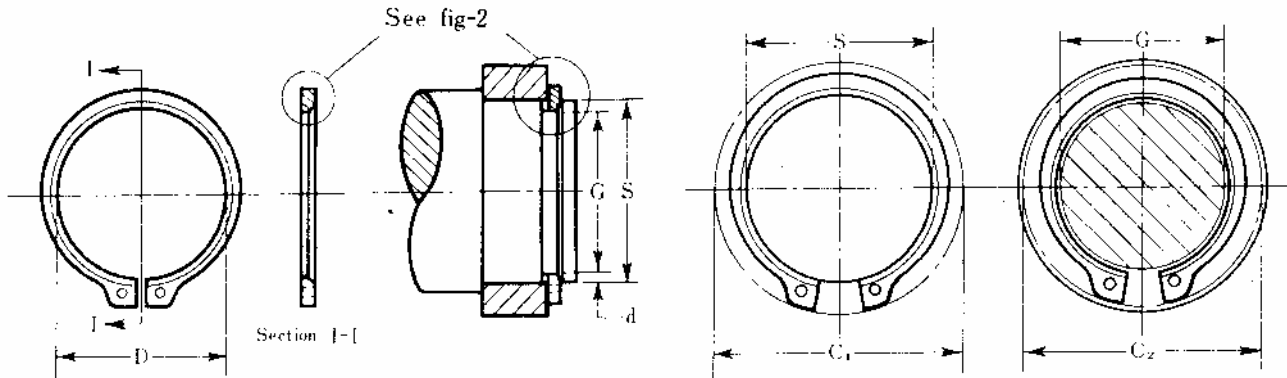


Unit:mm

MT	Ring dimension						Groove dimension							
	D		t		U		S	G			W		d	
	Nominal Size	Bas.	Tol.	Bas.	Tol.	Bas.		Tol.	T.I.R	Bas.	Tol.			
MT-	28	31.10	+0.65 -0.50	1.3	±0.06	1.02	±0.030	28	30.0	+0.08 -0.00	0.10	1.10	+0.03 -0.00	1.00
	30	33.40				1.02		30	32.2	+0.10 -0.00				1.10
	32	35.35				0.99		32	34.2					1.07
	35	38.75				0.97		35	37.5	1.05				
	40	44.25	+0.90 -0.65	1.6	±0.08	1.22	±0.045	40	42.7	+0.13 -0.00	0.13	1.31	1.35	
	42	46.60				1.19		42	45.0			1.29	1.50	
	47	52.15				1.17		47	50.5			1.27	1.75	
	52	57.90	+1.00 -0.75	2.0	±0.08	1.52	±0.055	52	56.0	+0.15 -0.00	0.15	1.65	2.00	
	55	61.10				1.50		55	59.2			1.63	+0.04 -0.00	2.10
	62	68.60				1.45		62	66.8			1.58		2.40
	72	79.60				1.78		72	77.3			1.93	2.65	
	80	89.10	±1.40	2.8	±0.065	2.08	±0.065	80	85.9	+0.05 -0.00	2.26	2.95		
85	94.40	2.08				85		91.2	2.26			3.10		

- Material=Carbon steel.
- Hardness=HRC44~52.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- The data of thrust load shows the value when the ring is tested by the shaft or the bore made of cold rolled steel.

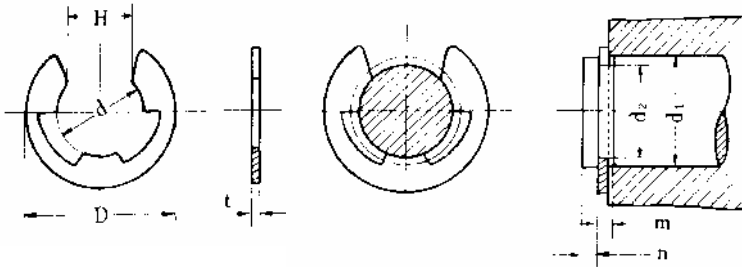
NT Beveled Retaining Rings (External)



Unit:mm

NT	Ring dimension						Groove dimension							
	D		t		U		S	G			W		d	
Nominal Size	Bas.	Tol.	Bas.	Tol.	Bas.	Tol.		Bas.	Tol.	T.I.R	Bas.	Tol.		
NT-	28	25.80	+0.25 -0.40	1.3	±0.06	1.04	±0.030	28	26.25	+0.00 -0.10	0.13	1.12	+0.03 -0.00	0.88
	30	27.90				1.12		0.88						
	32	29.60				1.10		1.00						
	35	32.30	+0.35 -0.50	1.6	±0.08	0.99	±0.045	35	32.70	+0.00 -0.13	0.15	1.07	+0.04 -0.00	1.15
	40	36.75				1.24		1.35						
	45	41.60				1.22		1.45						
	50	46.20	+0.35 -0.65	2.0	±0.045	1.19	±0.045	50	46.70	+0.00 -0.13	0.15	1.29	+0.04 -0.00	1.65
	55	50.60				1.57		1.80						
	60	55.80				1.52		1.85						

- Material=Carbon steel.
- Hardness=HRC44~52.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- The data of thrust load shows the value when the ring is tested by the shaft or the bore made of cold rolled steel

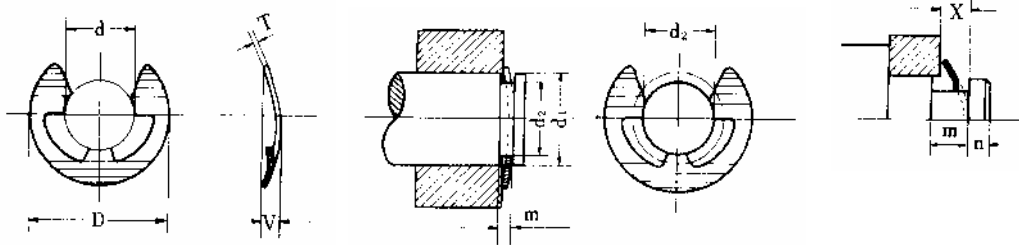


E-rings can be supplied in rail stacked or tape wrapped.
 Size No.0.6 through 1: Rail Stacked
 Size No.1.2 through 12: Tape wrapped

Unit:mm

ETW		Ring dimension								Groove dimension						
		d		D		H		t		d1		d2		m		n
		Bas	Tol.	Bas	Tol.	Bas	Tol.	Bas	Tol.	Over	Under	Bas	Tol.	Bas	Tol.	Min.
ETW-	※ 0.6	0.6	±0.04	1.5	±0.1	0.45	±0.02	0.2	±0.02	0.8	1.0	0.65	+0.05 -0.00	0.3	+0.05 -0.00	0.4
	※ 0.7	0.7	+0.00 -0.08	2.0		0.55	+0.00 -0.10	0.2		0.9	1.2	0.70		0.3		0.4
		0.8		2.0		0.70		0.2		1.0	1.4	0.82		0.3		0.4
	※ 1.0	1.0		2.8		0.88		0.2		1.3	1.7	1.00		0.3		0.5
		1.2		3.0	1.00		0.3	±0.025	1.4	2.0	1.23	0.4	0.6			
		1.5		4.0	1.30		0.4	±0.03	2.0	2.5	1.53	0.5	0.8			
	※ 1.9	1.9	+0.00 -0.09	4.5	1.70	+0.00 -0.25	0.4		2.5	3.0	1.93	0.5	1.0			
		2.0		5.0	1.70		0.4		2.5	3.2	2.05	+0.06 -0.00	0.5	1.0		
	※ 2.3	2.3		6.0	2.00		0.4		3.0	4.0	2.35	0.5	1.0			
		2.5		6.0	2.10		0.4	±0.04	3.2	4.0	2.55	0.5	1.0			
		3.0		7.0	2.60		0.6		4.0	5.0	3.05	0.7	1.0			
	※ 3.2	3.2		7.0	2.80		0.6		4.0	5.0	3.25	+0.075 -0.00	0.7	1.2		
		4.0	+0.00 -0.12	9.0	3.50	+0.00 -0.30	0.6		5.0	7.0	4.05		0.7	1.2		
		5.0		11.0	4.30		0.6	6.0	8.0	5.05	0.7		1.2			
		6.0		12.0	5.20		0.8	7.0	9.0	6.05	0.9		1.2			
		7.0		14.0	6.10		0.8	±0.05	8.0	11.0	7.10	+0.09 -0.00	0.9	1.5		
		8.0	+0.00 -0.15	16.0	6.90	+0.00 -0.35	0.8		9.0	12.0	8.10		0.9	1.8		
		9.0		18.0	7.80		0.8		10.0	14.0	9.10		0.9	2.0		
		10.0		20.0	8.70		1.0		11.0	15.0	10.15		1.15	2.0		
		12.0	+0.00 -0.18	23.0	10.40		1.0	±0.06	13.0	18.0	12.15	+0.11 -0.00	1.15	2.5		
	15.0		29.0	13.00	+0.00 -0.45	1.5	16.0		24.0	15.15	-0.00	1.65	3.0			
	19.0	+0.00 -0.21	37.0	16.50		1.5	20.0		31.0	19.15	+0.13 -0.00	1.65	3.5			
	24.0		44.0	20.80	+0.00 -0.50	2.0	±0.07		25.0	38.0	24.15	2.2	4.0			

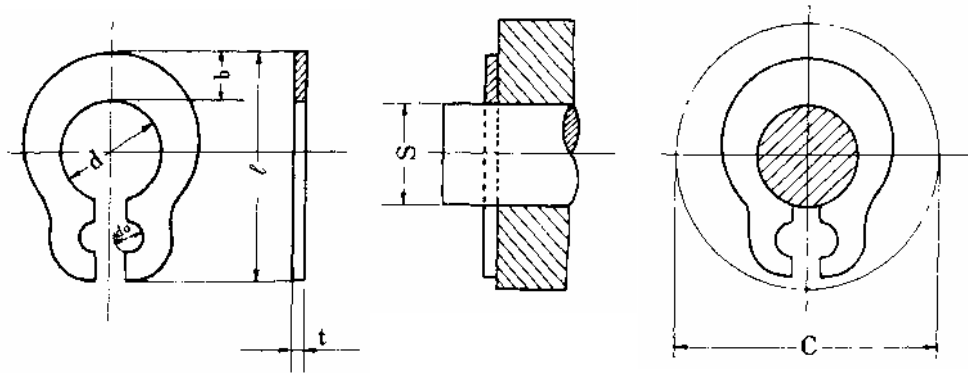
- Material=carbon steel,stainless steel.
- Hardness=HRC40~50.
- Finish=Black phosphate coating (ACP). Zinc plating.Chromate dipping.
- ※ marks are according to our company's specification



Unit:mm

BETW	Ring dimension						Groove dimension									
	d	D	T	V		d1		d2		m		x		n		
				Bas	Tol.	Min.	Max.	Bas	Tol.	Bas	Tol.	Min.	Max.	Min.		
BETW	1.5	1.5	4	0.4	0.8	+0.15 -0.10	2.0	2.5	1.53	+0.06 -0.00	0.8	+0.10 -0.00	0.55	0.65	0.8	
	2.0	2.0	5	0.4	0.8		2.5	3.2	2.05				0.8	0.55	0.65	1.0
	2.5	2.5	6	0.4	0.8		3.2	4.0	2.55				0.8	0.55	0.65	1.0
	3.0	3.0	7	0.6	1.1	+0.25 -0.00	4.0	5.0	3.05	+0.075 -0.00	1.1	0.85	1.00	1.0		
	4.0	4.0	9	0.6	1.1		5.0	7.0	4.05		1.1	0.85	1.00	1.2		
	5.0	5.0	11	0.6	1.1		6.0	8.0	5.05		1.1	0.85	1.00	1.2		
	6.0	6.0	12	0.8	1.3	+0.40 -0.00	7.0	9.0	6.05	+0.09 -0.00	1.3	1.00	1.20	1.2		
	7.0	7.0	14	0.8	1.3		8.0	11.0	7.10		1.3	1.00	1.20	1.5		
	8.0	8.0	16	0.8	1.3		9.0	12.0	8.10	1.3	1.00	1.20	1.8			
	9.0	9.0	18	0.8	1.3		10.0	14.0	9.10	1.3	1.00	1.20	2.0			
	10.0	10.0	20	1.0	1.7		11.0	15.0	10.15	1.7	1.30	1.60	2.0			
	12.0	12.0	23	1.0	1.7		13.0	18.0	12.15	1.7	1.30	1.60	2.5			
15.0	15.0	29	1.5	2.3	+0.60 -0.00	16.0	24.0	15.15	+0.11 -0.00	2.3	1.80	2.20	3.0			

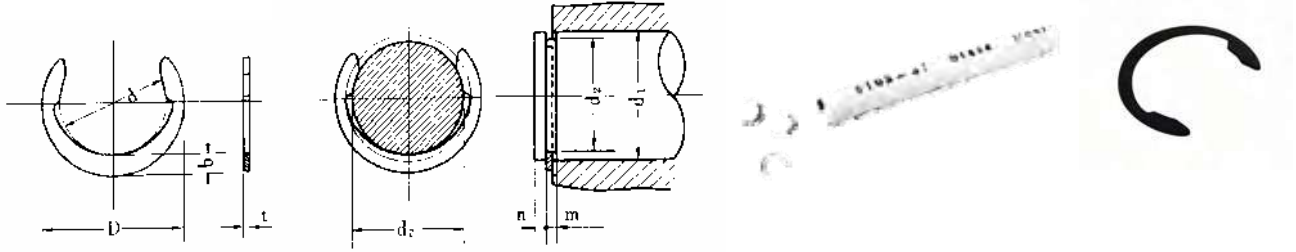
- Material=Carbon steel, Stainless steel.
- Hardness=HRC44~52
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.



Unit:mm

GTW	Ring dimension								C Max.	Applicable shaft		Thrust Load kgf
	d		b	R	do	t		S				
	Bas	Tol.				Bas	Tol.					
GTW-	1.5	1.40	+0.05 -0.08	0.75	3.8	0.9	0.4	±0.03	5.3	1.5	±0.02	1.5
	2.0	1.90	+0.03 -0.10	1.00	4.8	0.9	0.6	±0.04	6.4	2.0		2.0
	2.5	2.35	+0.05 -0.08	1.20	5.4	0.9	0.6		6.8	2.5		3.0
	3.0	2.85	+0.05 -0.10	1.40	6.3	0.9	0.6		7.7	3.0	4.0	
	4.0	3.80	+0.05 -0.10	1.80	8.4	1.2	0.8		10.3	4.0	6.0	
	5.0	4.75	±0.08	2.20	9.8	1.2	0.8	±0.05	11.4	5.0	8.0	
	6.0	5.70		2.40	11.5	1.4	1.0		13.5	6.0	10.0	
	7.0	6.70	±0.10	2.70	12.8	1.4	1.0	±0.05	14.8	7.0	±0.05	12.0
	8.0	7.70		3.00	14.1	1.4	1.0		15.8	8.0		12.0
	9.0	8.65		3.30	16.6	2.0	1.2	±0.06	19.8	9.0		15.0
10.0	9.65	3.50		17.8	2.0	1.2	20.8		10.0	16.0		

- Material=Carbon steel, Stainless steel.
- Hardness=HRC44~52
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.

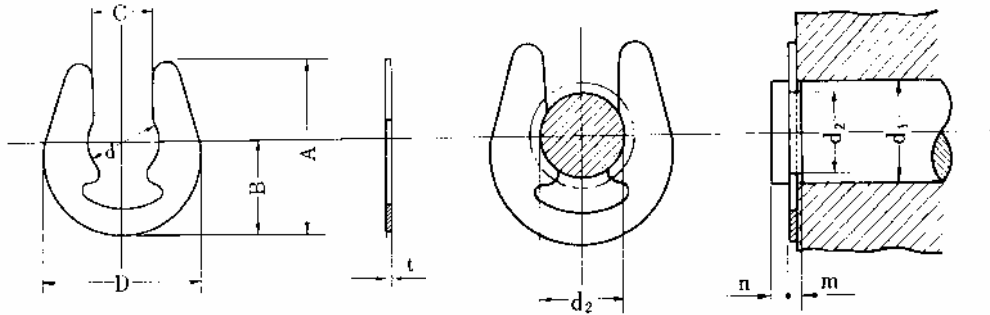


C-rings can be supplied in tape wrapped.
 Size No.12 through 50.

Unit:mm

CTW	Ring dimension							Groove dimension					
	d		D	b	t		d1	d2		m		n (Min)	
	Bas	Tol.			Bas	Tol.		Bas	Tol.	Bas	Tol.		
5103-	12	2.59	+0.05 - 0.10	4.17	0.79	0.4	±0.03	3.2	2.69	±0.04	0.48	0.04	0.5
	18	4.09		6.19	1.05	0.4	±0.04	4.8	4.19		0.48		0.6
	21	4.75		6.99	1.12	0.6		5.6	4.90	0.70	0.7		
	25	5.36		7.90	1.27	0.6		6.4	5.59	0.70	0.8		
	31	6.86	+0.07 - 0.15	9.56	1.35	0.6	±0.05	7.9	7.01	0.70	0.06	0.9	
	37	8.33		11.37	1.52	0.6		9.5	8.51	0.70		1.0	
	40	9.12		12.32	1.60	0.6		10.3	9.25	0.70		1.1	
	43	9.80		13.10	1.65	0.6		11.1	9.98	0.70		1.1	
	46	10.54		14.00	1.73	0.6	±0.05	11.9	10.69	0.70	1.2		
	50	11.20	±0.15	14.76	1.78	0.9	±0.06	12.7	11.43	±0.07	1.00	0.07	1.3
	56	12.62		16.56	1.98	0.9		14.3	12.88		1.00		1.4
	81	18.31		±0.18	23.23	2.46		1.4	20.6		18.59		1.50

- Material=Carbon steel, Stainless steel.
- Hardness=HRC44~52
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.



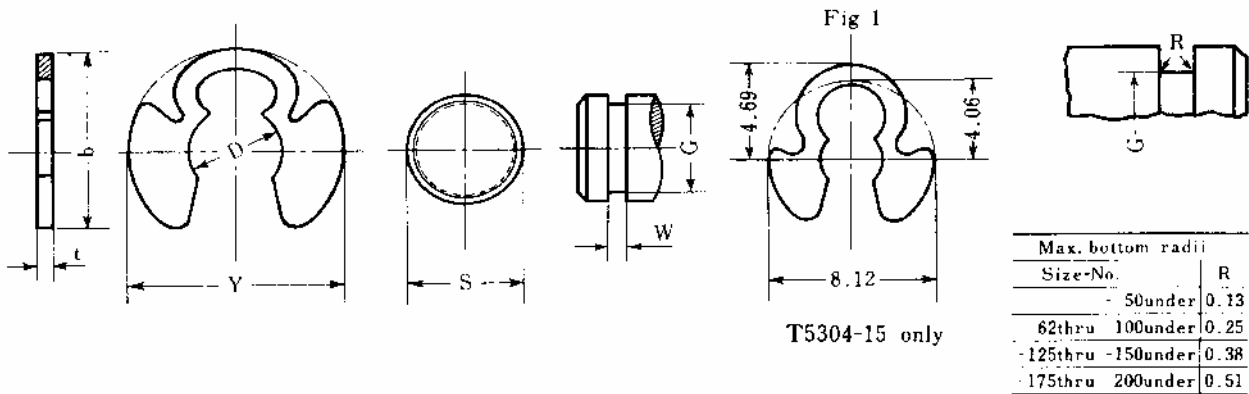
Unit:mm

UTW		Ring dimension								Groove dimension							
		d		A	D	C		B	t		d1		d2		m		n (Min)
		Bas.	Tol.			Bas.	Tol.		Bas.	Tol.	Min.	Max.	Bas.	Tol.	Bas.	Tol.	
UTW-	3.2	3.2	+0.03 -0.10	8.7	8.0	2.8	+0.0 -0.2	4.6	0.6	±0.04	4	5	3.3	+0.05 -0.00	0.7	+0.1 -0.0	1.0
	4.0	4.0		10.0	9.0	3.6		5.3	0.7		5	7	4.1		0.8		1.2
	5.0	5.0		12.8	11.6	4.4		6.8	0.7		6	8	5.1		0.8		1.2
	6.0	6.0	+0.05 -0.15	14.8	13.5	5.3	+0.0 -0.3	8.0	0.7	±0.05	7	9	6.1	+0.08 -0.00	0.8	1.2	
	7.0	7.0	17.0	15.0	6.2	9.0		0.9	8		11	7.1	1.0		1.5		
	8.0	8.0	+0.05 -0.20	19.5	17.5	7.1		10.5	1.0		9	12	8.1		1.1	1.8	

- Material=Carbon steel, Stainless steel.
- Hardness=HRC44~52
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.

5304 Klip Rings

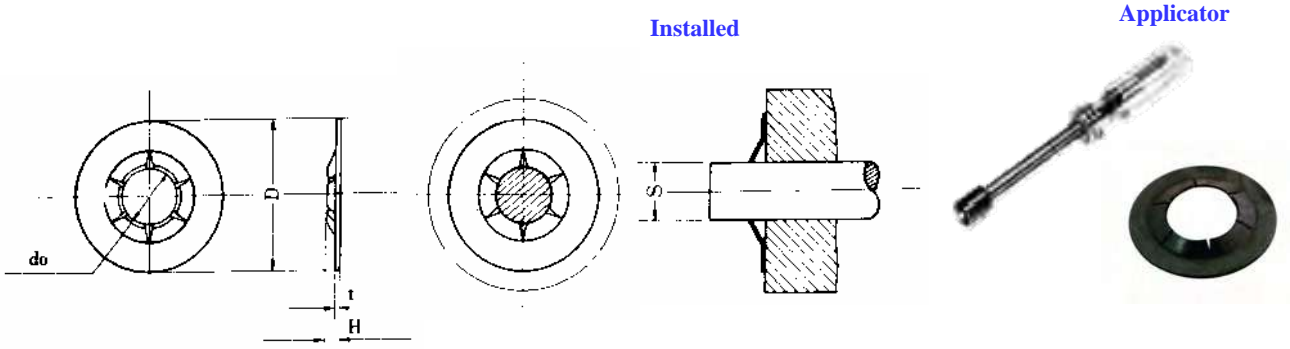
Groove Dimension



Unit:mm

5304	Shaft dia.	Ring dimension						Groove diameter				Max. bottom radii	Thrust load			
		Inside dia.		Thickness		Outside dia.	Height	Diameter		Width			Tested shaft	Ring safety =2.5	Groove safety =2	
		S	D	Tol.	t	Tol.	Y	b	G	Tol.	W		Tol.	R	S	Pr(kg)
5304-	15	4.0~4.5	2.79	±0.08	0.6	+0.10 -0.05	FIG 1	8.00	3.05	±0.10	0.75	+0.15 -0.00	0.13	4.0	140	40
	18	4.5~5.5	3.56				10.16	9.14	3.76					4.8	190	50
	25	6.0~7.0	4.78				12.24	10.92	5.33					6.4	280	90
	31	7.5~8.5	6.35				14.94	13.11	6.91					7.9	350	110
	37	9.0~10.5	7.92	±0.10	0.9	+0.10 -0.05	17.27	15.09	8.41	±0.15	1.05	+0.15 -0.00	0.13	9.5	580	130
	43	11~12	9.53				19.10	16.76	9.91					11.1	830	180
	50	12~13	10.31				20.98	18.34	11.18					12.7	940	270
	62	15~17	12.70	±0.13	1.0	+0.10 -0.05	24.54	21.54	13.49	±0.20	1.15	+0.15 -0.00	0.25	15.9	1,120	490
	75	18~20	15.09				27.81	24.64	16.05					19.0	1,660	720
	100	24~26	20.62	±0.15	1.2	+0.10 -0.05	35.94	31.75	21.84	±0.25	1.40	+0.20 -0.00	0.25	25.4	2,160	1,170
	125	31.8	26.21				45.72	39.00	27.69					31.8	4,950	1,570
	150	38.1	31.75	±0.20	2.77	±0.08	52.07	44.30	33.45	±0.38	2.62	+0.25 -0.00	0.38	38.1	6,880	2,160
	175	44.4	35.71	±0.25	3.18	±0.10	58.42	50.70	37.59					±0.38	3.05	+0.25 -0.00
	200	50.8	41.28	±0.38	3.18	±0.10	67.31	58.70	43.94	±0.38	3.53	-0.00	0.51			

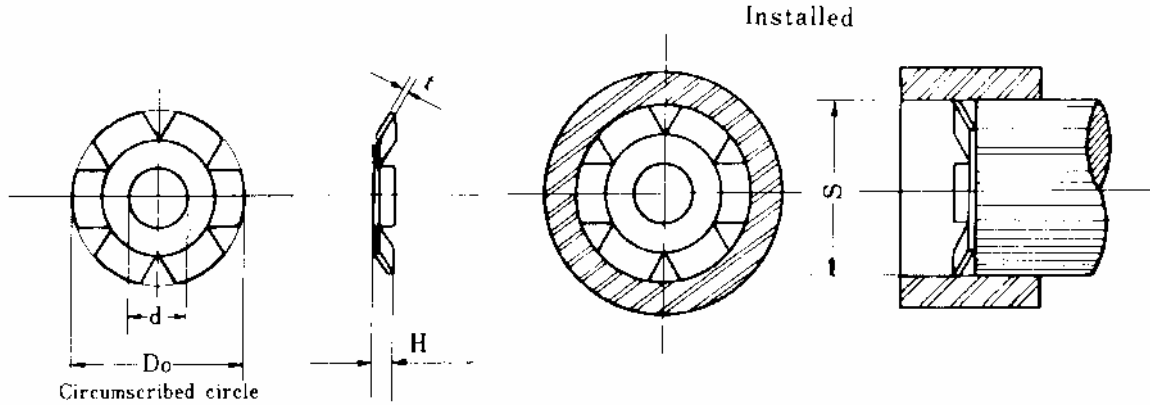
- Material=Carbon steel.
- Hardness=HRC44~54
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- The data of thrust load shows the value when the ring is tested b the shaft made of cold rolled steel.



Unit:mm

SPN		Ring dimension					Applicable shaft		Thrust Load
		d		D	H	t	S		
Size-No.	Bas.	Tol.							Bas.
SPN-	1.2	1.1	+0.00 -0.10	4.5	0.6	0.25	1.2	+0.04 -0.03	20
	1.5	1.4		5.2	0.6	0.25	1.5		20
	2	1.9		6.0	0.7	0.25	2.0		20
	2.4	2.3	+0.00 -0.15	7.0	0.8	0.25	2.4		45
	2.6	2.5		7.0	0.9	0.25	2.6		45
	3	2.9		10.0	1.3	0.30	3.0	+0.05 -0.03	100
	4	3.9		12.0	1.4	0.30	4.0		100
	5	4.9	14.0	1.55	0.40	5.0	+0.06 -0.03	150	
	6	5.9	16.0	1.75	0.40	6.0		170	
	8	7.9	17.5	1.8	0.50	8.0	+0.07 -0.03	180	
	10	9.9	21.0	2.2	0.70	10.0		320	
	12	11.9	27.0	2.8	0.90	12.0	-0.03	400	

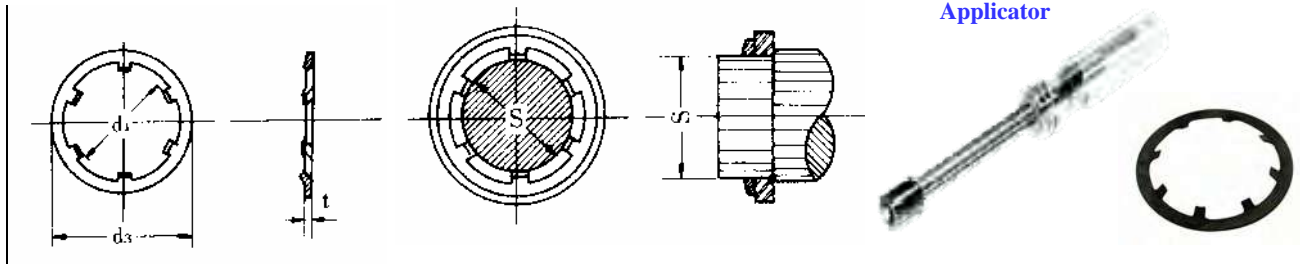
- Material=Carbon steel, Stainless steel.
- Hardness=HRC40~50.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- The data of thrust load shows the value when the nut is tested by the shaft made of cold rolled steel.
- This ring can not use of hardened shaft.



Unit: mm

RPN		Ring dimension				Applicable bore		Thrust Load	
		D		d	H	t	S		
Size- No.	Bas.	Tol.							Bas.
RPN-	6	6.2	±0.10	1.0	1.0	0.30	6	+0.03	40
	8	8.2		1.8	1.2	0.30	8	-0.06	50
	10	10.2		3.0	1.4	0.40	10	+0.03 -0.07	80

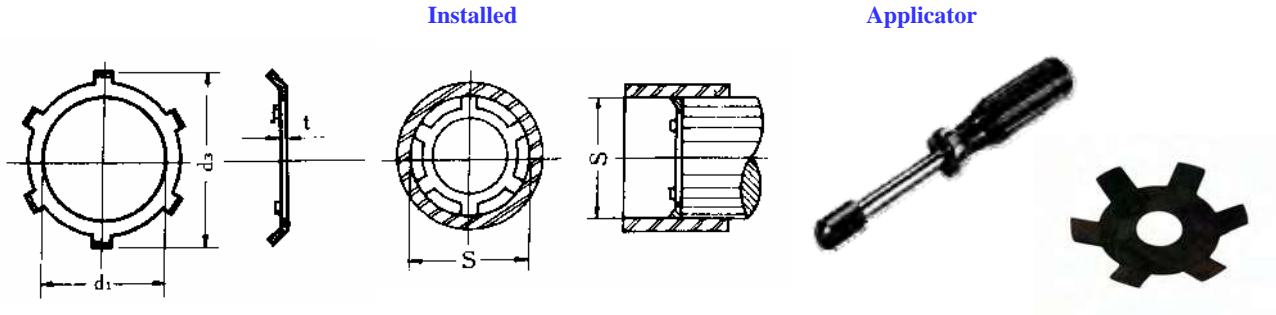
- Material=Carbon steel, Stainless steel.
- Hardness=HRC40~50.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- The data of thrust load shows the value when the nut is tested by the bore made of cold rolled steel.
- This bore can not use of hardened shaft.



Unit:mm

CSTW		Ring dimension					Applicable shaft		Thrust load	
		d		D		t	No. of Teeth	S		
Size-No.	Bas.	Tol.	Bas.	Tol.				Bas.	Tol.	kgf
CSTW-	2	1.9	±0.05	6	±0.2	0.25	3	2	+0.03 -0.00	6
	2.4	2.2	+0.10 -0.00	6.4		0.25	3	2.4	±0.03	6
	3	2.8		8		0.25	4	3		9
	3.5	3.3		7.5		0.25	4	3.5		10
	4	3.8		9		0.25	4	4		12
	4.5	4.3		10		0.25	5	4.5		14
	5	4.8		10		0.25	5	5		16
	6	5.8		11		0.25	5	6		18
	8	7.8		13		0.25	5	8		21
	10	9.8		15.4		0.25	6	10		21
	12	11.8		17.8	±0.3	0.4	6	12		±0.05
	14	13.8	20.3	0.4		6	14	23		
	16	15.8	22.8	0.4		6	2	23		
	18	17.8	25	0.4		8	18	25		
	19	18.7	±0.15	25.4		0.4	6	19	25	
	20	19.8	+0.10 -0.00	28		0.4	8	20	25	
22	21.7	±0.15	28.5	0.4	6	22	25			

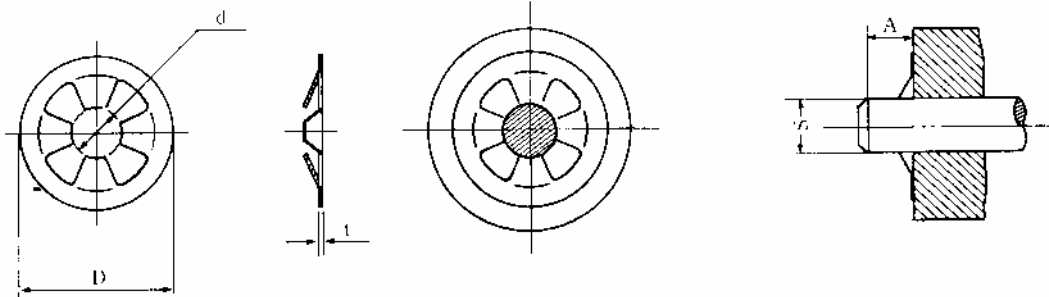
- Material=Carbon steel, Stainless steel.
- Hardness=HRC40~50.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- The data of thrust load shows the value when the nut is tested by the shaft made of cold rolled steel.
- This ring can not use of hardened shaft.



Unit:mm

CRTW		Ring dimension					Applicable bore		Thrust load
		D		d		t	No.of Teeth	S	
Size-No.		Bas.	Tol.	Bas.	Tol.			Bas.	Tol.
CRTW-	6	6.2	+0.0 -0.10	2.2	±0.2	0.25	6	6	20
	8	8.2		3.6		0.25	6	8	20
	10	10.2		5		0.25	6	10	18
	12	12.2		6.6		0.25	6	12	15
	14	14.2		8.2		0.25	6	14	13
	16	16.2		9.8		0.25	6	16	12
	18	18.8		11		0.4	8	18	30

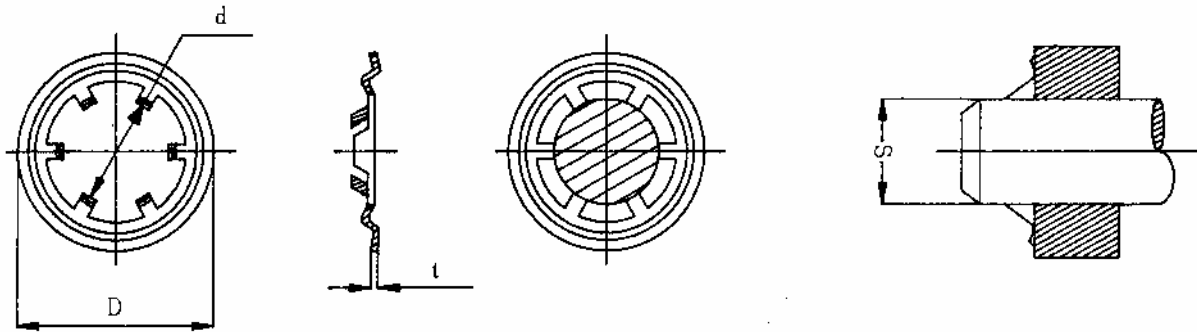
- Material=Carbon steel, Stainless steel.
- Hardness=HRC40~50.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- The data of thrust load shows the value when the nut is tested by the shaft made of cold rolled steel.
- This ring can not use of hardened bore.



Unit:mm

CSN		Nut					Applicable stud		
		d		D		t	S		A
Size-No.		Bas.	Tol.	Bas.	Tol.	Bas.	Bas.	Tol.	
CSN-	3	2.7	±0.2	12	±0.3	0.3	3	±0.05	4.8
	4	3.7		12		0.3	4		6.0
	5	4.7		14		0.4	5		6.6

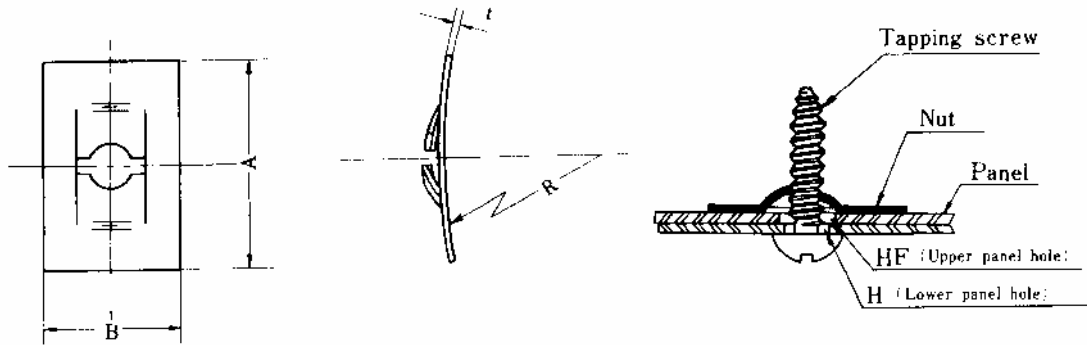
- Material=Stainless steel.
- Hardness=HRC31(minimum).
- This nut can not use of hardened stud..



Unit:mm

HCS		Nut				Applicable stud			
		d		D		t	S		No.of Teeth
Size-No.	Bas.	Tol.	Bas.	Tol.	Bas.	Bas.	Tol.		
HCS-	4	3.8	+0.0 -0.2	12	±0.3	0.3	4	±0.05	4
	5	4.8		14		0.3	5		5
	6	5.8		16		0.3	6		6
	8	7.8		20		0.3	8		6

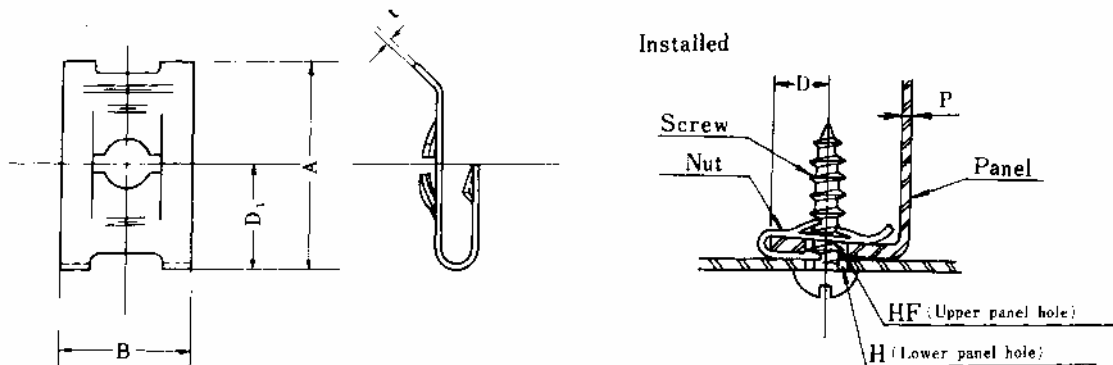
- Material=Stainless steel.
- Hardness=HRC31(minimum).
- This nut can not use of hardened stud..



Unit:mm

FSN	applicable screw	Nut dimension				Panel size	
		A	B	R	t	H	HF
FSN-3001	M 3 X 0.5	16	10	40	0.3	3.2	4
FSN-4001	M 4 X 0.7	20	13	50	0.4	4.3	5
FSN-5001	M 5X 0.8	20	13	50	0.15	5.3	6
FSN-6001	M 6 X 1.0	20	13	50	0.5	6.4	7

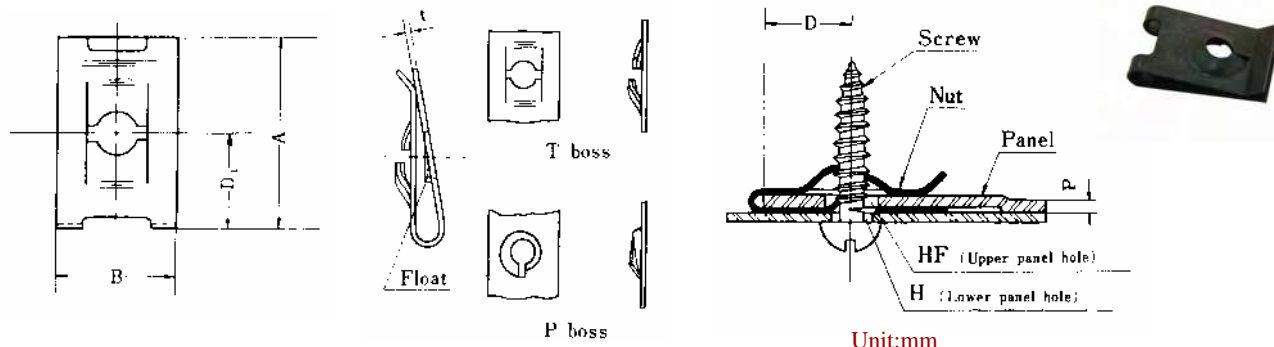
- Material=Carbon steel.
- Hardness=HRC40~50.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- Applicable screw must be used tapping screw JIS B 1115.
- Enquire special types of nut when you need other size or type.



Unit:mm

JSN		applicable screw	Nut dimension				Panel size				
			A	B	D1	t	P		D	H	HF
Size-No.						Max.	Min.	Min.			
JSN-	3001	M 3 X 0.5	18.0	11.2	9.0	0.3	0.6	1.0	7.5	4.0	5.5
	4001	M 4 X 0.7	20.0	12.7	10.0	0.4	0.7	1.2	8.0	5.0	7.0
	4003	M 4 X 18	20.0	12.7	10.0	0.6	0.8	1.2	8.0	5.0	7.0
	5001	M 5 X 0.8	20.0	12.7	10.0	0.5	0.7	1.2	8.0	6.0	8.0
	5003	M 5 X 12	22.0	12.7	12.0	0.7	2.5	3.0	9.0	6.0	8.0
	5004	M 5 X 16	21.2	12.7	11.2	0.7	0.7	1.2	9.0	6.0	8.0
	6001	M 6 X 1.0	20.0	12.7	10.0	0.5	0.7	1.2	8.0	7.5	9.5
	6002	M 6 X 14	20.0	12.7	10.0	0.7	0.7	0.8	8.0	7.5	9.5

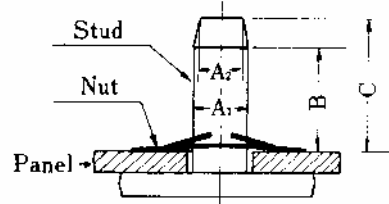
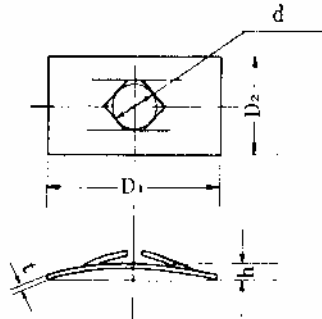
- Material=Carbon steel.
- Hardness=HRC40~50.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- Applicable screw must be used tapping screw JIS B 1115.
- Enquire special types of nut when you need other size or type.



Unit:mm

USN	Size-No.	applicable screw	Nut dimension				Panel size					Remarks		
			A	B	D1	t	P		D	H	HF	Material	Boss	Float
							Min.	Max.						
USN-	3001	M3×0.5	18.0	11.2	9.0	0.30	0.6	1.0	7.5	4.0	5.5		T	
	3006	M3×0.5	11.5	8.0	6.0	0.30	0.6	1.2	4.5	4.0	4.0	SUS	P	Without
	3012	M3-24	11.5	8.0	6.0	0.45	0.6	1.2	4.5	4.0	4.0	SUS	P	Without
	4001	M4×0.7	20.0	12.7	10.0	0.40	0.7	1.2	8.0	5.0	7.0		T	
	4003	M4×0.7	16.5	9.0	10.0	0.40	0.7	1.2	8.5	5.0	6.0		P	Without
	4004	M4-16	20.0	12.7	10.0	0.80	0.8	1.5	8.0	5.0	7.0		T	
	4005	M4-16	20.0	12.7	10.0	0.80	1.0	1.6	8.0	5.0	6.0	SUS	P	Without
	4006	M4-16	16.3	11.0	8.3	0.60	1.0	1.6	6.5	5.0	7.0		T	
	4007	M4-16	20.0	12.7	13.0	0.45	2.0	2.7	10.0	5.0	6.0		T	Without
	4024	M4-16	17.0	11.0	9.1	0.60	0.7	1.6	7.0	5.0	7.0		T	
	4026	M4-16	16.0	11.0	8.0	0.50	2.0	2.5	6.0	5.0	7.0	SUS	P	
	4031	M4-18	19.0	9.0	13.0	0.45	2.0	3.0	10.5	5.0	6.0		P	Without
	4037	M4×0.7	18.0	9.0	12.0	0.40	1.0	1.2	10.0	5.0	6.0	SUS	P	Without
	4048	M4-16	24.0	11.0	17.0	0.60	0.7	1.6	14.5	5.0	7.0		T	
	5001	M5×0.8	20.0	12.7	10.0	0.45	0.7	1.2	8.0	6.5	8.0		T	
	5003	M5-12	20.0	13.0	11.5	0.70	1.0	2.3	9.5	6.5	7.0		T	Without
	5004	M5-16	19.6	13.0	11.6	0.60	0.7	1.5	9.5	6.5	8.0		P	
	5008	M5-16	32.2	12.7	22.2	0.70	1.0	2.6	19.0	6.5	8.0	SUS	P	
	5011	M5-16	16.0	8.0	9.0	0.60	0.7	1.6	7.0	6.5	7.0		P	
	5016	M5-16	16.2	12.7	8.7	0.70	0.8	1.6	7.0	6.5	6.5		T	Without
5017	M5×0.8	21.0	12.7	11.5	0.40	1.3	2.0	9.0	6.5	6.5		T	Without	
5018	M5-16	20.0	13.0	10.0	0.70	1.2	1.6	8.0	6.5	6.5		P	Without	
6001	M6×1	20.0	12.7	10.0	0.50	0.7	1.2	8.0	7.5	9.5		T		
6002	M6-10	21.8	12.7	11.8	0.80	0.7	1.2	10.0	7.5	7.5		P	Without	

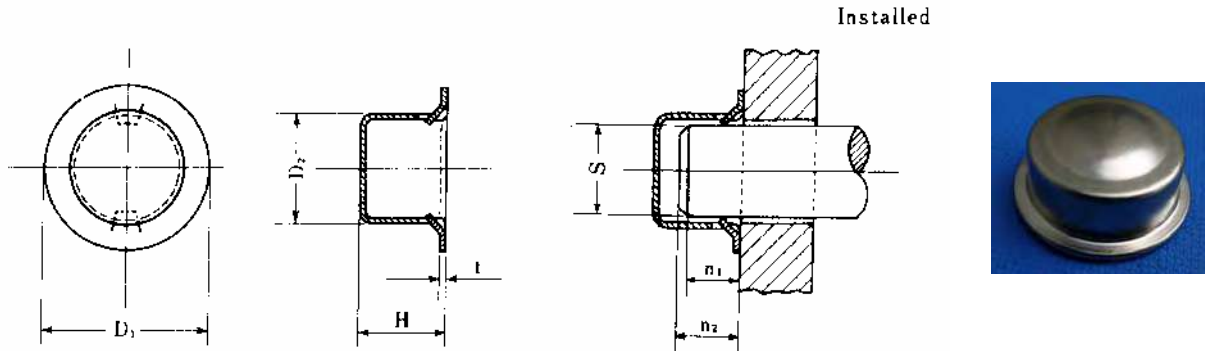
- Material=Carbon steel, or Stainless steel (SUS).
- Hardness=HRC40~50.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- Applicable screw must be used tapping screw JIS B 1115.
- Enquire special types of nut when you need other size or type.



Unit:mm

PSN		Nut							Stud diameter					Thrust load	
		d		D1	D2	Tol.	h		t	S1		S2	B		C
Size-No.	Bas.	Tol.	Bas.				Tol.	Bas.		Tol.	Bas.			Tol.	
PSN-	1.2	1.1	±0.1	12	6	±0.15	0.95	±0.25	0.3	1.3	±0.05	1	4.5	6	12
	1.5	1.38		12	6		0.95		0.3	1.57		1.2	4.5	6	12
	1.8	1.68		12	6		1.05		0.4	1.87		1.5	4.5	6	20
	2	1.85		12	6		1		0.4	2.07		1.6	4.5	6	23
	3	2.8	+0.2 -0.1	14	8	±0.25	1.2		0.4	3.1		2.6	6	8	28
	4	3.8		16	9		1.5		0.4	4.1		3.6	6	8	28
	5	4.8		18	11		1.6		0.4	5.1		4.6	6	8	50
	6	5.8		20	12		1.7		0.4	6.1		5.6	8	10	50
8	7.8	23	15	2.2	0.5	8.1	7.6	8	10	50					

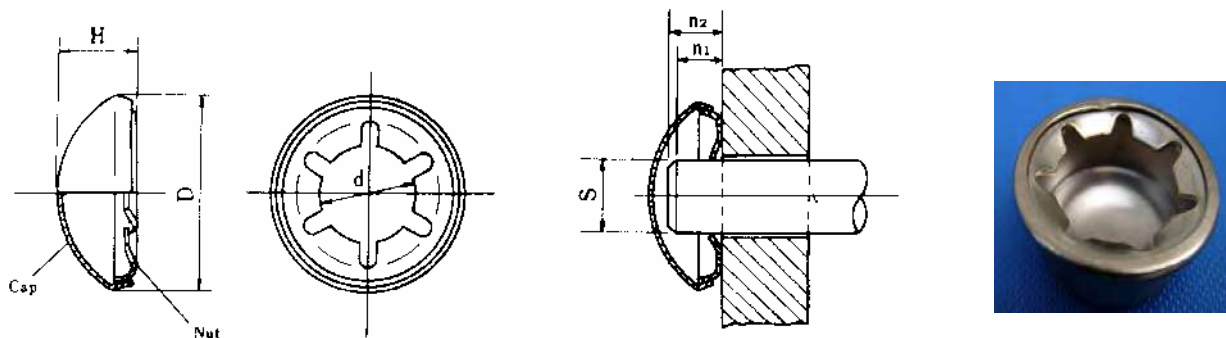
- Material=Carbon steel.
- Hardness=HRC40~50.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- The data of thrust load shows the value when the nut is tested by the stud made of cold rolled steel.
- This nut can not use of hardened stud.



Unit:mm

WS		Nut							Applicable shaft			
		D1		D2		H		t	S		n1	n2
Size-No.	Bas.	Tol.	Bas.	Tol.	Bas.	Tol.			Bas.	Tol.	Min.	Max.
WS-	5	11.5	±0.2	6.0	±0.3	5.0	±0.3	0.40	5.0	±0.05	3.0	4.0
	6	12.0		7.1		5.0		0.45	6.0		3.0	4.0
	8	14.3		9.3		7.3		0.50	8.0		3.0	6.0

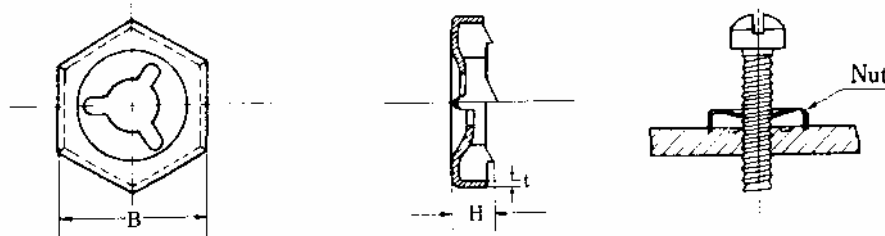
- Material=Carbon steel.
- Hardness=HRC40~50
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping, Ni plating .
- This nut can not use of hardened shaft.



Unit:mm

DS	Nut								Applicable shaft				
	d		D		H		t ₁	t ₂	S		n ₁	n ₂	
	Bas.	Tol.	Bas.	Tol.	Bas.	Tol.			Bas.	Tol.			Min.
DS-	5	4.9	+0.00 -0.15	13.0	±0.3	5.5	±0.3	0.3	0.3	5.0	+0.05 -0.03	2.5	4.0
	6	5.9		15.0		5.5		0.3	0.3	6.0		2.5	4.0
	8	7.9		15.6		5.5		0.3	0.3	8.0		2.5	4.0

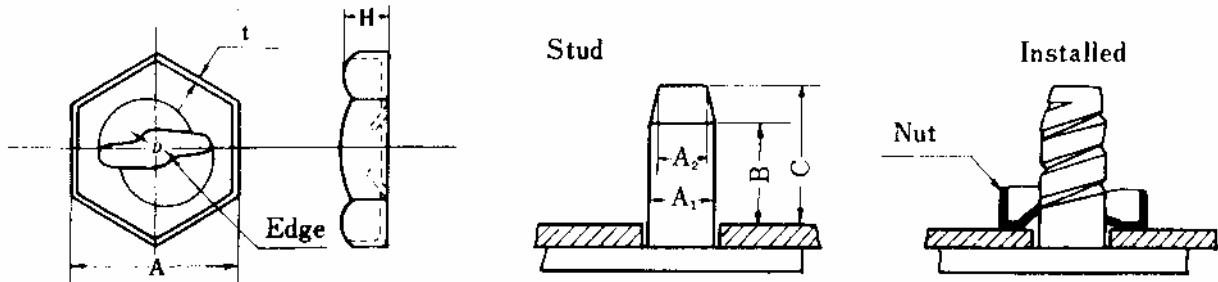
- Cap Material=Stainless steel (SUS-304CS).
- Nut Material=Carbon steel.
- Hardness=HRC40~50
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- This nut can not use of hardened shaft.



Unit:mm

ALN	applicable screw	Nut				
		B		H		t
Size-No.		Bas.	Tol.	Bas.	Tol.	Bas.
ALN-3	M3 X 0.5	7.35	+0.0	2.1	±0.2	0.3
ALN-4	M4 X 0.7	7.35	-0.3	2.1		0.3

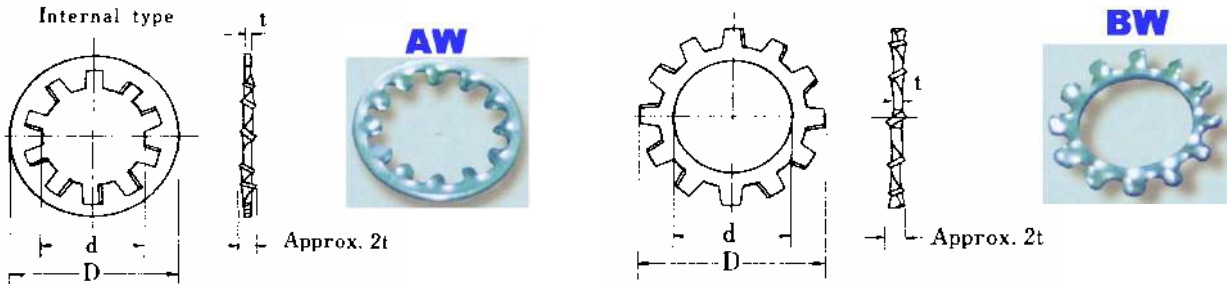
- Material=Carbon steel.
- Hardness=HRC38~46.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.
- Applicable screw must be used tapping screw JIS B 1115.
- Enquire special types of nut when you need other size or type.



Unit:mm

TPN		Nut						Stud diameter					Allowable Torque	
		D		A		H		t	A1		A2	B		C
Size-No.	Bas.	Tol.	Bas.	Tol.	Bas.	Tol.	Bas.		Tol.	Bas.			Tol.	
TPN-	2	1.65	±0.1	10.0	+0.5 -0.0	3.0	±0.5	0.4	2.00	±0.08	1.4	4.5	6.0	3
	3	2.60		12.0		3.2		0.4	3.00		2.4	6.0	8.0	10
	4	3.60		14.0		3.5		0.4	1.87		3.4	6.0	8.0	18

- Material=Carbon steel.
- Hardness=HRC38~46
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.

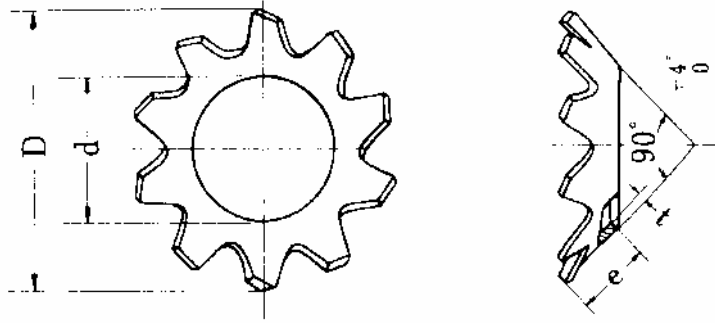


Unit:mm

Nominal Size		Screw Size		d		D		t		Teeth number	
AW	BW	m/m	Inch	Basic	Tol.	Basic	Tol.	Basic	Tol.	Internal	External
2	2	2	-	2.2	+0.20 -0.00	4.8	+0.00 -0.30	0.3	±0.025	7	8
2.3	2.3	2.3	-	2.5		5.3		0.3		7	8
2.5	2.5	2.5(2.6)	-	2.7		5.7		0.3		7	8
3	3	3	-	3.2		6.5	+0.00 -0.40	0.45	±0.035	7	8
3.5	3.5	3.5	-	3.7		7.5		0.45		8	8
4	4	4	-	4.3		8.5		0.45		8	8
4.5	4.5	4.5	-	4.8		9.5		0.5		8	8
5	5	5	-	5.3		10	+0.00 -0.50	0.6	±0.04	8	10
6	6	6	-	6.4		11		0.6		9	12
7	-	7	-	7.4		13		0.8	±0.05	10	-
8	8	8	-	8.4	15	0.8		9		12	
3/8"	3/8"	-	3/8"	9.8	17.5	0.9		9		12	
10	10	10	-	10.5	+0.40 -0.00	18	+0.00 -0.60	0.9	±0.055	9	12
7/16"	7/16"	-	7/16"	11.4		19.5		0.9		10	12
12	12	12	-	12.5		21		1	10	12	
1/2"	1/2"	-	1/2"	13		22.5		1	10	12	
14	14	14	-	14.5		23		1	10	12	
16	16	16	5/8"	16.5		26		1.2	12	14	
18	18	18	-	19	+0.50 -0.00	29	+0.00 -0.80	1.2	±0.065	12	14
3/4"	3/4"	-	3/4"	19.6		32		1.2		12	14
20	20	20	-	21		32		1.4	±0.07	12	14
22	22	22	7/8"	23		35		1.4		14	16
24	24	24	-	25		38		1.6		14	16
1"	1"	-	1"	26	41	1.6	±0.08	14	16		

- Material=carbon steel
- Hardness=HRC40~50
- Finish=Black phosphate coating (ACP). Zinc plating,Chromate dipping.
- ※ marks are according to our company's specification

Countersunk type

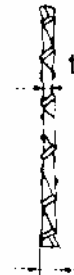
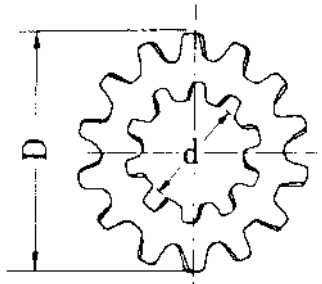


Unit:mm

CW		screw size	WASHER						
			d		D	e	t		Number of teeth
Size-No.		Bas.	Tol.	approx.	Max.	Bas.	Tol.		
CW-	3.0	3.0	3.2	+0.2 -0.0	6	1.8	0.4	±0.03	8
	3.5	3.5	3.7		7	2.1			
	4.0	4.0	4.3		8	2.5			
	4.5	4.5	4.8	+0.3 -0.0	9	2.7	0.5	±0.035	9
	5.0	5.0	5.3		10	3.1			
	6.0	6.0	6.4		12	3.8			0.6
	8.0	8.0	8.4	16	5.1	12			

- Material=carbon steel
- Hardness=HRC40~50
- Finish=Black phosphate coating (ACP). Zinc plating,Chromate dipping.

External-Internal type

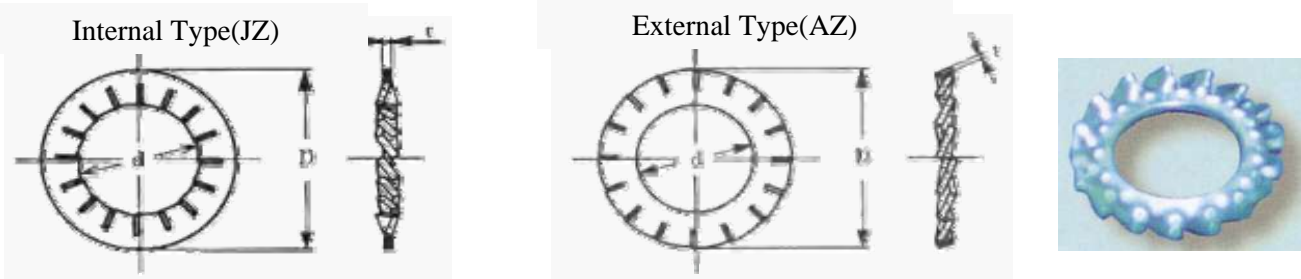


Approx. 2t

Unit:mm

ABW		screw size		WASHER						
				d		D	t		Number of teeth	
Size-No.	mm	inch	Bas.	Tol.	approx.	Bas.	Tol.	Internal	External	
ABW-	4.0	4.0		4.3	+0.2 -0.0	15.0	0.6	±0.04	8	12
	4.5	4.5		4.8						
	5.0	5.0		5.3						
	5.5	5.5		5.8	+0.3 -0.0	17.5	0.8	±0.05	9	
	6.0	6.0		6.4						
	8.0	8.0		8.4						
	3/8		3/8	9.8	+0.3 -0.0	26.0	1.0	±0.055	10	14
	10.0	10.0		10.5						
	7/16		7/16	11.4						
	12.0	12.0		12.5						
	1/2		1/2	13						
	14.0	14.0		14.5						
	16.0	16.0		16.5		35.0	1.4	±0.07	12	16

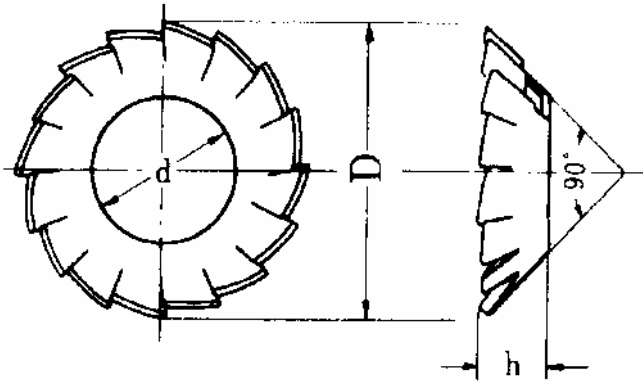
- Material=carbon steel
- Hardness=HRC40~50
- Finish=Black phosphate coating (ACP). Zinc plating,Chromate dipping.



Unit:mm

Nominal Size		Screw Size		d		D		t		Teeth Number	
JZ	AZ	mm	Inch	Basic	Tol.	Basic	Tol.	Basic	Tol.	Internal	External
3	3	3		3.05	+0.30 -0.00	6	±0.25	0.4	±0.03	8	10
4	4	4	5/32	4.1		8	±0.30	0.5		8	12
5	5	5		5.1		9.2		0.6		8	12
6	6	6		6.1	+0.36 -0.00	11	±0.35	0.7	±0.04	10	12
8	8	8	5/16"	8.2		14		0.8		12	14
10	10	10		10.2	+0.43 -0.00	18		±0.42		0.9	±0.04
12	12	12		12.3		20	1		14	18	
14	14	14		14.3		24	1.1		16	20	
16	16	16	5/8"	16.3	+0.52 -0.00	26	±0.50	1.2	±0.05	16	20
18	18	18		18.5		30		1.4		16	20
20	20	20		20.5		32.5		1.4		16	22
22	22	22	7/8"	22.5	+0.52 -0.00	35	±0.50	1.5	±0.05	18	22
24	24	24		24.5		38		1.5		20	24

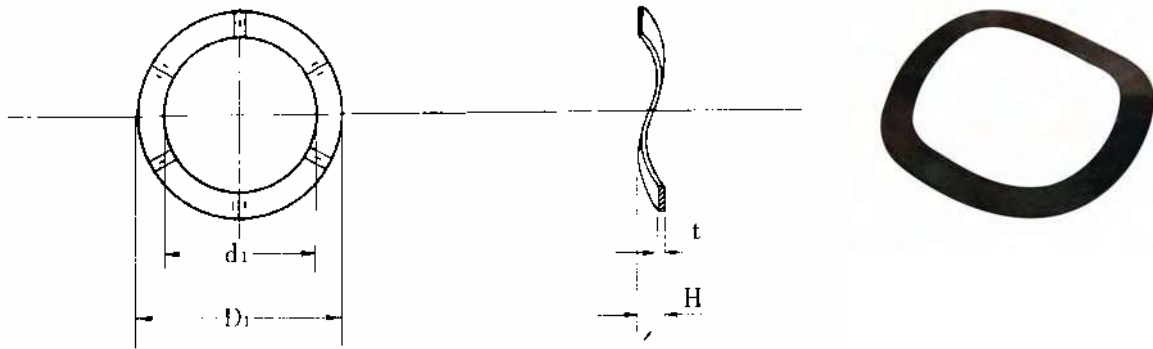
- Material=carbon steel
- Hardness=HRC40~50
- Finish=Black phosphate coating (ACP). Zinc plating,Chromate dipping.



Unit:mm

AZV	screw size		Washer								
			d		D		h	t		Number of teeth	
	Size-No.	mm	inch	Bas.	Tol.	Bas.		Tol.	Bas.		Tol.
AZV-	3.0	3.0		3.1	±0.30	6.0	±0.24	1.7	0.2	±0.02	12
	4.0	4.0	5/32	4.2		8.0	±0.29	2.2	0.3		14
	5.0	5.0		5.2	10.0		2.5	0.3	14		
	6.0	6.0		6.3	±0.36	12.0	±0.35	3.2	0.3		16

- Material=carbon steel
- Hardness=HRC40~50
- Finish=Black phosphate coating (ACP). Zinc plating,Chromate dipping.

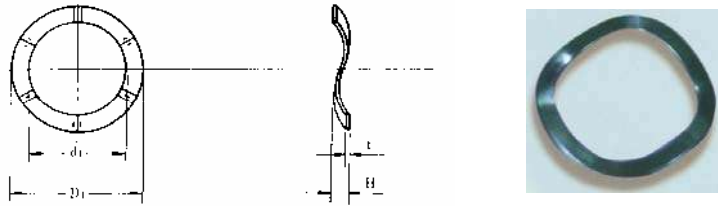


Unit:mm

WW		d1		D1		H		t	
Nominal Size	Basic	Tol.	Basic	Tol.	Basic	Tol.	Basic	Tol.	
4	4.3	+0.30 -0.15	8.0	+0.0 -0.5	1.5	+0.5 -0.0	0.2	±0.025	
5	5.4		9.0		1.5				
6	6.4		11.0		1.5				
8	8.5		12.5		2.0				
10	10.5		14.5		2.0				
12	12.5		17.0		2.5	+0.7 -0.0			
14	14.5		20.0		2.5				
16	16.7		22.5		2.5				
18	18.7		26.0		3.0				
20	20.7		29.1		3.0				
23	23.5	+0.50 -0.30	31.0	+0.0 -0.8	3.5	+1.0 -0.0	0.3		
26	26.4		34.2		3.5				
30	30.4		39.3		3.5				
32	33.8		46.0		4.5				
38	39.0	+0.70 -0.50	51.0	+0.0 -1.2	5.0		0.3		
40	40.6		53.5		5.0		0.3		
46	47.5		61.0		5.5		0.4	±0.03	

- Material=carbon steel.
- Hardness=HRC40~50.
- Finish=Black phosphate coating (ACP), Zinc plating,Chromate dipping.
- Free height H shows when 3 waves are at the same height.
- Internal diameter d1 shows inscribed circle and outer diameter D1 shows circumscribed circle.
- ※ marks are according to our company's specification.

BWW Wave Washers (For bearing use)



Unit:mm

BWW		Bearing dia.	d1	D1	H	t	Applicable bearing No				
Nominal size											
	624	13	8.2	12.2	1.9	0.15	695		624	633	
	625	16	12.0	15.0	2.1	0.15			625	634	
	626	19	12.7	18.1	2.5	0.20	698	607	626	635	
	608	22	14.5	21.0	2.4	0.20	6900	608	627	636	
	629	26	19.8	24.9	3.5	0.20		6000	629	637	
	6001	28	22.6	26.6	3.0	0.25	6902	6001		638	
	6200	30	21.0	29.1	3.2	0.25	6903		6200	639	
	6201	32	23.1	31.4	3.0	0.25		6002	6201		
	6202	35	25.6	33.8	3.5	0.30		6003	6202	6300	
	6203	40	30.3	38.6	4.0	0.30			6203		
	6302	42	30.1	40.6	4.5	0.30	6905	6004		6302	
	6303	47	34.0	45.8	4.0	0.30	6906	6005	6204	6303	
	6304	52	40.8	50.3	5.5	0.30			6205	6304	
	6305	62	47.5	60.5	6.8	0.40	6908	6007	6206	6305	6403
	6306	72	54.0	70.2	7.0	0.45	6910		6207	6306	6404
	6307	80	61.0	78.5	7.0	0.45	6911	6010	6208	6307	6405
	6308	90	69.3	89.5	7.0	0.60	6913	6011	6210	6308	6406
	6309	100	73.0	100.0	8.0	0.70	6914	6013	6211	6309	6407
	6310	110	88.9	108.9	8.0	0.80	6916	6014	6212	6310	6408
	6311	120	95.8	118.9	8.5	0.80	6917		6213	6311	6409
	6312	130	108.3	128.3	11.0	0.80	6919	6017	6215	6312	6410
	6313	140	112.4	138.4	11.0	0.80	6920	6018	6216	6313	6411

- Material=carbon steel. ● Hardness=HRC40~50. ● Finish=Black phosphate coating (ACP), Zinc plating,Chromate dipping.
- Free height H shows when 3 waves are at the same height. ● ※ marks are according to our company's specification.
- Internal diameter d1 shows inscribed circle and outer diameter D1 shows circumscribed circle.

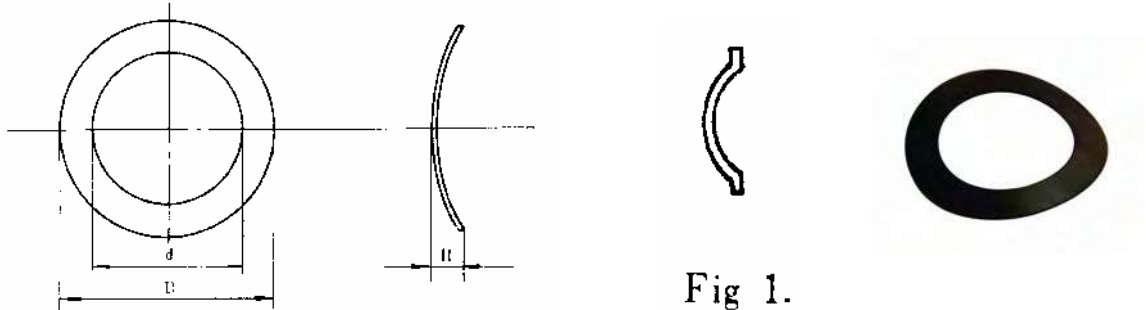
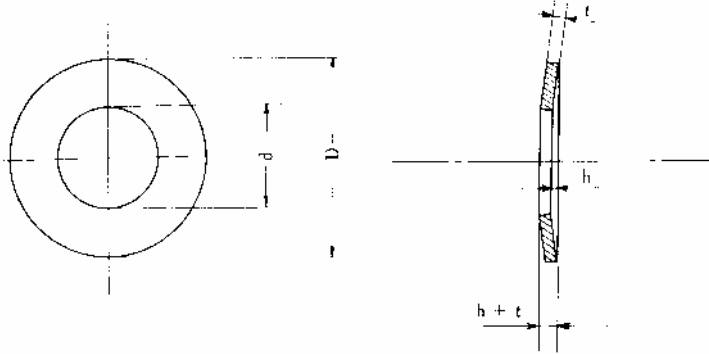


Fig 1.

Unit:mm

MB		d	D		H		t	Remarks		
Nominal Size	Basic	Tol.	Basic	Tol.	Basic	Tol.		Material	Special Design	
1711	1.7	+0.2 -0.1	3.7	±0.2	0.6	±0.2	0.1	PBS		
3212	3.2		6.5		1		0.15	SUS		
4001	4.1		10		1.3		0.2			
4201	4.2		10		1.2		0.25			
4301	4.3		6.8		1		0.15			
4302	4.3	±0.2	8	±0.2	1.2	±0.2	0.3			
5011	5		7.9		1.2		0.15			
5211	5.2		10		1.2		0.1	PBP		
5301	5.3		10		1.4		0.3			
6201	6.2		11		1.2		0.2			
6203	6.2		11		1.4		0.15			
6301	6.3		11		1.5		0.4			
6411	6.4		24		±0.3		2.5	0.4	SUS	
6511	6.5		9.8		±0.2		1.2	0.5	SUS	
6811	6.8		10.6		±0.2		1.8	0.15		
8302	8.5	±0.3	15	±0.3	2.3	±0.3	0.5			
8501	8.5		16		3		0.4			
12511	12.5		16.8		2.2		0.4			
14501	14.8		20		3		0.3			
15900	15.9		20		1.3		0.25			
※ 16601	16.6		25		2		0.3			Fig. 1

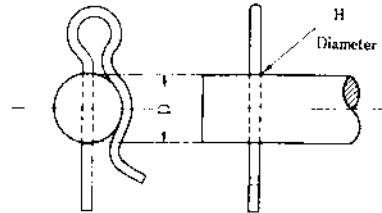
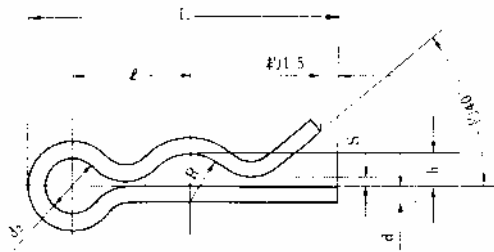
- Material=carbon steel,stainless steel.
- Hardness=HRC40~50.
- Finish=Black phosphate coating (ACP). Zinc plating,Chromate dipping.
- ※ marks are according to our company's specification



Unit:mm

DB	d		D		H (Heavy Duty)			L (Light Duty)						
	Bas.	Tol.	Bas.	Tol.	t	h	h+t	t	h	h+t				
Size-No.	Bas.	Tol.	Bas.	Tol.	Bas.	Tol.	App.	App.	Bas.	Tol.	App.	App.		
DB-	4	4.2	8	±0.3	0.4	±0.04	0.2	0.6	0.3	±0.03	0.25	0.55		
	5	5.2			10		0.5	0.25	0.75		0.4	0.3	0.7	
	6	6.2			12.5	0.7	±0.05	0.3	1		0.5	±0.04	0.35	0.85
	7	7.2			14	0.8		0.3	1.1		0.5		0.4	0.9
	8	8.2			16	0.9	±0.06	0.35	1.25		0.6	±0.05	0.45	1.05
	9	9.2	18	1	0.4	1.4		0.7	0.5	1.2				
	10	10.2	20	1	0.45	1.45		0.8	0.55	1.35				
	11	11.2	22.5	±0.4	1.2	±0.07	0.5	1.7	0.8	±0.06	0.65	1.45		
	12	12.2			25		1.5	0.55	2.05		0.9	0.7	1.6	
	14	14.2			28		1.5	0.65	2.15		1	0.8	1.8	
	16	16.3	31.5	±0.5	1.75	±0.08	0.7	2.45	1.2	±0.07	0.9	2.1		
	18	18.3			35.5		2	0.8	2.8		1.2	1	2.2	
	20	20.4			40		2	0.9	2.9		1.5	1.15	2.65	
	● 22	22.4			45	2.5	±0.10	1	3.5	1.75	±0.08	1.3	3.05	
	25	25.4			50	3	±0.12	1.1	4.1	2	1.4	3.4		
	● 28	28.5	56	3	1.3	4.3		2	1.6	3.6				
	30	31	63	±0.6	3.5	±0.15	1.4	4.9	2.5	±0.10	1.75	4.25		
	35	36			71		4	1.6	5.6		2.5	2	4.5	
	40	41			80		5	1.7	6.7		3	2.3	5.3	
	45	46	91	5	±0.12	2	7	3.5	±0.12	2.5	6			
● 50	51	±0.7	100	±0.7		6	2.2	8.2		3.5	2.8	6.3		

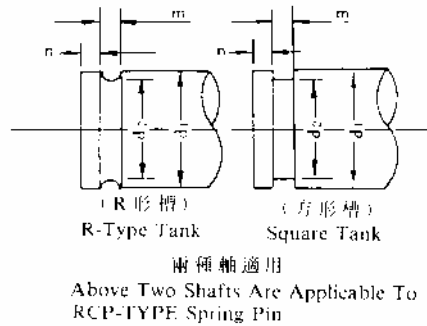
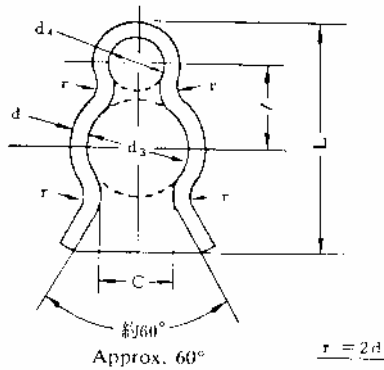
- Material=Carbon steel, Stainless steel.
- Hardness=HRC40~50.
- Finish=Black phosphate coating (ACP), Zn plating, Chromate dipping.



Unit:mm

SSP	SNAP-PIN								Adaptable Axis			
	d		d2	⌀	R	h	S	L	D	H		
Nominal Size	nominal	tol.	Approx.	Approx.	Approx.	Approx.	Max.	Approx.	Ref.	Ref.		
4	1.0	±0.02	3.0	6	2	1.0	0.5	16.3	4	1.2		
5				6.5	2.5	1.5		17.9	5			
6	1.2	±0.03	3.6	7.8	3	1.8	0.9	21.2	6	1.5		
8	1.6			10.4	4	2.4		0.8	27.7	8	1.9	
10	1.8			5.4	12.2	5		3.2	0.9	32.6	10	2.2
12				13.2	6	4.2		35.8		12		
14	2.0	±0.05	8.2	15	7	5.0	1.0	40.6	14	2.4		
16				16	8	6.0		43.8	16			
※ 18				18	9	8.9		49.0	18		2.4	
※ 20				20	10							
※ 22	22	11										
※ 24	24	12										

- Material=SWB or SWRH 57-82
- Hardness=HRC40~50. (When SWRH 57-82 are used)
- Finish=Black phosphate coating (ACP). Zinc plating,Chromate dipping.
- ※ marks are according to our company's specification

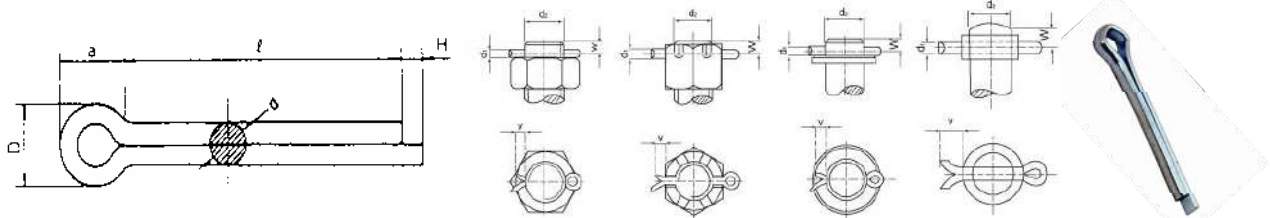


Unit:mm

RCP		Spring pin dimension							Applicable Shaft					
		d3		d		d4	C	L	d1	d2	m	n		
Size-No.		Bas.	Tol.	Bas.	Tol.	Aprox.	Aprox.	Max	Aprox.	Aprox.		Min		
RCP-	4	2.7		0.6	±0.02	1.4	2.9	1.9	7.8	4.0	3.2	0.8	1.5	
	5	3.6		0.7		1.8	3.8	2.5	10.1	5.0	4.1	0.9		
	6	4.4		0.8		2.2	4.5	3.1	12.0	6.0	4.9	1.0		
	7	5.4				2.7	5.3	3.8	14.1	7.0	5.9			
	8	6.3		0.9		3.2	6.1	4.4	16.3	8.0	6.8	1.1		
	9	7.3		1.0		3.7	6.8	5.1	18.2	9.0	7.8			
	10	7.7		±0.03	3.9	7.3	5.4	19.5	10.0	8.7	1.2			
	12	9.4			4.7	8.9	6.6	23.7	12.0	10.4	1.4			
	14	11.1			5.6	10.4	7.8	27.8	14.0	12.1	1.6			
	16	12.6		1.8	6.3	12.2	8.8	32.6	16.0	13.6	2.1	2.0		
	18	13.4		2.3	6.7	13.5	9.4	36.0	18.0	14.9	2.6	2.5		
	20	15.0		2.6	±0.04	7.5	15.2	10.5	40.5	20.0	16.5	1.9		3.0
	22	16.6		2.9		8.3	16.8	11.6	44.8	22.0	18.1	3.2		
	25	18.7		3.2		9.4	18.8	13.1	50.2	25.0	20.7	3.7		4.0
	28	21.7				10.9	21.1	15.2	56.3	28.0	23.7			
30	23.7		11.9		22.6	16.6	60.3	30.0	25.7					

- Material=SWC or SWRH6
- Hardness=HRC40~50. (When SWRH6 are used)
- Finish=Black phosphate coating (ACP). Zinc plating,Chromate dipping.

COT Cotter Pins
(JIS B 1351)

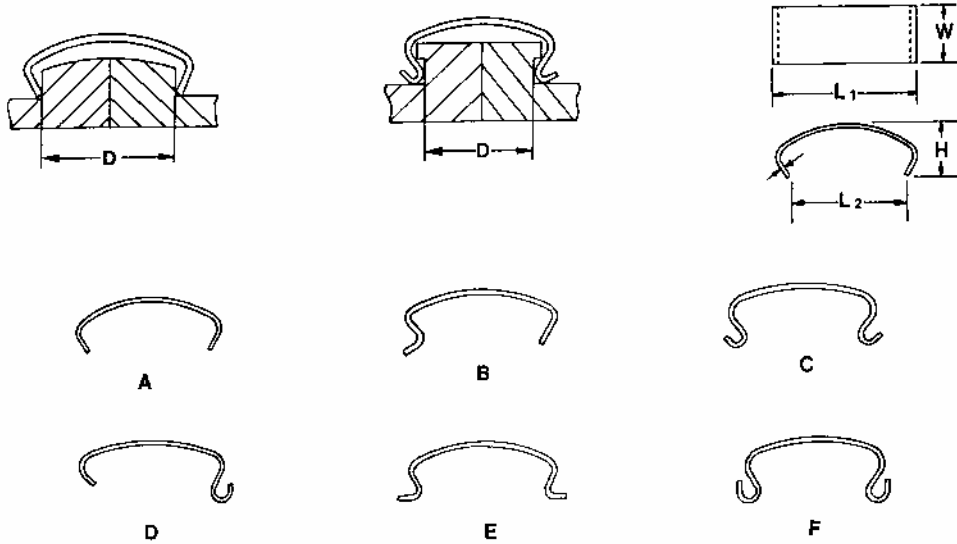


Unit:mm

COT		0.6	0.8	1	1.2	1.6	2	2.5	3.2	4	5	6.3	8	10	13		
d	Basic	0.5	0.7	0.9	1	1.4	1.8	2.3	2.9	3.7	4.6	5.9	7.5	9.5	12.4		
	Tol.	0 -0.1						0 -0.2									
D	Basic	1	1.4	1.8	2.0	2.8	3.6	4.6	5.8	7.4	9.2	11.8	15.0	19.0	24.8		
	tol.	0 -0.1	0 -0.2	0 -0.3	0 -0.4	0 -0.6	0 -0.7	0 -0.9	0 -1.2	0 -1.5	0 -1.9	0 -2.4	0 -3.1	0 -3.1	0 -3.1	0 -3.1	
b	~	2	2.4	3	3	3.2	4	5	6.4	8	10	13	16	20	26		
H	max.	1.6	1.6	1.6	2.5	2.5	2.5	2.5	3.2	4	4	4	4	6.3	6.3		
	min.	0.8	0.8	0.8	1.2	1.2	1.2	1.2	1.6	2	2	2	2	3.2	3.2		
Bolts	Ⅲ	-	2.5	3.5	4.5	5.5	7	9	11	14	20	27	39	56	80		
	Ⅳ	2.5	3.5	4.5	5.5	7	9	11	14	20	27	39	56	80	120		
Clevis Pin	Ⅲ	-	2	3	4	5	6	8	9	12	17	23	29	44	69		
	Ⅳ	2	3	4	5	6	8	9	12	17	23	29	44	69	110		
Pin hole	~	0.6	0.8	1	1.2	1.6	2	2.5	3.2	4	5	6.3	8	10	13		
l	4	±0.5															
	5																
	6																
	8																
	10		±0.5														
	12																
	14			±0.5													
	16				±0.5												
	18					±0.8											
	20						±0.8										
	22							±0.8									
	25								±0.8								
	28									±0.8							
	32										±0.8						
	36											±1.2					
	40												±1.2				
	45													±1.2			
	50														±1.2		
	56															±1.2	
	63																±1.2
71																	
80																	
90																	
100																	
112																	
125																	
140																	
160																	
180																	
200																	
224																	
250																	
280																	

- Material=SWC or SWRH6
- Hardness=HRC40~50. (When SWRH6 are used)
- Finish=Black phosphate coating (ACP). Zinc plating,Chromate dipping.

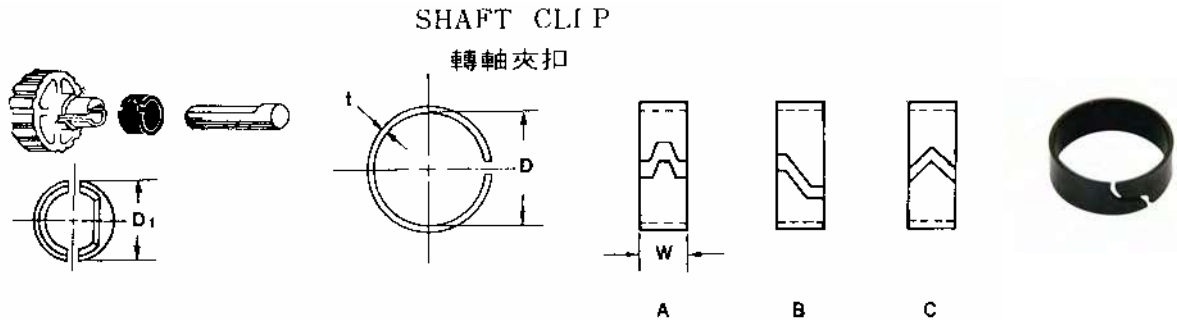
CASE CLIP
如意夾



Unit:mm

CCN		Clip				Stud dimension	
Size No		d	W	H	T	L1	L2
CCN-	08B	8.0	7.0	4.5	0.5	10.0	7.3
	12BX	12.0	10.0	5.5	0.5	14.6	11.0
	12BY	12.0	8.5	5.0	0.5	14.0	11.0
	12Ex	12.0	12.0	5.0	0.4	13.3	11.0
	13C	13.0	5.0	6.5	0.4	16.2	12.0
	17.5F	17.5	7.0	9.5	0.7	21.0	16.0
	18D	18.0	10.0	8.0	0.5	21.0	16.5
	20A	20.0	10.0	9.0	0.6	22.6	18.0

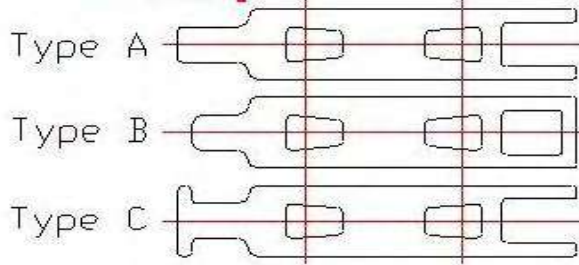
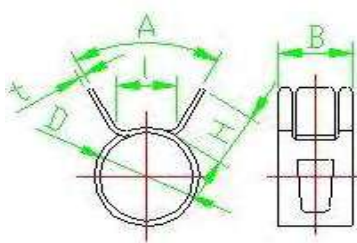
- Material=carbon steel
- Hardness=HRC40~50
- Finish=Black phosphate coating (ACP). Zinc plating,Chromate dipping.



Unit:mm

OCN		Clip		
Size No	d	W	T	
OCN-	6.5B	5.8	3.0	0.3
	9.3AX	8.1	4.8	0.5
	9.3AY	8.1	0.5	0.5
	9.3AZ	8.2	6.4	0.3
	10AX	8.4	5.0	0.4
	10AY	8.4	5.0	0.5
	11A	9.7	4.8	0.4
	12A	10.8	6.4	0.6
	13.5A	11.9	4.8	0.5
	14C	12.2	4.0	0.5
	17.5AX	15.2	6.4	0.5
	17.5AY	15.2	6.4	0.5
	18C	15.7	4.0	0.5

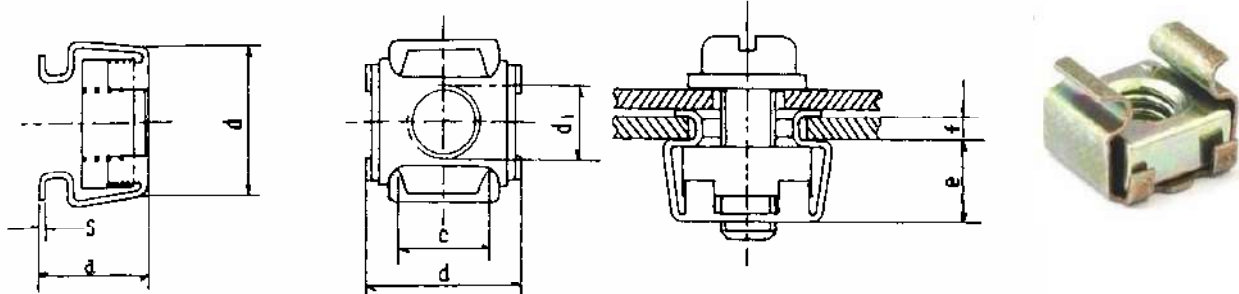
- Material=carbon steel
- Hardness=HRC40~50
- Finish=Black phosphate coating (ACP). Zinc plating,Chromate dipping.



Unit:mm

HS	Nominal Diameter	D		Max. ID	t	B	H	L	α	Finish		material	Hardness	Ref. Assy OD	
		Bas.	Tol.							Code	Type			Hv	Min.
HS-	660158	6.8	6.8	8.3	0.4	6.0	6.0	3.0	85	C	B	SK5M SK5-CSP S60C-CSP	420~450	7.5	8.3
	660231									ZC					
	660159	7.8	7.8	9.5	0.6	5.0	5.3	60	C	A	8.5			9.5	
	660232								ZC		9.4			10.6	
	660160	9.4	9.4	10.6	0.7	5.0	3.9	60	C	B	10.2			11.3	
	660234								ZC		11.1			12.2	
	660169	11.0	11.0	12.2	0.6	6.0	6.3	60	C	B	11.1			12.2	
	660162								D		12.0			13.0	
	660236	11.6	11.6	13.0	0.7	5.0	4.5	60	ZC	A	12.5			13.6	
	660163								C		12.0			13.0	
	660237	12.0	12.0	13.6	0.8	6.0	6.0	65	ZC	B	13.0			14.2	
	660177								C		13.5			15.0	
	660175	12.5	12.5	15.0	0.8	6.0	7.0	65	C	B	13.5			15.0	
	660164								D		14.0			15.5	
	660240	13.1	13.1	15.5	0.9	12.0	5.8	50	ZC	A	14.0			15.5	
	660167								B		15.0			17.0	
	660180	13.8	13.8	16.5	0.9	10.0	5.0	8.0	C	A	15.0			17.0	
	660241								ZC		16.0			17.7	
	660165	14.8	14.8	17.7	1.0	10.0	7.5	60	C	B	16.0			17.7	
	660178								B		17.0			18.2	
	660242	15.5	15.5	18.2	1.0	12.0	8.9	11.0	ZC	B	17.0			18.2	
	660166								C		19.0			21.8	
	660243	17.8	17.8	21.8	0.3	12.0	7.0	11.3	73	B	19.0			21.8	
	660168								C		20.0			22.0	
	660176	18.5	18.5	22.0	0.9	10.0	8.0	14.4	C	A	20.0			22.0	
	660173								ZC		21.3			24.0	
	660174	19.8	19.8	24.0	1.0	10.0	11.8	13.8	90	C	21.3			24.0	
	660246								50		23.0			26.0	
	660171	20.8	20.8	26.0	0.3	12.0	8.0	15.6	92	B	23.0			26.0	
	660172								C		25.0			28.0	
660248	23.0	23.0	28.0	1.2	12.0	9.0	14.5	60	A	25.0	28.0				
660170								ZC		28.0	32.0				
660249	26.0	26.0	32.0	1.4	15.0	10.0	17.0	60	B	28.0	32.0				
660220								ZC		18.6	19.9				
660221	17.0	17.0	20.2	0.9	12.0	8.0	11.3	80	B	18.6	19.9				
660222								ZC		21.0	23.0				
660224	19.7	19.7	23.0	1.2	15.0	9.6	9.6	60	P	21.0	23.0				
660256								ZC		23.5	26.0				
660224	21.7	21.7	26.0	0.3	15.0	9.0	12.7	67	B	23.5	26.0				
660224								P		28.5	31.5				
660257	26.2	26.2	31.5	0.4	15.0	10.0	15.9	69	ZC	28.5	31.5				
660257								ZC							

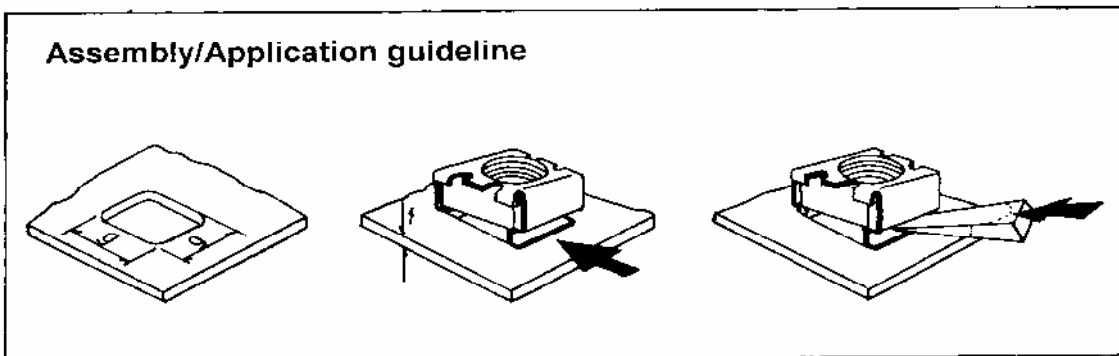
- Material: SK5 / S60C / Carbon Steel / Spring steel
- Hardness: Hv 420~550
- Finish: Black phosphate coating / Zn plating / Chromate dipping
- Size: According to industries standards or by special order



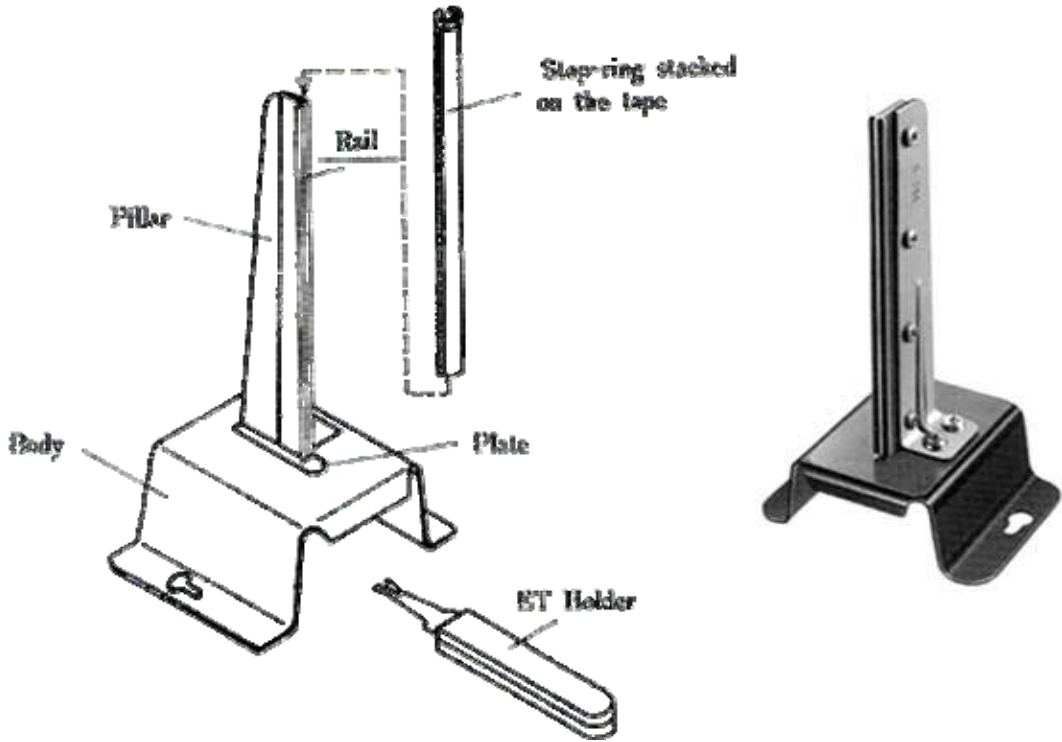
Unit:mm

CNUT		Cage Nut									
Size No	Type	A	B	C	D	E	F	G	H	T	
CNUT	M5	L	13.0	13.3	6.1	9.0	8.2	11.0	4.5	3.1	0.4
	M5	H	13.0	13.3		10.0					
	M6	L	13.0	13.3		9.0					
	M6	H	13.0	13.3		10.0					
	M8	L	15.7	15.7	8.1	11.0	10.6	14.0	5.5	3.0	0.5
	M8	H	15.7	15.7		11.5					
	M10	L	15.7	15.7		11.0					
	M10	H	15.7	15.7		11.5					

- Material=carbon steel
- Hardness=HRC40~50
- Finish=Black phosphate coating (ACP). Zinc plating,Chromate dipping.



ET STAND (For 200pcs stack)



Adaptabe E type stop-unit				E-STACK	ET Holder	ET Stand
ETS	Inside diameter	Outside diameter	Plate thickness	Size No.	Size No.	Size No.
ETS-2	2	5	0.4	2	2	2
2.5	2.5	6	0.4	2.5	2.5	2.5
3	3	7	0.6	3	3	3
4	4	9	0.6	4	4	4
5	5	11	0.6	5	5	5
6	6	12	0.8	6	6	6
7	7	14	0.8	7	7	7
8	8	16	0.8	8	8	8
9	9	18	0.8	9	9	9
10	10	20	1	10	10	10
12	12	23	1	12	12	12