

schrodoco

FOR THAT SPECIALISED FASTENER...

CIRCLIPS and E'RINGS
Black and Stainless Steel



**STARLOCK
PUSH-ON
FIXING
WASHERS**



SPRING PINS
METRIC AND IMPERIAL
Black and Zinc Plated



**CAPTIVE NUTS, PUSH ON FIXES,
FLAT NUTS and CAGED NUTS**



Disc Spring Washers

Plain Wire Rings

Insert Nuts

Toolclips

Hammer Drive Screws

Tee Nuts

Free Phone 0800 SCREWS
(0800 727 397)

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CIRCLIPS & E'RINGS



MATERIAL: Carbon Spring Steel E.N.42.

STANDARD FINISH: Phosphated and Oil

Heat treated in accordance with International Specifications.

Plated to customer's requirements – finish coatings may increase the specified thickness.

Also available in PHOSPHOR BRONZE B.5.407/2 and STAINLESS STEEL Grade DIN1.4122.

Variations are available to the basic types as follows:

Beveled types to take up end play

Bowed types to take up end play

Heavy Duty and special thickness

Spring Rings to customer's own design.



EXTERNAL CIRCLIPS

Shaft sizes from 3mm to 220mm and 5/32" to 5.38"

Available ex stock in Spring Steel

Shaft sizes 7mm to 70mm

Available ex stock in Stainless Steel



INTERNAL CIRCLIPS

Shaft sizes from 8MM TO 290MM AND 3/8" TO 7.7/8".

Available ex stock in Spring Steel

Shaft sizes 13mm to 60mm

Available ex stock in Stainless Steel



E'RINGS

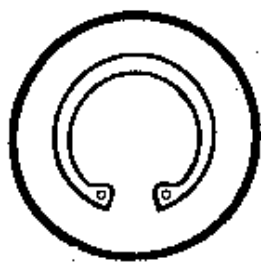
Groove dimensions from 0.8mm to 30mm and .052" to .940"

Available ex stock in Spring Steel

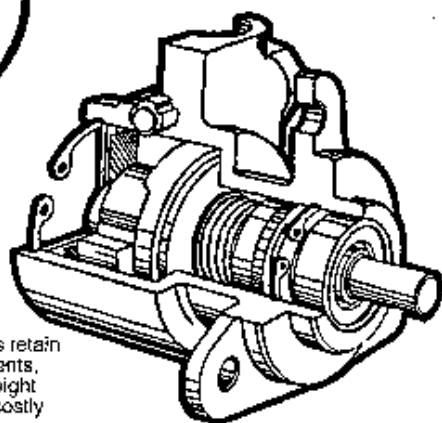
Some sizes ex stock in Stainless Steel

THE TYPES SHOWN ON THIS PAGE ARE CARRIED EX STOCK AND APPEAR IN DETAIL ON THE FOLLOWING PAGES. THERE ARE A NUMBER OF OTHER CIRCLIP DESIGNS AVAILABLE EX FACTORY IN THE UK AND WE LIST THESE AT THE REAR OF THIS SECTION. FULL SPECIFICATIONS ARE AVAILABLE FROM US ON REQUEST.

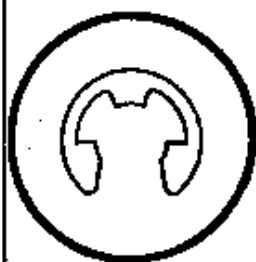
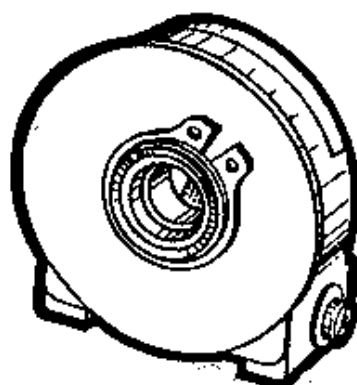
APPLICATIONS



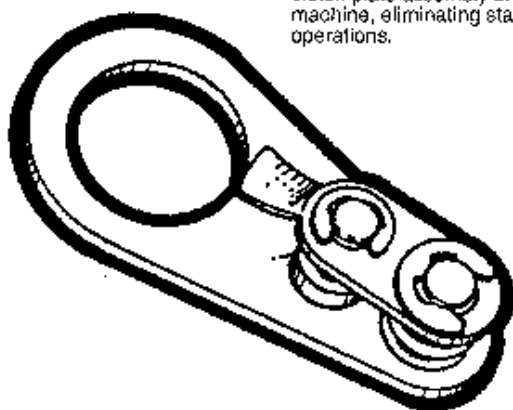
BASIC INTERNAL Rings retain pressure pump components, replacing two castings, eight screws and eliminating costly machining operations.



BASIC EXTERNAL Ring retains collector disc assembly in electric motor governor, eliminating riveting and allowing disassembly for maintenance.



E-RING. Securing spring coils in clutch plate assembly at dictating machine, eliminating staking operations.

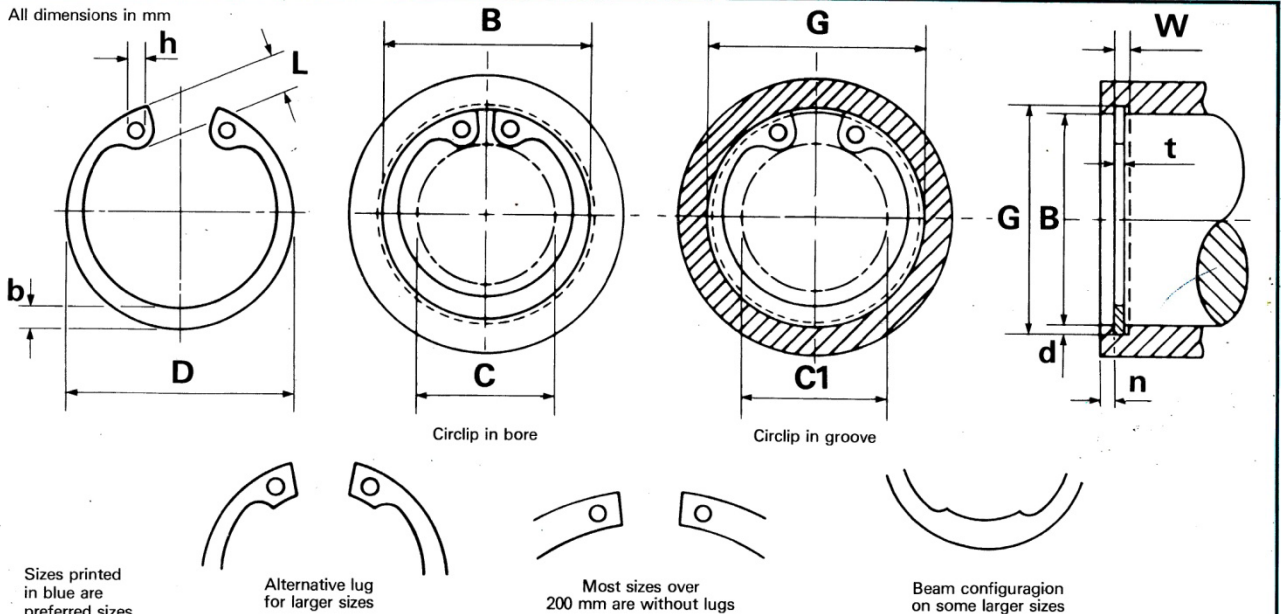


STANDARD INTERNAL CIRCLIPS EUROPEAN SPECIFICATIONS

D1300 INCORPORATING DIN 472 & BS3673 Pt.4



All dimensions in mm



Sizes printed in blue are preferred sizes

Alternative lug for larger sizes

Most sizes over 200 mm are without lugs

Beam configuration on some larger sizes

† Thrust load calculations see pages 9 & 10

SIZE CODE	Bore		Groove (G)						Circlip (F)										Wt. (kg/k)	Tc† (N)	Tg† (N)
	B	G	Tol.	W	Tol.	n (min)	d ~	t	Tol.	D	Tol.	C	C1	L (max)	b ~	h (min)					
0080	8	8.4	+0.09 -0.00	0.90		0.6	0.2	0.80	+0.00	8.7	+0.36 -0.10	3.0	3.6	2.4	1.1	1.0	0.11	6200	600		
0090	9	9.4		0.90		0.6	0.2	0.80	-0.05	9.8		3.7	4.4	2.5	1.3	1.0	0.17	7000	680		
0095	9.5	9.9		1.10		0.6	0.2	1.00		10.3		3.2	3.9	3.0	1.3	1.2	0.22	9300	720		
0100	10	10.4		1.10		0.6	0.2	1.00		10.8		3.3	4.0	3.2	1.4	1.2	0.24	9700	750		
0110	11	11.4		1.10		0.6	0.2	1.00		11.8		4.1	4.8	3.3	1.5	1.2	0.30	10700	830		
0120	12	12.5	+0.11 -0.00	1.10		0.8	0.3	1.00		13.0	+0.42 -0.13	4.9	5.7	3.4	1.7	1.5	0.34	11700	1130		
0130	13	13.6		1.10		0.9	0.3	1.00		14.1		5.4	6.4	3.6	1.8	1.5	0.39	12700	1470		
0140	14	14.6		1.10		0.9	0.3	1.00		15.1		6.2	7.2	3.7	1.9	1.7	0.45	13600	1580		
0150	15	15.7		1.10		1.1	0.4	1.00		16.2		7.2	8.3	3.7	2.0	1.7	0.48	14600	1980		
0160	16	16.8		1.10		1.2	0.4	1.00		17.3		8.0	9.2	3.8	2.0	1.7	0.54	15600	2410		
0170	17	17.8	+0.13 -0.00	1.10		1.2	0.4	1.00		18.3	+0.42 -0.13	8.8	10.0	3.9	2.1	1.7	0.59	16600	2560		
0180	18	19.0		1.10		1.5	0.5	1.00		19.5		9.4	10.8	4.1	2.2	2.0	0.61	17500	3390		
0190	19	20.0		1.10		1.5	0.5	1.00		20.5		10.4	11.8	4.1	2.2	2.0	0.72	18500	3580		
0200	20	21.0		1.10		1.5	0.5	1.00		21.5		11.2	12.6	4.2	2.3	2.0	0.75	19500	3770		
0210	21	22.0		1.10		1.5	0.5	1.00		22.5		12.2	13.6	4.2	2.4	2.0	0.84	20400	3960		
0220	22	23.0	+0.21 -0.00	1.10		1.5	0.5	1.00	+0.00 -0.06	23.5	+0.42 -0.21	13.2	14.6	4.2	2.5	2.0	0.86	21400	4150		
0230	23	24.1		1.30		1.7	0.6	1.20		24.6		14.2	15.7	4.2	2.5	2.0	1.20	26900	4770		
0240	24	25.2		1.30		1.8	0.6	1.20		25.9		14.8	16.4	4.4	2.6	2.0	1.21	28000	5430		
0250	25	26.2		1.30		1.8	0.6	1.20		26.9		15.5	17.2	4.5	2.7	2.0	1.33	29200	5650		
0260	26	27.2		1.30		1.8	0.6	1.20		27.9		16.1	17.8	4.7	2.8	2.0	1.35	30400	5880		
0270	27	28.4		1.30	+0.14 -0.00	2.1	0.7	1.20		29.1		17.1	19.0	4.7	2.9	2.0	1.55	31600	7130		
0280	28	29.4		1.30		2.1	0.7	1.20		30.1		17.9	19.8	4.8	2.9	2.0	1.64	32700	7390		
0290	29	30.4		1.30		2.1	0.7	1.20		31.1		18.9	20.8	4.8	3.0	2.0	1.74	33900	7650		
0300	30	31.4		1.30		2.1	0.7	1.20		32.1		19.9	21.8	4.8	3.0	2.0	1.87	35100	7920		
0310	31	32.7		1.30		2.6	0.9	1.20		33.4		20.0	22.3	5.2	3.2	2.5	2.20	36200	9930		
0320	32	33.7	+0.25 -0.00	1.30		2.6	0.9	1.20	+0.50 -0.25	34.4	+0.90 -0.39	20.6	22.9	5.4	3.2	2.5	1.98	37400	10300		
0330	33	34.7		1.30		2.6	0.9	1.20		35.5		21.6	23.9	5.4	3.3	2.5	2.13	38800	10600		
0340	34	35.7		1.60		2.6	0.9	1.50		36.5		22.6	24.9	5.4	3.3	2.5	2.88	49700	10900		
0350	35	37.0		1.60		3.0	1.0	1.50		37.8		23.6	26.2	5.4	3.4	2.5	2.93	51100	13200		
0360	36	38.0		1.60		3.0	1.0	1.50		38.8		24.6	27.2	5.4	4.0	2.5	3.23	52600	13600		
0370	37	39.0	+0.30 -0.00	1.60		3.0	1.0	1.50	+0.00 -0.07	39.8	+1.10 -0.46	25.4	28.0	5.5	3.2	2.5	2.98	54100	13900		
0380	38	40.0		1.60		3.0	1.0	1.50		40.8		26.4	29.0	5.5	3.7	2.5	3.54	55500	14300		
0400	40	42.5		1.85		3.8	1.3	1.75		43.5		27.8	30.9	5.8	3.9	2.5	4.63	56600	18800		
0410	41	43.5		1.85		3.8	1.3	1.75		44.5		28.6	31.7	5.9	4.0	2.5	5.37	58000	19300		
0420	42	44.5		1.85		3.8	1.3	1.75		45.5		29.6	32.7	5.9	4.1	2.5	5.21	59500	19800		
0450	45	47.5		1.85		3.8	1.3	1.75		48.5		32.0	35.1	6.2	4.3	2.5	5.88	63700	21200		
0470	47	49.5		1.85		3.8	1.3	1.75		50.5		33.5	36.7	6.4	4.4	2.5	6.13	66500	22100		
0480	48	50.5		1.85		3.8	1.3	1.75		51.5		34.5	37.7	6.4	4.5	2.5	6.31	68000	22600		
0500	50	53.0		2.15		4.5	1.5	2.00		54.2		36.3	40.0	6.5	4.6	2.5	8.01	80900	28300		
0510	51	54.0		2.15		4.5	1.5	2.00		55.2		37.3	41.0	6.5	4.7	2.5	8.72	82500	28800		
0520	52	55.0	+0.30 -0.00	2.15		4.5	1.5	2.00	+0.00 -0.07	56.2	+1.10 -0.46	37.9	41.6	6.7	4.7	2.5	8.91	84100	29400		
0550	55	58.0		2.15		4.5	1.5	2.00		59.2		40.7	44.4	6.8	5.0	2.5	9.44	89000	31100		
0560	56	59.0		2.15		4.5	1.5	2.00		60.2		41.7	45.4	6.8	5.1	2.5	9.75	90600	31700		
0570	57	60.0		2.15		4.5	1.5	2.00		62.2		42.7	46.4	6.8	5.1	2.5	9.56	92200	32200		
0580	58	61.0		2.15		4.5	1.5	2.00		62.2		43.5	47.2	6.9	5.2	2.5	10.36	93800	32800		
0600	60	63.0		2.15		4.5	1.5	2.00		64.2		44.7	48.4	7.3	5.4	2.5	11.15	97100	33900		
0620	62	65.0		2.15		4.5	1.5	2.00		66.2		46.7	50.4	7.3	5.5	2.5	11.59	100000	35100		
0630	63	66.0		2.15		4.5	1.5	2.00		67.2		47.7	51.4	7.3	5.6	2.5	11.78	102000	35600		
0640	64	67.0		2.15		4.5	1.5	2.00		68.2		48.7	52.4	7.3	5.2	2.5	16.80	104000	36200		
0650	65	68.0		2.65		4.5	1.5	2.50		69.2		49.0	52.8	7.6	5.8	3.0	17.71	131000	36800		

Standard material - carbon spring steel. Standard finish - phosphate and oil.

D1300 (continued)



SIZE CODE	Bore		Groove (G)						Circlip (F)										Wt. (kg/k)	Tc† (N)	Tg† (N)
	B	G	Tol.	W	Tol.	n (min)	d ~	t	Tol.	D	Tol.	C	C1	L (max)	b ~	h (min)					
0670	67	70.0	+ 0.30 - 0.00	2.65	+ 0.14 - 0.00	4.5	1.5	2.50	+ 0.00 - 0.07	72.5	+ 1.10 - 0.46	50.8	54.6	7.7	6.0	3.0	17.71	136000	37900		
0680	68	71.0		2.65		4.5	1.5	2.50		72.5		51.6	55.4	7.8	6.1	3.0	17.72	138000	38500		
0700	70	73.0		2.65		4.5	1.5	2.50		74.5		53.6	57.4	7.8	6.2	3.0	17.65	142000	39600		
0720	72	75.0		2.65		4.5	1.5	2.50		76.5		55.6	59.4	7.8	6.4	3.0	19.70	146000	40700		
0750	75	78.0		2.65		4.5	1.5	2.50		79.5		58.6	62.4	7.8	6.6	3.0	20.62	152000	42400		
0760	76	79.0		2.65		4.5	1.5	2.50		80.7		59.6	63.4	7.8	6.1	3.0	22.68	154000	43000		
0780	78	81.0		2.65		4.5	1.5	2.50		82.5		60.1	64.0	8.5	6.8	3.0	22.46	158000	44100		
0800	80	83.5		2.65		5.3	1.8	2.50		85.5		62.1	66.5	8.5	7.0	3.0	21.38	162000	52800		
0820	82	85.5		2.65		5.3	1.8	2.50		87.5		64.1	68.5	8.5	6.2	3.0	22.27	166000	54100		
0850	85	88.5		3.15		5.3	1.8	3.00		90.5		66.9	71.3	8.6	7.2	3.5	31.78	206000	56100		
0880	88	91.5	+ 0.35 - 0.00	3.15		5.3	1.8	3.00	+ 0.00 - 0.08	93.5	+ 1.30 - 0.54	69.9	74.3	8.6	7.4	3.5	32.94	214000	58100		
0900	90	93.5		3.15		5.3	1.8	3.00		95.5		71.9	76.3	8.6	7.6	3.5	33.35	218000	59400		
0920	92	95.5		3.15		5.3	1.8	3.00		97.5		73.7	78.1	8.7	7.8	3.5	35.72	223000	60700		
0950	95	98.5		3.15		5.3	1.8	3.00		100.5		76.5	80.9	8.8	8.1	3.5	38.88	231000	62700		
0980	98	101.5		3.15		5.3	1.8	3.00		103.5		79.0	83.5	9.0	8.3	3.5	42.16	238000	64700		
1000	100	103.5	+ 0.54 - 0.00	3.15		5.3	1.8	3.00		105.5		80.6	85.1	9.2	8.4	3.5	43.41	243000	66000		
1020	102	106.0		4.15		6.0	2.0	4.00		108.0		82.0	87.0	9.5	8.5	3.5	55.20	330000	76900		
1050	105	109.0		4.15		6.0	2.0	4.00		112.0		85.0	90.0	9.5	8.7	3.5	59.20	340000	79200		
1080	108	112.0		4.15		6.0	2.0	4.00		115.0		88.0	93.0	9.5	8.9	3.5	62.60	350000	81400		
1100	110	114.0		4.15		6.0	2.0	4.00		117.0		88.2	93.2	10.4	9.0	3.5	71.75	356000	82900		
1120	112	116.0		4.15		6.0	2.0	4.00		119.0		90.0	95.0	10.5	9.1	3.5	70.68	362000	84400		
1150	115	119.0		4.15		6.0	2.0	4.00		122.0		93.0	98.0	10.5	9.3	3.5	73.16	372000	86700		
1200	120	124.0		4.15		6.0	2.0	4.00		127.0		96.9	102.0	11.0	9.7	3.5	80.40	388000	90500		
1250	125	129.0		4.15		6.0	2.0	4.00		132.0		101.9	107.0	11.0	10.0	4.0	81.20	405000	94300		
1270	127	131.0		4.15		6.0	2.0	4.00		135.0		103.9	109.0	11.0	10.0	4.0	80.80	411000	95800		
1300	130	134.0	+ 0.63 - 0.00	4.15	+ 0.18 - 0.00	6.0	2.0	4.00	+ 0.00 - 0.10	137.0	+ 1.50 - 0.63	106.9	112.0	11.0	10.2	4.0	85.13	421000	98000		
1350	135	139.0		4.15		6.0	2.0	4.00		142.0		111.5	116.0	11.2	10.5	4.0	94.79	437000	102000		
1400	140	144.0		4.15		6.0	2.0	4.00		147.0		116.5	121.0	11.2	10.7	4.0	98.61	453000	106000		
1450	145	149.0		4.15		6.0	2.0	4.00		152.0		121.0	126.0	11.4	10.9	4.0	106.50	469000	109000		
1500	150	155.0		4.15		7.5	2.5	4.00		158.0		124.8	131.0	12.0	11.2	4.0	106.80	485000	141000		
1550	155	160.0		4.15		7.5	2.5	4.00		164.0		129.8	136.0	12.0	11.4	4.0	128.00	502000	146000		
1600	160	165.0		4.15		7.5	2.5	4.00		169.0		132.7	139.0	13.0	11.6	4.0	130.50	518000	151000		
1650	165	170.0		4.15		7.5	2.5	4.00		174.5		137.7	144.0	13.0	11.8	4.0	132.00	534000	156000		
1700	170	175.0		4.15		7.5	2.5	4.00		179.5		141.6	148.0	13.5	12.0	4.0	149.50	550000	160000		
1750	175	180.0		4.15		7.5	2.5	4.00		184.5		146.6	153.0	13.5	12.0	4.0	158.50	566000	165000		
1800	180	185.0	+ 0.72 - 0.00	4.15		7.5	2.5	4.00	+ 1.70 - 0.72	189.5		150.2	156.0	14.2	13.0	4.0	168.00	583000	170000		
1850	185	190.0		4.15		7.5	2.5	4.00		194.5		155.2	161.0	14.2	13.0	4.0	177.50	599000	174000		
1900	190	195.0		4.15		7.5	2.5	4.00		199.5		160.2	166.0	14.3	13.0	4.0	184.00	615000	179000		
1950	195	200.0		4.15		7.5	2.5	4.00		204.5		165.2	171.0	14.2	13.0	4.0	189.60	631000	184000		
2000	200	205.0		4.15		7.5	2.5	4.00		209.5		170.2	176.0	14.3	13.0	4.0	196.00	647000	188000		
2100	210	216.0		5.15		9.0	3.0	5.00	+ 0.00 - 0.12	222.0	+ 2.00 - 0.81	180.2	187.0	14.2	14.0	4.0	263.00	739000	237000		
2200	220	226.0		5.15		9.0	3.0	5.00		232.0		190.2	197.0	14.2	14.0	4.0	276.00	774000	249000		
2300	230	236.0		5.15		9.0	3.0	5.00		242.0		200.2	207.0	14.2	14.0	4.0	291.00	809000	260000		
2400	240	246.0		5.15		9.0	3.0	5.00		252.0		210.2	217.0	14.2	14.0	4.0	304.00	845000	271000		
2500	250	256.0		5.15		9.0	3.0	5.00		262.0		220.2	227.0	14.2	14.0	4.0	318.50	880000	283000		
2600	260	268.0	+ 0.81 - 0.00	5.15		12.0	4.0	5.00	+ 0.00 - 0.12	275.0	+ 2.00 - 0.81	226.0	235.0	16.2	16.0	5.0	385.00	915000	392000		
2700	270	278.0		5.15		12.0	4.0	5.00		285.0		236.0	245.0	16.2	16.0	5.0	401.50	950000	407000		
2800	280	288.0		5.15		12.0	4.0	5.00		295.0		246.0	255.0	16.2	16.0	5.0	417.50	985000	422000		
2900	290	298.0		5.15		12.0	4.0	5.00		305.0		256.0	265.0	16.2	16.0	5.0	433.40	1020000	437000		
3000	300	308.0		5.15		12.0	4.0	5.00		315.0		266.0	275.0	16.2	16.0	5.0	446.00	1060000	452000		
3100	310	320.0	+ 0.89 - 0.00	6.20	+ 0.22 - 0.00	15.0	5.0	6.00	+ 0.00 - 0.18	327.0	+ 2.50 - 1.00	267.8	279.0	20.2	20.0	6.0	658.50	1310000	584000		
3200	320	330.0		6.20		15.0	5.0	6.00		337.0		277.8	289.0	20.2	20.0	6.0	682.00	1350000	603000		
3300	330	340.0		6.20		15.0	5.0	6.00		347.0		287.8	299.0	20.2	20.0	6.0	705.00	1390000	622000		
3400	340	350.0		6.20		15.0	5.0	6.00		357.0		297.8	309.0	20.2	20.0	6.0	729.00	1440000	641000		
3500	350	360.0		6.20		15.0	5.0	6.00		367.0		307.8	319.0	20.2	20.0	6.0	752.50	1480000	660000		
3600	360	370.0		6.20		15.0	5.0	6.00		377.0		317.8	329.0	20.2	20.0	6.0	769.00	1520000	679000		
3700	370	380.0		6.20		15.0	5.0	6.00		387.0		327.8	339.0	20.2	20.0	6.0	793.00	1560000	697000		
3800	380	390.0		6.20		15.0	5.0	6.00		397.0		337.8	349.0	20.2	20.0	6.0	817.00	1610000	716000		
3900	390	400.0		6.20		15.0	5.0	6.00		407.0		347.8	359.0	20.2	20.0	6.0	838.50	1650000	735000		
4000	400	410.0		6.20		15.0	5.0	6.00		417.0		357.8	369.0	20.2	20.0	6.0	862.50	1690000	754000		

Reference to Table Headings

A = Free gap
a = Radial depth
B = Bore diameter
b = Beam dimension
C = Clearance on shaft
or in bore
C₁ = Clearance in groove
D = Free diameter (Working)
D₁ = Free diameter (Non-functional)
d = Groove depth
E = End play take-up
F = Circlip details
G = Groove diameter
H = Height

h = Hole diameter
L = Lug depth
n = Edge margin
n₁ = Shaft or bore face
to retained face
r = Radius
S = Shaft diameter
Tc = Thrust load for circlip
Tg = Thrust load of groove
t = Thickness
W = Groove width
w = Wing dimension
Wt = Weight
X = Outer groove wall to
retained face

Abbreviations used

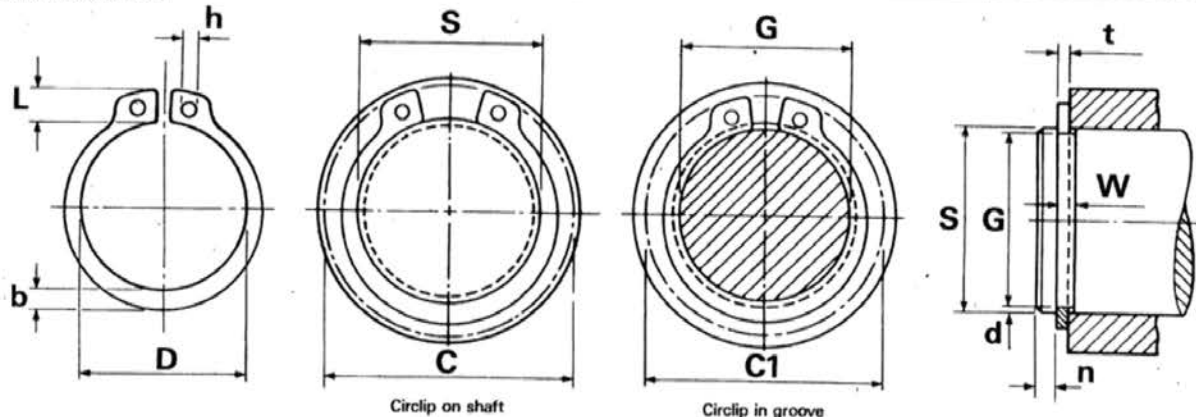
B.S. = British Standard
dec. = Decimal
frac. = Fraction
kg/k = Kilogrammes per thousand
lb.f = Pounds force
lb/k = Pounds per thousand
max. = Maximum
min. = Minimum
N = Newton
Nom. = Nominal
Tol. = Tolerance

STANDARD EXTERNAL CIRCLIPS EUROPEAN SPECIFICATIONS

D1400 INCORPORATING DIN 471 & BS3673 Pt.4



All dimensions in mm



Sizes printed in blue are preferred sizes

† Thrust load calculations see pages 9 & 10

SIZE CODE	Shaft		Groove (G)							Circlip (F)										Wt. (kg/k)	Tc† (N)	Tg† (N)
	S	G	Tol.	W	Tol.	n (min)	d ~	t	Tol.	D	Tol.	C	C1	L (max)	b ~	h (min)						
0030	3	2.8	+0.00 -0.04	0.50	+0.00 -0.05	0.3	0.10	0.40	+0.00 -0.05	2.7	+0.06 -0.18	7.0	6.6	1.9	0.8	1.0	0.02	1170	110			
0040	4	3.8		0.50		0.3	0.10	0.40		3.7		8.6	8.2	2.2	0.9	1.0	0.03	1600	150			
0050	5	4.8	+0.00 -0.048	0.70		0.3	0.10	0.60		4.7		10.3	9.8	2.5	1.1	1.0	0.08	2900	190			
0060	6	5.7		0.80		0.5	0.15	0.70		5.6		11.7	11.1	2.7	1.3	1.2	0.13	4100	340			
0070	7	6.7		0.90		0.5	0.15	0.80		6.5		13.5	12.9	3.1	1.4	1.2	0.18	5500	400			
0080	8	7.6	+0.00 -0.06	0.90		0.6	0.20	0.80		7.4		14.7	14.0	3.2	1.5	1.2	0.20	6200	600			
0090	9	8.6		1.10		0.6	0.20	1.00		8.4		16.0	15.2	3.3	1.7	1.2	0.32	8800	680			
0100	10	9.6		1.10		0.6	0.20	1.00		9.3		17.0	16.2	3.3	1.8	1.5	0.40	9700	750			
0110	11	10.5		1.10		0.8	0.25	1.00		10.2		18.0	17.1	3.3	1.8	1.5	0.41	10700	1040			
0120	12	11.5		1.10		0.8	0.25	1.00		11.0		19.0	18.1	3.3	1.8	1.7	0.45	11700	1130			
0130	13	12.4	+0.00 -0.11	1.10		0.9	0.30	1.00		11.9		20.2	19.2	3.4	2.0	1.7	0.52	12700	1470			
0140	14	13.4		1.10		0.9	0.30	1.00		12.9		21.4	20.4	3.5	2.1	1.7	0.56	13800	1580			
0150	15	14.3		1.10		1.1	0.35	1.00		13.8		22.6	21.5	3.6	2.2	1.7	0.62	14600	1980			
0160	16	15.2		1.10		1.2	0.40	1.00		14.7		23.8	22.6	3.7	2.2	1.7	0.69	15600	2410			
0170	17	16.2		1.10		1.2	0.40	1.00		15.7		25.0	23.8	3.8	2.3	1.7	0.77	16600	2560			
0180	18	17.0	+0.00 -0.13	1.30		1.5	0.50	1.20		16.5		26.2	24.8	3.9	2.4	2.0	0.99	21000	3390			
0190	19	18.0		1.30	1.5	0.50	1.20	17.5	27.2	25.8	3.9	2.5	2.0	1.10	22200	3580						
0200	20	19.0		1.30	1.5	0.50	1.20	18.5	28.4	27.0	4.0	2.6	2.0	1.18	23400	3770						
0210	21	20.0		1.30	1.5	0.50	1.20	19.5	29.6	28.2	4.1	2.7	2.0	1.26	24500	3960						
0220	22	21.0		1.30	1.5	0.50	1.20	20.5	30.8	29.4	4.2	2.8	2.0	1.39	25700	4150						
0230	23	22.0	+0.00 -0.21	1.30	1.5	0.50	1.20	21.5	32.0	30.6	4.3	2.9	2.0	1.54	26900	4340						
0240	24	22.9		1.30	1.7	0.55	1.20	22.2	33.2	31.7	4.4	3.0	2.0	1.52	28000	4980						
0250	25	23.9		1.30	1.7	0.55	1.20	23.2	34.2	32.7	4.4	3.0	2.0	1.70	29200	5180						
0260	26	24.9		1.30	1.7	0.55	1.20	24.2	35.5	33.9	4.5	3.1	2.0	1.75	30400	5390						
0270	27	25.6		1.30	2.1	0.70	1.20	24.9	36.7	34.8	4.6	3.1	2.0	1.89	31600	7130						
0280	28	26.6	+0.00 -0.25	1.60	2.1	0.70	1.50	25.9	37.9	36.0	4.7	3.2	2.0	2.47	40900	7390						
0290	29	27.6		1.60	2.1	0.70	1.50	26.9	39.1	37.2	4.8	3.4	2.0	2.75	42400	7650						
0300	30	28.6		1.60	2.1	0.70	1.50	27.9	40.5	38.6	5.0	3.5	2.0	2.93	43800	7920						
0320	32	30.3		1.60	2.6	0.85	1.50	29.6	43.0	40.7	5.2	3.6	2.5	3.02	46700	10300						
0330	33	31.3		1.60	2.6	0.85	1.50	30.5	44.0	41.7	5.2	3.7	2.5	3.30	48200	10600						
0340	34	32.3	+0.00 -0.25	1.60	2.6	0.85	1.50	31.5	45.4	43.1	5.4	3.8	2.5	3.72	49700	10900						
0350	35	33.0		1.60	3.0	1.00	1.50	32.2	46.8	44.2	5.6	3.9	2.5	3.78	51100	13200						
0360	36	34.0		1.85	3.0	1.00	1.75	33.2	47.8	45.2	5.6	4.0	2.5	4.55	51400	13600						
0380	38	36.0		1.85	3.0	1.00	1.75	35.2	50.2	47.6	5.8	4.2	2.5	5.08	54800	14300						
0400	40	37.5		1.85	3.8	1.25	1.75	36.5	52.6	49.5	6.0	5.0	2.5	5.54	56800	18800						
0420	42	39.5	+0.00 -0.30	1.85	3.8	1.25	1.75	38.5	55.7	52.5	6.5	5.0	2.5	5.99	59600	19800						
0450	45	42.5		1.85	3.8	1.25	1.75	41.5	59.1	55.9	6.7	5.0	2.5	6.75	63700	21200						
0460	46	43.5		1.85	3.8	1.25	1.75	42.5	60.1	56.9	6.7	5.0	2.5	7.24	65100	21700						
0470	47	44.5		1.85	3.8	1.25	1.75	43.5	61.3	58.1	6.8	5.0	2.5	7.30	66500	22100						
0480	48	45.5		1.85	3.8	1.25	1.75	44.5	62.5	59.3	6.9	5.0	2.5	7.51	67900	22600						
0500	50	47.0	+0.00 -0.30	2.15	4.5	1.50	2.00	45.8	64.5	60.8	6.9	5.5	2.5	9.88	80900	28300						
0520	52	49.0		2.15	4.5	1.50	2.00	47.8	66.7	63.0	7.0	5.5	2.5	9.53	84100	29400						
0540	54	51.0		2.15	4.5	1.50	2.00	49.8	69.0	65.2	7.1	5.5	2.5	10.30	87400	30500						
0550	55	52.0		2.15	4.5	1.50	2.00	50.8	70.2	66.4	7.2	5.5	2.5	10.41	89000	31100						
0560	56	53.0		2.15	4.5	1.50	2.00	51.8	71.6	67.6	7.3	5.5	2.5	10.50	90600	31700						
0580	58	55.0	+0.00 -0.30	2.15	4.5	1.50	2.00	53.8	73.6	69.6	7.3	5.6	2.5	12.47	93800	32800						
0600	60	57.0		2.15	4.5	1.50	2.00	55.8	75.6	71.8	7.4	5.8	2.5	13.69	97100	33900						
0620	62	59.0		2.15	4.5	1.50	2.00	57.8	77.8	74.0	7.5	6.0	2.5	12.36	100000	35100						
0630	63	60.0		2.15	4.5	1.50	2.00	58.8	79.0	75.2	7.6	6.2	2.5	13.10	102000	35600						
0650	65	62.0		2.65	4.5	1.50	2.50	60.8	81.4	77.6	7.8	6.3	3.0	20.44	131000	36800						

Standard material - carbon spring steel. Standard finish - phosphate and oil.

D1400 (continued)



SIZE CODE	Shaft		Groove (G)						Circlip (F)										Wt. (kg/k)	Tc† (N)	Tg† (N)
	S	G	Tol.	W	Tol.	n (min)	d ~	t	Tol.	D	Tol.	C	C1	L (max)	b ~	h (min)					
0670	67	64.0	+0.00 -0.30	2.65	+0.14 -0.00	4.5	1.50	2.50	+0.00 -0.07	62.5	+0.46 -1.10	83.6	79.8	7.9	6.4	3.0	20.43	135000	37900		
0680	68	65.0		2.65		4.5	1.50	2.50		63.5		84.4	81.0	8.0	6.5	3.0	19.55	138000	38500		
0700	70	67.0		2.65		4.5	1.50	2.50		65.5		87.0	83.2	8.1	6.6	3.0	22.13	142000	39600		
0720	72	69.0		2.65		4.5	1.50	2.50		67.5		89.2	85.4	8.2	6.8	3.0	21.60	146000	40700		
0750	75	72.0		2.65		4.5	1.50	2.50		70.5		92.7	88.8	8.4	7.0	3.0	24.65	152000	42400		
0770	77	74.0	+0.00 -0.35	2.65		4.5	1.50	2.50	+0.00 -0.08	72.5		94.9	91.0	8.5	7.2	3.0	24.26	156000	43500		
0780	78	75.0		2.65		4.5	1.50	2.50		73.5		96.1	92.2	8.6	7.3	3.0	28.10	158000	44100		
0800	80	76.5		2.65		5.3	1.75	2.50		74.5		98.1	93.7	8.6	7.4	3.0	26.68	162000	52800		
0820	82	78.5		2.65		5.3	1.75	2.50		76.5		100.3	95.9	8.7	7.6	3.0	28.35	166000	54100		
0850	85	81.5		3.15		5.3	1.75	3.00		79.5		103.3	98.9	8.7	7.8	3.5	35.40	206000	56100		
0880	88	84.5	+0.00 -0.35	3.15		5.3	1.75	3.00	+0.00 -0.08	82.5		106.5	102.0	8.8	8.0	3.5	39.85	214000	58100		
0900	90	86.5		3.15		5.3	1.75	3.00		84.5		108.5	104.0	8.8	8.2	3.5	38.89	218000	59400		
0950	95	91.5		3.15		5.3	1.75	3.00		89.5		114.8	111.0	9.4	8.6	3.5	42.39	231000	62700		
0980	98	94.5		3.15		5.3	1.75	3.00		91.5		118.6	114.0	9.8	9.0	3.5	54.00	238000	64700		
1000	100	96.5		3.15		5.3	1.75	3.00		94.5		120.2	116.0	9.6	9.0	3.5	48.86	243000	66000		
1020	102	98.0	+0.00 -0.54	4.15		6.0	2.00	4.00		95.0	+0.54 -1.30	122.4	118.0	9.7	9.2	3.5	68.73	330000	76900		
1050	105	101.0		4.15		6.0	2.00	4.00		98.0		126.2	122.0	10.1	9.3	3.5	73.16	340000	79200		
1080	108	104.0		4.15		6.0	2.00	4.00		100.0		129.0	124.0	10.0	9.5	3.5	83.45	349000	81400		
1100	110	106.0		4.15		6.0	2.00	4.00		103.0		131.2	127.0	10.1	9.6	3.5	75.24	356000	82900		
1150	115	111.0		4.15		6.0	2.00	4.00		108.0		137.3	133.0	10.6	9.8	3.5	78.65	327000	86700		
1200	120	116.0		4.15		6.0	2.00	4.00	+0.00 -0.10	113.0		143.1	138.0	11.0	10.2	3.5	85.58	388000	90500		
1250	125	121.0		4.15		6.0	2.00	4.00		118.0		149.0	144.0	11.4	10.4	4.0	99.62	404000	94200		
1300	130	126.0		4.15		6.0	2.00	4.00		123.0		154.4	150.0	11.6	10.7	4.0	98.10	421000	98000		
1350	135	131.0		4.15		6.0	2.00	4.00		128.0		159.8	155.0	11.8	11.0	4.0	113.40	437000	102000		
1400	140	136.0		4.15		6.0	2.00	4.00		133.0		165.2	160.0	12.0	11.2	4.0	119.18	453000	106000		
1450	145	141.0	+0.00 -0.63	4.15	+0.18 -0.00	6.0	2.00	4.00	+0.63 -1.50	138.0		170.6	166.0	12.2	11.5	4.0	128.53	470000	109000		
1500	150	145.0		4.15		7.5	2.50	4.00		142.0		177.3	171.0	13.0	11.8	4.0	132.80	485000	110000		
1550	155	150.0		4.15		7.5	2.50	4.00		146.0		182.3	176.0	13.0	12.0	4.0	136.06	501000	116000		
1600	160	155.0		4.15		7.5	2.50	4.00		151.0		188.0	182.0	13.3	12.2	4.0	137.50	518000	115000		
1650	165	160.0		4.15		7.5	2.50	4.00		155.5		193.4	187.0	13.5	12.5	4.0	151.96	534000	116000		
1700	170	165.0		4.15		7.5	2.50	4.00		160.5		198.4	192.0	13.5	12.9	4.0	169.00	550000	120000		
1750	175	170.0		4.15		7.5	2.50	4.00		165.5		203.4	197.0	13.5	12.9	4.0	173.70	566000	125000		
1800	180	175.0		4.15		7.5	2.50	4.00		170.5		210.0	204.0	14.2	13.5	4.0	188.00	582000	130000		
1850	185	180.0		4.15		7.5	2.50	4.00		175.5		215.2	209.0	14.3	13.5	4.0	193.00	598000	134000		
1900	190	185.0		4.15		7.5	2.50	4.00		180.5		220.0	214.0	14.2	14.0	4.0	203.00	615000	139000		
1950	195	190.0	+0.00 -0.72	4.15		7.5	2.50	4.00	+0.00 -0.12	185.5	+0.72 -1.70	225.0	219.0	14.2	14.0	4.0	209.50	631000	144000		
2000	200	195.0		4.15		7.5	2.50	4.00		190.5		230.0	224.0	14.2	14.0	4.0	214.00	647000	149000		
2050	205	199.0		5.15		9.0	3.00	5.00		193.0		235.0	228.0	14.2	14.0	4.0	278.00	721000	232000		
2100	210	204.0		5.15		9.0	3.00	5.00		198.0		240.0	233.0	14.2	14.0	4.0	285.00	739000	238000		
2200	220	214.0		5.15		9.0	3.00	5.00		208.0		250.0	243.0	14.2	14.0	4.0	298.50	775000	249000		
2300	230	224.0		5.15		9.0	3.00	5.00	+0.00 -0.12	218.0		260.0	253.0	14.2	14.0	4.0	312.00	809000	260000		
2400	240	234.0		5.15		9.0	3.00	5.00		228.0		270.0	263.0	14.2	14.0	4.0	326.00	844000	271000		
2500	250	244.0		5.15		9.0	3.00	5.00		238.0		280.0	272.0	14.2	14.0	4.0	340.00	880000	283000		
2600	260	252.0		5.15		12.0	4.00	5.00		245.0		294.0	285.0	16.2	16.0	5.0	414.00	915000	392000		
2700	270	262.0		5.15		12.0	4.00	5.00		255.0		304.0	295.0	16.2	16.0	5.0	430.50	950000	407000		
2800	280	272.0	+0.00 -0.81	5.15		12.0	4.00	5.00		265.0	+0.81 -2.00	314.0	305.0	16.2	16.0	5.0	446.50	985000	422000		
2900	290	282.0		5.15		12.0	4.00	5.00		275.0		324.0	315.0	16.2	16.0	5.0	463.00	1020000	437000		
3000	300	292.0		5.15		12.0	4.00	5.00		285.0		334.0	325.0	16.2	16.0	5.0	479.00	1056000	452000		
3100	310	300.0		6.20		15.0	5.00	6.00		293.0		352.2	341.0	20.2	20.0	6.0	710.50	1309000	584000		
3200	320	310.0		6.20		15.0	5.00	6.00		303.0		362.2	351.0	20.2	20.0	6.0	734.00	1351000	603000		
3300	330	320.0	+0.00 -0.89	6.20	+0.22 -0.00	15.0	5.00	6.00	+0.00 -0.18	313.0	+1.00 -2.50	372.2	361.0	20.2	20.0	6.0	757.00	1393000	622000		
3400	340	330.0		6.20		15.0	5.00	6.00		323.0		382.2	371.0	20.2	20.0	6.0	780.00	1436000	641000		
3500	350	340.0		6.20		15.0	5.00	6.00		333.0		392.2	381.0	20.2	20.0	6.0	805.00	1478000	660000		
3600	360	350.0		6.20		15.0	5.00	6.00		343.0		402.2	391.0	20.2	20.0	6.0	827.00	1520000	679000		
3700	370	360.0		6.20		15.0	5.00	6.00		353.0		412.2	401.0	20.2	20.0	6.0	850.00	1562000	697000		
3800	380	370.0		6.20		15.0	5.00	6.00		363.0		422.2	411.0	20.2	20.0	6.0	873.00	1604000	716000		
3900	390	380.0		6.20		15.0	5.00	6.00		373.0		432.2	421.0	20.2	20.0	6.0	896.00	1646000	735000		
4000	400	390.0		6.20		15.0	5.00	6.00		383.0		442.2	431.0	20.2	20.0	6.0	919.00	1689000	754000		

Competitors Equivalents

Anderton	Seeger	Waldes/Salter	Anderton	Seeger	Waldes/Salter	Anderton	Seeger	Waldes/Salter
A0500	—	—	D1400	DIN471 (A)	7100*	N1500	—	5133
A0600	—	—	N1400	—	5100	A1500U,C&S	—	2025, 2021, 2026*
A0700	—	—	B1400	AZ	6100*	N1501	—	5131
A0900	—	—	M1408	AV	—	N1540	—	5144
A1000	—	—	N1408	—	5108	M1700	—	—
A1100	—	—	M1440	G	—	M1800	H	—
A1200	—	—	N1440	—	5555	N1800	—	5103
D1300	DIN472 (J)	7000*	D1460	DIN471 (AS)	—	D2000	DIN984 (JK)	—
N1300	—	N5000	N1460	—	5160	D2100	DIN983 (AK)	—
B1300	JZ	6000*	M1465	—	7115*	M2300	SB	—
N1302	—	N5002	N1465	—	5115	M2400	SW	—
N1305	—	5005	B1500	—	6133*	M2500	—	—
M1308	JV	—	D1500	DIN6799 (RS)	7133*	M3200	DIN5417 (SP)	—
N1308	—	5008						

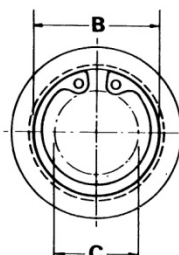
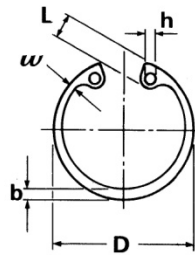
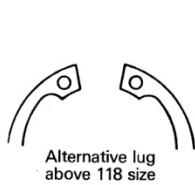
*Salter only

STANDARD INTERNAL CIRCLIPS AMERICAN SPECIFICATIONS *

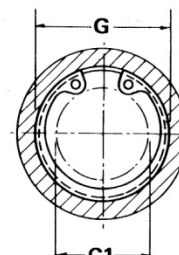
N1300 EQUIVALENT TO MIL-R-21248/MS 16625



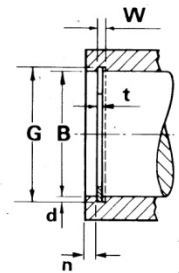
All dimensions in inches



Circlip in bore



Circlip in groove



† Thrust load calculations see pages 9 & 10

* These circlips should not be used as direct substitutes for British Standard Imperial sizes

SIZE CODE	Bore (B)		Groove (G)							Circlip (F)										Wt. (lb/k)	Tc† (lb.f)	Tg† (lb.f)
	B		G	Tol.	W	Tol.	n (min)	d ~	t	Tol.	D	Tol.	C	C1	L (max)	b ~	w ~	h (min)				
	(frac)	(dec)																				
0025	1/4	.250	.268	±.001	.018	+.002	.027	.009	.015		.280		.11	.13	.068	.025	.015	.029	0.08	530	130	
0031	5/16	.312	.330		.018	-.000	.027	.009	.015		.346		.17	.19	.069	.033	.018	.029	0.11	660	160	
0037	3/8	.375	.397		.029		.033	.011	.025		.415		.20	.22	.085	.040	.028	.039	0.25	1320	235	
0043	7/16	.438	.461		.029		.036	.012	.025		.482		.23	.25	.101	.049	.029	.039	0.37	1550	285	
0045	29/64	.453	.477		.029		.036	.012	.025		.498		.25	.27	.101	.050	.030	.045	0.43	1600	310	
0050	1/2	.500	.530	±.002	.039		.045	.015	.035		.548	+.010 -.005	.26	.29	.117	.053	.035	.045	0.70	2470	425	
0051	—	.512	.542		.039		.045	.015	.035		.560		.27	.30	.119	.053	.035	.045	0.77	2530	435	
0056	9/16	.562	.596		.039		.051	.017	.035		.620		.28	.32	.137	.053	.035	.045	0.86	2780	540	
0062	5/8	.625	.665		.039		.060	.020	.035		.694		.35	.39	.137	.060	.035	.060	1.0	3090	705	
0068	11/16	.688	.732		.039		.066	.022	.035		.763		.41	.45	.137	.063	.036	.060	1.2	3400	855	
0075	3/4	.750	.796		.039	+.003 -.000	.069	.023	.035	±.002	.831		.45	.50	.147	.070	.040	.060	1.3	3710	975	
0077	—	.777	.825		.046		.072	.024	.042		.859		.47	.52	.151	.074	.044	.060	1.7	4610	1050	
0081	13/16	.812	.862		.046		.075	.025	.042		.901		.49	.53	.160	.077	.044	.060	1.9	4820	1150	
0086	—	.866	.920		.046		.081	.027	.042		.961		.54	.59	.160	.081	.045	.060	2.0	5140	1320	
0087	7/8	.875	.931		.046		.084	.028	.042		.971		.55	.60	.160	.084	.045	.060	2.1	5190	1390	
0090	—	.901	.959	±.003	.046		.087	.029	.042		1.000	+.015 -.010	.58	.63	.160	.087	.047	.060	2.2	5350	1480	
0093	15/16	.938	1.000		.046		.093	.031	.042		1.041		.61	.67	.160	.091	.050	.060	2.4	5570	1640	
0100	1	1.000	1.066		.046		.099	.033	.042		1.111		.68	.74	.160	.104	.052	.060	2.7	5940	1870	
0102	—	1.023	1.091		.046		.102	.034	.042		1.136		.70	.76	.160	.106	.054	.060	2.8	6070	1970	
0106	1.1/16	1.062	1.130		.056		.102*	.034	.050		1.180		.69	.75	.185	.110	.055	.076	3.7	7500	2040	
0112	1.1/8	1.125	1.197	±.004	.056		.108	.036	.050		1.249	+.025 -.020	.75	.82	.185	.116	.057	.076	4.0	7950	2290	
0118	1.3/16	1.188	1.262		.056		.111	.037	.050		1.319		.81	.88	.185	.120	.058	.076	4.3	8400	2490	
0125	1.1/4	1.250	1.330		.056		.120	.040	.050		1.388		.88	.95	.185	.124	.062	.076	4.8	8850	2830	
0131	1.5/16	1.312	1.396		.056		.126	.042	.050		1.456		.94	1.02	.185	.130	.062	.076	5.0	9300	3120	
0137	1.3/8	1.375	1.461		.056		.129	.043	.050		1.526		1.00	1.08	.185	.130	.063	.076	5.1	9700	3340	
0143	1.7/16	1.438	1.528		.056	+.004 -.000	.135	.045	.050		1.596		1.06	1.15	.185	.133	.065	.076	5.8	10200	3660	
0145	—	1.456	1.548		.056		.138	.046	.050		1.616		1.08	1.17	.185	.133	.065	.076	6.0	10300	3790	
0150	1.1/2	1.500	1.594		.056		.141	.047	.050		1.660		1.13	1.22	.185	.133	.066	.076	6.1	10600	3990	
0156	1.9/16	1.562	1.658		.068		.144	.048	.062		1.734		1.15	1.24	.205	.160	.079	.076	9.1	11400	4240	
0162	1.5/8	1.625	1.725		.068		.150	.050	.062		1.804		1.21	1.31	.205	.160	.080	.076	10.1	11800	4590	
0165	—	1.653	1.755	±.005	.068		.153	.051	.062		1.835	+.035 -.025	1.24	1.34	.205	.167	.083	.076	10.4	12100	4760	
0168	1.11/16	1.688	1.792		.068		.156	.052	.062		1.874		1.27	1.38	.205	.170	.085	.076	10.8	12300	4960	
0175	1.3/4	1.750	1.858		.068		.162	.054	.062		1.942		1.34	1.44	.205	.175	.082	.076	11.5	12800	5340	
0181	1.13/16	1.812	1.922		.068		.165	.055	.062		2.012		1.40	1.51	.205	.170	.084	.091	12.0	13200	5630	
0185	—	1.850	1.962		.068		.168	.056	.062		2.054		1.44	1.55	.205	.170	.085	.091	12.8	13500	5860	
0187	1.7/8	1.875	1.989		.068		.171	.057	.062		2.072		1.46	1.58	.205	.170	.085	.091	12.8	13700	6040	
0193	1.15/16	1.938	2.056		.068		.177	.059	.062		2.141		1.52	1.64	.205	.165	.079	.091	13.3	14100	6470	
0200	2	2.000	2.122		.068		.183	.061	.062		2.210		1.59	1.71	.205	.170	.085	.091	13.0	14600	6900	
0206	2.1/16	2.062	2.186		.086		.186	.062	.078		2.280		1.61	1.73	.225	.186	.091	.091	18.0	18900	7230	
0212	2.1/8	2.125	2.251		.086		.189	.063	.078		2.350		1.65	1.78	.236	.195	.096	.091	19.4	19500	7570	
0218	2.3/16	2.188	2.318		.086		.195	.065	.078		2.415		1.71	1.84	.236	.199	.098	.091	19.6	20000	8040	
0225	2.1/4	2.250	2.382		.086		.198	.066	.078		2.490		1.77	1.91	.236	.203	.107	.091	21.8	20600	8400	
0231	2.5/16	2.312	2.450		.086		.207	.069	.078		2.560		1.84	1.98	.236	.205	.106	.091	22.6	21200	9020	
0237	2.3/8	2.375	2.517		.086		.213	.071	.078		2.630		1.90	2.04	.236	.207	.108	.091	23.8	21700	9540	
0244	2.7/16	2.440	2.584		.086		.216	.072	.078		2.702		1.96	2.11	.236	.205	.104	.108	25.3	22300	10100	
0250	2.1/2	2.500	2.648		.086		.222	.074	.078	±.003	2.775	+.040 -.030	2.02	2.17	.236	.210	.103	.108	29.3	22900	13000	
0256	2.9/16	2.562	2.714		.103		.228	.076	.093		2.844		2.02	2.18	.268	.222	.109	.108	30.4	28000	11000	
0262	2.5/8	2.625	2.781		.103		.234	.078	.093		2.910		2.08	2.24	.268	.226	.118	.108	34.5	28600	11600	
0268	2.11/16	2.688	2.848		.103		.240	.080	.093		2.980		2.15	2.31	.268	.236	.122	.108	36.2	29300	12200	
0275	2.3/4	2.750	2.914		.103		.246	.082	.093		3.050		2.18	2.34	.284	.234	.114	.108	35.5	30000	12800	
0281	2.13/16	2.812	2.980	±.006	.103	+.005 -.000	.252	.084	.093		3.121		2.24	2.40	.284	.230	.115	.108	39.2	30800	13400	
0287	2.7/8	2.875	3.051		.103		.264	.088	.093		3.191		2.30	2.47	.284	.240	.125	.108	41.0	31500	14300	
0300	3	3.000	3.182		.103		.273	.091	.093		3.325		2.43	2.60	.284	.250	.124	.108	42.5	32900	15400	
0306	3.1/16	3.062	3.248		.120		.279	.093	.109		3.418		2.46	2.64	.299	.254	.126	.123	54.4	39300	16100	
0312	3.1/8	3.125	3.315		.120		.285	.095	.109		3.488		2.52	2.71	.299	.260	.129	.123	56.0	40100	16800	
0315	—	3.149	3.348		.120		.288	.096	.109		3.523		2.55	2.74	.299	.260	.129	.123	57.1	40400	17100	
0325	3.1/4	3.250	3.446		.120		.294	.098	.109		3.623		2.65	2.84	.299	.269	.135	.123	59.9	41700	18000	
0334	3.11/32	3.346	3.546		.120		.300	.100	.109		3.734		2.69	2.89	.323	.276	.140	.123	63.0	43000	18900	
0347	3.15/32	3.469	3.675		.120		.309	.103	.109		3.857		2.77	2.96	.350	.294	.143	.123	69.0	44500	20200	
0350	3.1/2	3.500	3.710		.120		.315	.105	.109		3.890		2.80	2.90	.350	.294	.143	.123	71.0	44900	20800	
0354	—	3.543	3.776		.120		.321	.107	.109		3.936		2.84	3.07	.350	.292	.142	.123	72.1	45500	21400	
0362	3.5/8	3.625	3.841		.120		.324	.108	.109		4.024		2.92	3.13	.350	.298	.149	.123	73.0	46500	22100	
0375	3.3/4	3.750	3.974		.120		.336	.112	.109		4.157		3.04	3.26	.350	.309	.155	.123	78.0	48200	23700	
0387	3.7/8	3.875	4.107		.120		.348	.116	.109		4.291		3.17	3.40	.350	.312	.165	.123	87.1	49800	25400	
0393	3.5/16	3.938	4.174		.120		.354	.118	.109		4.358		3.23	3.46	.350	.319	.166	.123	87.9	50600	26300	

N1300 (continued)



SIZE CODE	Bore (B)		Groove (G)								Circlip (F)										Wt. (lb/k)	Tc† (lb.f)	Tg† (lb.f)
	B		G	Tol.	W	Tol.	n (min)	d	t	Tol.	D	Tol.	C	C1	L (max)	b ~	w ~	h (min)					
	(frac)	(dec)																					
0400	4	4.000	4.240	± .006	.120	+ .005 - .000	.360	.120	.109	± .003	4.424	± .065	3.24	3.47	.378	.330	.166	.123	95.0	51400	27100		
0412	4 1/8	4.125	4.365		.120		.360	.120	.109		4.558		3.36	3.60	.378	.330	.171	.123	97.0	53000	28000		
0425	4 1/4	4.250	4.490		.120		.360	.120	.109		4.691		3.49	3.72	.378	.335	.180	.123	100	54600	28800		
0433	—	4.331	4.571		.120		.360	.120	.109		4.756		3.50	3.73	.413	.345	.180	.151	107	55600	29400		
0450	4 1/2	4.500	4.740		.120		.360	.120	.109		4.940		3.67	3.90	.413	.351	.181	.151	111	57800	30500		
0462	4 5/8	4.625	4.865	± .007	.120	+ .006 - .000	.360	.120	.109	± .004	5.076	± .080	3.79	4.03	.413	.360	.185	.151	119	59400	31400		
0475	4 3/4	4.750	4.995		.120		.366	.122	.109		5.213		3.92	4.16	.413	.370	.175	.151	124	61000	32800		
0500	5	5.000	5.260		.120		.390	.130	.109		5.485		4.10	4.36	.445	.395	.218	.151	136	64200	36800		
0525	5 1/4	5.250	5.520		.139		.405	.135	.125		5.770		4.31	4.58	.465	.408	.212	.151	175	77300	40100		
0537	5 3/8	5.375	5.650		.139		.405	.135	.125		5.910		4.44	4.71	.465	.408	.198	.151	179	78800	41000		
0550	5 1/2	5.500	5.770	± .008	.139	+ .008 - .000	.405	.135	.125	± .005	6.066	± .090	4.56	4.83	.465	.408	.200	.151	189	81000	42000		
0575	5 3/4	5.750	6.020		.139		.405	.135	.125		6.336		4.81	5.08	.465	.408	.198	.151	195	84700	43900		
0600	6	6.000	6.270		.139		.405	.135	.125		6.620		5.06	5.33	.465	.416	.223	.151	204	88400	45800		
0625	6 1/4	6.250	6.530		.174		.420	.140	.156		6.895		5.34	5.61	.454	.441	.213	.182	263	114900	49500		
0650	6 1/2	6.500	6.790		.174		.435	.145	.156		7.170		5.59	5.87	.454	.441	.224	.182	281	119500	53300		
0662	6 5/8	6.625	6.925	± .009	.174	+ .009 - .000	.450	.150	.156	± .005	7.308	± .090	5.71	6.01	.454	.441	.220	.182	300	121700	56200		
0675	6 3/4	6.750	7.055		.174		.456	.152	.156		7.445		5.73	6.03	.508	.456	.224	.182	325	124000	58000		
0700	7	7.000	7.315		.174		.471	.157	.156		7.720		5.91	6.22	.540	.485	.258	.182	344	128600	62200		
0725	7 1/4	7.250	7.575		.209		.486	.162	.187		7.995		6.10	6.42	.570	.490	.238	.182	428	159700	66400		
0750	7 1/2	7.500	7.840		.209		.510	.170	.187		8.270		6.35	6.69	.570	.507	.282	.182	476	165200	72100		
0775	7 3/4	7.750	8.100	± .008	.209	+ .008 - .000	.525	.175	.187	± .005	8.545	± .090	6.62	6.97	.560	.500	.241	.182	520	170700	76700		
0800	8	8.000	8.360		.209		.540	.180	.187		8.820		6.79	7.15	.600	.550	.280	.182	555	152700	81400		
0825	8 1/4	8.250	8.620		.209		.555	.185	.187		9.095		7.04	7.41	.600	.548	.260	.182	603	157500	86300		
0850	8 1/2	8.500	8.880		.209		.570	.190	.187		9.285		7.23	7.60	.632	.573	.277	.182	634	162300	91300		
0875	8 3/4	8.750	9.145		.209		.591	.197	.187		9.558		7.48	7.88	.632	.576	.283	.182	653	167000	97700		
0900	9	9.000	9.405	± .009	.209	+ .009 - .000	.606	.202	.187	± .005	9.830	± .090	7.73	8.13	.632	.592	.294	.182	732	171800	103000		
0925	9 1/4	9.250	9.668		.209		.627	.209	.187		10.102		7.98	8.39	.632	.622	.299	.182	767	176600	109000		
0950	9 1/2	9.500	9.930		.209		.645	.215	.187		10.375		8.23	8.65	.632	.622	.354	.182	803	181400	116000		
0975	9 3/4	9.750	10.190		.209		.660	.220	.187		10.648		8.50	8.93	NO	.622	.295	.182	833	186200	121300		
1000	10	10.000	10.450		.209		.675	.225	.187		10.920		8.75	9.19	LUG	.622	.295	.182	863	191000	127200		

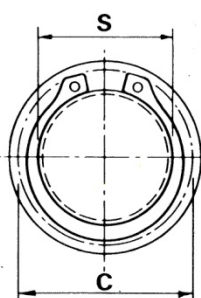
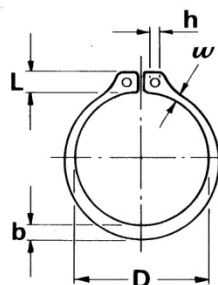
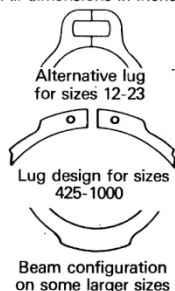
STANDARD EXTERNAL CIRCLIPS AMERICAN SPECIFICATION *

N1400 EQUIVALENT TO MIL-R-21248/MS 16624

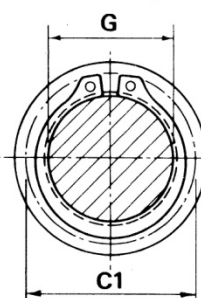


All dimensions in inches

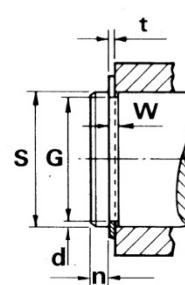
*These circlips should not be used as direct substitutes for British Standard Imperial sizes



Circlip on shaft



Circlip in groove



*Sizes 12-23 Beryllium copper only

† Thrust load calculations see pages 9 & 10

SIZE CODE	Shaft (S)		Groove (G)						Circlip (F)										Wt. (lb/k)	Tc† (lb.f)	Tg† (lb.f)
	S		G	Tol.	W	Tol.	n (min)	d ~	t	Tol.	D	Tol.	C	C1	L (max)	b ~	w ~	h (min)			
	(frac)	(dec)																			
*0012	1/8	.125	.117	±.0015	.012	+.002 - .000	.014	.004	.010	±.001	.112	+.002 - .004	.22	.214	.048	.018	.011	.024	0.018	110	28
*0015	5/32	.156	.146		.012		.017	.005	.010		.142		.27	.260	.056	.026	.016	.024	0.037	130	44
*0018	3/16	.188	.175		.018		.022	.007	.015		.168		.30	.286	.062	.025	.016	.023	0.059	240	69
*0019	—	.197	.185		.018		.020	.006	.015		.179		.32	.307	.058	.026	.016	.024	0.063	250	67
*0021	7/32	.219	.205		.018		.023	.007	.015		.196		.34	.324	.058	.028	.017	.024	0.074	280	87
*0023	15/64	.236	.222	±.002	.018	+.003 - .000	.023	.007	.015	±.002	.215	+.002 - .005	.36	.341	.058	.030	.019	.024	0.086	310	93
0025	1/4	.250	.230		.029		.032	.010	.025		.225		.45	.43	.083	.035	.025	.039	0.21	880	141
0027	—	.276	.255		.029		.035	.010	.025		.250		.48	.46	.084	.035	.024	.039	0.25	980	164
0028	9/32	.281	.261		.029		.033	.010	.025		.256		.49	.47	.083	.038	.025	.039	0.24	990	160
0031	5/16	.312	.290		.029		.036	.011	.025		.281		.54	.52	.090	.040	.026	.039	0.27	1100	194
0034	11/32	.344	.321	±.002	.029	+.003 - .000	.038	.012	.025	±.002	.309	+.002 - .005	.57	.55	.090	.042	.026	.039	0.31	1210	224
0035	—	.354	.330		.029		.038	.012	.025		.320		.59	.57	.090	.046	.029	.039	0.35	1250	240
0037	3/8	.375	.352		.029		.038	.012	.025		.338		.61	.59	.091	.050	.030	.039	0.39	1320	244
0039	—	.394	.369		.029		.041	.013	.025		.354		.62	.60	.090	.052	.031	.039	0.42	1390	278
0040	13/32	.406	.382		.029		.039	.012	.025		.366		.63	.61	.090	.054	.033	.039	0.43	1430	275

Standard material - carbon spring steel. Standard finish - phosphate and oil.

N1400 (continued)



SIZE CODE	Shaft (S)		Groove (G)						Circlip (F)											Wt. (lb./k)	Tc† (lb.f)	Tg† (lb.f)
	S		G	Tol.	W	Tol.	n (min)	d ~	t	Tol.	D	Tol.	C	C1	L (max)	b ~	w ~	h (min)				
	(frac)	(dec)																				
0043	7/16	.438	.412	±.002	.029	+.003 -.000	.042	.013	.025	±.002	.395	+.002 -.005	.66	.64	.091	.055	.033	.039	0.50	1550	322	
0046	15/32	.469	.443		.029		.042	.013	.025		.428		.68	.66	.091	.060	.035	.039	0.54	1660	345	
0050	1/2	.500	.468		.039		.051	.016	.035		.461		.77	.74	.111	.065	.040	.045	0.91	2470	452	
0055	—	.551	.519		.039		.051	.016	.035		.509		.81	.78	.111	.053	.036	.045	0.90	2730	500	
0056	9/16	.562	.530		.039		.051	.016	.035		.521		.82	.79	.111	.072	.041	.045	1.10	2780	508	
0059	19/32	.594	.559	+.003 -.000	.039	.057	.017	.035	±.002	.550	+.005 -.010	.86	.83	.112	.076	.043	.045	1.20	2940	588		
0062	5/8	.625	.588		.039	.060	.018	.035		.579		.90	.87	.113	.080	.045	.045	1.30	3090	654		
0066	43/64	.672	.631		.039	.066	.020	.035		.621		.93	.89	.113	.082	.043	.045	1.40	3320	780		
0068	11/16	.688	.646		.046	.068	.021	.042		.635		1.01	.97	.140	.084	.048	.050	1.80	4080	817		
0075	3/4	.750	.704		.046	.074	.023	.042		.693		1.09	1.05	.140	.092	.051	.050	2.10	4450	975		
0078	25/32	.781	.733	±.003	.046	.076	.024	.042	±.002	.722	+.005 -.010	1.12	1.08	.140	.094	.052	.050	2.2	4600	1060		
0081	13/16	.812	.762		.046	.080	.025	.042		.751		1.15	1.10	.140	.096	.054	.050	2.5	4800	1150		
0087	7/8	.875	.821		.046	.085	.027	.042		.810		1.21	1.16	.141	.104	.057	.050	2.8	5200	1340		
0093	15/16	.938	.882		.046	.088	.028	.042		.867		1.34	1.29	.170	.110	.063	.076	3.1	5600	1480		
0098	63/64	.984	.926		.046	.091	.029	.042		.910		1.39	1.34	.171	.114	.065	.076	3.5	5800	1610		
0100	1	1.000	.940	±.004	.046	.094	.030	.042	±.002	.925	+.010 -.015	1.41	1.35	.171	.116	.065	.076	3.6	5900	1700		
0102	—	1.023	.961		.046	.097	.031	.042		.946		1.43	1.37	.172	.118	.066	.076	3.9	6100	1790		
0106	1.1/16	1.062	.998		.056	.102	.032	.050		.982		1.50	1.44	.185	.122	.069	.076	4.8	7500	1920		
0112	1.1/8	1.125	1.059		.056	.105	.033	.050		1.041		1.55	1.49	.186	.128	.071	.076	5.1	7900	2100		
0118	1.3/16	1.188	1.118		.056	.111	.035	.050		1.098		1.61	1.54	.186	.132	.072	.076	5.6	8400	2350		
0125	1.1/4	1.250	1.176	±.004	.056	.117	.037	.050	+.004 -.000	1.156	+.013 -.020	1.69	1.62	.187	.140	.076	.076	5.9	8800	2610		
0131	1.5/16	1.312	1.232		.056	.126	.040	.050		1.214		1.75	1.67	.187	.146	.077	.076	6.8	9300	2970		
0137	1.3/8	1.375	1.291		.056	.132	.042	.050		1.272		1.80	1.72	.188	.152	.082	.076	7.2	9700	3270		
0143	1.7/16	1.438	1.350		.056	.138	.044	.050		1.333		1.87	1.79	.188	.160	.086	.076	8.1	10200	3580		
0150	1.1/2	1.500	1.406		.056	.147	.047	.050		1.387		1.99	1.90	.218	.168	.091	.118	9.0	10600	3990		
0156	1.9/16	1.562	1.468	±.005	.068	.148	.047	.062	+.004 -.000	1.446	+.013 -.020	1.95	1.85	.189	.180	.098	.100	11.7	10700	4150		
0162	1.5/8	1.625	1.529		.068	.151	.048	.062		1.503		2.17	2.08	.189	.180	.097	.100	12.8	11100	4410		
0168	1.11/16	1.688	1.589		.068	.156	.049	.062		1.560		2.04	1.95	.205	.197	.099	.100	13.2	11500	4720		
0175	1.3/4	1.750	1.650		.068	.157	.050	.062		1.618		2.11	2.01	.205	.197	.101	.100	13.8	11900	4950		
0177	—	1.772	1.669		.068	.162	.051	.062		1.618		2.19	2.09	.205	.197	.102	.100	14.1	12100	5160		
0181	1.13/16	1.812	1.708	±.005	.068	.163	.052	.062	+.005 -.000	1.675	+.015 -.025	2.23	2.13	.205	.197	.095	.100	14.7	12400	5330		
0187	1.7/8	1.875	1.769		.068	.166	.053	.062		1.735		2.29	2.19	.205	.197	.104	.100	15.5	12800	5620		
0196	—	1.968	1.857		.068	.174	.055	.062		1.819		2.39	2.27	.205	.197	.106	.123	18.2	13400	5170		
0200	2	2.000	1.886		.068	.178	.057	.062		1.850		2.48	2.36	.232	.224	.108	.123	19.2	13600	6450		
0206	2.1/16	2.062	1.946		.086	.183	.058	.078		1.906		2.52	2.40	.225	.217	.111	.123	22.6	17700	6760		
0212	2.1/8	2.125	2.003	±.006	.086	.192	.061	.078	+.005 -.000	1.964	+.015 -.025	2.61	2.48	.236	.228	.120	.123	24.4	18200	7330		
0215	2.5/32	2.156	2.032		.086	.195	.062	.078		1.993		2.62	2.49	.225	.217	.113	.123	26.6	18500	7560		
0225	2.1/4	2.250	2.120		.086	.204	.065	.078		2.081		2.87	2.74	.225	.217	.116	.123	26.0	19300	8270		
0231	2.5/16	2.312	2.178		.086	.210	.067	.078		2.139		2.94	2.81	.225	.217	.118	.123	28.4	19800	8760		
0237	2.3/8	2.375	2.239		.086	.213	.068	.078		2.197		2.86	2.72	.236	.228	.119	.123	27.9	20400	9130		
0243	2.7/16	2.438	2.299	±.006	.086	.217	.069	.078	±.003	2.255	+.020 -.030	2.92	2.78	.236	.228	.120	.123	29.4	20900	9580		
0250	2.1/2	2.500	2.360		.086	.219	.070	.078		2.313		2.98	2.84	.236	.228	.122	.123	29.7	21400	9900		
0255	—	2.559	2.419		.086	.219	.070	.078		2.377		3.09	2.94	.258	.250	.130	.123	31.7	21900	10100		
0262	2.5/8	2.625	2.481		.086	.225	.072	.078		2.428		3.11	2.96	.236	.228	.120	.123	35.0	22500	10700		
0268	2.11/16	2.688	2.541		.086	.230	.073	.078		2.485		3.32	3.18	.273	.246	.129	.123	36.0	23000	11200		
0275	2.3/4	2.750	2.602	±.005 -.000	.103	.231	.074	.093	±.003	2.543	+.020 -.030	3.33	3.18	.284	.276	.145	.123	47.0	28100	11500		
0287	2.7/8	2.875	2.721		.103	.240	.077	.093		2.659		3.42	3.26	.268	.260	.133	.123	48.4	29400	12500		
0293	2.15/16	2.938	2.779		.103	.247	.079	.093		2.717		3.49	3.32	.268	.260	.125	.123	50.0	30000	13200		
0300	3	3.000	2.838		.103	.252	.081	.093		2.775		3.55	3.38	.268	.260	.138	.123	51.5	30700	13700		
0306	3.1/16	3.062	2.898		.103	.255	.082	.093		2.832		3.61	3.44	.268	.260	.131	.123	56.8	31300	14200		
0312	3.1/8	3.125	2.957	±.006	.103	.261	.084	.093	±.003	2.892	+.020 -.030	3.75	3.57	.305	.272	.141	.123	57.9	32000	14800		
0315	3.5/32	3.156	2.986		.103	.264	.085	.093		2.920		3.74	3.56	.284	.276	.143	.123	59.0	32300	15200		
0325	3.1/4	3.250	3.076		.103	.270	.087	.093		3.006		3.83	3.65	.284	.276	.145	.123	61.9	33200	16000		
0334	3.11/32	3.346	3.166		.103	.279	.090	.093		3.092		3.93	3.74	.284	.276	.147	.123	63.9	34200	17000		
0343	3.7/16	3.438	3.257		.103	.280	.090	.093		3.179		4.02	3.83	.284	.276	.130	.123	65.9	35200	17600		
0350	3.1/2	3.500	3.316	±.007	.120	.285	.092	.109	±.004	3.237	+.020 -.040	4.15	3.96	.320	.285	.148	.123	71.9	42000	18200		
0354	—	3.543	3.357		.120	.288	.093	.109		3.277		4.20	4.00	.320	.288	.149	.123	72.9	42500	18600		
0362	3.5/8	3.625	3.435		.120	.294	.095	.109		3.352		4.28	4.09	.323	.315	.153	.123	76.0	43400	19500		
0368	3.11/16	3.688	3.493		.120	.301	.097	.109		3.410		4.31	4.11	.335	.302	.156	.123	80.0	44200	20300		
0375	3.3/4	3.750	3.552		.120	.306	.099	.109		3.468		4.44	4.23	.337	.310	.160	.123	82.9	44900	21000		
0387	3.7/8	3.875	3.673	±.007	.120	.312	.101	.109	±.004													

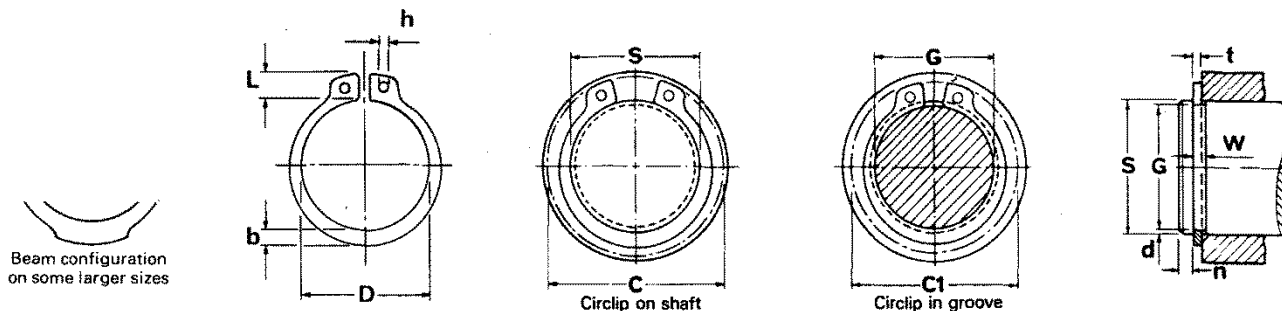
STANDARD HEAVY DUTY CIRCLIPS

D1460

INCORPORATING DIN 471 Table 2



All dimensions in mm



† Thrust load calculations see pages 9 & 10

SIZE CODE	Shaft S	Groove (G)					Circlip (F)										Wt. (kg/k)	Tc† (N)	Tg† (N)	SIZE CODE
		G	Tol.	W	Tol.	n (min)	d ~	t	Tol.	D	Tol.	C	C1	L (max)	b ~	h (min)				
0120	12	11.5		1.60		0.7	0.25	1.50		11.0		19.3	18.3	3.4	1.8	1.7	0.75	17500	1130	0120
0150	15	14.3		1.60		1.1	0.35	1.50		13.8		25.1	23.9	4.8	2.0	2.0	1.10	21900	2260	0150
0160	16	15.2	+0.00	1.60		1.2	0.40	1.50		14.7	+0.10	26.5	25.2	5.0	2.5	2.0	1.19	23400	2410	0160
0170	17	16.2	-0.11	1.60		1.5	0.40	1.50		15.7	-0.36	27.5	26.2	5.0	2.6	2.0	1.39	24800	3200	0170
0180	18	17.0		1.60		1.5	0.50	1.50	+0.00	16.5		28.7	27.2	5.1	2.7	2.0	1.56	26300	4070	0180
0190	19	17.8		1.60		1.8	0.60	1.50	-0.06	17.5	+0.13	29.9	28.2	5.2	2.5	2.0	1.45	27800	4300	0190
0200	20	19.0	+0.00	1.85		1.5	0.50	1.75		18.5	-0.42	31.5	30.0	5.5	3.0	2.0	2.19	34100	4150	0200
0220	22	21.0	-0.13	1.85		1.5	0.50	1.75		20.5		34.5	33.0	6.0	3.1	2.0	2.42	37500	4980	0220
0230	23	21.8	+0.00	1.85		1.8	0.60	1.75		21.3		35.7	34.0	6.1	3.2	2.0	2.60	39200	5200	0230
0240	24	22.9	-0.15	1.85		1.7	0.55	1.75		22.2		37.1	35.5	6.3	3.2	2.0	2.76	40900	5880	0240
0250	25	23.9		2.15		1.7	0.55	2.00		23.2		38.3	36.7	6.4	3.4	2.0	3.59	48700	6130	0250
0260	26	24.4	+0.00	2.15		2.4	0.80	2.00		23.6	+0.21	39.7	37.6	6.6	3.3	2.0	3.65	50600	7840	0260
0270	27	25.5	-0.21	2.15		2.3	0.75	2.00		24.7		40.5	38.5	6.5	3.4	2.0	3.85	52600	7630	0270
0280	28	26.6		2.15		2.1	0.70	2.00		25.9	-0.42	41.5	39.6	6.5	3.5	2.0	4.25	54500	8440	0280
0290	29	27.6		2.15		2.1	0.70	2.00		26.9		42.5	40.6	6.5	3.8	2.0	4.30	56500	7650	0290
0300	30	28.6		2.15		2.1	0.70	2.00		27.9		43.5	41.6	6.5	4.1	2.0	5.35	58400	9610	0300
0320	32	30.3		2.15		2.6	0.85	2.00		29.6		45.5	43.3	6.5	4.1	2.5	5.85	62300	10200	0320
0330	33	31.3		2.15	+0.14	2.5	0.85	2.00	+0.00	30.5		46.9	44.7	6.7	4.0	2.5	5.20	64300	10600	0330
0340	34	32.3		2.65	-0.00	2.6	0.85	2.50	+0.07	31.5		47.9	45.7	6.6	4.2	2.5	7.05	82800	12200	0340
0350	35	33.0		2.65		3.0	1.00	2.50		32.2	-0.50	48.9	46.4	6.7	4.2	2.5	7.20	85200	13200	0350
0360	36	33.8	+0.00	2.65		3.3	1.10	2.50		33.0		49.9	47.2	6.7	4.2	2.5	7.50	87600	14900	0360
0380	38	36.0	-0.25	2.65		3.0	1.00	2.50		35.2		52.1	49.6	6.8	4.3	2.5	8.30	92500	15800	0380
0400	40	37.5		2.65		3.8	1.25	2.50		36.5		55.0	51.5	7.0	4.4	2.5	8.60	80900	18800	0400
0420	42	39.5		2.65		3.8	1.25	2.50		38.5		57.4	53.9	7.2	4.5	2.5	9.30	84900	19800	0420
0450	45	42.5		2.65		3.8	1.25	2.50		41.5	+0.39	61.0	57.5	7.5	4.7	2.5	10.70	91000	21200	0450
0480	48	45.5		2.65		3.8	1.25	2.50		44.5	-0.90	64.6	61.1	7.8	5.0	2.5	11.30	97100	22600	0480
0500	50	47.0		3.15		4.5	1.50	3.00		45.8		67.0	63.0	8.0	5.1	2.5	15.30	121000	28300	0500
0520	52	49.0		3.15		4.5	1.50	3.00		47.8		69.4	65.4	8.2	5.2	2.5	16.60	126000	29400	0520
0550	55	52.0		3.15		4.5	1.50	3.00	+0.00	50.8	-0.08	73.0	69.0	8.5	5.4	2.5	17.10	133000	31100	0550
0580	58	55.0		3.15		4.5	1.50	3.00		53.8		76.6	72.6	8.8	5.6	2.5	18.90	141000	32800	0580
0600	60	57.0	+0.00	3.15		4.5	1.50	3.00		55.8		79.0	75.0	9.0	5.8	2.5	19.40	146000	33900	0600
0650	65	62.0	-0.30	4.15		4.5	1.50	4.00		60.8	+0.46	84.6	80.6	9.3	6.3	3.0	29.10	210000	36800	0650
0700	70	67.0		4.15		4.5	1.50	4.00		65.5	-1.10	90.0	86.0	9.5	6.6	3.0	35.30	226000	39600	0700
0750	75	72.0		4.15		4.5	1.50	4.00		70.5		95.4	91.4	9.7	7.0	3.0	39.30	243000	42400	0750
0800	80	76.5		4.15		5.3	1.75	4.00	+0.00	74.5		100.6	96.1	9.8	7.4	3.0	43.70	258000	52800	0800
0850	85	81.5		4.15		5.3	1.75	4.00	-0.10	79.5		106.0	101.5	10.0	7.8	3.5	48.50	275000	56100	0850
0900	90	86.5	+0.00	4.15		5.3	1.75	4.00		84.5		111.4	106.9	10.2	8.2	3.5	59.40	291000	59400	0900
0950	95	91.5	-0.35	4.15		5.3	1.75	4.00		89.5	+0.54	116.6	112.1	10.3	8.6	3.5	61.20	307000	62700	0950
1000	100	96.5		4.15		5.3	1.75	4.00		94.5	-1.30	122.0	117.5	10.5	9.0	3.5	71.60	324000	66200	1000

Standard material - carbon spring steel. Standard finish - phosphate and oil.

STANDARD HEAVY DUTY CIRCLIPS

N1460 EQUIVALENT TO MIL-R-21248/MS 3217

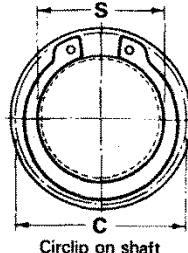
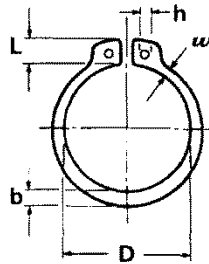


All dimensions
in inches
Standard material -
carbon spring steel.
Standard finish -
phosphate and oil.

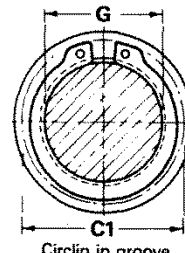


Beam configuration
on some larger sizes

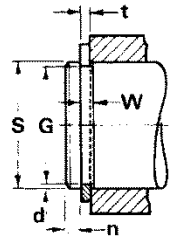
† Thrust load
calculations
see pages 9 & 10



Circlip on shaft



Circlip in groove

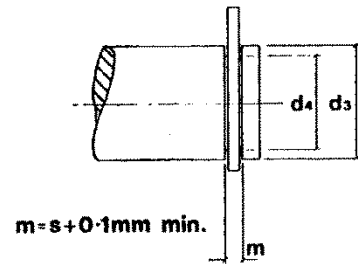
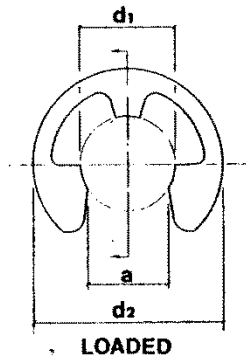


SIZE CODE	Shaft (S)		Groove (G)							Circlip (F)										Wt. (lb/k)	Tc† (lb.f)	Tg† (lb.f)
	S		G	Tol.	W	Tol.	n (min)	d ~	t	Tol.	D	Tol.	C	C1	L (max)	b ~	w ~	h (min)				
	(frac)	(dec)																				
0050	1/2	.500	.468	+.001 -.002	.056	+.004 -.000	.048	.016	.050	±.002	.460	+.005 -.010	.75	.72	.124	.090	.050	.048	1.6	3500	450	
0059	—	.591	.555		.056		.054	.018	.050		.543		.86	.83	.134	.104	.057	.048	2.2	4180	600	
0062	5/8	.625	.588		.056		.057	.019	.050		.575		.90	.86	.134	.106	.060	.048	2.3	4420	670	
0066	—	.669	.629	+.001 -.003	.056		.060	.020	.050		.616		.94	.90	.134	.114	.062	.048	2.6	4730	750	
0075	3/4	.750	.704		.086		.069	.023	.078		.689		1.12	1.08	.185	.127	.077	.076	5.6	8270	975	
0087	7/8	.875	.821	+.002 -.004	.086	+.005 -.000	.081	.027	.078	±.003	.804	+.010 -.015	1.25	1.20	.185	.148	.084	.076	7.5	9650	1330	
0098	63/64	.984	.925		.086		.090	.030	.078		.906		1.36	1.30	.185	.156	.089	.076	7.8	10800	1670	
0098	1	1.000	.938		.086		.093	.031	.078		.906		1.37	1.31	.185	.156	.089	.076	7.8	11000	1750	
0106	1.1/16	1.062	.998		.103		.096	.032	.093		.978		1.52	1.46	.225	.163	.092	.091	11.5	14000	1920	
0112	1.1/8	1.125	1.059		.103		.099	.033	.093		1.036		1.58	1.52	.225	.175	.100	.091	12.5	14800	2100	
0118	—	1.181	1.111	+.003 -.004	.103	+.006 -.000	.105	.035	.093	±.004	1.087	+.013 -.020	1.64	1.57	.225	.176	.098	.091	13.5	15500	2340	
0125	1.1/4	1.250	1.174		.103		.114	.038	.093		1.150		1.70	1.63	.225	.185	.103	.091	14.9	16400	2690	
0131	1.5/16	1.312	1.234		.103		.117	.039	.093		1.208		1.77	1.69	.225	.196	.110	.091	16.0	17200	2890	
0137	1.3/8	1.375	1.291		.103		.126	.042	.093		1.268		1.83	1.75	.225	.200	.110	.091	17.8	18000	3260	
0150	1.1/2	1.500	1.406		.120		.141	.047	.109		1.380		1.94	1.84	.215	.205	.105	.107	27.0	19000	3990	
0156	1.5/8	1.562	1.468	+.003 -.004	.120	+.006 -.000	.141	.047	.109	±.004	1.437	+.013 -.020	2.00	1.90	.215	.205	.110	.098	25.0	20000	4150	
0175	1.3/4	1.750	1.650		.120		.150	.050	.109		1.608		2.18	2.08	.215	.205	.111	.098	26.5	22500	4950	
0193	1.15/16	1.938	1.826		.139		.178	.056	.125		1.782		2.47	2.36	.264	.256	.121	.123	36.6	28500	6140	
0200	2	2.000	1.880		.139		.180	.060	.125		1.840		2.53	2.41	.265	.256	.122	.123	40.0	29500	6780	

To BS 3673 Pt. II

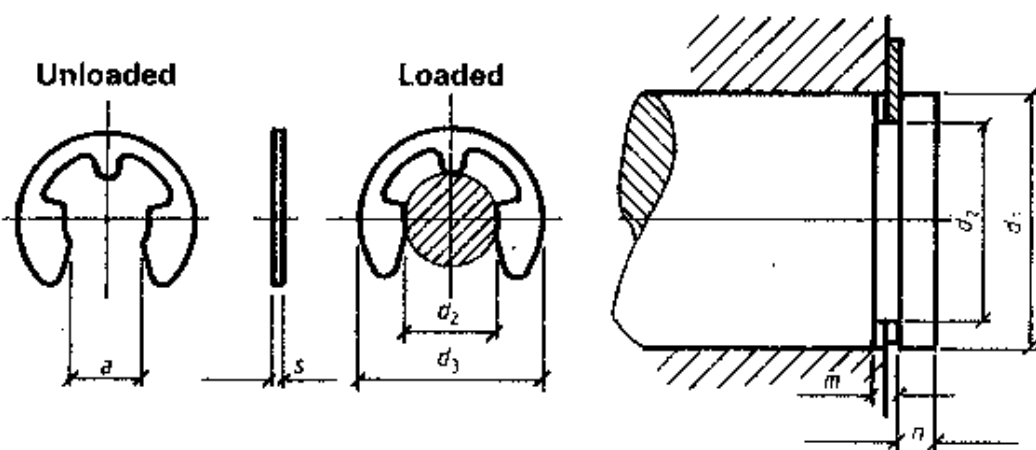
E TYPE

CIRCLIPS



Ref. No.	Nominal Size d3	SHAFT SIZES		Groove Dia. d4	Tolerance	Groove Width m	Tolerance	Free Dia.	Loaded Dia. d2	Thickness S	Tolerance
		From	To								
E-052	·062	$\frac{1}{16}$ "	$\frac{3}{32}$ "	·052	$\begin{matrix} +.002 \\ -.000 \end{matrix}$	·012	$\begin{matrix} +.002 \\ -.000 \end{matrix}$	·156	·176	·010	$\pm .0015$
E-056	·062	$\frac{5}{64}$ "	$\frac{3}{32}$ "	·056		·018		·152	·160	·016	
E-072	·094	$\frac{3}{32}$ "	$\frac{7}{32}$ "	·072		·023		·175	·180	·020	
E-074	·094	$\frac{3}{32}$ "	$\frac{7}{32}$ "	·074		·017		·187	·193	·015	
E-079	·110	$\frac{7}{64}$ "	$\frac{5}{32}$ "	·079		·023		·235	·243	·020	
E-087	·125	$\frac{7}{32}$ "	$\frac{5}{16}$ "	·087		·027		·230	·243	·024	
E-095	·125	$\frac{7}{32}$ "	$\frac{5}{16}$ "	·095		·017		·230	·243	·015	
E-102	·140	$\frac{9}{64}$ "	$\frac{11}{64}$ "	·102		·017		·203	·216	·015	
E-105	·140	$\frac{9}{64}$ "	$\frac{11}{64}$ "	·105		·028		·270	·287	·025	
E-110	·140	$\frac{9}{64}$ "	$\frac{3}{16}$ "	·110		·017		·250	·266	·015	
E-116	·156	$\frac{3}{16}$ "	$\frac{1}{4}$ "	·116		·023		·282	·299	·020	
E-123	·156	$\frac{3}{16}$ "	$\frac{1}{4}$ "	·123		·027		·275	·280	·024	
E-125	·171	$\frac{3}{16}$ "	$\frac{1}{4}$ "	·125	$\begin{matrix} +.003 \\ -.000 \end{matrix}$	·017	$\begin{matrix} +.003 \\ -.000 \end{matrix}$	·375	·395	·015	$\pm .002$
E-127	·171	$\frac{3}{16}$ "	$\frac{1}{4}$ "	·127		·028		·312	·331	·025	
E-147	·187	$\frac{3}{16}$ "	$\frac{1}{4}$ "	·147		·028		·335	·351	·025	
E-154	·187	$\frac{3}{16}$ "	$\frac{1}{4}$ "	·154		·031		·350	·365	·028	
E-188	·218	$\frac{7}{32}$ "	$\frac{5}{16}$ "	·188		·028		·440	·457	·025	
E-194	·234	$\frac{1}{2}$ "	$\frac{5}{8}$ "	·194		·031		·425	·440	·028	
E-210	·250	$\frac{1}{2}$ "	$\frac{5}{8}$ "	·210		·028		·527	·546	·025	
E-232	·281	$\frac{5}{16}$ "	$\frac{3}{8}$ "	·232		·031		·465	·475	·028	
E-250	·312	$\frac{5}{16}$ "	$\frac{3}{8}$ "	·250		·028		·500	·524	·025	
E-273	·328	$\frac{7}{16}$ "	$\frac{1}{2}$ "	·273		·040		·545	·555	·036	
E-303	·375	$\frac{7}{16}$ "	$\frac{1}{2}$ "	·303		·039		·660	·680	·035	
E-311	·406	$\frac{7}{16}$ "	$\frac{1}{2}$ "	·311		·043		·615	·630	·039	
E-343	·437	$\frac{7}{16}$ "	$\frac{1}{2}$ "	·343	$\begin{matrix} +.003 \\ -.000 \end{matrix}$	·039	$\begin{matrix} +.004 \\ -.000 \end{matrix}$	·687	·710	·035	$\pm .002$
E-350	·468	$\frac{1}{2}$ "	$\frac{1}{2}$ "	·350		·047		·715	·730	·043	
E-380	·468	$\frac{1}{2}$ "	$\frac{1}{2}$ "	·380		·039		·600	·632	·035	
E-389	·500	$\frac{1}{2}$ "	$\frac{1}{2}$ "	·389		·051		·775	·790	·047	
E-396	·500	$\frac{1}{2}$ "	$\frac{1}{2}$ "	·396		·046		·800	·821	·042	
E-468	·562	$\frac{9}{16}$ "	$\frac{11}{16}$ "	·468		·055		·890	·910	·051	
E-485	·625	$\frac{9}{16}$ "	$\frac{11}{16}$ "	·485		·046		·940	·961	·042	
E-580	·750	$\frac{3}{4}$ "	$\frac{1}{2}$ "	·580		·054		1·120	1·142	·050	
E-586	·875	$\frac{3}{4}$ "	$\frac{1}{2}$ "	·586		·063		1·125	1·150	·059	
E-743	1·000	1"	1"	·743		·073		1·456	1·476	·069	
E-940	1·125	1 $\frac{1}{8}$ "	1 $\frac{1}{8}$ "	·940		·082		1·732	1·750	·079	






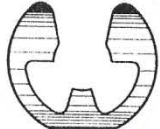





















'E' TYPE To DIN 6799 RETAINING RINGS



Nominal Size d2	RING DIMENSIONS							GROOVE DIMENSIONS					
	d1		s	Tol.	a	Tol.	Wt. per 1000 in kg =	d2	Tol.	m	Tol.	n Min.	d3 Max.
	From	To											
0.8	1.0	1.4	0.20	±0.02	0.58	±0.04	0.003	0.8	+0 —0.34	0.24	+0.04	0.4	2.25
1.2	1.4	2.0	0.30		1.01		0.009	1.2	+0 —0.06	0.34	—0	0.6	3.25
1.6	2.0	2.5	0.40		1.28		0.021	1.6		0.44	0.8	4.25	
1.9	2.5	3.0	0.50		1.61		0.040	1.9		0.54	1.0	4.80	
2.3	3.0	4.0	0.60		1.94		0.069	2.3		0.64	1.0	6.30	
3.2	4.0	6.0	0.60	±0.048	2.70	±0.048	0.088	3.2	+0 —0.075	0.64	+0.05 —0	1.0	7.30
4.0	5.0	7.0	0.70		3.34		0.158	4.0		0.74		1.2	9.30
5.0	6.0	8.0	0.70		4.11		0.236	5.0		0.74		1.2	11.30
6.0	7.0	9.0	0.70		5.26		0.255	6.0		0.74		1.2	12.30
7.0	8.0	11.0	0.90		5.84		0.474	7.0		0.94		1.5	14.30
8.0	9.0	12.0	1.00	±0.03	6.52	±0.088	0.660	8.0	+0 —0.09	1.05	+0.08 —0	1.8	16.30
9.0	10.0	14.0	1.10		7.63		1.090	9.0	1.15	2.0		18.60	
10.0	11.0	15.0	1.20		8.32		1.250	10.0	1.25	2.0		20.40	
12.0	13.0	18.0	1.30		10.45		1.530	12.0	1.35	2.5		23.40	
15.0	16.0	24.0	1.50		12.61	±0.07	3.370	15.0	1.55	3.0		29.40	
19.0	20.0	31.0	1.75	±0.084	15.92	±0.084	6.420	19.0	+0 —0.13	1.60		3.5	37.60
24.0	25.0	38.0	2.00		21.88		8.550	24.0	2.05	4.0		44.80	
30.0	32.0	42.0	2.50		25.80		13.600	30.0	2.55	4.5		52.60	

Other circlips and Spring Ring types available ex factory in the United Kingdom. Very limited stock is available on our shelves of selected items, Full details and specifications available on request.

NOTE: Circlips Pliers and Assortment kits are available ex stock.

REINFORCED E'RINGS 	CRESCENT RINGS 	E'RING VARIANTS 	E'RING VARIANTS 	E'RING VARIANTS 	BOWED E'RINGS 
INCREASED ABUTMENT 'K' TYPE 	INCREASED ABUTMENT 'K' TYPE 	PLAIN RINGS EXTERNAL 	PLAIN RINGS INTERNAL 	HEAVY DUTY CIRCLIPS EXT 	HEAVY DUTY CIRCLIPS INT 
PLAIN RINGS EXTERNAL 	'A' CLIPS ROUND SECTION 	PLAIN RINGS INTERNAL 	PLAIN WIRE RINGS ROUND SECT 	BALANCED LUG CIRCLIPS EXT 	BALANCED LUG CIRCLIPS INT 
'C' CLIPS ROUND SECTION 	SUPPORT RINGS & SHIMS 	BEVELLED CIRCLIPS 	GRIP RINGS METRIC 	GRIP RINGS IMPERIAL 	
CIRCLIP PLIERS 	APPLICATORS 	STACK-FEEDAS 	ASSORTMENT KITS 		

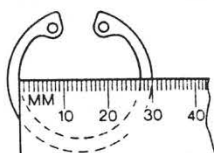
Circlip Size Identification

For our standard circlips, size is expressed as the diameter of the bore or shaft for which the clip is designed. For all External (type 471) and Internal (Type 472) circlips, a rough check on the size can be performed as follows: -

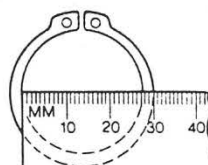
With the clip held lugs uppermost, measure with a ruler horizontally from the inside diameter on one side to the outside diameter on the opposite side.

This gives the size of the circlip to 1mm for most sizes.

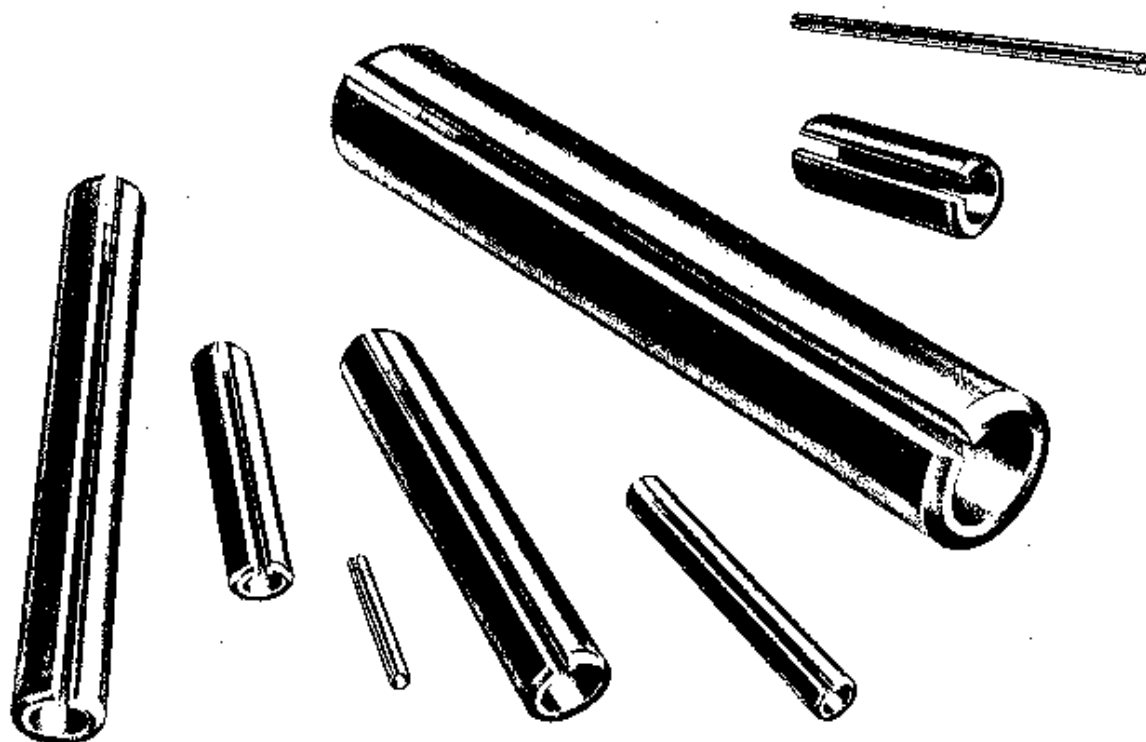
Internal (Type 472)



External (Type 471)



Spring pins



Spring Pins are a simple but highly versatile engineering component used to replace rivets, split pins, taper pins, dowel pins, bolts etc.

They are slotted to permit compression when inserted into the drilled hole, the elasticity of the material then exerting a continuous radial force over the full length of the pin.

Spring Pins are chamfered both ends to facilitate installation and removal. They are re-usable, self-locking and self-aligning. In addition, the permanent spring action takes up hole wear during normal service meaning there is no re-working of holes required.

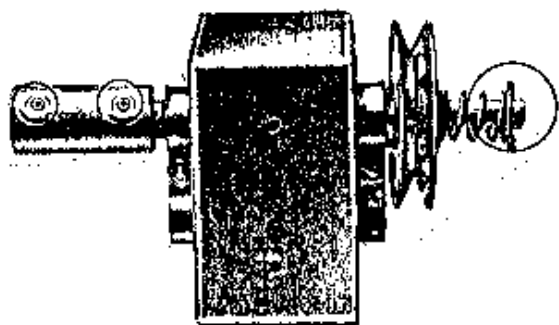
MATERIAL: Carbon Spring Steel

FINISH: Oil and Phosphated

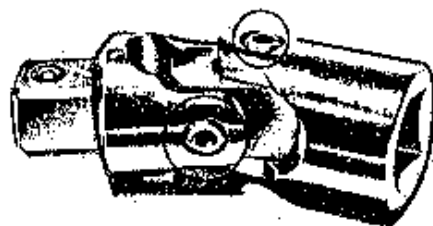
NON-STANDARD MATERIALS & SIZES: A range of spring pins outside those listed are available on indent ex UK.

STAINLESS STEEL and ZINC PLATED pins are available in most common sizes on one weeks delivery.

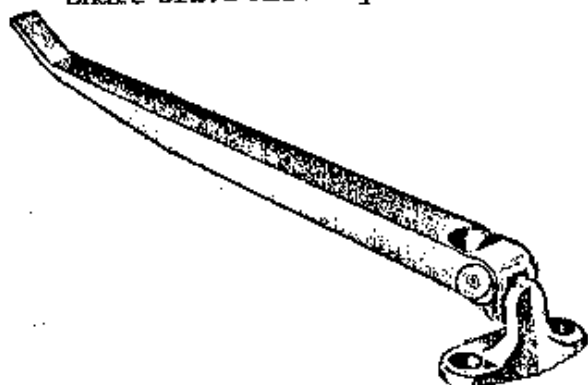
Some Applications



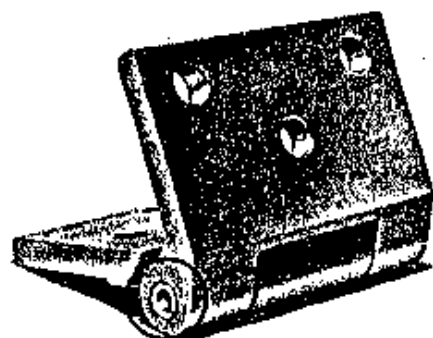
Shaft Drive Assembly Pins



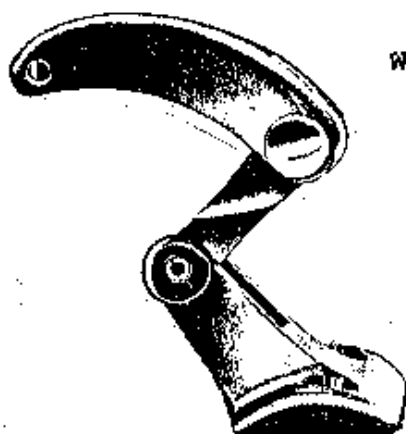
Clevis Joint Pivot Pins



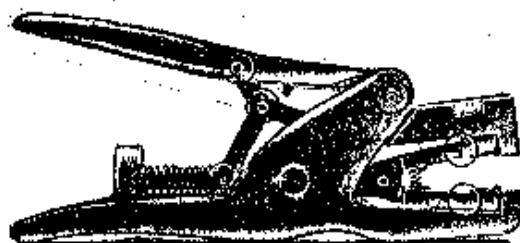
Window Stay



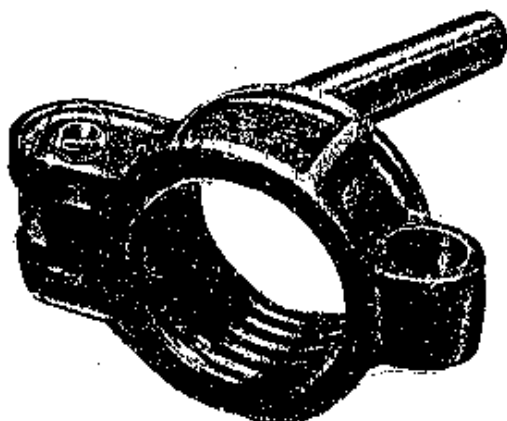
Hinge Pin



Automobile Window Stay Pivot Pin



Retaining Pin and Pivot Pin



Handle Retaining Pin



Stop Pin

Spring pins

IMPERIAL SIZES

1/16	x	3/16	1/8	x	3/16	3/16	x	7/8	1/4	x	1.5/8	7/16	x	3/4
	x	1/4		x	1/4		x	15/16		x	1.3/4		x	1
	x	5/16		x	5/16		x	1		x	1.7/8		x	1.1/4
	x	3/8		x	3/8		x	1.1/8		x	2		x	1.1/2
	x	7/16		x	7/16		x	1.1/4		x	2.1/4		x	1.3/4
	x	1/2		x	1/2		x	1.3/8		x	2.1/2		x	2
	x	9/16		x	9/16		x	1.1/2		x	2.3/4		x	2.1/4
	x	5/8		x	5/8		x	1.5/8		x	3		x	2.1/2
	x	11/16		x	11/16		x	1.3/4		x	3.1/4		x	2.3/4
	x	3/4		x	3/4		x	1.7/8		x	3.1/2		x	3
	x	13/16		x	13/16		x	2		x	3.3/4		x	3.1/4
	x	7/8		x	7/8		x	2.1/4		x	4		x	3.1/2
	x	15/16		x	15/16		x	2.1/2	5/16	x	3/8		x	3.3/4
	x	1		x	1		x	2.3/4		x	5/8		x	4
	x	1.1/4		x	1.1/8		x	3		x	3/4			
	x	1.1/2		x	1.1/4					x	13/16	1/2	x	3/4
				x	1.3/8	7/32	x	3/8		x	7/8		x	1
5/64	x	3/16		x	1.1/2		x	7/16		x	15/16		x	1.1/4
	x	1/4		x	1.5/8		x	1/2		x	1		x	1.1/2
	x	5/16		x	1.3/4		x	9/16		x	1.1/8		x	1.3/4
	x	3/8		x	1.7/8		x	5/8		x	1.1/4		x	2
	x	7/16		x	2		x	11/16		x	1.3/8		x	2.1/4
	x	1/2					x	3/4		x	1.1/2		x	2.1/2
	x	9/16	5/32	x	1/4		x	13/16		x	1.5/8		x	2.3/4
	x	5/8		x	5/16		x	7/8		x	1.3/4		x	3
	x	11/16		x	3/8		x	15/16		x	1.7/8		x	3.1/4
	x	3/4		x	7/16		x	1		x	2		x	3.1/2
	x	13/16		x	1/2		x	1.1/8		x	2.1/4		x	3.3/4
	x	7/8		x	9/16		x	1.1/4		x	2.1/2		x	4
	x	15/16		x	5/8		x	1.3/8		x	2.3/4			
	x	1		x	11/16		x	1.1/2		x	3			
	x	1.1/8		x	3/4		x	1.5/8		x	3.1/4			
	x	1.1/4		x	13/16		x	1.3/4		x	3.1/2			
	x	1.3/8		x	7/8		x	1.7/8		x	3.3/4			
	x	1.1/2		x	15/16		x	2		x	4			
3/32	x	5/32		x	1		x	2.1/4						
	x	3/16		x	1.1/8		x	2.1/2	3/8	x	5/8			
	x	1/4		x	1.1/4		x	2.3/4		x	3/4			
	x	5/16		x	1.3/8		x	3		x	7/8			
	x	3/8		x	1.1/2					x	1			
	x	7/16		x	1.5/8					x	1.1/8			
	x	1/2		x	1.3/4	1/4	x	3/8		x	1.1/4			
	x	9/16		x	1.7/8		x	7/16		x	1.3/8			
	x	5/8		x	2		x	1/2		x	1.1/2			
	x	11/16		x	2.1/4		x	9/16		x	1.5/8			
	x	3/4		x	2.1/2		x	5/8		x	1.3/4			
	x	13/16					x	11/16		x	1.7/8			
	x	7/8	3/16	x	1/4		x	3/4		x	2			
	x	15/16		x	3/8		x	13/16		x	2.1/4			
	x	1		x	7/16		x	7/8		x	2.1/2			
	x	1.1/8		x	1/2		x	15/16		x	2.3/4			
	x	1.1/4		x	9/16		x	1		x	3			
	x	1.3/8		x	5/8		x	1.1/8		x	3.1/4			
	x	1.1/2		x	11/16		x	1.1/4		x	3.1/2			
				x	3/4		x	1.3/8		x	3.3/4			
				x	13/16		x	1.1/2		x	4			

Spring pins

METRIC SIZES

M2	x 5	M3	x 22	M5	x 26	M6	x 95	M10	x 36
	x 6		x 24		x 28		x 100		x 40
	x 8		x 26		x 30				x 45
	x 10		x 28		x 32	M8	x 10		x 50
	x 12		x 30		x 35		x 12		x 55
	x 14		x 32		x 36		x 14		x 60
	x 16		x 35		x 40		x 16		x 65
	x 18		x 36		x 45		x 18		x 70
	x 20		x 40		x 50		x 20		
	x 22		x 50		x 55		x 22	M10	x 75
	x 24				x 60		x 24		x 80
	x 26	M4	x 6		x 65		x 26		x 85
	x 28		x 8		x 70		x 28		x 90
	x 30		x 10		x 75		x 30		x 95
	x 40		x 12		x 80		x 32		x 100
			x 14				x 35		
M2.5	x 5		x 16	M6	x 10		x 36	M12	x 18
	x 6		x 18		x 12		x 40		x 20
	x 8		x 20		x 14		x 45		x 22
	x 10		x 22		x 16		x 50		x 24
	x 12		x 24		x 18		x 55		x 26
	x 14		x 26		x 20		x 60		x 28
	x 16		x 28		x 22		x 65		x 30
	x 18		x 30		x 24		x 70		x 32
	x 20		x 32		x 26		x 75		x 35
	x 22		x 35		x 28		x 80		x 36
	x 24		x 36		x 30		x 85		x 40
	x 26		x 40		x 32		x 90		x 45
	x 28		x 45		x 35		x 95		x 50
	x 30		x 50		x 36		x 100		x 55
	x 40		x 60		x 40				x 60
					x 45				x 65
M3	x 5	M5	x 8		x 50	M10	x 16		x 70
	x 6		x 10		x 55		x 18		x 75
	x 8		x 12		x 60		x 20		x 80
	x 10		x 14		x 65		x 22		
	x 12		x 16		x 70		x 24		
	x 14		x 18		x 75		x 26	M16	x 50
	x 16		x 20		x 80		x 28		x 75
	x 18		x 22		x 85		x 30		x 80
	x 20		x 24		x 90		x 32		x 100
							x 35		x 140

COMBINATION PINS: Where exceptionally high strengths are required, one pin can be driven **inside** an already inserted **outer** pin. It is recommended that the hole be kept to the high side and pin gaps be staggered to 180 degrees.

The following chart shows the correct sizes to couple.

IMPERIAL RANGE -	Outer Pin	Inner Pin	METRIC RANGE -	Outer Pin	Inner Pin
	7/32 in	1/8 in		5 mm	3 mm
	1/4 in	5/32 in		6 mm	3.5 mm
	5/16 in	3/16 in		8 mm	5 mm
	3/8 in	7/32 in		10 mm	6 mm
	1/2 in	5/16 in		12 mm	8 mm
				14 mm	8 mm
				16 mm	10 mm

OTHER SPRING PINS AVAILABLE ON INDENT BASIS AGAINST FIRM ORDER

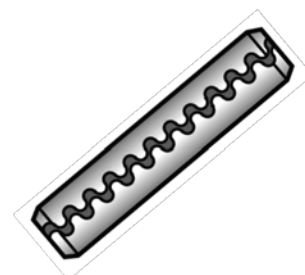
COILED SPRING PINS

Stainless Steel Material
Wound to 2.1/4 turns
Metric sizes only available
Size range 1.5mm - 12mm diameter



SKEW PROOF ROLLED WAVE SPRING PINS

Stainless Steel Material
Metric sizes only available
Size range 1.5mm - 8mm diameter

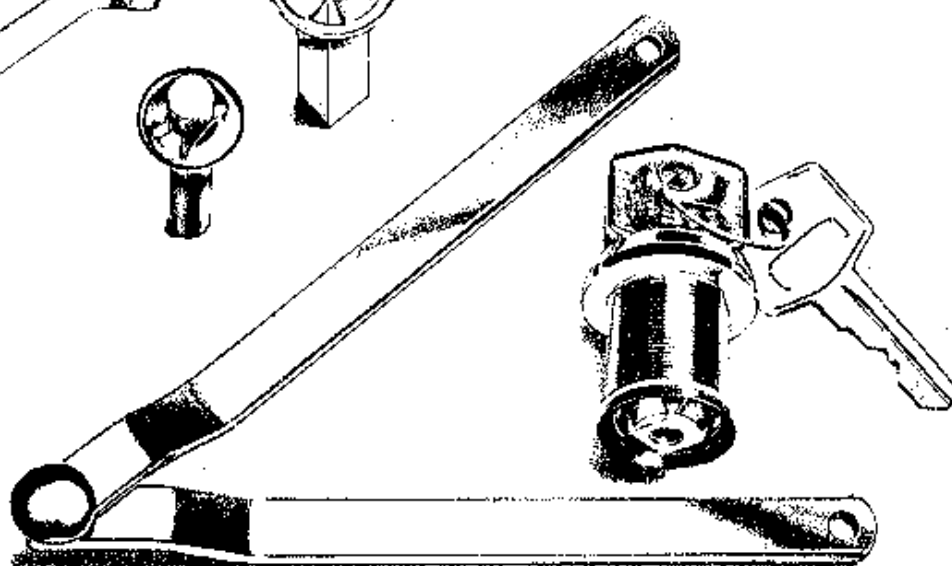
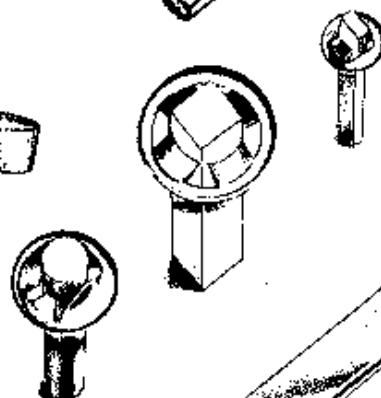
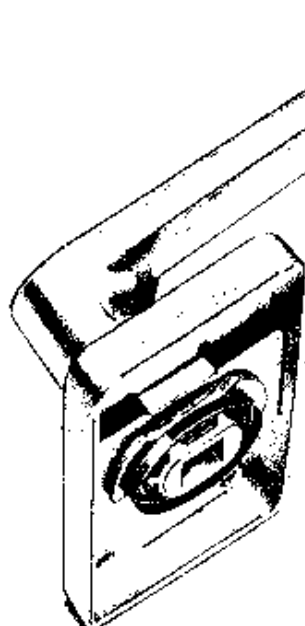
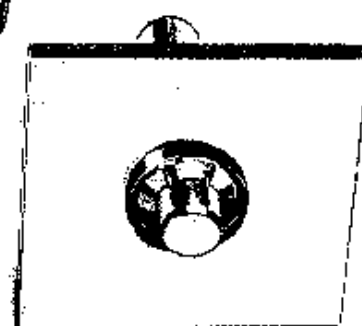
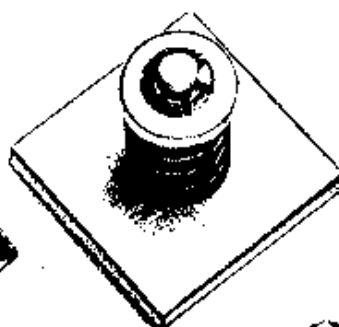
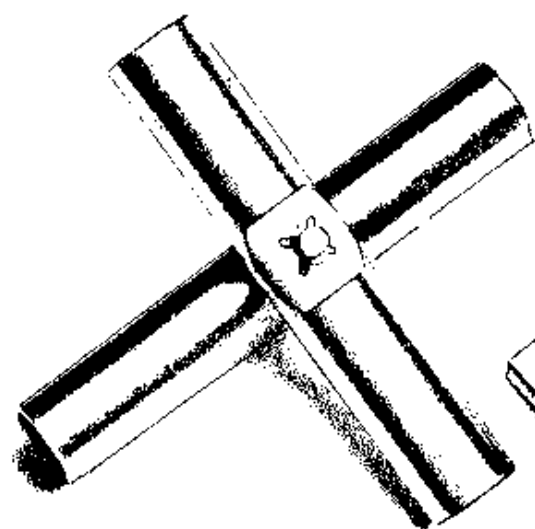


Starlock®

Push-on Fasteners in Spring and Stainless Steel

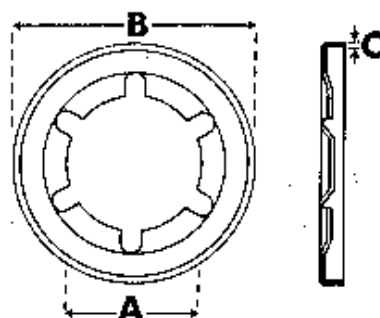


Some Applications



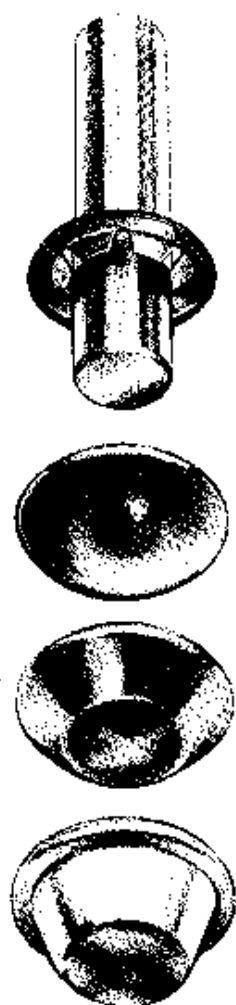
schrodoco

Starlock Push-on Fasteners



for a round shaft

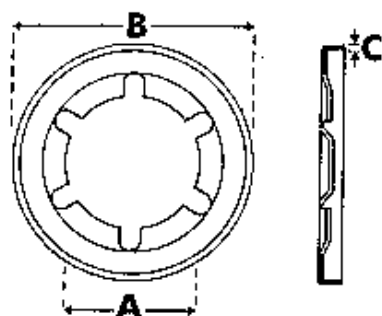
Starlock Push-on Fasteners were designed for use where a quick, permanent and efficient means of assembly is required to retain plain shafts of steel, non-ferrous and plastic materials. They are not normally recommended for use on hard plated or hardened surfaces.



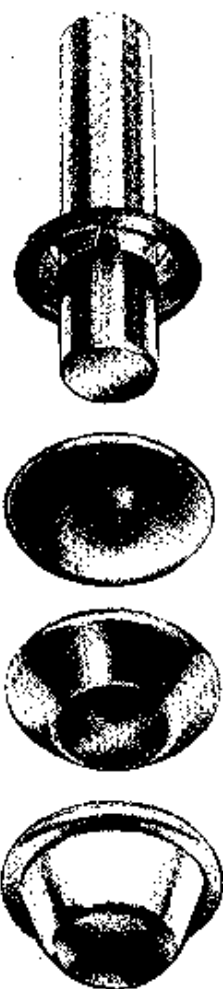
A Shaft Size	Part No. Uncapped	B Outside Diameter	C Material Thickness	Part No. Capped	E Outside Diameter	Size of Cap	Dome	Type of Axle	Cap Deep	Remarks
1/16	6488	.250	.008	6339	.282	0	C			
1/16	6218	.380	.008	6232	.418	1	CKS	KS		Standard
3/32	6330	.250	.008	6333	.282	0	C			
3/32	5883	.380	.008	6221	.418	1	CKS	KS		Standard
.104	6823	.380	.008	6892	.418	1	CKS	KS		
1/8	7025	.250	.008	7161	.282	0	C			
1/8	5897	.380	.008	6222	.418	1	CKS	KS		Standard
.144	6833	.380	.008	6891	.418	1	CKS	KS		
5/32	6707	.375	.008							
5/32	5928	.450	.008	6223	.480	2	CKS	KS	A	Standard
3/16	5920	.450	.008	6224	.480	2	CKS	KS	A	Standard
3/16	6500	.450	.012	7245	.480	2	CKS	KS	A	
3/8	7127	.600	.010	7201	.635	3	CKS	KS	A	
3/8	6718	.725	.012	6680	.775	4	CKS	KS	A	
7/32	6324	.450	.008	6235	.480	2	CKS	KS	A	Standard
7/32	6934	.600	.010	7155	.635	3	CKS	KS	A	
7/32	7108	.725	.012	8027	.775	4	CKS	KS	A	
1/4	5873	.600	.010	6225	.635	3	CKS	KS	A	Standard
1/4	7068	.600	.014	7244	.635	3	CKS	KS	A	
1/4	7029	.725	.012	7159	.775	4	CKS	KS	A	
9/32	6326	.600	.010	6236	.635	3	CKS	KS	A	Standard
9/32	6937	.725	.010	7167	.775	4	CKS	KS	A	
9/32	6938	.983	.010	7168	1.031	5	CKS	KS		
3/2	7136	1.437	.010	8028	1.510	6	CS			
5/16	5821	.600	.010	6226	.635	3	CKS	KS	A	Standard
5/16	7037	.600	.012	7169	.635	3	CKS	KS	A	
11/32	6332	.725	.012	6238	.775	4	CKS	KS	A	Standard
11/32	7109	.983	.012	8029	1.031	6	CS			
.365	6213	.725	.012	6233	.775	4	CKS	KS	A	
3/8	6020	.725	.012	6227	.775	4	CKS	KS	A	Standard
3/8	6482	.725	.016	7172	.775	4	CKS	KS	A	
5/8	6931	1.625	.020	7153	1.687	8	CS			
13/32	6331	.725	.012	6239	.775	4	CKS	KS	A	Standard
13/32	7110	.983	.012	7208	1.031	6	CS			
7/16	6494	.725	.012	6661	.775	4	CKS	KS	A	
7/16	6216	.983	.016	6228	1.031	5	CKS	KS		Standard
1/2	6143	.983	.016	6229	1.031	5	CKS	KS		Standard
11/32	6325	.983	.016	6237	1.031	5	CKS	KS		Standard
3/4	6720	.983	.008	7156	1.031	5	CKS	KS		
3/4	6185	.983	.016	6231	1.031	5	CKS	KS		Standard
3/4	6323	1.437	.008	7176	1.510	6	CS			

All dimensions shown are in inches and are approximate only.

Starlock Push-on Fasteners



for a round shaft



A Shaft Size	Part No. Uncapped	B Outside Diameter	C Material Thickness	Part No. Capped	E Outside Diameter	Size of Cap	Dome	Type of Cap Axle	Deep Axle	Remarks
3/4	6322	1.437	.016	6234	1.510	6	CS			Standard
7/8	6328	1.500	.018	6335	1.560	6A	CS			Standard
1	7064	1.625	.008	7178	1.510	6	CS			
1	6329	1.625	.020	6334	1.687	8	CS			Standard
1	6495	1.625	.028	7177	1.687	8	CS			
1 1/8	7061	1.625	.020	7248	1.687	8	CS			
1.225	7137	1.625	.020	7202	1.687	8	CS			

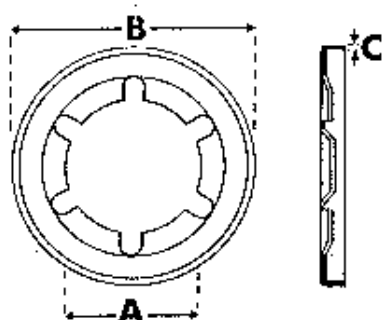
All dimensions shown are in inches and are approximate only.

Uncapped fasteners can be supplied in blue and varnish or in mechanical zinc plated finishes and certain sizes are available in stainless steel. Those uncapped fasteners shown as standard are readily available in blue and varnish finish.

Caps can be supplied in chrome plated mild steel reference C, in aluminium reference K, in stainless steel reference S and in zinc plated mild steel reference A as shown in the columns above.

Capped fasteners shown as standard are readily available in the following finish:- Blue and varnish fastener with chrome plated mild steel cap.

Starlock Push-on Fasteners



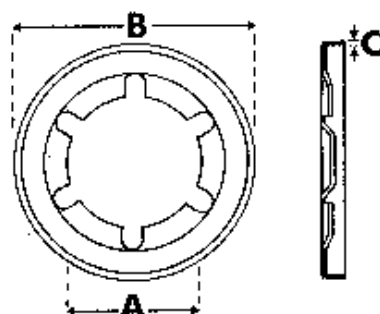
for a round shaft



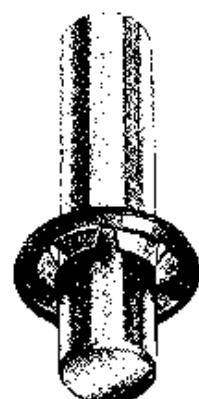
A Shaft Size	Part No. Uncapped	B Outside Diameter	C Material Thickness	Part No. Capped	E Outside Diameter	Size of Cap	Dome	Type of Cap Axle	Deep Axle	Remarks
1.5	6499	6.35	0.2	6669	7.2	0	C			
1.5	8004	9.7	0.2	7204	10.6	1	CKS	KS		Standard
2	6933	6.35	0.2	7154	7.2	0	C			
2	6489	9.7	0.2	6662	10.6	1	OKS	KS		Standard
2.5	7114	8.5	0.2							
3	6490	9.7	0.2	6663	10.6	1	CKS	KS		Standard
3	7184	14.8	0.3							
3.5	8006	9.7	0.2	8032	10.6	1	CKS	KS		
4	6492	11.5	0.2	6665	12.2	2	CKS	KS	A	Standard
4.5	7080	11.5	0.2	7206	12.2	2	CKS	KS	A	
5	6491	11.5	0.2	6664	12.2	2	CKS	KS	A	Standard
5	7129	11.5	0.3	8037	12.2	2	CKS	KS	A	
5	7077	15.2	0.25	7250	16.2	3	CKS	KS	A	
6	7073	14.5	0.25							
6	6493	15.2	0.25	6666	16.2	3	CKS	KS	A	Standard
6	7036	15.2	0.4	7160	16.2	3	CKS	KS	A	
6	8002	18.4	0.3	8031	19.7	4	CKS	KS	A	
6.75	7030	18.4	0.25	7158	19.7	4	CKS	KS	A	
7	6703	15.2	0.25	6670	16.2	3	CKS	KS	A	Standard
8	6704	15.2	0.25	6671	16.2	3	CKS	KS	A	Standard
8	7192	18.4	0.3	7207	19.7	4	CKS	KS	A	
8	7067	25.0	0.3	7243	26.2	5	CKS	KS		
8.5	7101	15.2	0.25	8033	16.2	3	CKS	KS	A	
9	6708	18.4	0.3	6674	19.7	4	CKS	KS	A	Standard
10	6496	18.4	0.3	6668	19.7	4	CKS	KS	A	Standard
10	7074	25.0	0.4	7249	26.2	5	CKS	KS		
11	6706	18.4	0.3	6673	19.7	4	CKS	KS	A	Standard
12	6713	25.0	0.4	6675	26.2	5	CKS	KS		Standard
13	6829	25.0	0.4	6885	26.2	5	CKS	KS		Standard
14	7065	23.0	0.4							
14	7078	25.0	0.4	8034	26.2	5	CKS	KS		
14	6825	28.1	0.4	6881	29.4	5A	CS			Standard
15	6714	28.1	0.4	6676	29.4	5A	CS			Standard
16	6826	28.1	0.4	6882	29.4	5A	CS			Standard
17	6715	28.1	0.4	6677	29.4	5A	CS			Standard
18	8001	28.1	0.4	8035	29.4	5A	CS			
18	6827	36.5	0.4	6883	38.2	6	CS			Standard
19	6828	36.5	0.4	6884	38.2	6	CS			Standard
20	7032	31.0	0.4							
20	6716	36.5	0.4	6678	38.2	6	CS			Standard
21	6830	36.5	0.4	6886	38.2	6	CS			Standard
22	6719	36.5	0.4	6889	38.2	6	CS			Standard
23	6831	38.0	0.45	6887	39.8	6A	CS			Standard
24	7035	38.0	0.5	7241	39.8	6A	CS			

All dimensions shown are in mm's and are approximate only.

Starlock Push-on Fasteners



for a round shaft



A Shaft Size	Part No. Uncapped	B Outside Diameter	C Material Thickness	Part No. Capped	E Outside Diameter	Size of Cap	Dome	Type of Cap Axle	Deep Axle	Remarks
24	6832	41.3	0.45	6888	43.0	8	CS			Standard
25	6717	41.3	0.5	6679	43.0	8	CS			Standard
27	7194	41.3	0.5	8036	43.0	8	CS			

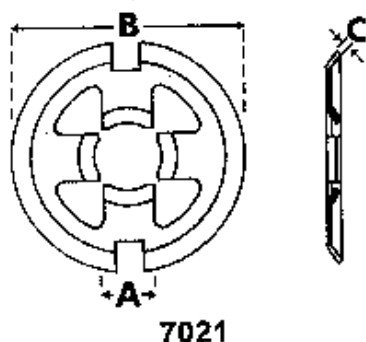
All dimensions shown are in mm's and are approximate only.

Uncapped fasteners can be supplied in bronze and varnish or in mechanical zinc plated finishes and certain sizes are available in stainless steel. Those uncapped fasteners shown as standard are readily available in bronze and varnish finish.

Caps can be supplied in chrome plated mild steel reference C, in aluminium reference K, in stainless steel reference S and in zinc plated mild steel reference A, as shown in the columns above.

Capped fasteners shown as standard are readily available in the following finish: - Bronze and varnish fastener with chrome plated mild steel cap.

Starlock Push-on Fasteners



for a square shaft



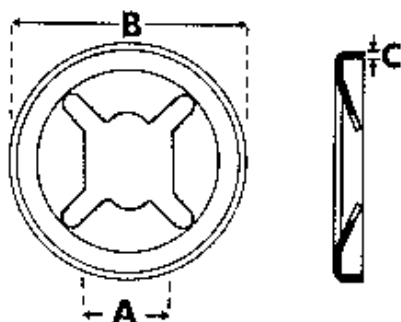
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This application originated from the door lock manufacturers. The unusual shape of the piercing is designed to give point contacts on the sides of the square shaft, and extra flexibility gives a wide range of fitting, i.e. part 7023 is suitable for shafts from .300" to .312" with two slots to assist in location on assembly.

A Shaft Size A/FLATS	Part No.	B Outside Diameter	C Material Thickness	Remarks
8mm	7021	20mm	.018	2 slots in O/D flangeless

All dimensions shown are in inches and are approximate only.

These fasteners can be supplied in blue and varnish or in mechanical zinc plated finishes.



for a square shaft



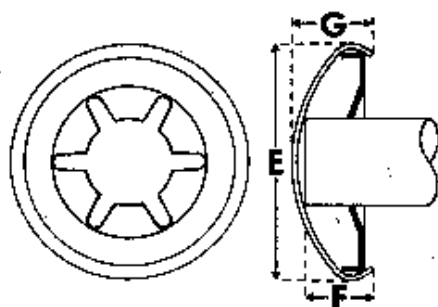
The 7mm square Starlock 7066 features two retaining teeth and two flat legs pieced to the nominal shaft size for location purposes.

A Shaft Size A/FLATS	Part No. Uncapped	B Outside Diameter	C Material Thickness	Part No. Capped	E Outside Diameter	Size of Cap	Dome	Type of Cap Axle	Deep Axle	Remarks
7mm	7066	18.4mm	0.4mm	7252	19.7mm	4	OKS	KS	A	

These fasteners can be supplied in bronze and varnish or in mechanical zinc plated finishes.

Caps can be supplied in chrome plated mild steel reference C, in aluminium reference K, in stainless steel reference S and in zinc plated mild steel reference A, as shown in the columns above.

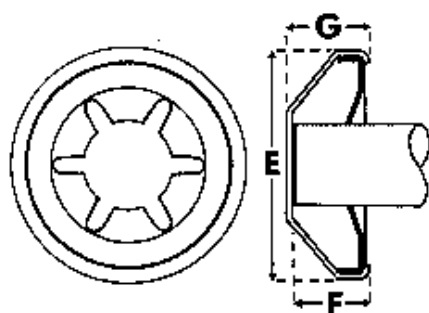
Starlock Push-on Fasteners



dome capped type



Size	E Outside Diameter	F Depth of Penetration of Shaft	G Height		E Outside Diameter	F Depth of Penetration of Shaft	G Height
0	.285	.050	.115	I	7.2	1.3	2.9
1	.418	.062	.125		10.6	1.6	3.0
2	.480	.075	.145		12.2	1.9	3.7
3	.635	.100	.187		16.2	2.55	4.75
4	.775	.125	.225		19.7	3.15	5.7
5	1.031	.187	.300		26.2	4.75	7.6
5A					29.4	5.0	9.15
6	1.510	.281	.475		38.2	7.15	12.1
6A	1.560	.312	.515		39.8	7.95	13.5
8	1.687	.290	.515		43.0	7.4	13.5
IMPERIAL INCHES					METRIC MM		

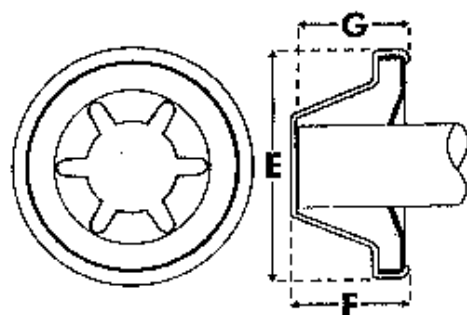


axle capped type

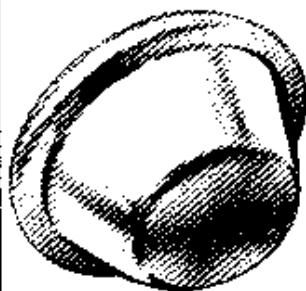


Size	E Outside Diameter	F Depth of Penetration of Shaft	G Height		E Outside Diameter	F Depth of Penetration of Shaft	G Height
1	.416	.146	.156		10.57	3.71	3.96
2	.485	.160	.170		12.32	4.06	4.32
3	.635	.200	.210		16.13	5.08	5.33
4	.770	.225	.235		19.55	5.72	5.97
5	1.035	.270	.284		26.29	6.86	7.21
IMPERIAL INCHES					METRIC MM		

Starlock Push-on Fasteners



deep axle capped
type



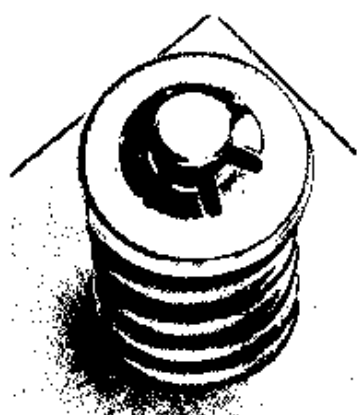
Size	E Outside Diameter	F Depth of Penetration of Shaft	G Height	E Outside Diameter	F Depth of Penetration of Shaft	G Height
2	.485	.210	.220	2.32	5.33	5.59
3	.635	.275	.285	16.13	6.99	7.24
4	.770	.310	.320	19.56	7.87	8.13

IMPERIAL INCHES

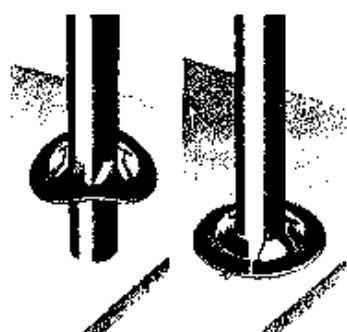
MÉTRIC MM

OTHER STARLOCK TYPES AVAILABLE ON INDENT ONLY

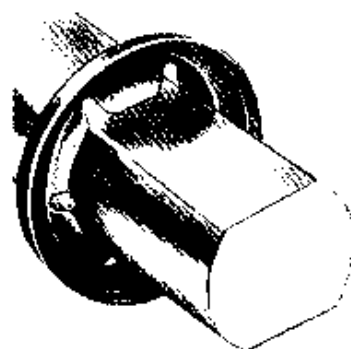
Full details including Drawings, Dimensions and Finishes available on request. These items are usually available immediately ex factory in the United Kingdom with deliveries from one to two weeks via Airpost, or one week via Airfreight.



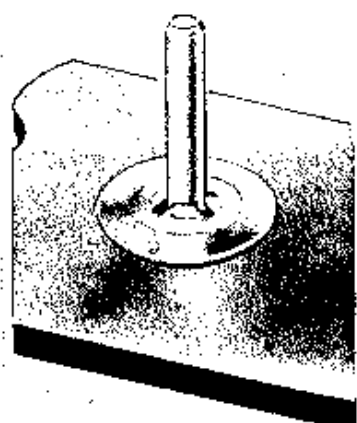
Reversed type



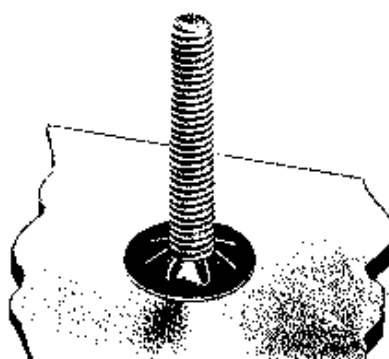
Single waved type



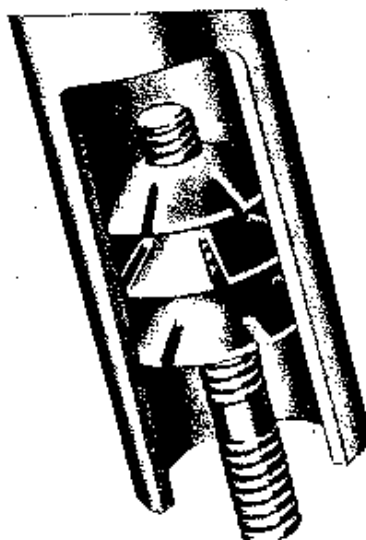
Double D type



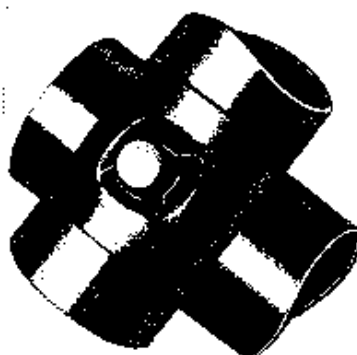
Belleville Type



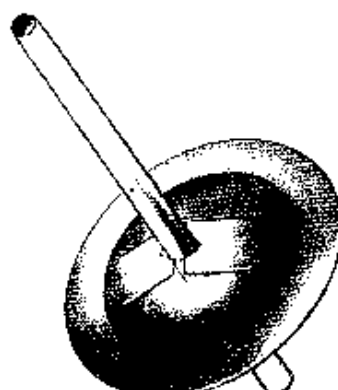
Screw retainer type



Inlock type



tube clip type



flangeless type



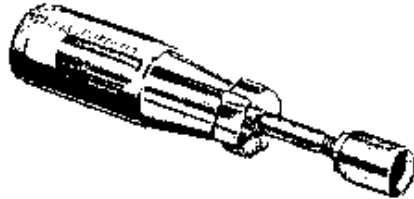
square shaft

STARLOCK ASSEMBLY TOOLS

REFERENCE

UNCAPPED

Handle		6110
Magnetic Ferrule for Starlock Washer sizes	1.5mm	6119
	1/16", 3/32", 1/8", 2mm, 3mm	6111
	5/32", 3/16", 7/32", 4mm, 5mm	6112
	1/4", 9/32", 5/16", 6mm, 7mm, 8mm	6113
	11/32", 3/8", 13/32", 9mm, 10mm, 11mm	6114
	1/2", 5/8", 7/16", 15/32", 17/32", 12mm, 13mm	6115
	14mm, 15mm, 16mm, 17mm	6400
	3/4", 7/8", 18mm, 19mm, 20mm, 21mm, 22mm, 23mm	6118
	1", 24mm, 25mm	6388
	Tube Clip	7001

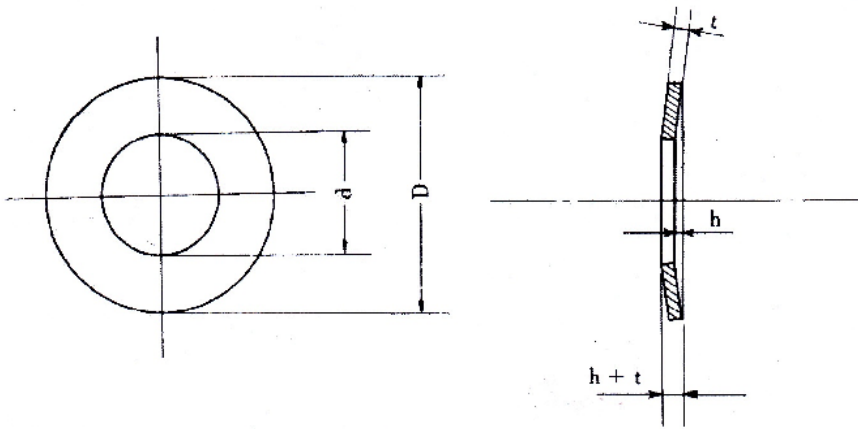


Extended Magnetic Ferrule for Starlock Washer sizes	1.5mm	6898
	1/16", 3/32", 1/8", 2mm, 3mm	6391
	5/32", 3/16", 7/32", 4mm, 5mm	6392
	1/4", 9/32", 5/16", 6mm, 7mm, 8mm	6393
	11/32", 3/8", 13/32", 9mm, 10mm, 11mm	6394
	1/2", 5/8", 7/16", 15/32", 17/32", 12mm, 13mm	6395

CAPPED

Handle		6110
Magnetic Ferrule for Starlock Washer sizes	1.5mm	6387
	1/16", 3/32", 1/8", 2mm, 3mm	6381
	5/32", 3/16", 7/32", 4mm, 5mm	6382
	1/4", 9/32", 5/16", 6mm, 7mm, 8mm	6383
	11/32", 3/8", 13/32", 9mm, 10mm, 11mm	6384
	7/16", 15/32", 1/2", 17/32", 5/8", 12mm, 13mm	6385
	14mm, 15mm, 16mm, 17mm	6893
	3/4", 18mm, 19mm, 20mm, 21mm, 22mm	6389
	7/8", 23mm	6897
	1", 24mm, 25mm	6398

DISC SPRING WASHERS



Unit: mm

Size-No.	d		D		H (Heavy Duty)				L (Light Duty)			
	Basic	Tol.	Basic	Tol.	t		h	h + t	t		h	h + t
					Basic	Tol.			Basic	Tol.		
DB- 4	4.2	+0.3 -0.1	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	+0.4 -0.1	18	±0.4	1		0.4	1.4	0.7		0.5	1.2
10	10.2		20		1	±0.07	0.45	1.45	0.8	±0.06	0.55	1.35
11	11.2		22.5		1.2		0.5	1.7	0.8		0.65	1.45
12	12.2		25		1.5	±0.07	0.55	2.05	0.9	±0.06	0.7	1.6
14	14.2		28		1.5		0.65	2.15	1		0.8	1.8
16	16.3	+0.5 -0.2	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	±0.1	0.9	2.9	1.5	±0.08	1.15	2.65
• 22	22.4		45		2.5		1	3.5	1.75		1.3	3.05
25	25.4		50		3	±0.12	1.1	4.1	2	±0.1	1.4	3.4
• 28	28.5	+0.6 -0.4	56	±0.6	3		1.3	4.3	2		1.6	3.6
30	31		63		3.5	±0.15	1.4	4.9	2.5	±0.12	1.75	4.25
35	36		71		4		1.6	5.6	2.5		2	4.5
40	41		80		5	±0.15	1.7	6.7	3	±0.12	2.3	5.3
45	46		91		5		2	7	3.5		2.5	6
• 50	51	±0.7	100	±0.7	6		2.2	8.2	3.5		2.8	6.3

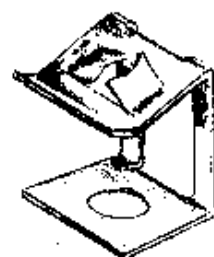
Material=Carbon spring steel. Hardness=HRC40~50.

Finish=Black phosphate coating (ACP). Zn plating, Chromate dip.



PRE-MET

ENGINEERING SOLUTIONS

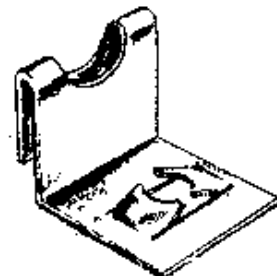


FLAT NUTS

ANGLE NUTS

CAPTIVE NUTS

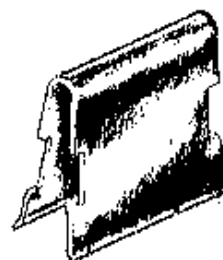
PUSH ON FIXES



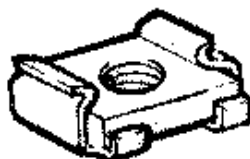
COMPRESSION RINGS

KNOB TO SHAFT CLIPS

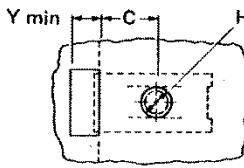
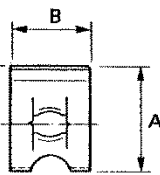
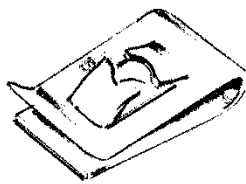
EDGE CLIPS



CAGED NUTS

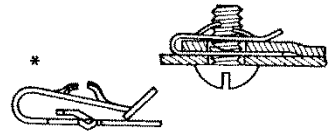


CAPTIVE NUTS U TYPE



PANEL LAYOUT FOR EDGE OR CENTRE MOUNTING

APPLICATION

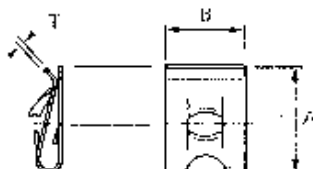


NOTE: EARTHING NUTS BARBS ENGAGE MOUNTING AND BACKING PANELS

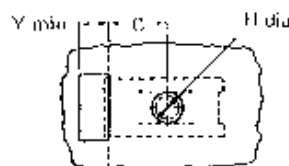
Self Retaining Clips for Panel Assembly. For Course and Machine Screw Threads.

Part No.	Screw Size	A Ins mm	B Ins mm	C Ins mm	T Ins mm	H Ins mm	Panel Range Ins mm	Y Ins mm	Type
L.S.400/10 SNU 1812	No. 4 AB SMS	7/16 11.08	5/16 7.94	3/16 4.75	.020 .508	3/16 4.75	.028/.048 .711/1.22	.218 5.53	U
L.S.400/52 SNU 2449	No. 4 AB SMS	7/16 11.08	5/16 7.94	3/16 4.75	.020 .508	3/16 4.75	.024/.028 .610/.710	.218 5.53	U
L.S.400/11 SNU 1219	No. 6 AB SMS	41/64 16.25	7/16 11.08	17/64 6.75	.022 .558	15/64 5.94	.028/.040 .711/1.62	.240 6.10	U
L.S.400/26	No. 6 AB SMS	41/64 16.25	7/16 11.08	17/64 6.75	.022 .558	15/64 5.94	.040/.064 1.016/1.626	.240 6.10	U
L.S.400/27 SNU 2811	No. 6 AB SMS	15/32 11.70	5/16 7.90	7/32 5.50	.022 .560	.205 5.20	.036/.048 .910/1.20		U
L.S.400/80	No. 6 AB SMS	15/32 11.70	5/16 7.90	7/32 5.50	.022 .560	.205 5.20	.080/.085 2.03/2.16		U
L.S.400/55 SNU 2954	No. 8 AB SMS	21/32 16.66	7/16 11.08	17/64 6.75	.022 .558	15/64 5.94	.100/.110 2.50/2.75	.300 7.62	U
L.S.400/62 SNU 2592	No. 6 AB SMS	3/8 9.50	5/16 7.90		.022 .560	.151/.161 3.84/4.09	.036/.048 .910/1.22		U
L.S.400/63 SNU 3374	No. 6 AB SMS	15/32 11.70	5/16 7.90	7/32 5.50	.022 .560	.205 5.20	.036/.048 .910/1.20	.205 5.20	U
L.S.400/13 SNU 1686	No. 8 AB SMS	35/64 13.89	1/2 12.70	7/32 5.53	.024 .610	9/32 7.11	.048/.064 1.22/1.62	.281 7.14	U
L.S.400/14 SNU 0536	No. 8 AB SMS	21/32 16.66	7/16 11.08	7/16 11.08	.024 .610	9/32 7.11	.028/.064 .711/1.62	.300 7.62	U
L.S.400/15	No. 8 AB SMS	21/32 16.66	7/16 11.08	17/64 6.75	.024 .610	9/32 7.11	.028/.064 .711/1.62	.300 7.62	U
L.S.400/24 SNU 3248	No. 8 AB SMS	21/32 16.66	7/16 11.08	9/32 7.11	.024 .610	9/32 7.11	.028/.040 .711/1.01		U *
L.S.400/35 SNU 3088	No. 8 AB SMS	5/8 15.88	7/16 11.08		.024 .610		.028/.064 .711/1.62		U
L.S.400/40 SNU 3381	No. 8 AB SMS	.650 16.50	.340 8.60	.344 8.74	.028 .710	.200 5.08	.028/.040 .710/1.02	.296 7.52	U
L.S.400/41 SNU 3106	No. 8 AB SMS	.600 15.20	.560 14.20	.312 7.92	.024 .610	.250 6.35	.032/.070 .810/1.78	.344 8.74	U
L.S.400/42 SNU 3247	No. 8 AB SMS	.650 16.50	.440 11.20	.265 6.73	.024 .610	.281 7.14	.036/.064 .910/1.63	.344 8.74	U *
L.S.400/48 SNU 1907	No. 8 AB SMS	43/64 17.07	7/16 11.11	17/64 6.75	.024 .610	1/4 6.35	.125/.140 3.175/3.55	.312 7.94	U
L.S.400/49 SNU 2569	No. 8 AB SMS	41/64 16.27	7/16 11.11	17/64 6.75	.024 .610	9/32 7.14	.100/.110 2.50/2.75	.300 7.62	U
L.S.400/50 SNU 3115	No. 8 AB SMS	37/64 14.68	1/2 12.70	7/32 5.53	.026 .660	9/32 7.11	.022/.040 .558/1.02	.281 7.14	U
L.S.400/53 SNU 1686	No. 8 AB SMS	35/64 13.89	1/2 12.70	7/32 5.53	.024 .610	9/32 7.11	.040/.045 1.01/1.143	.281 7.14	U
L.S.400/70 SNU 3333	No. 8 AB SMS	9/16 14.29	1/2 12.70	7/32 5.56	.024 .610	9/32 7.14	.022/.060 .559/1.52		U *
L.S.400/71	No. 8 AB SMS	9/16 14.29	1/2 12.70	7/32 5.56	.024 .610	9/32 7.14	.060/.092 1.52/2.34		U *
L.S.400/85 SNU 1864	No. 8 AB SMS	37/64 14.68	1/2 12.70	7/32 5.53	.026 .660	9/32 7.11	.022/.048 .558/1.22	.281 7.14	U
L.S.400/64 SNU 1561	No. 8 AB SMS	31/32 24.61	7/16 11.11	9/16 14.29	.024 .610	9/32 7.14	.028/.064 .711/1.62	.420 10.67	U
L.S.400/65 SNU 2013	No. 8 AB SMS	1.5/64 27.38	1/2 12.70	23/32 18.26	.024 .610	17/64 6.75	.080/.104 2.03/2.64	.344 8.74	U
L.S.400/67 SNU 2598	No. 8 AB SMS	29/32 23.02	7/16 11.11	.526/.536 13.36/13.61	.028 .710	7/32 5.56	.140/.164 3.56/4.16		U
L.S.400/68 SNU 3194	No. 8 AB SMS	.614 15.80	11/32 8.73	.344 max. 8.74 max.	.028 .710	.205 min 5.21 min	.115/.122 2.92/3.09		U

CAPTIVE NUTS U TYPE CONTINUED



U TYPE



PANEL LAYOUT FOR EDGE OR CENTRE MOUNTING

APPLICATION



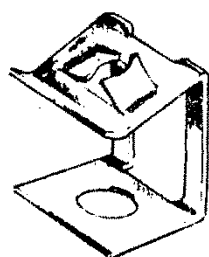
PREVAILING TORQUE TYPE DESIGNED FOR MORE ARDUOUS CONDITIONS

Self Retaining Clips for Panel Assembly. For Course and Machine Screw Threads.

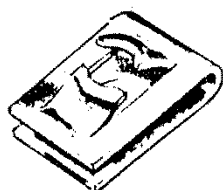
Part No.	Screw Size	A ins mm	B ins mm	C ins mm	T ins mm	H ins mm	Panel Range ins mm	Y ins mm	Type
L.S.400/88 SNF 3160	No. 8 AB SMS	.860 16.50	.440 11.20	.265 6.73	.024 .610	.281 7.14	.028/.064 .710/1.63	.437 11.10	*
L.S.400/25 SNU 0537	No.10 AB SMS	.25/32 19.81	1/2 12.70	5/16 7.94	.028 .710	5/16 7.94	.036/.080 .914/2.03	.370 9.40	U
L.S.400/43 SNU 1747 SNU 5275	No.10 AB SMS	.484 12.30	.625 15.88	.218 5.56	.028 .710	.312 7.94	.036/.064 .910/1.63		U
L.S.400/72 SNU 2310	No.10 AB SMS	.25/32 19.81	1/2 12.70	5/16 7.94	.028 .710	5/16 7.94	.036/.080 .914/2.03	.370 9.40	U
L.S.400/68 SNF 3176	No.10 AB SMS	.780 19.80	.500 12.70	.312 7.93	.028 .710	.312 7.93	.036/.104 .910/2.64	.563 14.30	*
L.S.400/73 SNU 3617	No.12 AB SMS	.930 23.60	.590 15.10	.500 12.70	.036 .910	.375 9.50	.036/.064 .910/1.60		U
L.S.400/74 SNU 0538	No.12 AB SMS	1.1/32 26.16	19/32 15.08	7/16 7.94	.032 .710	25/64 7.94	.036/.104 .914/2.03	.390 9.40	U
L.S.400/77 SNU 1866	No.12 AB SMS	1.11/64 29.77	19/32 15.08	9/16 14.29	.032 .813	9/32 7.14	.036/.104 .914/2.64	.390 9.91	U
L.S.400/92	6BA	7/16 11.11	5/16 7.94	3/16 4.75	.0108 .27	3/16 4.75	.018/.040 .46/1.00		U
L.S.400/32 SNU 0522	4 BA	.39/64 15.47	7/16 11.08	1/4 6.35	.0136 .345	1/4 6.35	.028/.064 .711/1.62	.245 6.20	U
L.S.400/33 SNU 0524	2BA	.25/32 19.81	1/2 12.70	5/16 7.94	.0164 .419	5/16 7.94	.036/.080 .914/2.03	.200 5.08	U
L.S.400/44 SNU 2498	2BA	.740 18.80	.410 10.40	.437 11.10	.016 .410	.265 6.73	.028/.040 .710/1.02	.187 4.75	U
L.S.400/34	6PK	.23/64 9.14	5/16 7.94		.0124 .315		.048/.064 1.22/1.62		U
L.S.400/37 SNU 0630	3/16 BSW	.25/32 19.81	1/2 12.70	5/16 7.94	.022 .558	5/16 7.94	.038/.080 .914/2.03	.370 5.08	U
L.S.400/46 SNU 0531	1/4 BSW	.31/32 24.61	5/8 15.88	13/32 10.32	.024 .610	13/32 10.32	.036/.104 .914/2.64	.400 10.18	U
L.S.400/81 SNU 1718	1/4 BSW	.15/16 23.81	5/8 15.90	7/16 11.11	.024 .610	8/32 7.14	.094/.104 2.34/2.64	.312 7.94	U
L.S.400/78 SNU 2037	5/16 ACME	1.1/16 26.99	5/8 15.88	17/32 13.49	.044 1.12	7/16 11.11	.036/.064 .914/1.62	.500 12.70	U
L.S.400/79 SNU 2213	5/16 ACME	1.1/16 26.99	5/8 15.88	1/2 12.70	.044 1.12	7/16 11.11	.080/.104 2.03/2.84	.500 12.70	U
L.S.400/46 SNU 3682	M6 x 1.0	.830 21.10	.550 14.00	.405 10.29	.022 .560	.394 10.00	.036/.104 .910/2.64	.400 10.16	U

Part No.		Screw Size	A mm	B mm	C mm	T mm	H mm	Panel Range mm	Y mm	Type
L.S.400/75	SNU 1218	M4	16.5	11	6.35	.35	6.35	.71/1.6	5	U
L.S.400/76		M6	19.8	12.7	8.0	.42	8	.91/2.1	5	U

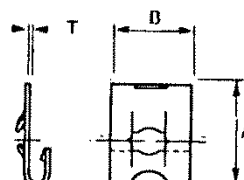
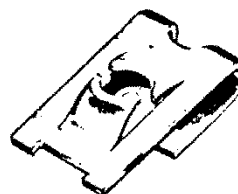
CAPTIVE NUTS CHASSIS OPEN AND J TYPES



CHASSIS TYPE

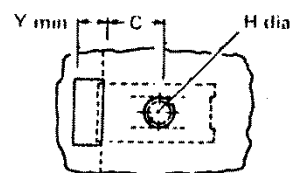
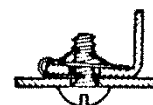


OPEN TYPE



J TYPE

APPLICATION

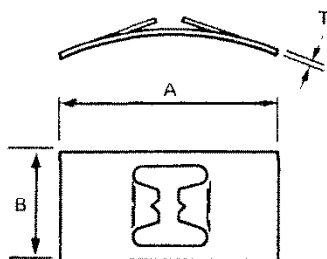
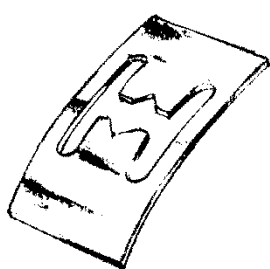


Panel layout with edge
or centre mounting

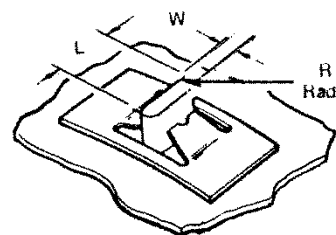
Self Retaining Clips for Panel Assembly. For Course and Machine Screw Threads.

Part No.	Screw Size	A ins mm	B ins mm	C ins mm	T ins mm	H ins mm	Panel Range ins mm	Y ins mm	Type
L.S.400/12 SNU2031	No. 6 AB SMS	31/64 12.29	1/2 12.70	1/4 6.35	.022 .558	7/32 5.53	.480/.520 12.19/13.20		Chassis
L.S.400/21 SNU 1898	No. 8 AB SMS	39/64 15.47	9/16 14.27	5/16 7.94	.024 .610	1/4 6.35	.610/.640 15.50/16.26		Chassis
L.S.400/38 SNU 2250	No. 8 AB SMS	31/64 12.30	1/2 12.70	15/64 5.95	.024 .610	7/32 5.56	.315/.354 8.0/9.0		Chassis
L.S.400/39 SNU 2251	No. 8 AB SMS	17/32 13.49	1/2 12.70	17/64 6.75	.024 .610	7/32 5.56	.236/.275 6.0/7.0		Chassis
L.S.400/16 SNU 1875	No. 8 AB SMS	13/32 10.31	11/32 8.74	11/64 4.37	.020 .508	17/64 6.75	.048/.064 1.22/1.62	.250 6.35	Open
L.S.400/17 SNU 2285	No. 8 AB SMS	15/32 11.91	13/32 10.31	3/16 4.75	.020 .508	1/4 6.35	.045 1.14	.250 6.35	Open
L.S.400/47 SNU 2032	No. 8 AB SMS	15/32 11.91	13/32 10.32	3/16 4.76	.020 .508	1/4 6.35	.032/.038 .813/.965	.250 6.35	Open
L.S.400/54 SNJ 1198/4	No. 6 AB SMS	21/32 16.67	7/16 11.11	9/32 7.14	.022 .558	15/64 5.95	.024/.040 .610/1.02	.160 4.06	J
L.S.400/83 SNJ 1198/6	No. 6 AB SMS	21/32 16.67	7/16 11.11	9/32 7.14	.022 .558	15/64 5.95	.048/.064 1.22/1.63	.160 4.06	J
L.S.400/56 SNJ 0116/5	No. 8 AB SMS	21/32 16.67	7/16 11.11	9/32 7.14	.024 .610	9/32 7.14	.028/.048 .711/1.22	.220 5.59	J
L.S.400/84 SNJ 0116/6	No. 8 AB SMS	21/32 16.67	7/16 11.11	9/32 7.14	.024 .610	9/32 7.14	.056/.072 1.42/1.83	.220 5.59	J
L.S.400/59 SNJ 0117/5	No.10 AB SMS	.780 19.80	.500 12.70	.344 8.74	.028 .710	.312 7.92	.028/.048 .710/1.22	.250 6.35	J
L.S.400/60 SNJ 0117/6	No. 10 AB SMS	.780 19.80	.500 12.70	.344 8.74	.028 .710	.312 7.92	.056/.080 1.42/2.03	.250 6.35	J
L.S.400/91 SNJ 1977	No.10 AB SMS	.5/8 15.88	11/16 17.46	9/32 7.14	.028 .710	5/16 7.94	.032/.040 .813/1.02	.250 6.35	J
L.S.400/86 SNJ 0118/8	No.12 AB SMS	1 25.40	19/32 15.08	7/16 11.11	.032 .813	3/8 9.53	.072/.104 1.83/2.64	.365 9.27	J
L.S.400/81 SNJ 1861	No.14 AB SMS) 1/4 x 12 ACME)	.690 17.50	.750 19.00	.312 7.92	.036 .910	.344 8.74	.036/.064 .910/1.63	.281 7.14	J
L.S.400/90 SNJ 1761	1/4 x 12 ACME	1.1/32 26.19	5/8 15.88	1/2 12.70	.036 .910	25/64 9.92	.036/.064 .914/1.63	.312 7.94	J
L.S.400/87 SNJ 0110/5	3/16 BSW	25/32 19.84	1/2 12.70	11/32 8.73	.022 .560	5/16 7.94	.028/.048 .710/1.22	.180 4.57	J

PUSH ON FIXES (RECTANGULAR TYPES)



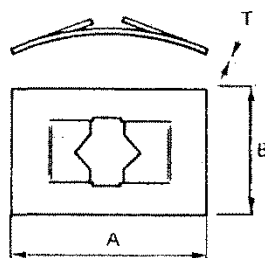
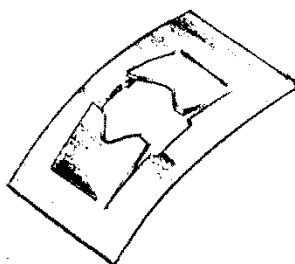
APPLICATION



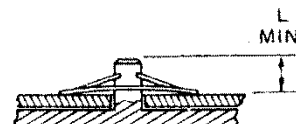
FOR USE ON PLAIN RECTANGULAR STUDS

Ideal for speedy application on many light duty assemblies.

Part No.	L ins mm	W ins mm	R max ins mm	Min. Stud Protrusion ins mm	A ins mm	B ins mm	T ins mm
L.S.403/15 SFO 2123	1/4 6.35	.079/.082 2.0/2.1	.041 1.04	1/8 3.18	7/16 11.08	3/8 9.53	.0148 .376
L.S.403/24 SFO 3003	1/4 6.35	.026/.029 .66/.74	.015 .38	1/8 3.18	7/16 11.08	3/8 9.53	.0148 .376
L.S.403/26 SFO 2974	1/4 6.35	.075/.080 1.9/2.03	.040 1.02	1/8 3.18	27/32 21.43	3/8 9.53	.0148 .274
L.S.403/30 SFO 1924	1/4 6.35	.060/.064 1.52/1.63	.031 .787	1/8 3.18	27/64 10.7	3/8 9.53	.0148 .376



APPLICATION

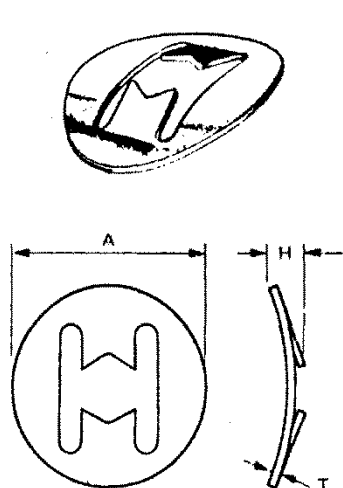


FOR USE ON PLAIN ROUND STUDS

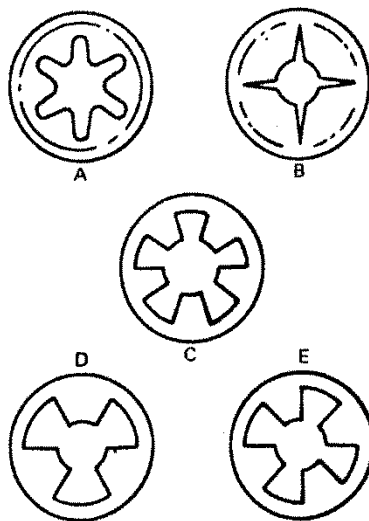
Ideal for speedy application on many light duty assemblies. Standard Finish:— B and L

Part No.	Stud Diameter ins mm	A ins mm	B ins mm	T ins mm	H ins mm	Stud Tolerance ins mm	L min. ins mm
L.S.403/29 SFP 1722	3/32 2.38	7/16 11.10	1/4 6.35	.0124 .315	—	.091/.094 2.31/2.39	1/8 3.18
L.S.403/25 SFP 2113	.118 3.00	1/2 12.7	5/16 7.94	.0136 .345	5/32 3.97	.113/.120 2.87/3.10	—
L.S.403/21 SFP 0211	1/8 3.18	1/2 12.7	5/16 7.94	.0136 .345	.055 1.40	.122/.126 3.10/3.20	5/32 3.97
L.S.403/31 SFP 0212	5/32 3.97	9/16 14.30	3/8 9.53	.0148 .376	—	.153/.157 3.89/3.99	3/16 4.76
L.S.403/22 SFP 0213	3/16 4.76	5/8 15.88	3/8 9.53	.0148 .376	.068 1.73	.184/.189 4.70/4.80	3/16 4.76
L.S.403/33 SFP 2114	.197 5.00	5/8 15.88	3/8 9.53	.0148 .376	—	.194/.199 4.93/5.10	3/16 4.76
L.S.403/34 SFP 2115	.236 6.00	3/4 19.10	1/2 12.7	.0164 .417	—	.232/.238 5.89/6.10	7/32 5.56
L.S.403/23 SFP 0215	1/4 6.35	3/4 19.05	1/2 12.7	.0164 .419	.095 2.41	.246/.252 6.25/6.40	7/32 5.56
L.S.403/32 SFP 0216	5/16 7.94	7/8 22.20	5/8 15.9	.0164 .419	—	.308/.314 7.82/7.98	1/4 6.35

PUSH ON FIXES (ROUND TYPE)



STANDARD DESIGN



DESIGN VARIATIONS

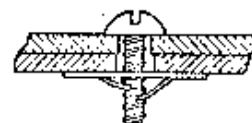
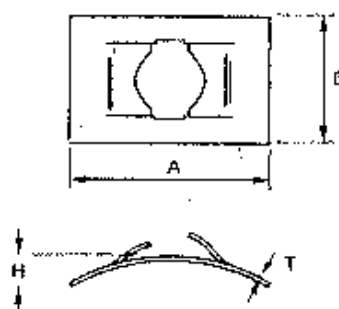
APPLICATION



For use on Plain Round Studs. Ideal for speedy application on many light duty assemblies.

Part No.	Stud Diameter ins mm	A ins mm	T ins mm	L min ins mm	Stud Tolerance ins mm	H ins mm	Design Variation
*L.S.403/13	3/32 2.38	3/8 9.53	.010 .254	—	.091/.094 2.31/2.39	—	B
L.S.403/16 SFO 2175	3/32 2.38	7/32 5.53	.0108 .274	1/8 3.18	.091/.094 2.31/2.39	—	A
L.S.403/10 SFR 1065	1/8 3.18	3/8 9.53	.0116 .295	5/32 3.97	.122/.126 3.10/3.20	.051 1.30	Standard
L.S.403/18 SFO 2938	1/8 3.18	9/32 7.11	.0084 .213	5/32 3.97	.122/.126 3.10/3.20	.030 .760	E
*L.S.403/36	1/8 3.18	3/8 9.53	.010 .254	—	.122/.126 3.10/3.20	—	B
L.S.403/11 SFR 1734	.146 3.71	1/2 12.70	.0148 .376	3/16 4.76	.143/.147 3.63/3.73	.110 2.79	Standard
L.S.403/19 SFO 2972	5/32 3.97	13/32 10.31	.0084 .213	—	.153/.157 3.89/3.99	.030 .760	C
*L.S.403/14	3/16 4.76	9/16 14.28	.0164 .419	—	.184/.189 4.67/4.80	—	D
L.S.403/17 SFO 2948	3/16 4.76	13/32 10.31	.0084 .213	3/16 4.76	.184/.189 4.67/4.80	.030 .760	C
L.S.403/37	3/16 4.76	1.1/2 38.10	.010 .254	—	.184/.189 4.67/4.80	—	D
L.S.403/35 SFO 3165	.238 6.00	17/32 13.49	.0108 .274	7/32 5.53	.233/.238 5.92/5.99	.030 .760	C
L.S.403/41	.238 6.00	9/16 14.28	.0148 .376	—	.233/.238 5.92/5.99	—	Standard
L.S.403/12 SFR 1591	1/4 6.35	9/16 14.28	.0164 .419	7/32 5.53	.248/.252 6.30/6.40	.080 2.03	Standard
L.S.403/20 SFO 2985	1/4 6.35	17/32 13.49	.0108 .274	7/32 5.53	.248/.252 6.30/6.40	.040 1.02	C
L.S.403/39 SFO 3104	.315 8.00	.590 14.98	.0108 .274	1/4 6.35	.309/.315 7.85/8.00	—	D

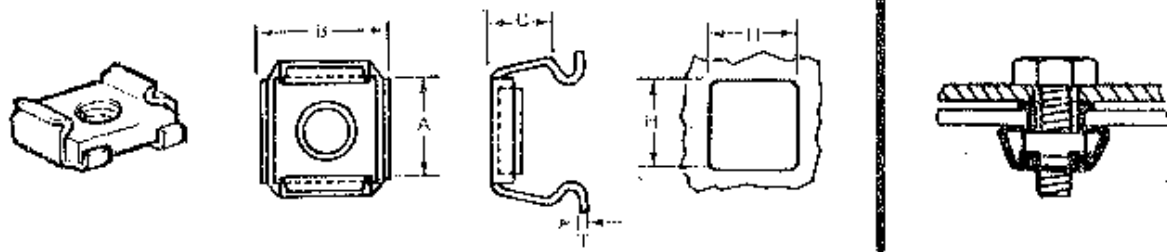
FLAT NUTS



Replaces threaded nuts and washers. For coarse and machine screw threads.

Part No.	Screw Size	A ins mm	B ins mm	T ins mm	H ins mm
L.S.401/10	SNP 121	No. 8 AB SMS 8/16 13.49	11/32 8.73	.022 .558	.080 1.57
L.S.401/11	SNP 0176	No. 8 AB SMS 5/8 15.08	3/8 9.53	.024 .610	.070 1.78
L.S.401/12	SNP 0177	No. 10 AB SMS 21/32 16.67	13/32 10.32	.028 .710	— —
L.S.401/14	SNP 1301	6 BA 11/32 8.74	15/64 5.95	.0108 .274	.015 .381
L.S.401/15	SNP 1302	4 BA 7/16 11.09	9/32 7.11	.0136 .345	.046 1.17
L.S.401/17	SNP 0164	2 BA 5/8 15.88	3/8 9.53	.0164 .419	.056 1.40
L.S.401/18	SNP 0170	3/16 BSW 5/8 15.88	3/8 9.53	.022 .558	— —
L.S.401/19	SNP 0171	1/4 BSW 3/4 19.05	1/2 12.70	.024 .610	— —
L.S.401/21	SNP 1048	4 mm 9/16 14.29	11/32 8.73	.0164 .419	.062 1.57

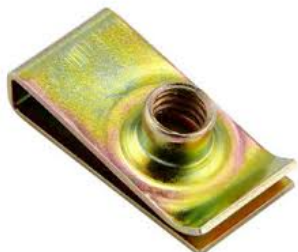
CAGED NUTS



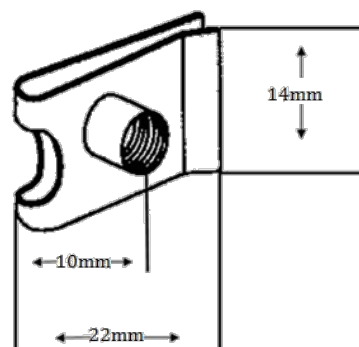
Part No.	Screw Size	A Inch mm	B Inch mm	C Inch mm	T Inch mm	H Inch mm	Panel Range Inch mm
L.S. 409/08	M4	.560 14.22	.540 13.72	.240 6.10	.018 .475	.375 9.53	.028/.064 0.71/1.63
L.S. 409/09	M4	.560 14.22	.540 13.72	.240 6.10	.018 .475	.375 9.53	.072/.104 1.83/2.64
L.S. 409/10	Ø8A	.560 14.22	.540 13.72	.240 6.10	.018 .475	.375 9.53	.028/.064 0.71/1.63
L.S. 409/11	Ø8A	.560 14.22	.540 13.72	.240 6.10	.018 .475	.375 9.53	.072/.104 1.83/2.64
L.S. 409/12	M5	.560 14.22	.540 13.72	.240 6.10	.018 .475	.375 9.53	.028/.064 0.71/1.63
L.S. 409/13	M5	.560 14.22	.540 13.72	.240 6.10	.018 .475	.375 9.53	.072/.104 1.83/2.64
L.S. 409/14	M6	.560 14.22	.540 13.72	.240 6.10	.018 .475	.375 9.53	.028/.064 0.71/1.63
L.S. 409/15	M6	.560 14.22	.540 13.72	.240 6.10	.018 .475	.375 9.53	.072/.104 1.83/2.64
L.S. 409/17	M8	.677 17.20	.642 16.30	.280 7.10	.015 0.38	.465/.504 11.8/12.8	.028/.064 0.71/1.63
L.S. 409/18	M8	.677 17.20	.642 16.30	.280 7.10	.015 0.38	.465/.504 11.8/12.8	.072/.125 1.83/3.20
L.S. 409/19	M10	.677 17.20	.642 16.30	.280 7.10	.015 0.38	.465/.504 11.8/12.8	.028/.064 0.71/1.63
L.S. 409/20	M10	.677 17.20	.642 16.30	.280 7.10	.015 0.38	.465/.504 11.8/12.8	.072/.125 1.83/3.20

U TYPE CAPTIVE NUT EXTENDED THREAD

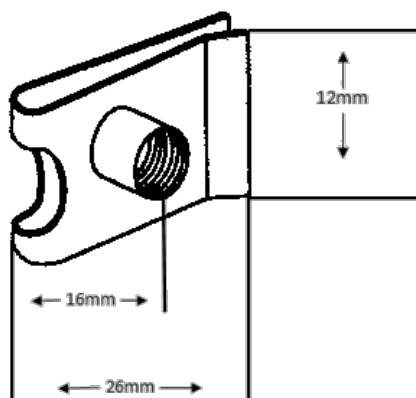
For Automotive Applications,
finished in Yellow Zinc Chromate



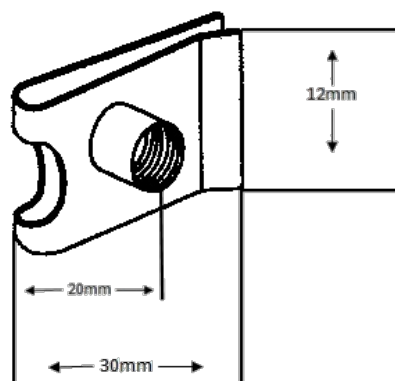
CAPTIVE NUTS FOR M5 THREAD
RECOMMENDED PANEL THICKNESS 0.8 - 1.5MM
SHORT TYPE
PART NUMBER USNM5



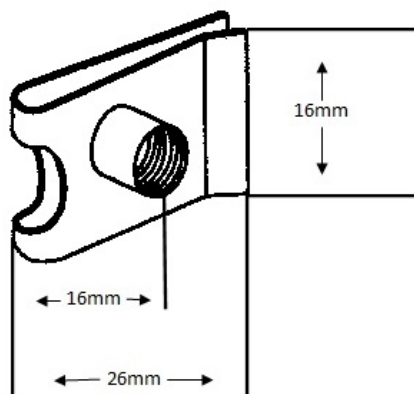
CAPTIVE NUTS FOR M6 THREAD
RECOMMENDED PANEL THICKNESS 4MM
SHORT TYPE
PART NUMBER USNM6S



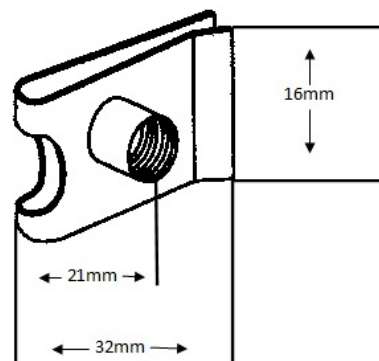
CAPTIVE NUTS FOR M6 THREAD
RECOMMENDED PANEL THICKNESS 4MM
LONG TYPE
PART NUMBER USNM6L



CAPTIVE NUTS FOR M8 THREAD
RECOMMENDED PANEL THICKNESS 4MM
SHORT TYPE
PART NUMBER USNM8S



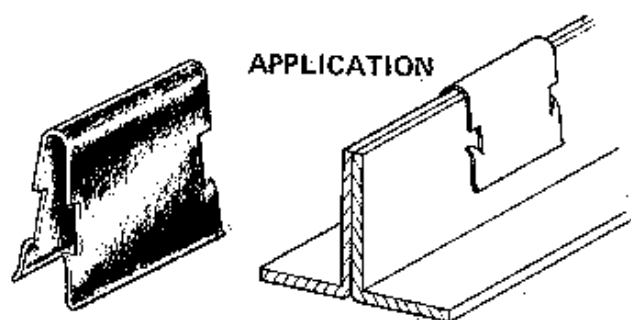
CAPTIVE NUTS FOR M8 THREAD
RECOMMENDED PANEL THICKNESS 4MM
LONG TYPE
PART NUMBER USNM8L



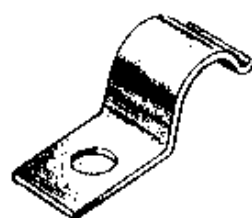
OTHER LEWIS SPRING PRODUCTS AVAILABLE ON INDENT ONLY

Full details including Drawings, Dimensions and Finishes available on request. Some selected sizes are available ex stock, with most others ex factory U.K. and delivery one to two weeks via Air Parcel Post.

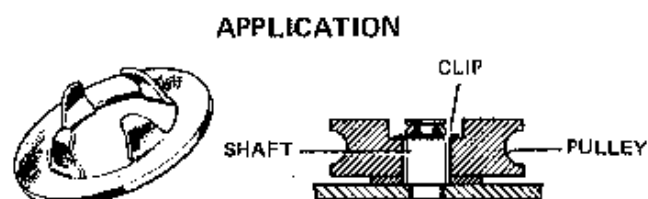
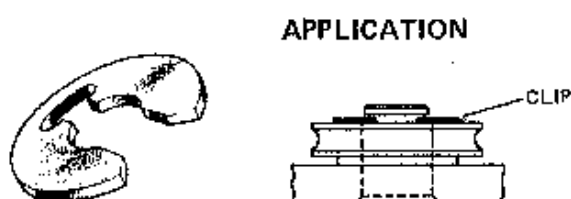
EDGE CLIPS



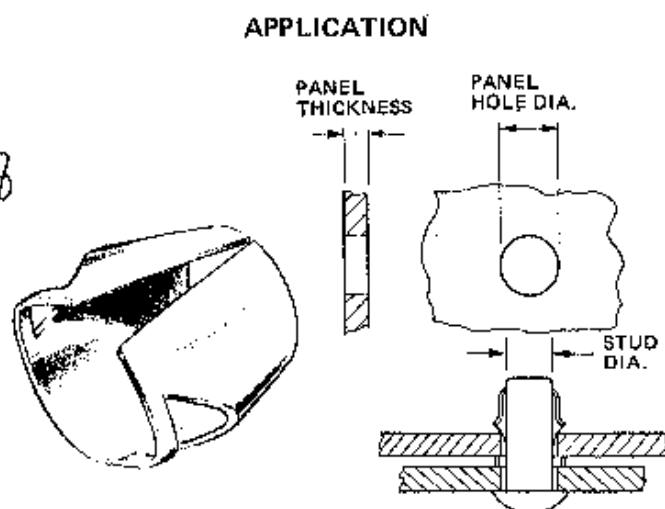
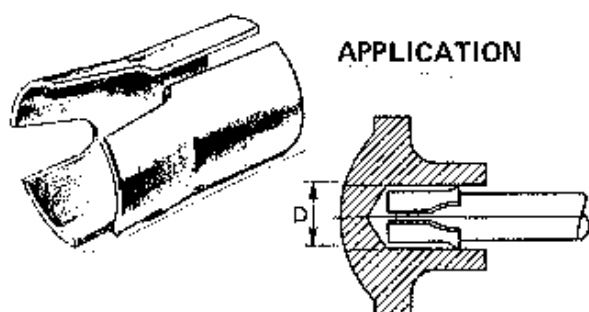
CABLE CLIPS



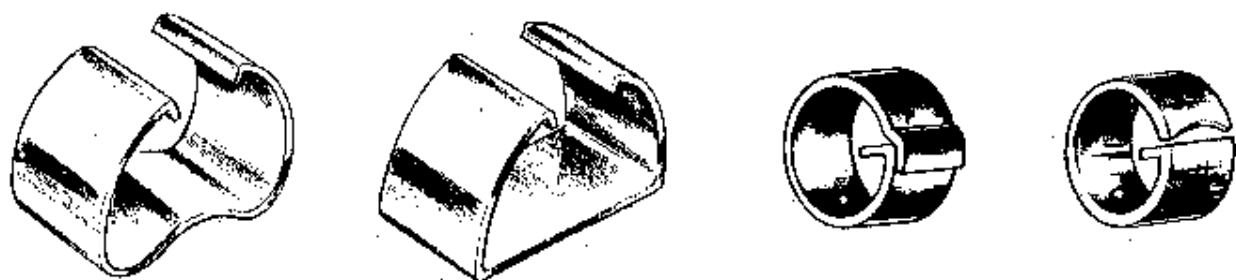
RETAINING CLIPS



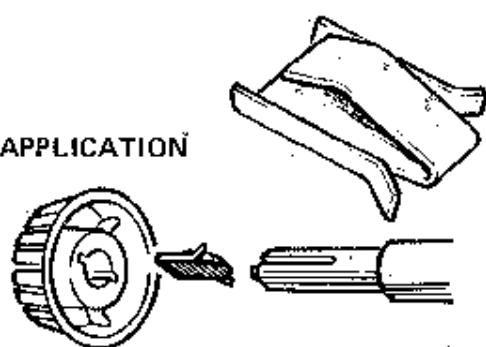
TUBULAR CLIPS



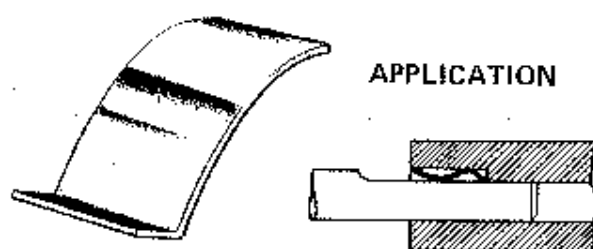
KNOB TO SHAFT CLIPS



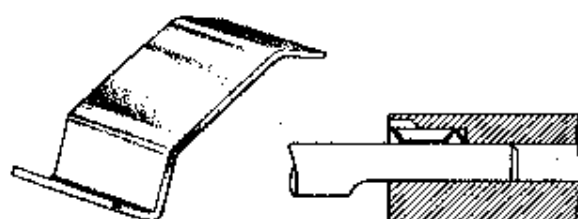
APPLICATION



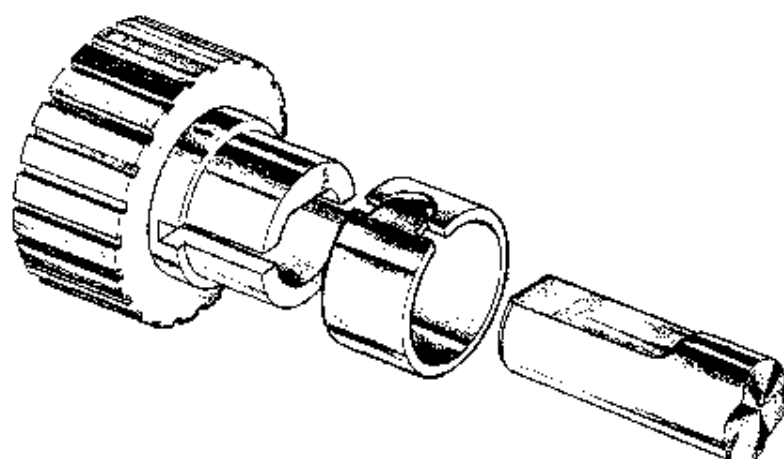
APPLICATION



APPLICATION



COMPRESSION RINGS



LOCKWASHERS

TOOTHED TYPE

Finish: Bright Zinc Plate

Available Sizes
(Int & External)

M3 (1/8")
M4 (5/32")
M5 (3/16")
M6
1/4")
M8 (5/16")
M10
3/8"
M12
7/16"
1/2"



Stainless Steel also available in sizes 5/32" & 3/16"

WAVEY (CRINKLE) WASHERS

Available in Stainless Steel and Beryllium Copper

Sizes

M2	5/16"
M2.5	3/8"
M3	7/16"
M3.5	1/2"
M4	3/4"
M5	
M8	

2BA
4BA
6BA
8BA



TEE NUTS

STEEL, ZINC PLATED & ZINC PASSIVATED

Available Sizes

BSW 3/16", 1/4", 5/16", 3/8"

METRIC M4, M5, M6, M8, M10, M12



HAMMER DRIVE SCREWS

Available as STEEL in following finishes:



Electro-Brassed	Nickel Plated
0 x 1/8	0 x 1/8
x 3/16	2 x 1/8
x 1/4	x 1/4
2 x 1/8	4 x 3/16
x 3/16	
x 1/4	Self Colour
4 x 3/16	8 x 3/8
x 1/4	10 x 3/8
x 5/16	x 1/2
6 x 1/4	
x 5/16	Zinc Plated
x 3/8	2 x 3/16
x 1/2	x 5/16
	4 x 1/4
	6 x 5/16
	x 3/8

INSERT NUT

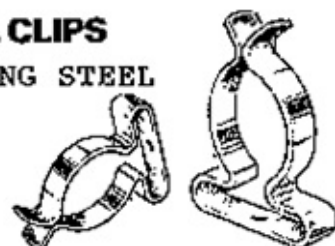
Steel, Zinc Plated

M6 x 13 (Flanged or Plain)
M6 x 20 (Flanged or Plain)
M8 x 13 (Plain)
M8 x 20 (Plain)



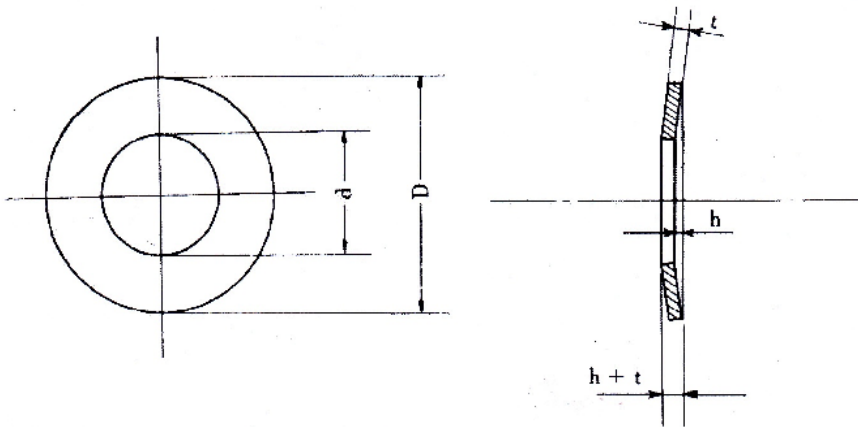
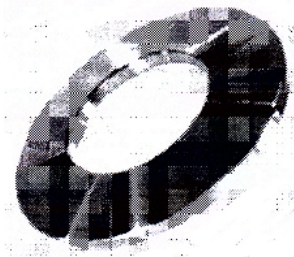
SPRING STEEL TOOL CLIPS

Available as SPRING STEEL
Zinc Plated



Part No	Grip Dia
LS101/10	1/4"
LS101/11	3/8"
LS101/12	1/2"
LS101/13	5/8"
LS101/14	3/4"
LS101/15	1"
LS101/16	1.1/8"
LS101/17	1.1/4"
LS101/18	1.1/2"
LS101/19	2"

DISC SPRING WASHERS



Unit: mm

Size-No.	d		D		H (Heavy Duty)				L (Light Duty)			
	Basic	Tol.	Basic	Tol.	t		h	h + t	t		h	h + t
					Basic	Tol.			Basic	Tol.		
DB- 4	4.2	+0.3 -0.1	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	+0.4 -0.1	18	±0.4	1		0.4	1.4	0.7		0.5	1.2
10	10.2		20		1	±0.07	0.45	1.45	0.8	±0.06	0.55	1.35
11	11.2		22.5		1.2		0.5	1.7	0.8		0.65	1.45
12	12.2		25		1.5	±0.07	0.55	2.05	0.9	±0.06	0.7	1.6
14	14.2		28		1.5		0.65	2.15	1		0.8	1.8
16	16.3	+0.5 -0.2	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	±0.1	0.9	2.9	1.5	±0.08	1.15	2.65
• 22	22.4		45		2.5		1	3.5	1.75		1.3	3.05
25	25.4		50		3	±0.12	1.1	4.1	2	±0.1	1.4	3.4
• 28	28.5	+0.6 -0.4	56	±0.6	3		1.3	4.3	2		1.6	3.6
30	31		63		3.5	±0.15	1.4	4.9	2.5	±0.12	1.75	4.25
35	36		71		4		1.6	5.6	2.5		2	4.5
40	41		80		5	±0.15	1.7	6.7	3	±0.12	2.3	5.3
45	46		91		5		2	7	3.5		2.5	6
• 50	51	±0.7	100	±0.7	6		2.2	8.2	3.5		2.8	6.3

Material=Carbon spring steel. Hardness =HRC40~50.

Finish=Black phosphate coating (ACP). Zn plating, Chromate dip.

Assortments

INTERNAL CIRCLIP KIT

BLACK

700 pieces Metric/Imperial
Ranging from 10mm (3/8")
to 40mm (1.5/8")

STAINLESS STEEL

150 pieces
Metric/Imperial
ranging from
10mm (3/8") to
40 mm (1.5/8")



METRIC TENSION PIN (Roll Pin) KIT

575 pieces ranging
from 2mm diameter
x 5mm long to 10mm
diameter x 40mm
long.



EXTERNAL CIRCLIP KIT

BLACK

795 pieces Metric/Imperial
ranging from 8mm (5/16") to 38mm
(1.1/2")

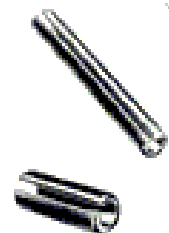
STAINLESS STEEL

150 pieces
Metric/Imperial
ranging from
8mm (5/16") to
38mm (1.1/2")



IMPERIAL TENSION PIN (Roll Pin) KIT

856 pieces ranging from 3/32"
diameter x 1/2" long to 1/2"
diameter x 1.1/2" long.



METRIC E'RING KIT

1,270 pieces ranging from 0.8mm
to 24mm.

IMPERIAL E'RING KIT

1,045 pieces ranging from .095"
to .580".



GREASE NIPPLE KIT

180 pieces in 9 different sizes
Straight and 90 Degree.

BSF1/4", BSF5/16", BSP1/4", BSP1/8",
SAE1/4", SAE5/16", 6mm, 8mm, 10mm.



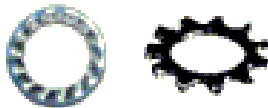
Assortments

INTERNAL TOOTH WASHER KIT

EXTERNAL TOOTH WASHER KIT

Both Kits contain
550 pieces

M5 (3/16")
M6 (1/4")
M8 (5/16")
M10 (3/8")
M12 (1/2")



COTTER PIN (Split Pin) KIT

150 pieces in 5 popular sizes

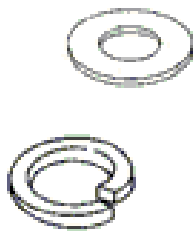
2.5 x 40mm
(3/32" x 1 1/2")
3.2 x 25mm
(1/8" x 1")
3.2 x 50mm
(1/8" x 2")
4 x 50mm
(5/32" x 2")
5 x 50mm
(3/16" x 2")



SPRING and FLAT WASHER KIT

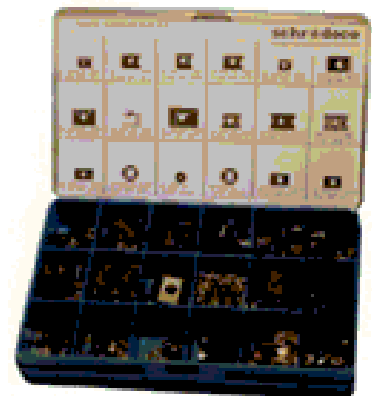
270 pieces Bright Zinc Plated.

M5 (3/16")
M6 (1/4")
M8 (5/16")
M10 (3/8")
M12 (1/2")



CAPTIVE NUT (Speed Nut) KIT

800 pieces to suit screw sizes No 4 to No 12, plus 3/16" & 1/4" BSW.
Included are Push-on-Fixes for stud diameters 3/32" & 1/4".



STARLOCK PUSH-ON FIXING WASHERS KIT

A handy assortment kit comprising 1,130 pieces.

A mixture of the most popularly used metric and imperial, plain and capped retainers.

Common Applications: Golf buggy wheels, toys, lawnmowers etc.



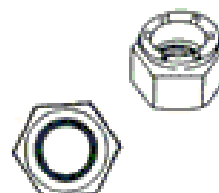
NYLON INSERT LOCKING NUT KITS

Three Kits available, each containing 125 pieces.

KIT No KNY2 (UNC Threads)
3/16", 1/4", 5/16", 3/8", 1/2".

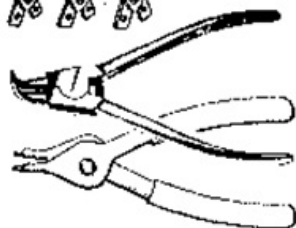
KIT No KNY3 (METRIC Threads)
M5, M6, M8, M10, M12.

KIT No KNY4 (UNF Threads)
3/16", 1/4", 5/16", 3/8", 1/2".



CIRCLIP PLIERS

Available with Fixed
or Interchangeable Tips



STARLOCK Push-on Fixing Washer
Installation Tool
Interchangeable Magnetic Ferrules
to suit all size Starlocks



CONVERSION TABLE INCHES TO MILLIMETRES

Fractions	Inch	mm	Fractions	Inch	mm	Fractions	Inch	mm	Fractions	Inch	mm
—	0004	01	25/32	781	19.844	—	2 1/8	55	3 11/16	3.6875	93.663
—	004	10	—	7874	20	2 3/16	2 1/8	55.563	—	3.7008	94
—	01	25	51/64	797	20.241	—	2 3/8	56	3 23/32	3.719	94.456
1/64	0156	397	13/16	8125	20.638	2 7/32	2 1/8	56.356	—	3.7401	95
—	0187	50	—	8268	21	—	2 1/4	57	3 3/4	3.750	95.250
—	0295	75	53/64	828	21.034	2 1/4	2 1/4	57.150	—	3.7795	96
1/32	03125	794	27/32	844	21.431	2 9/32	2 281	57.944	3 25/32	3.781	96.044
—	0394	1	55/64	859	21.828	—	2 2835	58	3 13/16	3.8125	96.638
3/64	0469	1.191	—	8681	22	2 5/16	2 312	58.738	—	3.8189	97
—	059	1.5	7/8	875	22.225	—	2 3226	59	3 27/32	3.844	97.631
1/16	062	1.588	57/64	8906	22.622	2 11/32	2 344	59.531	—	3.8583	98
5/64	0781	1.984	—	9055	23	—	2 3622	60	3 7/8	3.875	98.425
—	0787	2	29/32	9062	23.019	2 3/8	2 375	60.325	—	3.8976	99
3/32	094	2.381	59/64	922	23.416	—	2 4016	61	3 29/32	3.9062	99.219
—	0984	2.5	15/16	9375	23.813	2 13/32	2 408	61.119	—	3.9370	100
7/64	109	2.778	—	9449	24	2 7/16	2 438	61.913	3 15/16	3.9375	100.013
—	1181	3	61/64	953	24.209	—	2 4409	62	3 31/32	3.969	100.806
1/8	125	3.175	31/32	969	24.606	2 15/32	2 469	62.705	—	3.9764	101
—	1378	3.5	—	9843	25	—	2 4803	63	4	4.000	101.600
9/64	141	3.572	63/64	9844	25.003	2 1/2	2 500	63.500	4 1/16	4.062	103.188
5/32	156	3.969	1	1000	25.400	—	2 5197	64	4 1/8	4.125	104.775
—	1575	4	—	10236	26	2 17/32	2 531	64.294	—	4.1338	105
11/64	172	4.366	1 1/32	10312	26.194	—	2 559	65	4 3/16	4.1875	106.363
—	177	4.5	1 1/16	1062	26.988	2 9/16	2 562	65.088	4 1/4	4.250	107.950
3/16	1875	4.763	—	1083	27	2 19/32	2 594	65.881	4 5/16	4.312	109.538
—	1969	5	1 3/32	1094	27.781	—	2 5984	66	—	4.3307	110
13/64	203	5.159	—	11024	28	2 5/8	2 626	66.675	4 3/8	4.375	111.125
—	2185	5.5	1 1/8	1125	28.676	—	2 638	67	4 7/16	4.438	112.713
7/32	219	5.556	—	11417	29	2 21/32	2 656	67.469	4 1/2	4.500	114.300
15/64	234	5.953	1 5/32	1156	29.669	—	2 6772	68	—	4.5276	115
—	2362	6	—	11811	30	2 11/16	2 6875	68.263	4 9/16	4.562	115.888
1/4	250	6.350	1 3/16	11875	30.163	—	2 7165	69	4 5/8	4.625	117.475
—	2559	6.5	1 7/32	1219	30.956	2 23/32	2 719	69.056	4 11/16	4.6875	119.063
17/64	2656	6.747	—	12205	31	2 3/4	2 750	69.850	—	4.7244	120
—	2756	7	1 1/4	1250	31.750	—	2 7559	70	4 3/4	4.750	120.650
9/32	281	7.144	—	12588	32	2 25/32	2 781	70.8439	4 13/16	4.8125	122.238
—	2953	7.5	1 9/32	1281	32.544	—	2 7953	71	4 7/8	4.875	123.825
19/64	297	7.541	—	12892	33	2 13/16	2 8125	71.4378	—	4.9212	125
5/16	312	7.938	1 5/16	1312	33.338	—	2 8346	72	4 15/16	4.9375	125.413
—	315	8	—	13366	34	2 27/32	2 844	72.2314	5	5.000	127.000
21/64	328	8.334	1 11/32	1344	34.131	—	2 8740	73	—	5.1181	130
—	335	8.5	1 3/8	1376	34.825	2 7/8	2 875	73.025	5 1/4	5.250	133.350
11/32	344	8.731	—	13779	35	2 29/32	2 9062	73.819	5 1/2	5.500	139.700
—	3543	9	1 13/32	1408	35.719	—	2 9134	74	—	5.5118	140
23/64	359	9.129	—	14173	36	2 15/16	2 9375	74.813	5 3/4	5.750	146.050
—	374	9.5	1 7/16	1438	36.513	—	2 9527	75	—	5.8055	150
3/8	375	9.525	—	14587	37	2 31/32	2 989	75.406	6	6.000	152.400
25/64	391	9.922	1 15/32	1469	37.306	—	2 9924	76	6 1/4	6.250	158.750
—	3937	10	—	14961	38	3	3.000	76.200	—	6.2992	160
13/32	406	10.319	1 1/2	1500	38.100	3 1/32	3.0312	76.994	6 1/2	6.500	165.100
—	413	10.5	1 17/32	1531	38.894	—	3.0315	77	—	6.6929	170
27/64	422	10.716	—	15354	39	3 1/16	3.062	77.788	6 3/4	6.750	171.450
—	4331	11	1 9/16	1562	39.688	—	3.0709	78	7	7.000	177.800
7/16	438	11.113	—	15748	40	3 3/32	3.094	78.581	—	7.0866	180
29/64	453	11.509	1 19/32	1594	40.481	—	3.1102	79	—	7.4803	190
15/32	469	11.906	—	16142	41	3 1/8	3.125	79.375	7 1/2	7.500	190.500
—	4724	12	1 5/8	1625	41.275	—	3.1486	80	—	7.8740	200
31/64	484	12.303	—	16355	42	3 5/32	3.156	80.189	8	8.000	203.200
—	492	12.5	1 21/32	16562	42.069	3 1/16	3.1875	80.983	—	8.2677	210
1/2	500	12.700	1 11/16	16875	42.863	—	3.1880	81	8 1/2	8.500	215.900
—	5118	13	—	16929	43	3 7/32	3.219	81.756	—	8.6814	220
33/64	5156	13.097	1 23/32	1719	43.656	—	3.2283	82	9	9.000	228.600
17/32	531	13.494	—	17323	44	3 1/4	3.250	82.550	—	9.0551	230
35/64	547	13.891	1 3/4	1750	44.450	—	3.2677	83	—	9.4468	240
—	5512	14	—	17717	45	3 9/32	3.281	83.344	9 1/2	9.500	241.300
9/16	563	14.288	1 25/32	1781	45.244	—	3.3071	84	—	9.6425	250
—	571	14.5	—	18110	46	3 5/16	3.312	84.1377	10	10.000	254.001
37/64	578	14.684	1 13/16	18125	46.038	3 11/32	3.344	84.9314	—	10.2362	260
—	5906	15	1 27/32	1844	46.831	—	3.3464	85	—	10.6299	270
19/32	594	15.081	—	18504	47	3 3/8	3.375	85.725	11	11.000	279.401
39/64	609	15.478	1 7/8	1875	47.825	—	3.3856	86	—	11.0236	280
5/8	625	15.875	—	18898	48	3 19/32	3.406	86.519	—	11.4173	290
—	6299	16	1 29/32	19062	48.419	—	3.4262	87	—	11.8110	300
41/64	6406	16.272	—	19291	49	3 7/16	3.438	87.313	12	12.000	304.801
—	6498	16.5	1 15/16	19375	49.213	—	3.4646	88	13	13.000	330.201
21/32	656	16.669	—	19685	50	3 15/32	3.469	88.106	—	13.7795	350
—	6693	17	1 31/32	1989	50.008	3 1/2	3.500	89.000	14	14.000	355.601
43/64	672	17.066	2	2000	50.800	—	3.5039	89	15	15.000	381.001
11/16	6875	17.463	—	20079	51	3 17/32	3.531	89.694	—	15.7480	400
45/64	703	17.859	2 1/32	203125	51.694	—	3.5433	90	16	16.000	406.401
—	7087	18	—	20472	52	3 9/16	3.562	90.4877	17	17.000	431.801
23/32	719	18.256	2 1/16	2082	52.388	—	3.5827	91	—	17.7165	450
—	7283	18.5	—	20866	53	3 19/32	3.594	91.281	18	18.000	457.201
47/64	734	18.653	2 3/32	2094	53.181	—	3.622	92	19	19.000	482.601
—	7480	19	2 1/8	2125	53.975	3 5/8	3.625	92.075	—	19.6850	500
3/4	750	19.050	—	2126	54	3 21/32	3.656	92.869	20	20.000	508.001
49/64	7658	19.447	2 5/32	2156	54.769	—	3.6614	93	—	—	—

DRILL AND TAPPING CHART

METRIC ISO COARSE

60° thread form

Size mm	Pitch mm	TAPPING DRILL SIZES			
		PREFERRED		ALTERNATIVE	
		mm	inch	mm	inch
2.0	0.40	1.65		1.6	1/16
2.5	0.45	2.1		2.05	
3.0	0.50	2.55		2.5	
3.5	0.60	2.95		2.9	
4.0	0.70	3.4		3.2	
4.5	0.75	3.8		3.7	
5.0	0.80	4.3	11/64	4.2	
6.0	1.00	5.1	13/64	5.0	
7.0	1.00	6.1		6.0	15/64
8.0	1.25	6.9		6.8	17/64
9.0	1.25	7.9	5/16	7.8	
10.0	1.50	8.6	11/32	8.5	
11.0	1.50			9.5	3/8
12.0	1.75		13/32	10.2	
14.0	2.00	12.2	31/64	12.0	15/32
16.0	2.00	14.25	9/16	14.0	35/64
18.0	2.50	15.75		15.5	39/64
20.0	2.50		45/64	17.5	11/16
22.0	2.50		25/32	19.5	49/64
24.0	3.00			21.0	53/64
27.0	3.00		61/64	24.0	15/16
30.0	3.50			26.5	1-3/64
33.0	3.50		1-11/64	29.5	1-5/32
36.0	4.0		1-17/64	32.0	1-1/4

METRIC ISO FINE

60° thread form

Size mm	Pitch mm	TAPPING DRILL SIZES			
		PREFERRED		ALTERNATIVE	
		mm	inch	mm	inch
8.0	1.00	7.1	9/32	7.0	
10.0	1.25	8.9		8.6	11/32
12.0	1.50		27/64	10.5	
14.0	1.50		1/2	12.5	
16.0	1.50	14.75	37/64	14.5	
18.0	1.50		21/32	16.5	
20.0	1.50		47/64	18.5	
22.0	1.50		13/16	20.5	
24.0	2.00		7/8	22.0	

BSW WHITWORTH*

55° thread form

Size inch	Threads per inch	TAPPING DRILL SIZES			
		PREFERRED		ALTERNATIVE	
		mm	inch	mm	inch
1/16"	60	1.2	3/64	1.05	
3/32"	48	1.9		1.75	
1/8"	40	2.65		2.5	3/32
5/32"	32	3.2	1/8	2.95	
3/16"	24	3.7		3.6	9/64
7/32"	24	4.5		4.3	11/64
1/4"	20	5.1		5.0	3/16
5/16"	18	6.5		6.4	1/4
3/8"	16	7.9	5/16	7.8	19/64
7/16"	14	9.5		9.2	23/64
1/2"	12	10.5			13/32
9/16"	12			12.0	15/32
5/8"	11	13.5	17/32		33/64
3/4"	10	16.5	41/64	16.0	5/8
7/8"	9		3/4	19.0	47/64
1"	8	22.0	55/64		27/32
1-1/8"	7		31/32	24.5	61/64
1-1/4"	7	28.0	1-3/32	27.5	1-5/64
1-1/2"	6	33.5	1-5/16	33.0	1-19/64
1-3/4"	5	39.0	1-17/32	38.5	1-33/64
2"	4-1/2	44.5	1-49/64	44.0	1-3/4

UNF UNS*

60° thread form

Size inch	Threads per inch	TAPPING DRILL SIZES			
		PREFERRED		ALTERNATIVE	
		mm	inch	mm	inch
No. 5	44	2.7		2.65	
No. 6	40	2.95		2.9	
No. 8	36	3.6	9/64	3.5	
No. 10	32	4.1		4.0	5/32
No. 12	28	4.7		4.6	
1/8"	40	2.65		2.6	
5/32"	32	3.3		3.1	1/8
3/16"	32	4.1		3.9	5/32
7/32"	32	4.9		4.8	3/16
1/4"	20	5.5	7/32	5.4	
5/16"	24	6.9		6.8	
3/8"	24	8.6		8.4	
7/16"	20	10.0	25/64	9.8	
1/2"	20	11.5	29/64		
9/16"	18		33/64	12.8	
5/8"	18	14.5	37/64		
11/16"	16	16.0	5/8	15.75	
3/4"	16	17.5	11/16		
13/16"	16		3/4	19.0	
7/8"	14		13/16	20.5	
1"	12	23.5	59/64		
1-1/8"	12	26.5	15/16	23.5	
1-1/4"	12		1-3/8		
1-3/8"	12	33.0	1-11/64	29.5	
1-1/2"	12	36.0	1-19/64		

UNC UNS*

60° thread form

Size inch	Threads per inch	TAPPING DRILL SIZES			
		PREFERRED		ALTERNATIVE	
		mm	inch	mm	inch
No. 2	56	1.85		1.8	
No. 3	48	2.1		2.05	5/64
No. 4	40	2.35	3/32	2.3	
No. 5	40	2.65		2.6	
No. 6	32	2.85		2.8	7/64
No. 8	32	3.5		3.4	
No. 10	24	3.9	5/32	3.8	
No. 12	24	4.5		4.4	11/64
1/8"	40	2.65		2.6	
5/32"	32	3.3		3.1	1/8
3/16"	24	3.8		3.7	
7/32"	24	4.6		4.5	
1/4"	20	5.2	13/64	5.1	
5/16"	18	6.6	17/64	6.5	1/4
3/8"	16	8.1		8.0	5/16
7/16"	14	9.5	3/8		23/64
1/2"	13	11.0		10.8	27/64
9/16"	12	12.2	31/64		
5/8"	11	13.8	35/64	13.5	17/32
11/16"	11	15.25		15.0	19/32
3/4"	10		21/32	18.5	41/64
13/16"	10		23/32	18.0	
7/8"	9	19.5	49/64		
1"	8		7/8	22.5	
1-1/8"	7			25.0	63/64
1-1/4"	7		1-7/8	29.0	
1-3/8"	6	31.0	1-7/32		1-13/64
1-1/2"	6		1-11/32	34.0	1-21/64

DRILL AND TAPPING CHART

BSF

55° thread form

Size inch	Threads per inch	TAPPING DRILL SIZES			
		PREFERRED		ALTERNATIVE	
		mm	inch	mm	inch
3/16	32	4.0	5/32	3.9	
1/4	26	5.3		5.2	13/64
5/16	22	6.8	17/64	6.7	
3/8	20	8.3	21/64	8.2	5/16
7/16	18			9.5	3/8
1/2	16		7/16	11.0	27/64
9/16	16		1/2	12.5	31/64
5/8	14	14.0	35/64	13.8	17/32
3/4	12			16.5	21/32
7/8	11		25/32	19.5	49/64
1	10		57/64	22.5	7/8
1-1/4	9	28.5	1-1/8		1-7/64
1-1/2	8	34.5	1-23/64		1-11/32
1-3/4	7	40.5	1-19/32	40.0	1-37/64

BA

47.5° thread form

Size	Pitch mm	TAPPING DRILL SIZES			
		PREFERRED		ALTERNATIVE	
		mm	inch	mm	inch
0	1.00	5.1	13/64	5.0	
1	.090	4.5		4.4	11/64
2	0.81	4.0	5/32	3.9	
3	0.73	3.4		3.3	
4	0.66	3.0		2.95	
5	0.59	2.7		2.6	
6	0.53	2.35		2.25	
7	0.48	2.1		2.0	5/64
8	0.43	1.8		1.75	
9	0.39	1.55		1.5	
10	0.35	1.4		1.35	
11	0.31	1.2	3/64	1.15	
12	0.28	1.05		1.0	

Metric Conduit

60° thread form

Size mm	Pitch mm	TAPPING DRILL SIZES			
		PREFERRED		ALTERNATIVE	
		mm	inch	mm	inch
16	1.5	14.75	37/64	14.5	
20	1.5		47/64	18.5	
25	1.5			23.5	59/64
32	1.5		1-13/64	30.5	
40	1.5			38.5	1-33/64
50	1.5			48.5	1-29/32

BS Conduit

55° thread form

Size inch	Threads per inch	TAPPING DRILL SIZES			
		PREFERRED		ALTERNATIVE	
		mm	inch	mm	inch
5/8	18			14.25	9/16
3/4	16			17.0	43/64
1	16			23.5	59/64
1-1/4	16			30.0	1-11/64
1-1/2	14			36.0	
2	14			48.5	

Spark Plug

60° thread form

Size mm	Pitch mm	TAPPING DRILL SIZES			
		PREFERRED		ALTERNATIVE	
		mm	inch	mm	inch
10.0	1.00		23/64	9.0	
12.0	1.25	10.5			13/32
14.0	1.25	12.5			
18.0	1.50		41/64		

NPT (Taper Pipe)

60° thread form

Size inch	Thread per inch	TAPPING DRILL SIZES			
		WITH REAMER		WITHOUT REAMER	
		mm	inch	mm	inch
1/8	27	8.3	21/64	8.4	
1/4	18	10.8	27/64	11.2	7/16
3/8	18	14.25	9/16	14.25	9/16
1/2	14	17.5	11/16		45/64
3/4	14	22.5	57/64	23.0	29/32
1	11-1/2	28.5	1-1/8	29.0	1-9/64
1-1/4	11-1/2	37.0	1-15/32	37.5	1-31/64
1-1/2	11-1/2	43.5	1-23/32	44.0	1-47/64
2	11-1/2		2-3/16		2-13/64

NPS (Parallel Pipe)

60° thread form

Size inch	Threads per inch	TAPPING DRILL SIZES			
		NPSC		NPSM	
		mm	inch	mm	inch
1/8	27	8.7	11/32	9.2	23/64
1/4	18	11.2	7/16	12.0	15/32
3/8	18	14.75	37/64	15.5	39/64
1/2	14	18.0	23/32	19.0	3/4

NPSC - Pressure tight coupling thread. NPSM - Mechanical fastening thread

Brass

55° thread form

Size inch	Threads per inch	TAPPING DRILL SIZES			
		PREFERRED		ALTERNATIVE	
		mm	inch	mm	inch
1/4	26	5.3		5.2	13/64
5/16	26	6.9		6.8	17/64
3/8	26	8.5		8.4	21/64
7/16	26	10.2		10.0	25/64
1/2	26	11.8		11.5	29/64
9/16	26	13.2			33/64
5/8	26			14.75	37/64
3/4	26	18.0			45/64
7/8	26			21.0	53/64
1	26	24.5			61/64

BSPT (Taper Pipe)

55° thread form

Size inch	Thread per inch	TAPPING DRILL SIZES			
		WITH REAMER		WITHOUT REAMER	
		mm	inch	mm	inch
1/8	28	8.0	5/16	8.4	21/64
1/4	19	10.8	27/64	11.2	7/16
3/8	19	14.25	9/16	14.75	37/64
1/2	14		45/64		23/32
3/4	14	23.0	29/32		15/16
1	11	29.0	1-9/64	30.0	1-11/64
1-1/4	11	37.5	1-15/32	38.5	1-33/64
1-1/2	11	43.5	1-23/32	44.5	1-3/4
2	11		2-5/32		2-3/16

BSPF (Parallel Pipe)

55° thread form

Size inch	Threads per inch	TAPPING DRILL SIZES			
		PREFERRED		ALTERNATIVE	
		mm	inch	mm	inch
1/8	28	8.8		8.7	11/32
1/4	19	11.8	15/32	11.5	29/64
3/8	19	15.25		15.0	19/32
1/2	14	19.0	3/4		47/64
5/8	14	21.0	53/64		13/16
3/4	14	24.5	31/32		61/64
7/8	14		1-7/64	28.0	
1	11		1-7/32	30.5	
1-1/4	11	39.5	1-35/64	39.0	
1-1/2	11	45.5	1-25/32	46.0	1-49/64
2	11		2-1/4		
2-1/2	11		2-27/32		
3	11				

Hole size 3.369 - 3.344 inch