



浙江创诺汽车零部件有限公司

地址: 浙江嘉兴南湖区七星镇东大路599号  
电话: 0086-573-82033057  
传真: 0086-573-82510684  
网址: <http://www.channovprecision.com>  
邮箱: [info@channovprecision.com](mailto:info@channovprecision.com)

ZHEJIANG CHANNOV AUTO PARTS CO,LTD.

No.599, Qixing East Road, Nanhu District, Jiaxing, Zhejiang, China  
Tel: 0086-573-82033057  
Fax: 0086-573-82510684  
Http: <http://www.channovprecision.com>  
E-mail: [info@channovprecision.com](mailto:info@channovprecision.com)

**ZHEJIANG  
CHANNOV**

AUTO PARTS CO,LTD.

**浙江创诺汽车零部件有限公司**

# COMPANY PROFILE

## 企业简介

浙江创诺汽车零部件有限公司是一家专业生产碟形垫圈,高强度垫圈,止推垫圈,非标冲压件的领先制造商,在许多工业现实的发展中一直发挥着重要作用,融产品的研发、设计、生产制造、销售于一体,为客户提供专业和个性化服务。

我们严格按照标准生产各类防松垫圈,其性能均符合国标,德标,美标,国际标准。也可以根据客户的样品或图纸定制冲压件。采用原材料主要有:65Mn, SK5, SK7弹簧钢, SUS304,316不锈钢等冷轧带料和板材。由高精度模具冲压成形,再经过热处理,达到产品的机械性能;根据客户不同的要求,提供环保蓝白锌,彩锌,黑锌,机械镀锌,发黑,磷化,锌镍合金,达克罗,久美特,美加力,锌美特等相关表面处理。

公司以不断满足顾客对产品的多样化,高品质的需求为导向,运用现代科技和设备对产品进行持续改进、提升,从而为顾客提供更多更高品质的产品。

Zhejiang CHANNOV Auto Parts Co., Ltd. is a leading manufacturer specializing in the production of Disc Spring washers, high-strength washers, thrust washers and Customer parts. We focus on Develop and Design, manufacturing, We provide customers quality material and personalized services.

We produce all kinds of washers & customized Stamping parts .

The main raw materials are range: 65Mn, SK5, SK7 spring steel, SUS304, 316 stainless steel and other cold rolled strips and plates. It is formed by high-precision die stamping and heat treatment to achieve the mechanical properties of the product; according to the different requirements of customers, provide environmentally friendly blue and white zinc, color zinc, mechanical galvanizing, phosphating, zinc-nickel alloy, Dacromet, Geomet, blackening, etc.

The company is guided by continuously satisfying customers' demands for diversified and high-quality products, and uses modern technology and equipment to advance products.

Continuously improve and upgrade, so as to provide customers with more and higher-quality products.



# CONTENTS

## 目录

1 双叠自锁垫圈 DIN 25201 Wedge lock washers DIN 25201.....	03	24 轴用挡圈 DIN471 Retaining rings for shafts .....	40
2 不锈钢双叠自锁垫圈 DIN25201 Stainless steel Wedge lock washers.....	07	25 孔用挡圈 DIN472 Retaining rings for bores DIN472 .....	45
3 碟形防松垫圈 DIN9250 Safety Washers DIN 9250 .....	08	26 轴用挡圈 DIN472 Retaining rings for shafts .....	46
4 碟形防松垫圈 DIN9250S Safety Washers DIN9250S .....	09	27 E型卡簧 Circlips E-type .....	50
5 重型碟形防松垫圈 DIN9250VS Safety Washers DIN9250VS.....	10	28 不锈钢的种类和特点 Types and characteristics of stainless steel.....	52
6 碟形防松垫圈 DIN9250SS Stainless steel Safety Washers.....	11	29 常规垫圈和冲压件材料表 Conventional washers Stamping material table .....	53
7 重型不锈钢碟形防松垫圈 DIN9250Vss Stainless steel Safety washers .....	12	30 碟形弹簧标准材料表 Disc spring standard material table.....	53
8 CS法式锁紧垫圈 CS French lock washer .....	13	31 重型直槽弹性圆柱销 Heavy Straight Slot Elastic Cylindrical Pin .....	54
9 锯齿锥面弹簧垫圈NFE25511 Contact Washers NFE 25511 .....	14	32 轻型直槽弹性圆柱销 Light Straight Slot Elastic Cylindrical Pin .....	55
10 接地锁紧垫圈SKK-SN70093-DIN6795 Pierced washer SKK-SN70093-DIN6795 .....	15	33 直槽弹性圆柱销 Straight Slot Elastic Cylindrical Pin.....	56
11 S纹法式锁紧垫圈SKS-SKM-SKB-SKZ spattern French lock washerSKS-SKM-SKB-SKZ.....	17	34 重型轧制弹性圆柱销 Heavy-duty rolled elastic cylindrical pin .....	58
12 重载螺栓连接垫圈 DIN6796 Heavy Duty Locking Washer DIN6796 .....	20	35 标准型弹性圆柱销 Standard type elastic cylindrical pin .....	59
13 碟型弹簧垫圈 DIN2093 Disc Spring Washer DIN 2093.....	22	36 轻型滚动弹性销 Light-duty rolled elastic pin .....	60
14 碟型弹簧垫圈DIN2093 Type A Disc spring Washer DIN 2093A .....	23	37 重型轧制弹性圆柱销 Heavy-duty rolled elastic cylindrical pin .....	61
15 碟型弹簧垫圈DIN2093 Type B Disc spring Washer DIN 2093B.....	24	38 标准滚筒式弹性圆柱销 Standard typerolled elastic cylindrical pin .....	62
16 碟型弹簧垫圈DIN2093 Type C Disc spring Washer DIN 2093C.....	25	39 轻型滚动弹性销 Light-duty rolled elastic pin .....	63
17 配合垫圈与支承垫圈DIN988 Shim rings and supporting rings DIN 988.....	26	40 标准垫片 Standard spacer.....	64
18 密封调整垫圈DIN988 Shim rings and supporting rings .....	27	41 精密定位销 Precision locating pin .....	65
19 外齿锁紧垫圈 Toothed lock washer external teeth .....	28	42 定位衬套 Positioning bushing.....	66
20 内齿锁紧垫圈 Toothed lock washer internal teeth .....	31	43 弹性定位销 Elastic locating pin .....	67
21 锥形外齿锁紧垫圈 Countersunk lock washer .....	34	44 材质分析 Material analysis.....	68
22 外锯齿锁紧垫圈 serrated lock washer external teeth .....	36	45 表面处理分析 Surface treatment analysis .....	68
23 内锯齿锁紧垫圈 serrated lock washer Internal teeth .....	39		

## Wedge lock washers DIN25201 双叠自锁垫圈DIN25201



### Product introduction

#### DIN25201 STANDRAD

Wedge lock washers has developed a unique security system using tension method instead of friction. DIN25201 is a norm of wedge-lock system. Wedge lock washers cam height is greater than the bolt pitch. In addition, there are radial teeth on the opposite side. The both cams are faced each other. Radial teeth are used under the bolt and the connection surface.

Wedge lock washers are tightened under the bolt and/or nut. Loosening happens too little through angle difference and wedge effect blocks. Even a very low torque when tightening the bolt connection and it creates a wedge effect which can provide to be blocked connection.

### Features

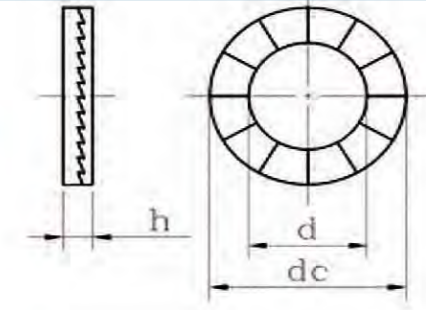
Security system uses geometrically to lock bolted connections in the most critical applications. This offers a unique wedge locking system following advantages:

- Providing maximum safety,
- Provides superior resistance to loosening due to vibration and dynamic loads,
- Ease of assembly and disassembly,
- The locking function is not affected by lubrications,
- Low and high preloads positive locking,
- Preload Control,
- The same temperature characteristics as standard nut&bolt,
- Reusability.

### Product application:

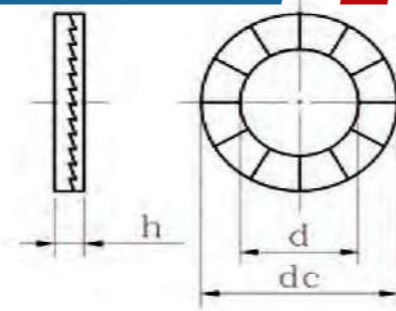
DIN25201 lock washer is widely used in metallurgy, national defense industry, rail transit, high-speed rail project, machinery manufacturing, electric power, new energy, petrochemical industry, auto parts, shipbuilding industry, aerospace, offshore mining equipment, industrial and construction machinery, special equipment manufacturing equipment and other industries.

## Wedge lock washers DIN25201 双叠自锁垫圈DIN25201



For soew 米制 英寸制	d (min)	d (max)	o (min)	o (max)	h pair (min)	h pair (max)	Kg/1000 pieces (CABBON STEEL)
3.00 #5	3.30	3.50	5.30	7.20	1.55	2.05	0.30
3.5 #6	3.80	4.00	7.40	7.80	1.55	2.05	0.40
3.5SP #6SP	3.80	4.00	8.80	9.20	1.55	2.05	0.60
4 #8	4.30	4.50	7.40	7.80	1.55	2.05	0.40
4 SP #8	4.30	4.50	8.80	9.20	1.55	2.05	0.60
5 #10	5.30	5.50	8.80	9.20	1.55	2.05	0.50
5 SP #10	5.30	5.50	10.60	11.00	1.55	2.05	1.10
6 -	6.40	6.60	10.60	11.00	1.55	2.05	0.70
6 SP -	6.40	6.60	13.30	13.70	2.25	2.75	2.00
- 1/4	7.10	7.30	11.30	11.70	2.25	2.75	0.80
- 1/4 SP	7.10	7.30	13.30	13.70	2.25	2.75	1.80
8 5/16	8.60	8.80	13.30	13.70	2.25	2.75	1.50
8 SP 5/16	8.60	8.80	16.40	16.80	2.25	2.75	2.80
- 3/8	10.20	10.40	16.40	16.80	2.25	2.75	2.30
- 3/8 SP	10.20	10.40	20.80	21.20	2.25	2.75	4.80
10 -	10.50	10.50	16.40	16.80	2.25	2.75	2.20
10 SP -	10.50	10.50	20.80	21.20	2.25	2.75	4.70
11 7/16	11.20	11.60	18.30	18.70	2.25	2.75	2.90
12 -	12.80	13.20	19.30	19.70	2.25	2.75	2.90
12 SP -	12.80	13.20	25.20	25.60	3.15	3.65	9.30
- 1/2	13.30	13.70	19.30	19.70	2.25	2.75	2.70
- 1/2 SP	13.30	13.70	25.20	25.60	3.15	3.65	9.00
14 9/16	15.00	15.40	22.80	23.20	3.15	3.65	5.60
14 SP 9/16 SP	15.00	15.40	30.50	30.90	3.15	3.65	14.10
16 5/8	16.80	17.20	25.20	25.60	3.15	3.65	6.70
16 SP 5/8 SP	16.80	17.20	30.50	30.90	3.15	3.65	12.80
18 -	19.30	19.70	28.80	29.20	3.15	3.65	8.90
18 SP -	19.30	19.70	34.30	34.70	3.15	3.65	15.80
- 3/4	19.80	20.20	30.50	30.90	3.15	3.65	10.50
- 3/4 SP	19.80	20.20	38.80	39.20	3.15	3.65	22.10
20 -	21.20	21.60	30.50	30.90	3.15	3.65	9.30
20 SP -	21.20	21.60	38.80	39.20	3.15	3.65	20.90
22 7/8	23.20	23.60	34.30	34.70	3.15	3.65	12.50
22 SP 7/8 SP	23.20	23.60	41.80	42.20	4.35	4.85	31.90
24 -	25.10	25.50	38.80	39.20	3.15	3.65	17.40
24 SP -	25.10	25.50	48.30	48.70	4.35	4.85	45.10
- 1	27.70	28.10	38.70	39.30	3.15	3.65	15.30
- 1 SP	27.70	28.10	48.20	48.80	4.35	4.85	42.00

Wedge lock washers DIN25201  
双叠自锁垫圈DIN25201



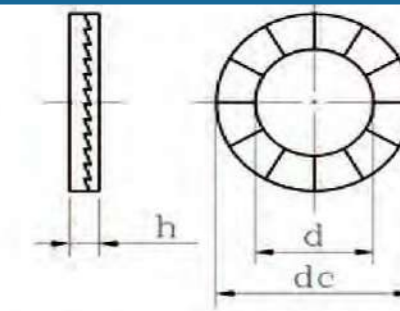
For soew 米制 英寸制	d (min)	d (max)	o (min)	o (max)	h pair (min)	h pair (max)	Kg/1000 pieces (CABBON STEEL)	
27	-	28.20	28.60	41.70	42.30	5.55	6.05	31.40
27 SP	-	28.20	28.60	48.20	48.80	5.55	6.05	52.70
30	1-1/8.	31.20	31.60	46.70	47.30	5.55	6.05	41.00
30 SP	1-1/8 SP	31.20	31.60	58.20	58.80	6.10	6.60	85.00
33	1-1/4.	34.20	34.60	48.20	48.80	5.55	6.05	38.90
33 SP	1-1/4 SP	34.20	34.60	58.20	58.80	6.10	6.60	80.00
36	1-3/8.	37.20	37.60	54.70	55.30	5.55	6.05	54.90
36 SP	1-3/8 SP	37.20	37.60	62.70	63.30	6.10	6.60	91.50
39	-	40.20	40.60	58.20	58.80	5.55	6.05	58.90
42	-	43.00	43.40	62.70	63.30	5.55	6.05	79.70
45	-	46.20	46.70	68.00	70.00	6.25	7.75	102.00
48	-	49.60	50.10	73.00	75.00	6.25	7.75	120.00
52	-	53.60	54.10	78.00	80.00	6.25	7.75	130.00
56	-	59.10	59.60	83.00	85.00	6.25	7.75	135.00
60	-	63.10	63.60	88.00	90.00	6.25	7.75	152.00
64	-	67.10	67.60	93.00	95.00	6.25	7.75	167.00
68	-	71.10	71.60	98.00	100.00	8.75	10.25	282.00
72	-	75.10	75.60	103.00	105.00	8.75	10.25	307.00
76	-	40.20	79.60	108.00	110.00	8.75	10.25	333.00
80	-	43.00	83.60	113.00	115.00	8.75	10.25	360.00
85	-	40.20	88.60	118.00	120.00	8.75	10.25	378.00
90	-	43.00	92.90	128.00	130.00	8.75	10.25	477.00
95	-	40.20	97.90	133.00	135.00	8.75	10.25	498.00
100	-	43.00	103.90	143.00	145.00	8.75	10.25	585.00
105	-	40.20	108.90	148.00	150.00	8.75	10.25	613.00
110	-	43.00	113.90	153.00	155.00	8.75	10.25	635.00
115	-	118.40	118.90	163.00	165.00	8.75	10.25	753.00
120	-	123.40	123.90	168.00	170.00	8.75	10.25	779.60
125	-	128.40	128.90	171.00	173.00	8.75	10.25	766.00
130	-	133.40	133.90	176.00	178.00	8.75	10.25	792.00

\*SP=Plus large

Material: 65mn /S60C /51CrVA/SK5 /60Si2Mn

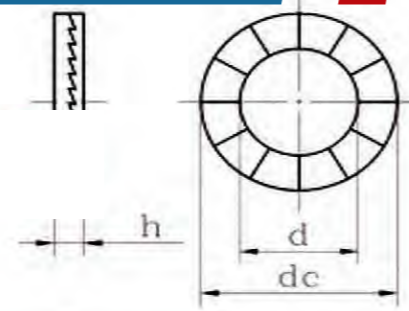
Surface Treatment: Mechanical galvanizing /Dacromet /Geomet /Magni /Delta

Wedge lock washers DIN25201  
双叠自锁垫圈DIN25201



For soew 米制 英寸制	d (min)	d (max)	o (min)	o (max)	h pair (min)	h pair (max)	Kg/1000 pieces (CABBON STEEL)	
3.00	#5	3.30	3.50	6.80	7.20	1.95	2.45	0.40
3.5	#6	3.80	4.00	7.40	7.80	1.95	2.45	0.40
3.5SP	#6SP	3.80	4.00	8.80	9.20	1.95	2.45	0.70
4	#8	4.30	4.50	7.40	7.80	1.95	2.45	0.40
4 SP	#8	4.30	4.50	8.80	9.20	1.95	2.45	0.47
5	#10	5.30	5.50	8.80	9.20	1.90	2.45	0.60
5 SP	#10	5.30	5.50	10.60	11.00	1.95	2.45	1.10
6	-	6.40	6.60	10.60	11.00	1.95	2.45	0.90
6 SP	-	6.40	6.60	13.30	13.70	1.95	2.45	1.60
-	1/4	7.10	7.30	11.30	11.70	1.95	2.45	0.90
-	1/4 SP	7.10	7.30	13.30	13.70	1.95	2.45	1.50
8	5/16	8.60	8.80	13.30	13.70	1.75	2.25	1.20
8 SP	5/16	8.60	8.80	16.40	16.80	1.75	2.25	2.30
-	3/8	10.20	10.40	16.40	16.80	1.75	2.25	1.90
-	3/8 SP	10.20	10.40	20.80	21.20	1.75	2.25	3.80
10	-	10.50	10.90	16.40	16.80	1.75	2.25	1.80
10 SP	-	10.50	10.90	20.80	21.20	1.75	2.25	3.70
11	7/16	11.20	11.60	18.30	18.70	1.95	2.45	2.60
12	-	12.80	13.20	19.30	19.70	1.75	2.25	2.30
12 SP	-	12.80	13.20	25.20	15.60	2.75	3.25	8.20
-	1/2	13.30	13.70	19.30	19.70	1.75	2.25	2.20
-	1/2 SP	13.30	13.70	25.20	25.60	2.95	3.45	8.00
14	9/16	15.00	15.40	22.80	23.20	2.75	3.25	4.90
14 SP	9/16 SP	15.00	15.40	30.50	30.90	2.95	3.45	13.10
16	5/8	16.80	17.20	25.20	25.60	2.75	3.25	5.90
16 SP	5/8 SP	16.80	17.20	30.50	30.90	2.95	3.45	11.30
18	-	19.30	19.70	28.80	29.20	2.95	3.45	8.00
18 SP	-	19.30	19.70	34.30	34.70	2.95	3.45	15.60
-	3/4	19.80	20.20	30.50	30.90	2.95	3.45	9.60
-	3/4 SP	19.80	20.20	38.80	39.20	2.95	3.45	21.00
20	-	21.20	21.60	30.50	30.90	2.75	3.25	8.20
20 SP	-	21.20	21.60	38.80	39.20	2.95	3.45	20.60
22	7/8	23.20	23.60	34.30	34.70	2.95	3.45	12.30
22 SP	7/8 SP	23.20	23.60	41.80	42.20	2.95	3.45	22.20
24	-	25.10	25.50	38.80	39.20	2.95	3.45	15.90
24 SP	-	25.10	25.50	48.30	48.70	2.95	3.45	35.00
-	1	27.70	28.10	38.70	39.30	2.70	3.20	14.20
-	1 SP	27.70	28.10	48.20	48.80	2.70	3.20	27.00

## Stainless steel Wedge lock washers 不锈钢双叠自锁垫圈DIN25201



For soew		d	d	o	o	h pair	h pair	Kg/1000 pieces (Stainless STEEL)
米制	英寸制	(min)	(max)	(min)	(max)	(min)	(max)	
27	-	28.20	28.60	41.70	42.30	6.30	6.80	34.50
27	-	28.20	28.60	48.20	48.80	6.30	6.80	53.40
30	1-1/8.	31.20	31.60	46.70	47.30	6.30	6.80	44.90
30	1-1/8.	31.20	31.60	58.20	58.80	6.30	6.80	91.80
33	1-1/4.	34.20	34.60	48.20	48.80	6.30	6.80	42.80
33	1-1/4.	34.20	34.60	58.20	58.80	/	/	/
36	1-3/8.	37.20	37.60	54.70	55.30	6.30	6.80	59.60
36	1-3/8.	37.20	37.60	62.70	63.30	/	/	/
39	-	40.20	40.60	58.20	58.80	6.30	6.80	67.40
42	-	43.00	43.40	62.70	63.30	6.30	6.80	75.00
45	-	46.20	46.70	68.00	70.00	6.05	7.55	102.00
48	-	49.60	50.10	73.00	75.00	6.05	7.55	120.00
52	-	53.60	54.10	78.00	80.00	8.25	9.75	180.40
56	-	59.10	59.60	83.00	85.00	8.25	9.75	213.00
60	-	63.10	63.60	88.00	90.00	8.25	9.75	235.00
64	-	67.10	67.60	93.00	95.00	8.25	9.75	258.00
68	-	71.10	71.60	98.00	100.00	8.25	9.75	282.00
72	-	75.10	75.60	103.00	105.00	8.25	9.75	307.00
76	-	40.20	79.60	108.00	110.00	8.25	9.75	333.00
80	-	43.00	83.60	113.00	115.00	8.25	9.75	360.00
85	-	40.20	88.60	118.00	120.00	/	/	/
90	-	43.00	92.90	128.00	130.00	/	/	/
95	-	40.20	97.90	133.00	135.00	/	/	/
100	-	43.00	103.90	143.00	145.00	/	/	/
105	-	40.20	108.90	148.00	150.00	/	/	/
110	-	43.00	113.90	153.00	155.00	/	/	/
115	-	118.40	118.90	163.00	165.00	/	/	/
120	-	123.40	123.90	168.00	170.00	/	/	/
125	-	128.40	128.90	171.00	173.00	/	/	/
130	-	133.40	133.90	176.00	178.00	/	/	/

Material: Stainless steel SUS304 / 31s hardness HV300-500

## Safety washers DIN 9250 不锈钢双叠自锁垫圈DIN25201



### Product introduction

Safety washers were developed as a reliable and economic bolt locking device with the basic principle of a disc spring. This ingenious form combines the advantage of security through friction and mechanical locking. Safety washers are now used world wide where secure fastening connections to counter the effect of vibration are required.

Safety washers are in the form of a disc spring but with a trapezoidal cross-section and serrations on both sides. The outer diameter is matched to the head diameter of the pan head and socket head cap screws.

Safety washers are available in two versions: the standard safety washer type "S" is available in for screws of sizes M1.6 to M36 and of the property classes up to 8.8. For screws of property classes 8.8 and 10.9, higher pretension forces might be necessary. These are covered by our reinforced washers type "VS".

Due to the conical form, optimal traction is achieved at highest positive locking due to the helical gearing.

### Features

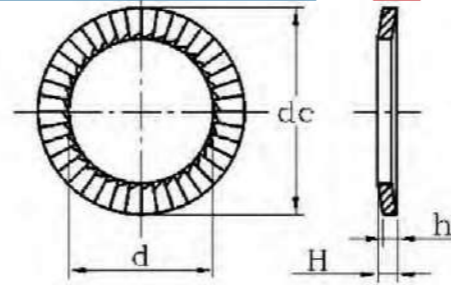
Safety Washers offer the following advantages:

- High resistance to vibration due to the positive locking of the serrations.
- Concentric force transmission and uniform axial load eliminate bending torques and deformation of the bolt stem.
- The design of the serrations prevents friction and damage to components when tightening.
- Extremely high safety against loss of pretension force and loosening.
- Wide variety for materials and different finishes.
- The closed ring form results in a high degree of pre-tensioning, while avoiding burst-open effect.
- Development and design of the washers take place on the basis of the screw geometrics, tightening torque as well as the constructive circumstances.

### Product application:

Applications span many industries such as automotive, machine, plant engineering, conveyors, electrical. Safety washers are used, for example, in mowing machines, textile machines, machine tools and a lot of other applications.

## Safety Washers DIN9250S 蝶形防松垫圈DIN9250S

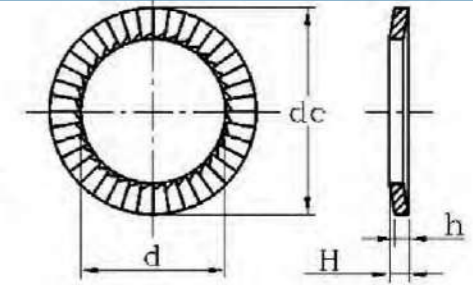


For soew		d	dc	h	H		Kg/1000 pieces
米制	英寸制				(max)	(min)	
27	-	1.7	3.2	0.35	0.6	0.4	0.013
27 SP	-	2.2	4	0.35	0.6	0.4	0.021
30	1-1/8.	2.7	4.8	0.45	0.9	0.5	0.039
30 SP	1-1/8 SP	3.2	5.5	0.45	0.9	0.5	0.049
33	1-1/4.	3.7	6	0.45	0.9	0.55	0.055
33 SP	1-1/4 SP	4.3	7	0.5	1	0.55	0.085
36	1-3/8.	5.3	9	0.6	1.1	0.6	0.167
36 SP	1-3/8 SP	6.4	10	0.6	1.2	0.7	0.2
39	-	6.7	9.5	0.6	1.2	0.65	0.15
42	-	7.4	12	0.7	1.3	0.8	0.355
45	-	8.4	13	0.7	1.4	0.9	0.3925
48	-	10.5	16	0.9	1.6	1.1	0.75
52	-	11.6	15.9	0.9	1.6	1.05	0.595
56	-	13	18	1	1.7	1.15	0.879
60	-	13.7	19	1	1.8	1.25	0.976
64	-	15	22	1.1	2	1.35	1.641
68	-	17	24	1.3	2.1	1.55	1.984
72	-	19	27	1.4	2.3	1.75	2.97
76	-	20	30	1.4	2.5	1.9	4.1
80	-	21	30	1.4	2.5	1.85	3.742
85	-	23	33	1.4	2.7	1.95	4.507
90	-	25.6	36	1.6	2.9	2.15	5.91
95	-	27	38	1.8	3.1	2.35	7.449
100	-	28.6	39	1.8	3.1	2.35	7.369
105	-	31.6	45	1.8	3.6	2.6	10.78
110	-	34	50	2.5	4	3.25	19.8
115	-	38	54	2.5	4.2	3.2	21.28

Material: 65mn /S60C/SK5 /60Si2Mn /51CrV4

Surface Treatment: Mechanical galvanizing /Dacromet /Geomet /Magni /Delta

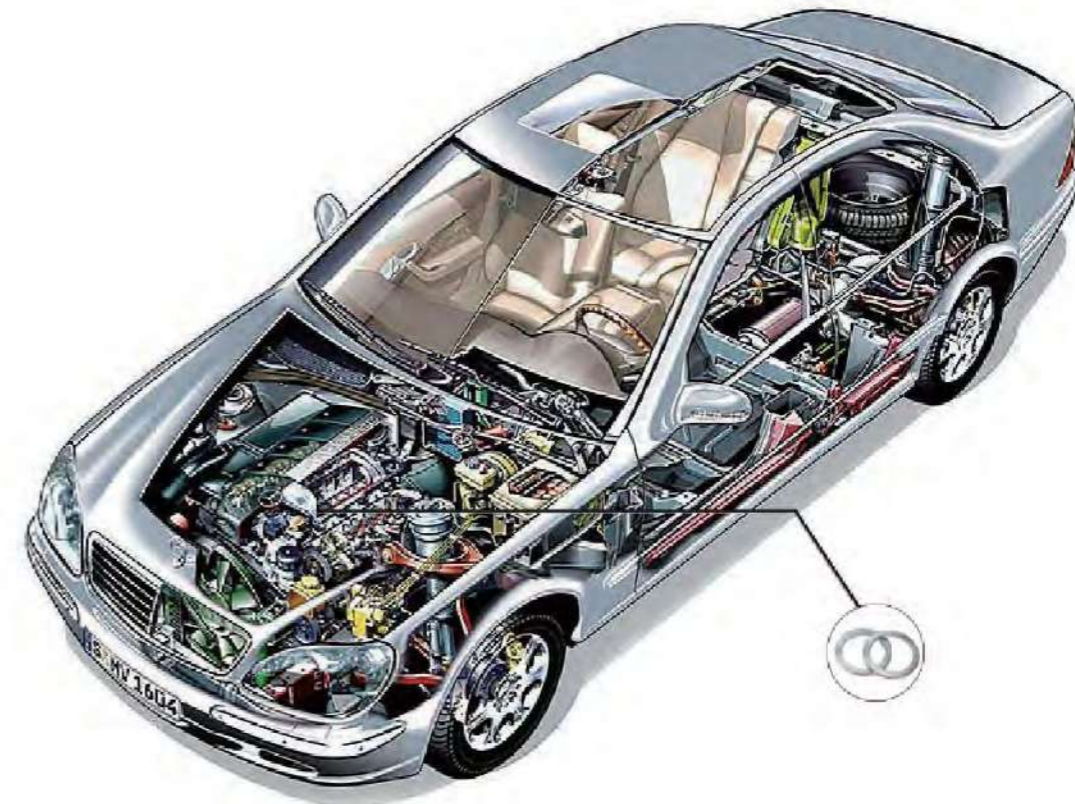
## Safety Washers DIN9250VS 重型蝶形防松垫圈DIN9250VS



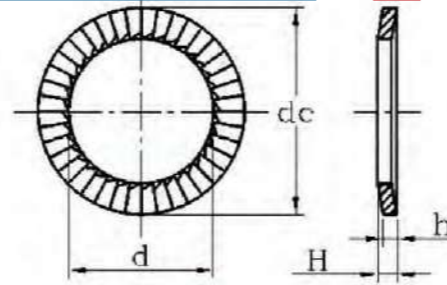
For soew		d	dc	h	H		Kg/1000
Metric	Inch				(max)	(min)	
27	-	5.3	9	1	1.3	1.05	0.298
27 SP	-	6.4	10	1	1.4	1.1	0.33
30	1-1/8.	8.4	13	1.5	2	1.6	0.836
30 SP	1-1/8 SP	10.5	16	1.8	2.3	1.9	1.501
33	1-1/4.	13	18	1.8	2.4	1.9	1.731
33 SP	1-1/4 SP	15	22	1.8	0.5	1.95	2.693
36	1-3/8.	17	24	2.5	3.1	2.6	4.145
36 SP	1-3/8 SP	19	27	2.5	3.2	2.65	5.37
39	-	21	30	2.5	3.3	2.7	6.709
42	-	23	33	2.5	3.4	2.7	8.184
45	-	25.6	36	3	3.9	3.2	11.262
48	-	28.6	39	3	4	3.3	12.36
52	-	31.6	45	3	4.3	3.55	18.222

Material: 65mn /S60C/SK5 /60Si2Mn /51CrV4

Surface Treatment: Mechanical galvanizing /Dacromet /Geomet /Magni /Delta



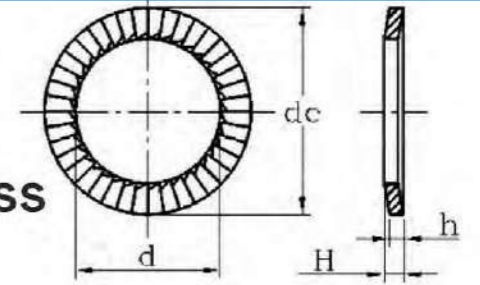
## Stainless steel Safety Washers 蝶形防松垫圈DIN9250SS



For soew 米制 英寸制	d	dc	h	H		Kg/1000 pieces	
				(max)	(min)		
M1.6	1.7	3.2	0.5	0.75	0.55	0.019	
M2	2.2	4	0.5	0.75	0.55	0.029	
M2.5	2.7	4.8	0.5	0.95	0.55	0.042	
M3	3.2	5.5	0.5	0.95	0.55	0.042	
M3.5	3.7	6	0.7	1.15	0.75	0.084	
M4	4.3	7	0.7	1.2	0.75	0.081	
M5	5.3	9	0.7	1.2	0.75	0.209	
M6	6.4	10	0.7	1.2	0.75	0.193	
	1/4	6.7	9.5	0.7	1.2	0.172	
M8	8.4	13	1	1.6	1.2	0.557	
M10	10.5	16	1	1.6	1.1	0.731	
		11.6	15.9	1.3	1.85	1.3	0.825
M12	13	18	1.3	1.85	1.3	1.099	
	1/2	13.7	19	1.3	1.95	1.4	1.222
M14	15	22	1.5	2.3	1.65	2.244	
M16	17	24	1.5	2.3	1.75	2.487	
M18	19	27	1.8	2.6	2.05	3.843	
	3/4	20	30	1.8	2.6	2.2	5.294
M20	21	30	1.8	2.8	2.15	3.923	
M22	23	33	1.8	3	2.3	5.893	
M24	25.6	36	2	3.1	2.35	7.508	
	1	27	38	2.5	3.6	2.85	10.508
M27	28.6	39	2.5	3.6	2.85	10.3	
M30	31.6	45	2.5	4.1	3.1	15.185	
M36	38		3	4.7	3.7	26.218	

Material: 304 (A2)/316 (A4) 7.631/17-7PH  
Surface Treatment: Polishing

## Stainless steel Safety Washers 重型不锈钢蝶形防松垫圈DIN9250Vss 'SS



For soew Metric Inch	d	dc	h	H		Kg/1000	
				(max)	(min)		
M5	3/16	5.3	9	1	1.3	1.05	0.298
M6		6.4	10	1	1.4	1.1	0.33
M8	5/16	8.4	13	1.5	2	1.6	0.836
M10	3/8	10.5	16	1.8	2.3	1.9	1.501
M12		13	18	1.8	2.4	1.9	1.731
M14		15	22	1.8	0.5	1.95	2.693
M16	5/8	17	24	2.5	3.1	2.6	4.145
M18		19	27	2.5	3.2	2.65	5.37
M20		21	30	2.5	3.3	2.7	6.709
M22		23	33	2.5	3.4	2.7	8.184
M24		25.6	36	3	3.9	3.2	11.262
M27		28.6	39	3	4	3.3	12.36
M30	1-1/8.	31.6	45	3	4.3	3.55	18.222

Material: 304 (A2)/316 (A4) 7.631/17-7PH  
Surface Treatment: Polishing



## Contact Washers NFE 25511 CS法式锁紧垫圈



### Product introduction

Contact Washers are Conical Shaped Lock Washers, formed with a ribbed top surface. The conical shape exerts locking force 360 Degree around the underside of the screw head or nut by generating Tension. The ribbed top surface further enhances the locking force and resists the torqued fastener connection potential for loosening under pressure and vibration. This is a single-sided toothed and non-slip locking washer providing the designer the ability to secure wobble-prone screw effectively. It is particularly suitable for use on slot fasteners, dynamic cross-loaded to the screw connections and applications that require high biasing forces.

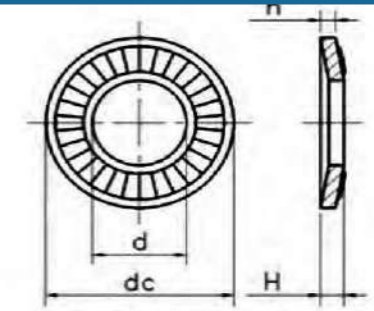
### Features

- Highest security performance
- To prevent the vibration and dynamic load caused by loosening
- Easy to install and remove
- Locking effect is not affected by lubrication
- Whether the level of the pre-tightening force has a good locking effect or not
- Can control the level of pre-tightening force
- Same temperature characteristics whit standard bolt/nut
- Can be used repeatedly

### Product application:

NFE25511 Contact washer is widely used in electronic appliances, electrical equipment elevators, communications, rolling stock assembly, medical machinery and special equipment

## Contact Washers NFE 25511 锯齿锥面弹簧垫圈 NFE25511



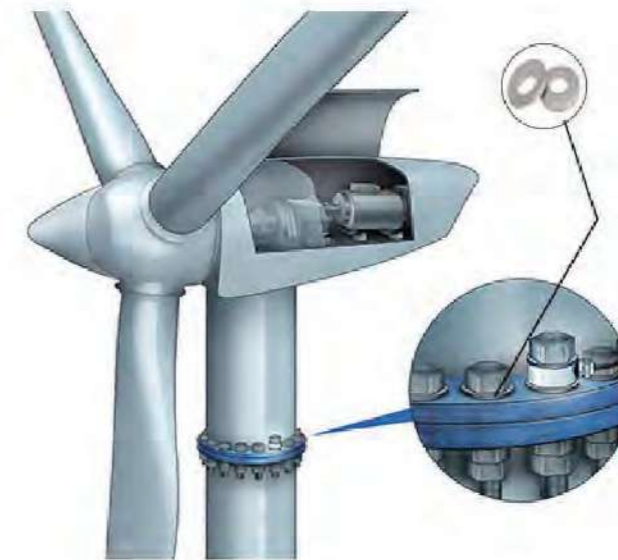
For soew	d	d	dc	dc	h	h	H	H	Mpcs/Kg
	Min	Max	Min	Max	Min	Max	Min	Max	
3	3.1	3.35	5.78	6.21	0.47	0.53	0.7	0.9	0.18
4	4.1	4.4	7.71	8.29	0.77	0.83	1	1.2	0.43
5	5.1	5.4	9.71	10.29	0.96	1.04	1.25	1.5	0.72
6	6.1	6.4	11.65	12.35	1.16	1.24	1.55	1.85	1.254
8	8.2	8.56	15.65	16.35	1.36	1.44	1.8	2.2	2
10	10.2	10.58	19.58	20.42	1.55	1.65	2.1	2.6	3.6
12	12.4	12.83	23.58	24.42	1.75	1.85	2.4	2.9	6.316
14	14.4	14.83	29.58	30.42	2.34	2.46	3.2	3.7	12.1
16	16.4	16.83	31.5	32.5	2.74	2.86	3.6	4.1	12.1

### Material:

carbon steel: 65mn / S60C / SK5 / 60Si2Mn / 51CrV4

Stainless steel: 304 (A2/316 (A4) .631/17-7PH

Surface Treatment: Mechanical galvanizing / Dacromet / Geomet / Magni / Delta / Polishing





## Pierced Washers SKK-SN70093-DIN6795 接地锁紧垫圈SKK-SN70093-DIN6795



### Product introduction

SKK-SN70093-DIN6795 Pierced washer with claw-shaped angle can effectively fix the swinging bolt. Its 6 claw-shaped angle can provide spring and shape locking function, especially suitable for slot fasteners and high biasing force. The ground piercing washer can effectively pierce the metal surface when the bolt is tightened. It can be used for piercing effect. It is used for the electrostatic discharge of electronic and electrical equipment. Due to the electrical equipment and other products in the process of using static electricity. Serious electrostatic discharge It can cause equipment to fire or even explode, so ground piercing gaskets have been widely used in electrical cabinets, electronic communications and other industries and fields.

SKK-SN70093-DIN6795 Pierced washer with claw-shaped angle can effectively fix the swinging bolt. Its 6 claw-shaped angle can provide spring and shape locking function, especially suitable for slot fasteners and high biasing force. The ground piercing washer can effectively pierce the metal surface when the bolt is tightened. It can be used for piercing effect. It is used for the electrostatic discharge of electronic and electrical equipment. Due to the electrical equipment and other products in the process of using static electricity, serious electrostatic discharge It can cause equipment to cabinets, electronic communications and other industries and fields.

SKK, the surface of the washer is "S" type locking pattern, and the other specifications are basically the same as SN70093 and DIN6795;

SN70093, this type of grounding washer is Siemens standard the surface of the washer is "I" straight lock pattern, the standard specification has a wide range (M3-M24)

DIN6795 is basically the same as SN70093 in locking pattern and size.

### Features

- Versatile-anti-loosening locking and electrostatic discharge
- High elasticity
- Reusable
- Material independence
- Insensitive to temperature
- No rotation when tightened
- Suitable for any standard bolt

### Product application:

SKK-SN70093-DIN6795 Pierced washer is widely used in electronic appliances, electrical equipment, elevators, communications rolling stock assembly, medical machinery and special equipment

## Pierced Washers SKK-SN70093-DIN6795 接地锁紧垫圈SKK-SN70093-DIN6795

95



SN70093 Ground piercing washer / calw pad(for electrically conductive connections)							
For screw with metric thread	d1(mm)	d2(mm)	h(mm)	n(mm)	s(mm)	m(mm)	Kg/1000pcs
M3	3.10-3.40	5.80-6.20	0.80-0.95	0.15-0.35	0.53-0.65	0.70-0.90	0.09
M3.5	3.60-3.90	6.80-7.20	0.95-1.10	0.15-0.35	0.63-0.77	0.90-1.10	0.15
M4	4.10-4.40	7.80-8.20	1.00-1.15	0.20-0.40	0.73-0.85	1.10-1.30	0.25
M5	5.20-5.44	9.80-10.20	1.25-1.50	0.30-0.70	0.90-1.10	1.90-2.10	0.41
M6	6.10-6.40	11.80-12.20	1.50-1.80	0.30-0.70	1.10-1.30	2.00-2.20	0.71
M8	8.20-8.50	15.8-16.20	1.95-2.40	0.30-0.70	1.30-1.40	2.00-2.20	1.50
M10	10.20-10.80	19.70-20.60	19.70-20.20	2.15-2.60	0.30-0.70	2.00-2.20	2.68
M12	12.40-12.80	23.70-24.20	2.15-2.60	0.30-0.70	1.50-1.60	2.60-2.80	3.85
M16	16.40-16.80	31.70-32.30	3.50-3.90	0.30-0.70	2.28-2.60	4.50-4.70	11.3
M20	20.50-21.00	19.70-40.30	4.20-4.65	0.40-0.80	2.78-3.10	4.50-4.70	21.0
M24	24.50-25.00	48.70-49.30	4.45-4.90	0.40-0.80	2.78-3.10	5.00-5.20	21.0

SN70093 Ground piercing washer / calw pad(for electrically conductive connections)							
For screw with metric thread	d1(mm)	d2(mm)	h(mm)	n(mm)	s(mm)	m(mm)	Kg/1000pcs
M4	4.10-4.80	6.80-8.20	1.00-1.15	0.1	0.77-0.83	1.10-1.30	0.25
M5	4.10-4.80	9.80-10.20	1.25-1.50	0.3	0.97-1.03	1.90-2.10	0.41
M6	6.10-6.48	11.80-12.20	1.50-1.80	0.3	1.16-1.24	2.00-2.20	0.71
M8	8.20-8.78	15.8-16.20	1.95-2.40	0.3	1.36-1.44	2.00-2.20	1.5
M10	10.20-10.78	19.75-20.25	2.15-2.60	0.3	1.56-1.64	2.00-2.20	2.68
M12	12.40-12.98	23.75-24.25	2.15-2.60	0.3	1.56-1.64	2.00-2.20	3.85

Note: Spring steel S60C/ 65Mn / SK5 hardness 420-510 HV10,  
Stainless steel SuS304 / 316 hardness HV300-500 HV10  
Surface coating is Dacromet, mechanical zinc plating, nickel plating, blackening;

Spattern French lock Washers  
SKS-SKM-SKB-SKZ

S纹法式锁紧垫圈  
SKS-SKM-SKB-SKZ



**Product introduction**

“SK” series toothed lock washers can effectively prevent the thread from loosening. It locking the edges of the special geometry to effectively avoid the damage of the bolt connection surface and respond to the impact of torque changes. To improve the anti-loosening coefficient, the “SK” series French lock washers have four different models: SKS-SKM-SKB-SKZ, all of which have excellent anti-loosening and locking performance.

**Features**

- Effective protection of connection surfaces
- Reusable
- Independent material
- Small torque change during installation
- The screw does not by itself when turning
- Suitable for any standard and meterable threads

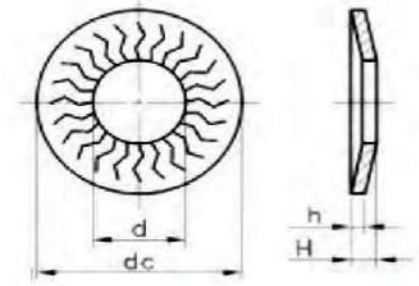
**Product application:**

Slot  
Connection assembly with dynamic load  
Sheet metal



Spattern French lock Washers  
SKS-SKM-SKB-SKZ

S纹法式锁紧垫圈  
SKS-SKM-SKB-SKZ



French Lock Washer-Type S-BN208010(Connecting small/narrow receiving surfaces)

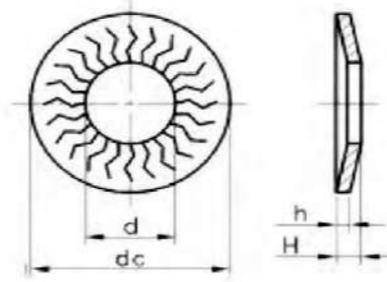
For screw with metric thread	d(mm)	dc(mm)	H(mm)	h(mm)	Kg/1000pcs
M4	4.10-4.40	7.80-8.20	1.15-1.40	0.95-1.05	0.27
M5	5.10-5.40	9.80-10.20	1.25-1.50	0.95-1.05	0.4
M6	6.10-6.40	11.77-12.20	1.55-1.85	1.16-1.24	0.707
M8	8.20-8.56	15.77-16.20	1.90-2.40	1.36-1.44	1.500
M10	10.20-10.56	19.73-20.25	2.10-2.60	1.55-1.65	2.630
M12	12.40-12.83	23.73-24.25	2.20-2.70	1.55-1.65	3.870

French Lock Washer-Type M-BN208010(Medium connection high strength/medium bearing surfaces)

For screw with metric thread	d(mm)	dc(mm)	H(mm)	h(mm)	Kg/1000pcs
M4	4.10-4.48	9.80-10.20	1.25-1.50	0.95-1.05	0.470
M5	5.10-5.48	11.80-12.20	1.55-1.90	1.16-1.24	0.790
M6	6.10-6.48	13.77-14.20	1.85-2.20	1.36-1.44	1.240
M8	8.20-8.78	17.68-18.20	1.95-2.40	1.36-1.44	2.030
M10	10.20-10.78	21.73-22.25	2.25-2.75	1.55-1.65	6.010
M12	12.40-12.83	26.73-27.25	2.65-3.10	1.75-1.85	6.010
M14	14.40-14.83	29.63-30.25	3.20-3.70	2.34-2.46	9.370
M16	16.40-16.98	31.88-32.50	3.45-3.95	2.44-2.56	10.650
M18	18.50-19.25	34.38-35.00	4.00-4.50	2.94-3.06	15.200
M20	21.00-21.75	39.38-40.00	4.20-4.70	2.94-3.06	20.400
M22	23.00-23.75	44.38-45.00	4.80-5.30	3.44-3.56	30.400
M24	25.00-25.75	49.38-50.00	5.10-5.60	3.44-3.56	38.20
M27	28.00-28.85	59.26-60.00	3.10-6.60	3.91-4.09	69.00
M30	31.00-31.85	69.26-70.00	7.30-7.80	4.41-4.59	109.00

Note: Spring steel S60C / 65Mn / SK5 hardness 420-510 HV10,  
Stainless steel SuS304 / 316 hardness HV300-500 HV10  
Surface coating is Dacromet, mechanical zinc plating, nickel plating, blackening;

Spattern French lock Washers  
SKS-SKM-SKB-SKZ  
S纹法式锁紧垫圈  
SKS-SKM-SKB-SKZ



French Lock Washer-Type B-BN208010(Connect high protection/large bearing surfaces)					
For screw with metric thread	d(mm)	dc(mm)	H(mm)	h(mm)	Kg/1000pcs
M4	6.10-6.40	17.68-18.20	2.15-2.55	1.36-1.44	2.47
M5	8.20-8.56	21.73-22.25	2.60-3.00	1.84-1.96	4.88
M6	10.20-10.56	26.73-27.25	3.20-3.70	2.34-2.46	9.20
M8	12.40-12.83	31.68-32.30	4.10-4.60	2.74-2.86	14.62

French Lock Washer-BN208010(Connecting cylinder head bolts)					
For screw with metric thread	d(mm)	dc(mm)	H(mm)	h(mm)	Kg/1000pcs
M6	6.10-6.40	9.54-9.90	1.50-1.80	1.36-1.44	0.50
M8	8.20-8.56	12.34-12.70	1.55-1.85	1.36-1.44	0.78
M10	10.20-10.56	15.74-16.10	1.85-2.20	1.55-1.65	1.42
M12	12.40-12.83	17.78-18.30	2.05-2.45	1.75-1.85	1.78
M14	14.40-14.83	20.88-21.40	2.70-3.10	2.34-2.46	3.19
M16	16.40-16.83	24.08-24.60	2.90-3.30	2.44-2.56	4.40

Note: Spring steel S60C / 65Mn / SKS hardness 420-510 HV10,  
Stainless steel SuS304 / 316 hardness HV300-500 HV10  
Surface coating is Dacromet,mechanical zinc plating,nickel plating,blackening;



Heavy Duty Locking Washers DIN6796  
重载螺栓连接垫圈DIN6796



Product introduction

German standard DIN6796 dish washer also known as “conical elastic washer”, “dish spring washer”, “bowl washer”, the shape is like a dish spring, when the washer is flattened,its load is 70-90% of the bolt load,Suitable for high-strength bolts of grade 8.8-12.9 The dish washer is used to compensate the formation of settlement in the screw connection and prevent the connection from loosening.It has a compensation effect on the wear, creep,thermal expansion, shrinkage of the consumables and the compression of the seals. DIN6796 disk washers are similar to NFE 25510 disk washers.DIN6908 disk washers for assemblies,and DIN2093 (corresponding to GB/T 1972) disk springs.

Features

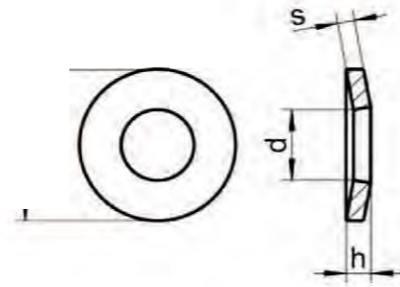
- High axial load
- High fatigue life
- High load drop (caused by temperature difference) compensation
- Effectively reduce the negative effects of dynamic loads and prevent locking
- High elasticity, uniform load concentration and high safety

Product application:

Heavy Duty Locking Washer DIN6796 is widely used in electronic appliances, electrical Equipment, elevators,communications,rolling stock assembly,medical machinery and special equipment



## Heavy Duty Locking Washers DIN6796 重载螺栓连接垫圈DIN6796



size	d/mm	d2/mm	s/mm	h/mm	f/n	Kg/1000Mpcs
M2	2.2	5	0.40	0.50-0.60	630	0.05
M2.5	2.7	6	0.50	0.60-0.72	950	0.09
M3	3.2	7	0.60	0.70-0.85	1320	0.14
M3.5	3.7	8	0.80	0.90-1.06	2400	0.25
M4	4.3	9	1.0	1.10-1.30	3800	0.38
M5	5.3	11	1.20	1.30-1.55	5500	0.68
M6	6.4	14	1.50	1.7-2.00	8600	1.42
M7	7.4	17	1.75	2.00-2.30	11300	2.51
M8	8.4	18	2.00	2.20-2.60	14900	3.10
M10	10.5	23	2.50	2.80-3.20	22100	5.13
M12	13.0	29	3.00	3.40-3.95	34100	12.35
M14	15.0	35	3.50	4.00-4.65	46000	21.44
M16	17.0	39	4.00	4.60-5.25	59700	30.19
M18	19.0	42	4.50	5.10-5.80	74400	38.68
M20	21.0	45	5.00	5.60-6.40	93200	48.52
M22	23.0	49	5.50	6.10-7.05	114000	63.07
M24	25.0	56	6.00	6.80-7.75	131000	92.30
M27	28.0	60	6.50	7.30-8.35	154000	112.13
M30	31.0	70	7.00	8.00-9.20	172000	168.92
M33	34	76	7.50	8.50-10.00	226000	213.52
M36	37.2	83	8.00	9.20-10.50	276000	271.39
M42	43.5	96	8.50	10.50-12.00	290000	383.61
M48	49.6	110	9.00	11.00-12.50	261000	535.18
M58	58	128	9.50	12.00-13.50	260000	762.21
M64	66	136	10.00	12.80-14.00	277000	871.34
M72	74	145	10.50	13.00-15.00	327000	1006.08
M90	92.5	160	11.00	14.00-16.00	378000	1155.31
M100	102.5	180	11.50	15.00-17.00	370000	1551.52
M125	128	220	12.00	16.50-19.00	365000	2367.49

Note: Product design hardness is 420-510 HV10;

Spring steel S60C / 60Si2MnA / 50CrVA

surface treatment blackened / blued / mechanical galvanized / dacromet / jumet etc.

Stainless steel SUS301 / 304 / 316, 1.7-7PH hardened polished natura color treatment;

## Disc Spring Washers DIN2093 碟型弹簧垫圈DIN2093



### Product introduction

DIN 2093 springs are conical washers with elastic properties. They are commonly known as disc springs but sometimes they are called belleville washers. These springs are manufactured according to the specifications of DIN 2093 standard, which establishes all the characteristics these pieces have to meet.

The main feature of DIN 2093 disc springs is the capacity to generate high spring force compared to traditional helical springs, in small enclosures and with short displacements. These spring washers are under small deflection when submitted to large loads. Serial or parallel assembly allows us to obtain higher deflections and loads.

Series

Some springs are classified as A, B or C. This classification corresponds, according to DIN 2093 standard, to a specific relation between the external diameter of the disc spring and its thickness. The three series for each standard measure are established:

Series A:  $De/t \approx 18$ ; high force springs

Series B:  $De/t \approx 28$ ; medium force springs

Series C:  $De/t \approx 40$ ; low force springs

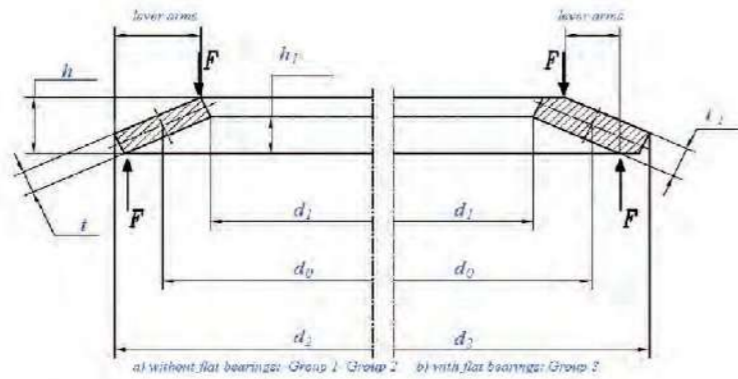
### Features

- High load capacity with small deflection
- High fatigue life
- Largely Self-damping, giving good shock absorption and energy dissipation
- Singly or in stacks to meet various requirements
- Various characteristics due to different thickness and height
- Low Maintenance cost & Greater Security

### Product application:

- Automotive & Engines
- Clutches, brakes
- Valves, pumps
- Machine Tools
- Screwed or bolted sections.
- Bearing preload.
- Hoists, cranes
- Electrical switch gear
- And many more applications

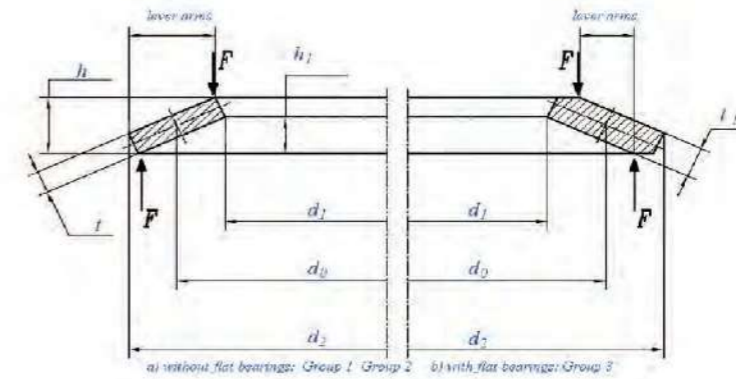
## Disc Spring Washers DIN2093A 碟型弹簧垫圈DIN2093 Type A



For Bolt			8	10	12.5	14	16	18	20	22.5	25	28	31.5	35.5	40	45	50
d <sub>1</sub>	h12	max	4.32	5.32	6.35	7.35	8.35	9.35	10.38	11.38	12.38	14.38	16.48	18.51	20.61	22.61	25.61
		min	4.2	5.2	6.2	7.2	8.2	9.2	10.2	11.2	12.2	14.2	16.3	18.3	20.4	22.4	25.4
d <sub>2</sub>	h12	max	8	10	12.5	14	16	18	20	22.5	25	28	31.5	35.5	40	45	50
		min	7.85	9.85	12.32	13.82	15.82	17.82	19.79	22.29	24.79	27.79	31.25	35.25	39.75	44.75	49.75
t			0.4	0.5	0.7	0.8	0.9	1	1.1	1.25	1.5	1.5	1.75	2	2.25	2.5	3
t <sub>1</sub>			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
h4			0.2	0.25	0.3	0.3	0.35	0.4	0.45	0.5	0.55	0.65	0.7	0.8	0.9	1	1.1
h			0.6	0.75	1	1.1	1.25	1.4	1.55	1.75	2.05	2.15	2.45	2.8	3.15	3.5	4.1
washer type			1	1	1	1	1	1	1	2	2	2	2	2	2	2	2

For Bolt			56	63	71	80	90	100	112	125	140	160	180	200	225	250
d <sub>1</sub>	h12	max	28.71	31.25	36.25	41.25	46.25	51.3	57.3	64.3	72.3	82.35	92.35	102.35	112.35	127.4
		min	28.5	31	36	41	46	51	57	64	72	82	92	102	112	127
d <sub>2</sub>	h12	max	56	63	71	80	90	100	112	125	140	160	180	200	225	250
		min	55.7	62.7	70.7	79.7	89.65	99.65	111.65	124.6	139.6	159.6	179.6	199.54	224.54	249.54
t			3	3.5	4	5	5	6	6	8	8	10	10	12	12	14
t <sub>1</sub>			-	-	-	-	-	-	-	-	-	-	-	-	-	-
h4			1.3	1.4	1.6	1.7	2	2.2	2.5	2.6	3.2	3.5	4	4.2	5	5.6
h			4.3	4.9	5.6	6.7	7	8.2	8.5	10.6	11.2	13.5	14	16.2	17	19.6
washer type			2	2	2	2	2	2	3	3	3	3	3	3	3	3

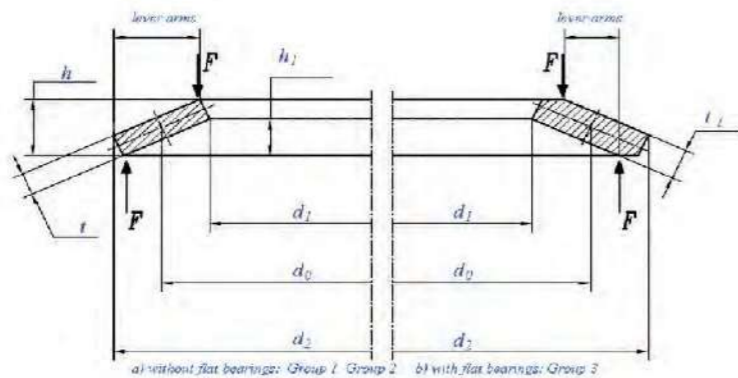
## Disc Spring Washers DIN2093B 碟型弹簧垫圈DIN2093 Type B



For Bolt			8	10	12.5	14	16	18	20	22.5	25	28	31.5	35.5	40	45	50
d <sub>1</sub>	h12	max	8	10	12.5	14	16	18	22.5	22.5	25	28	31.5	35.5	40	45	50
		min	7.85	9.85	12.32	13.82	15.82	17.82	22.29	22.29	24.79	31.25	35.25	39.75	44.75	44.75	49.75
d <sub>2</sub>	h12	max	4.32	5.32	6.35	7.35	8.35	9.35	11.38	11.38	12.38	14.38	16.48	18.51	20.61	22.61	25.61
		min	4.2	5.2	6.2	7.2	8.2	9.2	11.2	11.2	24.79	27.79	31.25	35.25	39.75	44.75	49.75
t			0.3	0.4	0.5	0.5	0.6	0.7	0.8	0.8	0.9	1	1.25	1.25	1.5	1.75	2
t <sub>1</sub>			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
h4			0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.65	0.7	0.8	1	0.9	1.15	1.3	1.4
h			0.55	0.7	0.85	0.9	1.05	1.2	1.35	1.45	1.6	1.8	2.15	2.25	2.65	3.05	3.4
washer type			1	1	1	1	1	1	2	2	2	2	2	2	2	2	2

For Bolt			56	63	71	80	90	100	112	125	140	160	180	200	225	250
d <sub>1</sub>	h12	max	56	63	71	80	90	100	112	125	140	160	180	200	224.54	250
		min	55.7	62.7	70.7	79.7	89.65	99.65	111.65	124.6	139.6	139.6	179.6	199.54	224.54	249.54
d <sub>2</sub>	h12	max	28.71	31.25	36.25	41.25	46.25	51.3	57.3	64.3	72.3	72.3	92.35	102.35	112.35	127.4
		min	28.5	31	36	41	46	51	57	64	72	82	92	102	112	127
t			2	2.5	2.5	3	3.5	3.5	4	5	5	6	6	8	8	10
t <sub>1</sub>			-	-	-	-	-	-	-	-	-	-	-	-	-	-
h4			1.6	1.75	2	2.3	2.5	2.8	3.2	3.5	4	4.5	5.1	5.6	6.5	7
h			3.6	4.25	4.5	5.3	6	6.3	7.2	8.5	9	10.5	11.1	13.6	14.5	17
washer type			2	2	2	2	2	2	2	3	3	3	3	3	3	3

## Disc Spring Washers DIN2093C 碟型弹簧垫圈DIN2093 Type C



For Bolt			8	10	12.5	14	16	18	20	22.5	25	28	31.5	35.5	40	45	50
d <sub>2</sub>	h12	max	8	10	12.5	14	16	18	22.5	22.5	25	28	31.5	35.5	40	45	50
		min	7.85	9.85	12.32	13.85	15.82	17.82	19.79	22.29	24.79	27.79	31.25	35.25	39.75	44.75	49.75
d <sub>1</sub>	h12	max	4.32	5.32	6.35	7.35	8.35	9.35	11.38	11.38	12.38	14.38	16.48	18.57	20.61	22.61	25.61
		min	4.2	5.2	6.2	7.2	8.2	9.2	10.2	11.2	12.2	14.2	16.3	18.3	20.4	22.4	25.4
t			0.2	0.25	0.35	0.35	0.4	0.45	0.5	0.6	0.7	0.8	0.8	0.9	1	1.25	1.25
t <sub>1</sub>			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
h4			0.25	0.3	0.45	0.45	0.5	0.6	0.65	0.8	0.9	1	1.05	1.15	1.3	1.6	1.6
h			0.45	0.55	0.8	0.8	0.9	1.05	1.15	1.4	1.6	1.8	1.8	2.05	2.3	2.85	2.85
washer type			1	1	1	1	1	1	1	11	11	1	1	1	1	2	2

For Bolt			56	63	71	80	90	100	112	125	140	160	180	200	225	250
d <sub>2</sub>	h12	max	56	63	71	80	90	100	112	125	140	160	180	200	224.54	250
		min	55.7	62.7	70.7	79.7	89.65	99.65	111.65	124.6	139.6	139.6	179.6	199.54	224.54	249.54
d <sub>1</sub>	h12	max	28.71	31.25	36.25	41.25	46.25	51.3	57.3	64.36	72.3	72.3	92.35	102.35	112.35	127.4
		min	28.5	31	36	41	46	51	57	64	72	82	92	102	112	127
t			1.5	1.8	2	2.25	2.5	2.7	3	3.5	3.8	4.3	4.8	5.5	6.5	7
t <sub>1</sub>			-	-	-	-	-	-	-	-	-	-	-	-	-	-
h4			1.95	2.35	2.6	2.95	3.2	3.5	3.9	4.5	4.9	5.6	6.2	7	7.1	7.8
h			3.45	4.15	4.6	5.2	5.7	6.2	6.9	8	8.7	9.9	11	12.5	13.6	14.8
washer type			2	2	2	2	2	2	2	2	2	2	2	2	3	3

## Shim rings and supporting rings DIN988 配合垫圈与配合垫圈DIN988



### Product introduction

Axial play resulting from manufacturing tolerances can be rigidly reduced by using various thicknesses of shim washers. All required combinations in incremental steps of 0.1mm can be used. In addition to DIN988 specified components, these shim washers are also manufactured in thicknesses of 0.15mm and 0.25mm. Thicknesses from 1.1 to 1.9 mm are manufactured by special special request only.

### Features

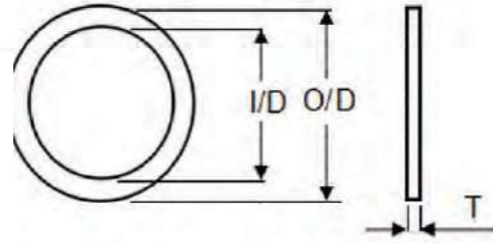
- Easy fitting and requires little space
- Easy and secure installation
- Economical solution
- High reliability

### Product application:

- Compensation for axial play
- Mechanical engineering
- Automotive engineering
- Gear systems



## Shim rings and supporting rings 密封调整垫圈DIN988



1/0	0/0	SHIM WASHERS-THICKNESS(T)					SUPPORT WASHERS
		0.10	0.20	0.30	0.50	1.00	
3	6	-	-	-	-	-	1.00
4	8	-	-	-	-	-	1.00
5	10	-	-	-	-	-	1.00
6	12	-	-	-	-	-	1.20
7	13	-	-	-	-	-	
8	14	-	-	-	-	-	1.20
9	15	-	-	-	-	-	1.20
10	16	-	-	-	-	-	1.20
12	18	-	-	-	-	-	1.20
13	19	-	-	-	-	-	1.50
14	20	-	-	-	-	-	1.50
15	21	-	-	-	-	-	1.50
15	22	-	-	-	-	-	1.50
16	22	-	-	-	-	-	1.50
17	24	-	-	-	-	-	1.50
18	25	-	-	-	-	-	1.50
20	28	-	-	-	-	-	2.00
22	30	-	-	-	-	-	
22	32	-	-	-	-	-	
25	35	-	-	-	-	-	2.00
26	37	-	-	-	-	-	2.00
28	40	-	-	-	-	-	2.00
30	42	-	-	-	-	-	2.50
32	45	-	-	-	-	-	2.50
35	45	-	-	-	-	-	2.50
37	47	-	-	-	-	-	2.50
40	50	-	-	-	-	-	2.50
42	52	-	-	-	-	-	2.50
45	55	-	-	-	-	-	3.00
48	60	-	-	-	-	-	3.00
50	62	-	-	-	-	-	3.00
55	68	-	-	-	-	-	3.00
56	72	-	-	-	-	-	3.00
60	75	-	-	-	-	-	3.00
63	80	-	-	-	-	-	3.00
65	85	-	-	-	-	-	3.50
70	90	-	-	-	-	-	3.50
80	100	-	-	-	-	-	3.50
85	105	-	-	-	-	-	3.50
90	110	-	-	-	-	-	3.50
95	115	-	-	-	-	-	3.50
100	120	-	-	-	-	-	
105	130	-	-	-	-	-	

Material: 65mn/SK5 /304(A2)/316(A4)  
Surface Treatment: Zinc / polishing

## Toothed lock washer external teeth 外齿锁紧垫圈



- DIN6797A
- SME B18.21.1, Type A.

### Product introduction

An external tooth lock washer has teeth that extend radially outward to bite into the bearing surface. Like internal tooth lock washers, they are designed to prevent a nut or bolt head from loosening with the strut action of the teeth. They work best with larger screw or bolt heads. External tooth lock washers provide maximum torsional resistance.

### Features

- Provide maximum torsional resistance
- Work best with larger screws(round,pan,binding,etc.)

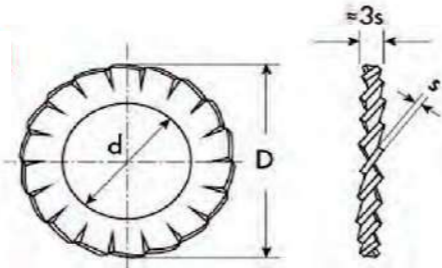
### Product application:

Used in conjunction with bolts or nuts to reduce friction and prevent loosening or dispersing pressure. After hardening, the angled tooth surface will play a better locking role. It is widely used in equipment manufacturing, engineering machinery, agricultural machinery, power transmission and distribution, Construction, shipbuilding and other industrial equipment



## Toothed lock washer external teeth 外齿锁紧垫圈

- DIN6797R
- SME B18.21.1, Type R.



DIN 6797A External Tooth Lock Washer

For screw with metric thread	d(mm)	dc(mm)	S(mm)	Number of teeth	Kg/1000pcs
M1.6	1.7-1.84	3.3-3.6	0.3	6	0.01
M2	2.2-2.34	4.2-4.5	0.3	6	0.025
M2.5	2.7-2.84	5.2-5.5	0.4	6	0.04
M3	3.2-3.38	5.7-6	0.4	6	0.045
M3.5	3.7-3.88	6.64-7	0.5	6	0.075
M4	4.3-4.48	7.64-8	0.5	8	0.095
M5	5.3-5.48	9.64-10	0.6	8	0.18
M6	6.4-6.62	10.57-11	0.7	8	0.22
M7	7.4-7.62	12.07-12.5	0.8	8	0.3
M8	8.4-8.62	14.57-15	0.8	8	0.45
M10	10.5-10.77	17.55-18	0.9	9	0.8
M12	13-13.27	19.98-20.5	1	10	1.0
M14	15-15.27	23.48-24	1	10	1.6
M16	17-17.27	25.48-26	1.2	12	2.0
M18	19-19.33	29.48-30	1.4	12	3.5
M20	21-21.33	32.38-33	1.4	12	3.8
M22	23-23.33	35.38-36	1.5	14	5
M24	25-25.33	37.38-38	1.5	14	6
M27	28-28.33	43.38-44	1.6	14	8
M30	31-31.39	47.38-48	1.6	14	9

Note: Product design hardness is

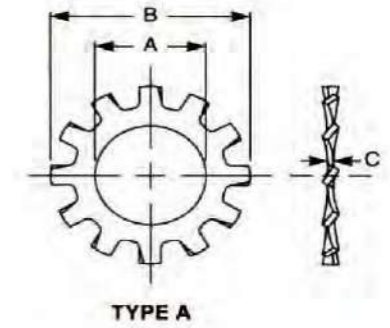
Spring steel: S60C / 60Si2MnA / 50CrVA

surface treatment: Blackened / Black / Mechanical galvanized /Dacromet / Geomet etc.

Stainless steel SUS301 / 304 / 316,1 7 -7PH hardened polished natural color treatment;

## Toothed lock washer external teeth 外齿锁紧垫圈

- DIN6797R
- SME B18.21.1, Type R.



TYPE A

Nominal washer Size	A		B		C	
	Inside Diameter		Outside Diameter		Thickness	
	Max	Min	Max	Min	Max	Min
#3	_109	_102	_235	_220	_016	_010
#4	_123	_115	_260	_245	_018	_012
#5	_136	_129	_285	_270	_020	_014
#6	_150	_141	_320	_305	_022	_016
#8	_176	_168	_381	_365	_023	_018
#10	_204	_195	_410	_395	_024	_018
#12	_231	_221	_475	_460	_027	_020
1/4	_267	_256	_510	_494	_028	_023
5/16	_332	_320	_610	_588	_034	_028
3/8	_398	_384	_694	_670	_040	_032
7/16	_464	_448	_760	_740	_040	_032
1/2	_530	_513	_900	_880	_045	_037
9/16	_596	_576	_985	_960	_045	_037
5/8	663	_641	1.070	1.045	_050	_042
3/4	_795	_768	1.260	1.220	_055	_047
7/8	_927	_897	1.410	1.380	_060	_052
1	1.060	1.025	1.620	1.590	_067	_059
1-1/8	1.142	1.128	1.827	1.797	_067	_059
1-1/4	1.293	1.269	2.202	2.172	_067	_059
1-1/2	1.580	1.560	2.392	2.359	_099	_091

Note: Product design hardness is

Spring steel S60C / 60Si2MnA / 50CrVA

surface treatment blackened / black / mechanical galvanized /dacromet / Geomet etc.

Stainless steel SUS301 / 304 / 316,1 7 -7PH hardened polished natural color treatment;



## Toothed lock washer internal teeth 内齿锁紧垫圈

- DIN6797J
- ASME B18.21.1, Type J.



### Product introduction

An internal tooth lock washer has teeth that extend radially inward to bite into the bearing surface. The internal tooth lock washer is designed to prevent a nut or bolt head from loosening with the strut action set up by the teeth. The teeth, also, absorb shock and vibration. The teeth abrade the grounding surface in electrical grounding applications to improve the electrical connection.

### Features

- Work best with smaller screw heads.
- Use where appearance warrants that teeth be hidden

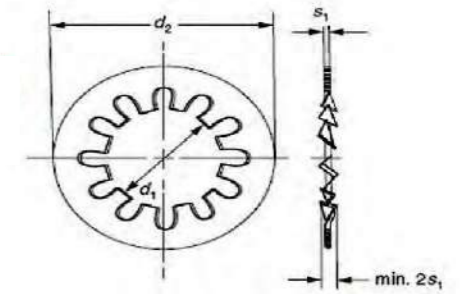
### Product application:

Used in conjunction with bolts or nuts to reduce friction and prevent loosening or dispersing pressure. After hardening, the angled tooth surface will play a better locking role. It is widely used in equipment manufacturing, engineering machinery, agricultural machinery, power transmission and distribution, shipbuilding and other industrial equipment



## Toothed lock washer internal teeth 内齿锁紧垫圈

- DIN6797J
- ASME B18.21.1, Type J.



DIN 6797J External Tooth Lock Washer

For screw with metric thread	d(mm)	dc(mm)	S(mm)	Number of teeth	Kg/1000pcs
M1.6	2.2-2.34	4.2-4.5	0.3	6	0.04
M2.5	2.7-2.84	5.2-5.5	0.4	6	0.045
M3	3.2-3.38	5.7-6	0.4	6	0.045
M3.5	3.7-3.88	6.64-7	0.5	6	0.085
M4	4.3-4.48	7.64-8	0.5	8	0.1
M5	5.3-5.48	9.64-10	0.6	8	0.2
M6	6.4-6.62	10.57-11	0.7	8	0.25
M7	7.4-7.62	12.07-12.5	0.8	8	0.35
M8	8.4-8.62	14.57-15	0.8	8	0.55
M10	10.5-10.77	17.57-18	0.9	9	0.9
M12	13-13.27	19.98-20.5	1	10	1.2
M14	15-15.27	23.48-24	1	10	1.9
M16	17-17.27	25.48-26	1.2	12	2.4
M18	19-19.33	29.48-30	1.4	12	3.7
M20	21-21.33	32.38-33	1.4	12	4.1
M22	23-23.33	35.38-36	1.5	14	6
M24	25-25.33	37.38-38	1.5	14	6.5
M27	28-28.33	43.38-44	1.6	14	8.5
M30	31-31.39	47.38-48	1.6	14	9.5

Note: Product design hardness is

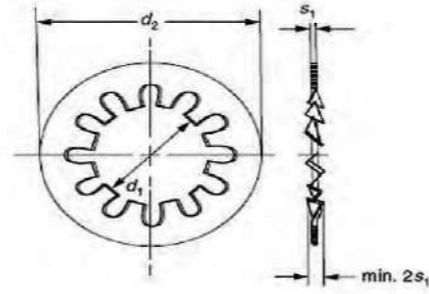
Spring steel S60C/ 60Si2MnA / 50CrVA

surface treatment blackened / black / mechanical galvanized / dacromet / Geomet etc.

Stainless steel SUS301 / 304 / 316, 1.7-7PH hardened polished natural color treatment;

## Toothed lock washer internal teeth 内齿锁紧垫圈

- DIN6797J
- ASME B18.21.1, Type A.



Nominal washer Size	A		B		C	
	Inside Oiameter		Outside Oiameter		Thickness	
	Max	Min	Max	Min	Max	Min
#3	_095	_089	_200	_175	_016	_010
#3	_109	_102	_232	_215	_016	_010
#4	_129	_115	_270	_245	_018	_012
#5	_136	_129	_280	_255	_020	_014
#6	_150	_141	_295	_275	_022	_016
#8	_176	_168	_340	_325	_023	_018
#10	_204	_195	_381	_365	_024	_018
#12	_231	_221	_410	_394	_027	_020
1/4	_267	_256	_478	_460	_028	_023
5/16	_332	_320	_610	_594	_034	_028
3/8	_398	_384	_692	_670	_040	_032
7/16	_464	_448	_789	_740	_040	_032
1/2	_530	_512	_900	_867	_045	_037
9/16	_596	_576	_985	_957	_045	_037
5/8	663	_640	1.071	1.045	_050	_042
3/4	_795	_769	1.245	1.220	_055	_047
7/8	_927	_894	1.410	1.364	_060	_052
1	1.060	1.019	1.637	1.590	_067	_059
1-1/8	1.192	1.144	1.830	1.799	_067	_059
1-1/4	1.325	1.275	1.975	1.921	_067	_059

Note: Product design hardness is  
Spring steel S60C/ 60Si2MnA / 50CrVA  
surface treatment blackened / black / mechanical galvanized / dacromet / Geomet etc.  
Stainless steel SUS301 / 304 / 316, 17-7PH hardened polished natural color treatment;

## Countersunk lock washer 锥形外齿锁紧垫圈

- DIN6797V
- ASME 818.21.1 Type A.



### Product introduction

An countersunk lock washer has teeth that extend radially inward to bite into the bearing surface. Countersunk lock washer is designed to prevent a nut or bolt head from loosening with the strut action set up by the teeth. The teeth, also, absorb shock and vibration. The teeth abrade the grounding surface in electrical grounding applications to improve the electrical connection.

### Features

- Provide maximum torsional resistance.
- Work best with larger head screws (round, pan, binding, etc.)

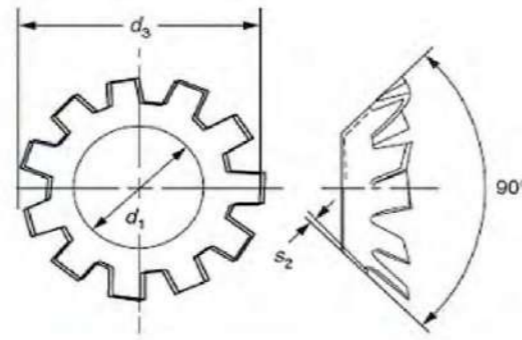
### Product application:

Used in conjunction with bolts or nuts to reduce friction and prevent loosening or dispersing pressure. After hardening, the angled tooth surface will play a better locking role. It is widely used in equipment manufacturing, engineering machinery, agricultural machinery, power transmission and distribution, construction, shipbuilding and other industrial equipment.



## Countersunk lock washer 锥形外齿锁紧垫圈

- DIN6797V
- ASME B18.21.1, Type A.



DIN 6797V Conical External Tooth Lock Washer

For screw with metric thread	d(mm)	dc(mm)	S(mm)	Number of teeth	Kg/1000pcs
M2	2.2-2.34	4.2	0.2	6	0.02
M2.5	2.7-2.84	5.1	0.2	6	0.025
M3	3.2-3.38	6	0.2	6	0.025
M3.5	3.7-3.88	7	0.25	6	0.04
M4	4.3-4.48	8	0.25	8	0.05
M5	5.3-5.48	9.8	0.3	8	0.12
M6	6.4-6.62	11.8	0.4	10	0.2
M7	8.4-8.62	15.3	0.4	10	0.4
M8	10.5-10.77	19	0.5	10	0.7
M10	13-13.27	23	0.5	10	1.2
M12	15-15.27	26.2	0.6	12	1.3
M14	17-17.27	30.2	0.6	12	1.3

Note: Product design hardness is Spring steel S60C/ 60Si2MnA / 50CrVA surface treatment blackened / black / mechanical galvanized / dacromet/ Geomet etc. Stainless steel SUS301/ 304 / 316, 1 7-7PH hardened polished natural color treatment;



## serrated lock washer external teeth 外锯齿锁紧垫圈

- DIN6798A
- ASME 818.21.1, Type A.



### Product introduction

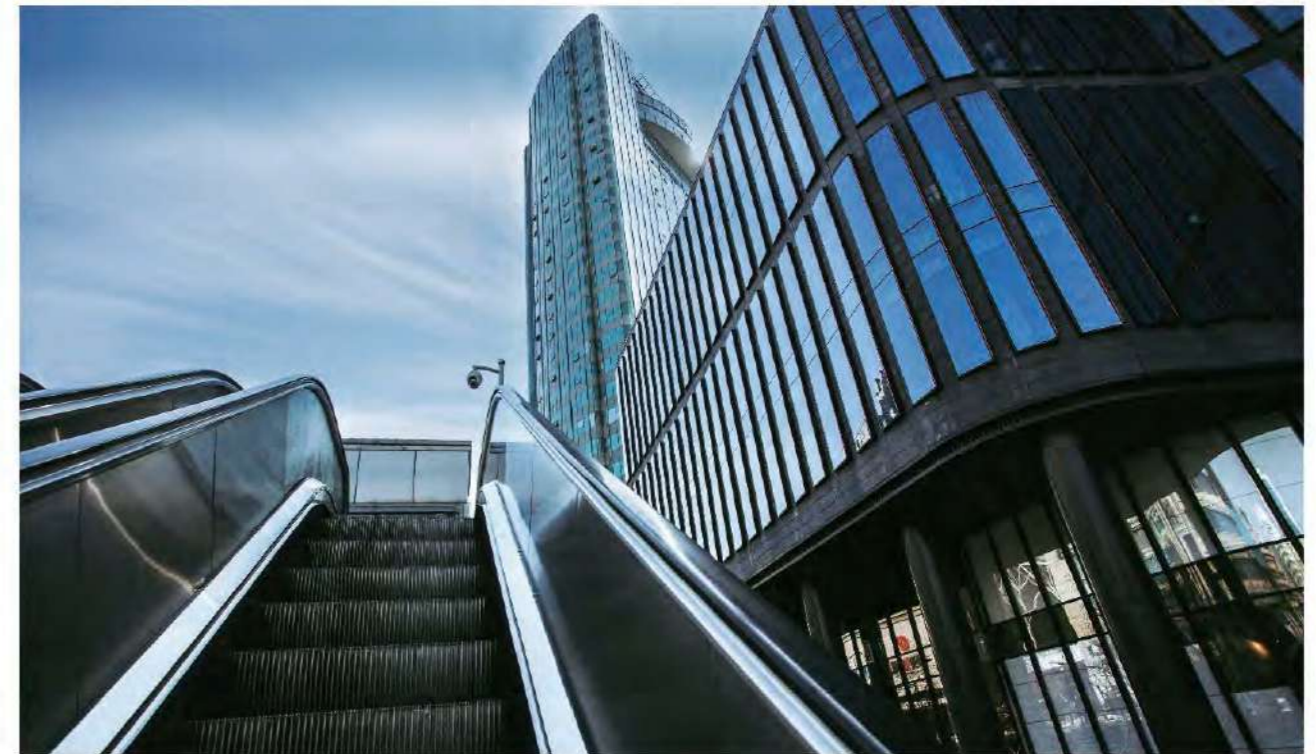
The teeth on these washers bite further into the screw head and joint than standard external-tooth washers to provide a stronger hold. Use with fasteners that have heads large enough to make contact with the teeth, such as pan, button, and binding head screws.

### Features

- Provide maximum torsional resistance.
- Work best with larger head screws (round, pan, binding, etc.)

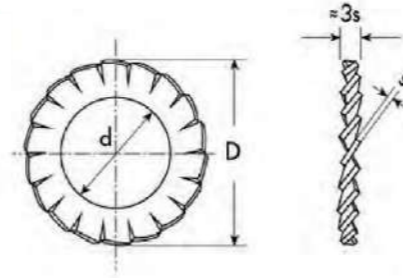
### Product application:

Used in connection with bolts or reduce friction and prevent loosening or dispersing pressure. After hardening, the angled tooth surface will play a better locking role. It is widely used in equipment manufacturing, engineering machinery, agricultural machinery, power transmission and distribution, construction, shipbuilding and other industrial equipment.



## serrated lock washer external teeth 外锯齿锁紧垫圈

- DIN6798A



DIN 6797A Conical External Tooth Lock Washer					
For screw with metric thread	d(mm)	dc(mm)	S(mm)	Number of teeth	Kg/1000pcs
M1.6	1.7-1.84	3.3-3.6	0.3	9	0.02
M2	2.2-2.34	4.2-4.5	0.3	9	0.03
M2.5	2.7-2.84	5.2-5.5	0.4	9	0.045
M3	3.2-3.38	5.7-6	0.4	9	0.06
M3.5	3.7-3.88	6.64-7	0.5	10	0.11
M4	4.3-4.48	7.64-8	0.5	11	0.14
M5	5.3-5.48	9.64-10	0.6	11	0.28
M6	6.4-6.62	10.57-11	0.7	12	0.36
M7	7.4-7.62	12.07-12.5	0.8	14	0.5
M8	8.4-8.62	14.57-15	0.8	14	0.8
M10	10.5-10.77	17.55-18	0.9	16	1.25
M12	13-13.27	19.98-20.5	1	16	1.6
M14	15-15.27	23.48-24	1	18	2.3
M16	17-17.27	25.48-26	1.2	18	2.9
M18	19-19.33	29.48-30	1.4	18	5
M20	21-21.33	32.38-33	1.4	20	6
M22	23-23.33	35.38-36	1.5	20	7.5
M24	25-25.33	37.38-38	1.5	20	8
M27	28-28.33	43.38-44	1.6	22	12
M30	31-31.39	47.38-48	1.6	22	14

Note: Product design hardness is 380-420 HV10;

Spring steel S60C / 60Si2MnA/ 50CrVA

surface treatment blackened / black / mechanical galvanized / dacromet / Geomet etc.

Stainless steel SUS301 / 304/ 316,1 7-7PH hardened polished natural color treatment;

## serrated lock washer internal teeth 内锯齿锁紧垫圈

- DIN6798J



### Product introduction

The teeth on these washers bite further into the screw head and joint than standard Internal teeth-washers to provide a stronger hold.use with fasteners that have heads large enough to make contact with the teeth,such as pan,button,and binding head screws.

### Features

- Provide maximum torsional resistance.
- Work best with larger head screws (round,pan,button,etc.)

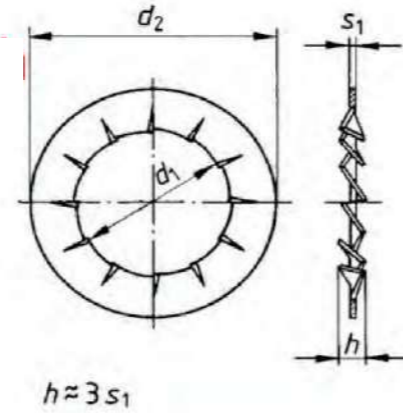
### Product application:

Used in conjunction with bolts or nuts to reduce friction and prevent loosening or dispersing pressure.After hardening,the angled tooth surface will play a better locking role.It is widely used in equipment manufacturing,engineering machinery,agricultural machinery,power transmission and distribution,construction,shipbuilding and other industrial equipment.



## serrated lock washer internal teeth 内锯齿锁紧垫圈

- DIN6798J



DIN 6798J Conical External Tooth Lock Washer					
For screw with metric thread	d(mm)	dc(mm)	S(mm)	Number of teeth	Kg/1000pcs
M1.6	1.7-1.84	3.3-3.6	0.3	7	0.02
M2	2.2-2.34	4.2-4.5	0.3	7	0.03
M2.5	2.7-2.84	5.2-5.5	0.4	7	0.045
M3	3.2-3.38	5.7-6	0.4	7	0.06
M3.5	3.7-3.88	6.64-7	0.5	8	0.11
M4	4.3-4.48	7.64-8	0.5	8	0.14
M5	5.3-5.48	9.64-10	0.6	8	0.28
M6	6.4-6.62	10.57-11	0.7	9	0.36
M7	7.4-7.62	12.07-12.5	0.8	10	0.5
M8	8.4-8.62	14.57-15	0.8	10	0.8
M10	10.5-10.77	17.57-18	0.9	12	1.25
M12	13-13.27	19.98-20.5	1	12	1.6
M14	15-15.27	23.48-24	1	14	2.3
M16	17-17.27	25.48-26	1.2	14	2.9
M18	19-19.33	29.48-30	1.4	14	5
M20	21-21.33	32.38-33	1.4	16	6
M22	23-23.33	35.38-36	1.5	16	7.5
M24	25-25.33	37.38-38	1.5	16	8
M27	28-28.33	43.38-44	1.6	18	12
M30	31-31.39	47.38-48	1.6	18	14

Note: Product design hardness is  
Spring steel S60C/ 60tSi2MnA / 50CrVA  
surface treatment blackened / black / mechanical galvanized / dacromet / Geomet etc.  
Stainless steel SUS301 / 304 / 316,1 7-7PH hardened polished natural color treatment;

## Retaining rings for shafts 轴用挡圈

- DIN471
- Imperial size stand



### Product introduction

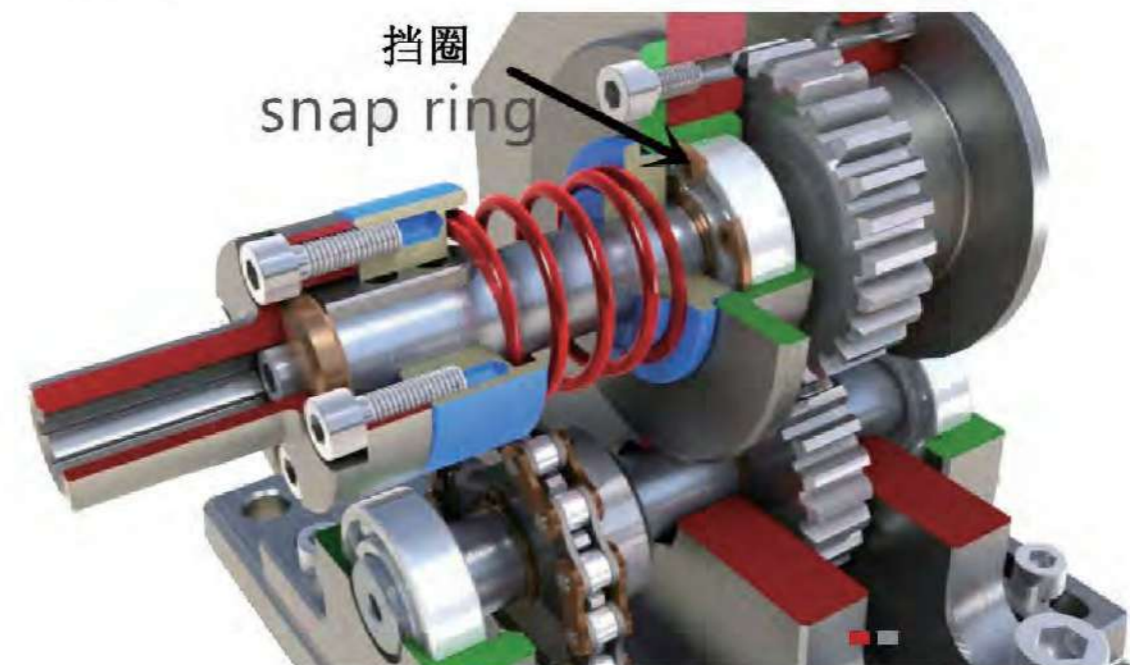
Retaining rings for shafts and bores are the most common retaining rings. These rings provide the most favorable solution with respect to thickness and radial width. They transfer large axial force from the located mating component onto the groove wall. The external rings can also be used for relatively higher shaft rotational speeds.

### Features

Circlips have been designed to fix seals or scraper rings on the cylinder rod. The advantages of the circlip are reduction of material waste and the number of components.

### Product application:

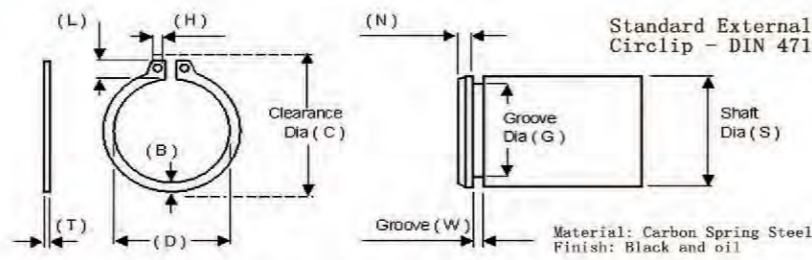
- Mechanical engineering
- Automotive engineering
- Gear systems
- Electrical engineering
- Precision mechanics



# Retauning rings for shafts

## 轴用挡圈

- DIN471
- Imperial size standard

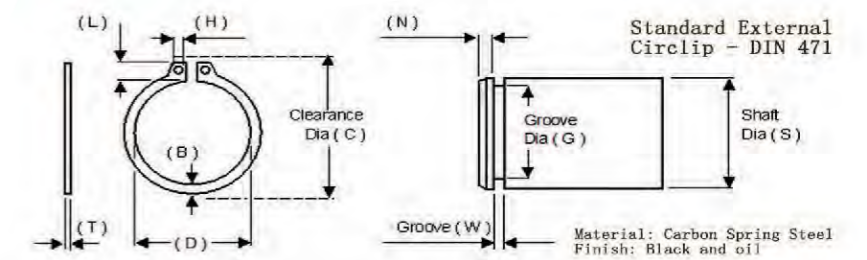


Circlip Dimensions											Croove Dimensions				
(T)	Tolerance	(D)	Tolerance	(C)	(B)	(L)	(H)	Fr KN	(G)	Tolerance	(W)	(N)	Fn KN		
0.40	+0.00 -0.05	2.7	+0.04 -0.15	7.0	0.8	1.9	1.0	0.5	2.8	+0.00 -0.040	0.5	0.3	0.2		
0.40	+0.00 -0.05	3.7	+0.04 -0.15	8.6	0.9	2.2	1.0	0.5	3.8	+0.00 -0.048	0.5	0.3	0.2		
0.60	+0.00 -0.05	4.7	+0.04 -0.15	10.3	1.1	2.5	1.0	1.0	4.8	+0.00 -0.048	0.7	0.3	0.3		
0.70	+0.00 -0.05	5.6	+0.04 -0.15	11.7	1.3	2.7	1.2	1.5	5.7	+0.00 -0.048	0.8	0.5	0.5		
0.80	+0.00 -0.05	6.5	+0.06 -0.18	13.5	1.4	3.1	1.2	2.6	6.7	+0.00 -0.06	0.9	0.5	0.5		
0.80	+0.00 -0.05	7.4	+0.06 -0.18	14.7	1.5	3.2	1.2	3.0	7.6	+0.00 -0.06	1.1	0.6	0.8		
1.00	+0.00 -0.06	8.4	+0.06 -0.18	16.0	1.7	3.3	1.2	3.5	8.6	+0.00 -0.06	1.1	0.6	0.9		
1.00	+0.00 -0.06	9.3	+0.10 -0.36	17.0	1.8	3.3	1.5	4.0	9.6	+0.00 -0.06	1.1	0.6	1.0		
1.00	+0.00 -0.06	10.2	+0.10 -0.36	18.0	1.8	3.3	1.5	4.5	10.5	+0.00 -0.11	1.1	0.8	1.4		
1.00	+0.00 -0.06	11.0	+0.10 -0.36	19.0	1.8	3.3	1.7	5.0	11.5	+0.00 -0.11	1.1	0.8	1.5		
1.00	+0.00 -0.06	11.9	+0.10 -0.36	20.2	2.0	3.4	1.7	5.8	12.4	+0.00 -0.11	1.1	0.9	2.0		
1.00	+0.00 -0.06	12.9	+0.10 -0.36	21.4	2.1	3.5	1.7	6.4	13.4	+0.00 -0.11	1.1	0.9	2.2		
1.00	+0.00 -0.06	13.8	+0.10 -0.36	22.6	2.2	3.6	1.7	6.9	14.3	+0.00 -0.11	1.1	1.1	2.7		
1.00	+0.00 -0.06	14.7	+0.10 -0.36	23.8	2.2	3.7	1.7	7.4	15.2	+0.00 -0.11	1.1	1.2	3.3		
1.00	+0.00 -0.06	15.7	+0.10 -0.36	25.0	2.3	3.8	1.7	8.0	16.2	+0.00 -0.11	1.1	1.2	3.5		
1.20	+0.00 -0.06	16.5	+0.10 -0.36	26.2	2.4	3.9	2.0	17.0	17.0	+0.00 -0.11	1.3	1.5	4.6		
1.20	+0.00 -0.06	17.5	+0.10 -0.36	27.2	2.5	3.9	2.0	17.0	18.0	+0.00 -0.11	1.3	1.5	4.8		
1.20	+0.00 -0.06	18.5	+0.13 -0.42	28.4	2.6	4.0	2.0	17.1	19.0	+0.00 -0.21	1.3	1.5	5.1		
1.20	+0.00 -0.06	19.5	+0.13 -0.42	29.6	2.7	4.1	2.0	16.8	20.0	+0.00 -0.21	1.3	1.5	5.4		
1.20	+0.00 -0.06	20.5	+0.13 -0.42	30.8	2.8	4.2	2.0	16.9	21.0	+0.00 -0.21	1.3	1.5	5.7		
1.20	+0.00 -0.06	21.5	+0.13 -0.42	32.0	2.9	4.3	2.0	16.6	22.0	+0.00 -0.21	1.3	1.5	5.9		
1.20	+0.00 -0.06	22.2	+0.21 -0.42	33.2	3.0	4.4	2.0	16.1	22.9	+0.00 -0.21	1.3	1.7	6.8		
1.20	+0.00 -0.06	23.2	+0.21 -0.42	34.2	3.0	4.4	2.0	16.2	23.9	+0.00 -0.21	1.3	1.7	7.1		
1.20	+0.00 -0.06	24.2	+0.21 -0.42	35.5	3.1	4.5	2.0	16.1	24.9	+0.00 -0.21	1.3	1.7	7.3		
1.20	+0.00 -0.06	24.9	+0.21 -0.42	36.7	3.1	4.6	2.0	16.4	25.6	+0.00 -0.21	1.3	2.1	9.6		
1.50	+0.00 -0.06	25.9	+0.21 -0.42	37.9	3.2	4.7	2.0	32.1	26.6	+0.00 -0.21	1.6	2.1	10.0		
1.50	+0.00 -0.06	26.9	+0.21 -0.42	39.1	3.4	4.8	2.0	31.8	27.6	+0.00 -0.21	1.6	2.1	10.4		
1.50	+0.00 -0.06	27.9	+0.21 -0.42	40.5	3.5	5.0	2.0	32.1	28.6	+0.00 -0.21	1.6	2.1	10.7		
1.50	+0.00 -0.06	28.6	+0.21 -0.42	41.5	3.5	5.0	2.5	31.5	29.3	+0.00 -0.21	1.6	2.6	13.9		
1.50	+0.00 -0.06	29.6	+0.21 -0.42	43.0	3.6	5.2	2.5	31.2	30.3	+0.00 -0.25	1.6	2.6	13.9		
1.50	+0.00 -0.06	30.5	+0.25 -0.50	44.0	3.7	5.2	2.5	31.6	31.3	+0.00 -0.25	1.6	2.6	14.3		
1.50	+0.00 -0.06	31.5	+0.25 -0.50	45.4	3.8	5.4	2.5	31.3	32.3	+0.00 -0.25	1.6	2.6	14.7		
1.50	+0.00 -0.06	32.2	+0.25 -0.50	46.8	3.9	5.6	2.5	33.0	33.0	+0.00 -0.25	1.6	3.0	17.8		
1.75	+0.00 -0.06	33.2	+0.25 -0.50	47.8	4.0	5.6	2.5	34.0	34.0	+0.00 -0.25	1.85	3.0	18.3		
1.75	+0.00 -0.06	34.2	+0.25 -0.50	49.0	4.1	5.7	2.5	35.0	35.0	+0.00 -0.25	1.85	3.0	18.8		
1.75	+0.00 -0.06	35.2	+0.25 -0.50	50.2	4.2	5.8	2.5	36.0	36.0	+0.00 -0.25	1.85	3.0	19.3		
1.75	+0.00 -0.06	36.0	+0.25 -0.50	51.4	4.3	5.9	2.5	37.0	37.0	+0.00 -0.25	1.85	3.8	19.9		
1.75	+0.00 -0.06	36.5	+0.25 -0.50	52.6	4.4	6.0	2.5	37.5	37.5	+0.00 -0.25	1.85	3.8	25.3		
1.75	+0.00 -0.06	37.5	+0.25 -0.50	54.1	4.5	6.2	2.5	38.5	38.5	+0.00 -0.25	1.85	3.8	26.0		
1.75	+0.00 -0.06	38.5	+0.39 -0.90	55.7	4.5	6.5	2.5	39.5	39.5	+0.00 -0.25	1.85	3.8	26.7		
1.75	+0.00 -0.06	39.5	+0.39 -0.90	56.7	4.6	6.5	2.5	40.5	40.5	+0.00 -0.25	1.85	3.8	27.3		
1.75	+0.00 -0.06	40.5	+0.39 -0.90	57.9	4.6	6.6	2.5	41.5	41.5	+0.00 -0.25	1.85	3.8	28.0		
1.75	+0.00 -0.06	41.5	+0.39 -0.90	59.1	4.7	6.7	2.5	42.5	42.5	+0.00 -0.25	1.85	3.8	28.1		
1.75	+0.00 -0.06	42.5	+0.39 -0.90	60.1	4.8	6.7	2.5	43.5	43.5	+0.00 -0.25	1.85	3.8	29.0		
1.75	+0.00 -0.06	43.5	+0.39 -0.90	61.3	4.9	6.8	2.5	44.5	44.5	+0.00 -0.25	1.85	3.8	30.0		
1.75	+0.00 -0.06	44.5	+0.39 -0.90	62.5	5.0	6.9	2.5	45.5	45.5	+0.00 -0.25	1.85	3.8	30.1		
2.00	+0.00 -0.07	45.8	+0.39 -0.90	64.5	5.1	6.9	2.5	47.0	47.0	+0.00 -0.25	2.15	4.5	38.0		
2.00	+0.00 -0.07	46.8	+0.39 -0.90	65.7	5.2	7.0	2.5	48.0	48.0	+0.00 -0.25	2.15	4.5	38.8		
2.00	+0.00 -0.07	47.8	+0.39 -0.90	66.7	5.2	7.0	2.5	49.0	49.0	+0.00 -0.25	2.15	4.5	39.7		
2.00	+0.00 -0.07	48.8	+0.39 -0.90	68.0	5.3	7.1	2.5	50.0	50.0	+0.00 -0.25	2.15	4.5	40.4		
2.00	+0.00 -0.07	49.8	+0.46 -1.10	69.0	5.3	7.1	2.5	51.0	51.0	+0.00 -0.30	2.15	4.5	41.2		
2.00	+0.00 -0.07	50.8	+0.46 -1.10	70.2	5.4	7.2	2.5	52.0	52.0	+0.00 -0.30	2.15	4.5	42.0		
2.00	+0.00 -0.07	51.8	+0.46 -1.10	71.6	5.5	7.3	2.5	53.0	53.0	+0.00 -0.30	2.15	4.5	42.8		
2.00	+0.00 -0.07	52.8	+0.46 -1.10	72.4	5.5	7.3	2.5	54.0	54.0	+0.00 -0.30	2.15	4.5	43.7		

# Retauning rings for shafts

## 轴用挡圈

- DIN471
- Imperial size standard

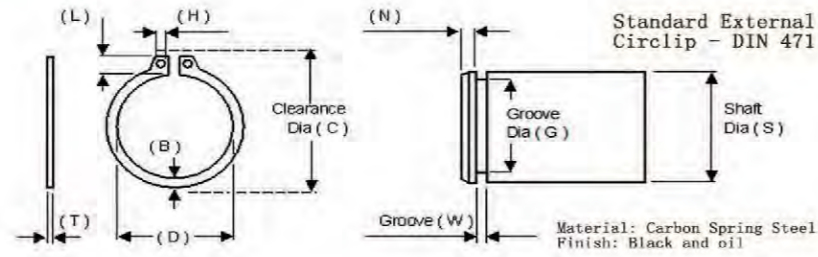


Circlip Dimensions											Croove Dimensions				
(T)	Tolerance	(D)	Tolerance	(C)	(B)	(L)	(H)	Fr KN	(G)	Tolerance	(W)	(N)	Fn KN		
2.00	+0.00 -0.07	53.8	+0.46 -1.10	73.6	5.6	7.3	2.5	55.0	55.0	+0.00 -0.30	2.15	4.5	44.3		
2.00	+0.00 -0.07	55.8	+0.46 -1.10	75.6	5.8	7.4	2.5	69.2	57.0	+0.00 -0.30	2.15	4.5	46.0		
2.00	+0.00 -0.07	57.8	+0.46 -1.10	77.8	6.0	7.5	2.5	69.3	59.0	+0.00 -0.30	2.15	4.5	47.5		
2.00	+0.00 -0.07	58.8	+0.46 -1.10	79.0	6.2	7.6	2.5	70.2	60.0	+0.00 -0.30	2.15	4.5	48.3		
2.50	+0.00 -0.07	60.8	+0.46 -1.10	81.4	6.3	7.8	3.0	135.6	62.0	+0.00 -0.30	2.65	4.5	49.8		
2.50	+0.00 -0.07	62.5	+0.46 -1.10	83.6	6.4	7.9	3.0	136.1	64.0	+0.00 -0.30	2.65	4.5	51.3		
2.50	+0.00 -0.07	63.5	+0.46 -1.10	84.4	6.5	8.0	3.0	135.9	65.0	+0.00 -0.30	2.65	4.5	52.2		
2.50	+0.00 -0.07	65.5	+0.46 -1.10	87.0	6.6	8.1	3.0	134.2	67.0	+0.00 -0.30	2.65	4.5	53.8		
2.50	+0.00 -0.07	67.5	+0.46 -1.10	89.2	6.8	8.2	3.0	131.8	69.0	+0.00 -0.30	2.65	4.5	55.3		
2.50	+0.00 -0.07	70.5	+0.46 -1.10	92.7	7.0	8.4	3.0	130.0	72.0	+0.00 -0.30	2.65	4.5	57.6		
2.50	+0.00 -0.07	72.5	+0.46 -1.10	94.9	7.2	8.5	3.0	131.3	74.0	+0.00 -0.30	2.65	4.5	59.3		
2.50	+0.00 -0.07	73.5	+0.46 -1.10	96.1	7.3	8.6	3.0	131.3	75.0	+0.00 -0.30	2.65	5.3	60.0		
2.50	+0.00 -0.07	74.5	+0.46 -1.10	98.1	7.4	8.6	3.0	128.4	76.5	+0.00 -0.30	2.65	5.3	71.6		
2.50	+0.00 -0.07	76.5	+0.46 -1.10	100.3	7.6	8.7	3.0	128.0	78.5	+0.00 -0.30	2.65	5.3	73.5		
3.00	+0.00 -0.08	79.5	+0.46 -1.10	103.3	7.8	8.7	3.5	215.4	81.5	+0.00 -0.35	3.15	5.3	76.2		
3.00	+0.00 -0.08	81.5	+0.54 -1.30	105.5	7.9	8.8	3.5	222.2	83.5	+0.00 -0.35	3.15	5.3	78.2		
3.00	+0.00 -0.08	82.5	+0.54 -1.30	106.5	8.0	8.8	3.5	221.8	84.5	+0.00 -0.35	3.15	5.3	79.0		
3.00	+0.00 -0.08	84.5	+0.54 -1.30	108.5	8.2	8.8	3.5	217.2	86.5	+0.00 -0.35	3.15	5.3	80.8		
3.00	+0.00 -0.08	86.5	+0.54 -1.30	111.0	8.4	9.0	3.5	217.0	88.5	+0.00 -0.35	3.15	5.3	82.7		
3.00	+0.00 -0.08	89.5	+0.54 -1.30	114.8	8.6	9.4	3.5	212.2	91.5	+0.00 -0.35	3.15	5.3	85.5		
3.00	+0.00 -0.08	91.5	+0.54 -1.30	116.8	8.8	9.4	3.5	211.1	93.5	+0.00 -0.35	3.15	5.3	87.3		
3.00	+0.00 -0.08	92.5	+0.54 -1.30	118.0	9.0	9.5	3.5	208.1	94.5	+0.00 -0.35	3.15	5.3	88.2		
3.00	+0.00 -0.08	94.5	+0.54 -1.30	120.2	9.0	9.6	3.5	206.4	96.5	+0.00 -0.35	3.15	5.3	90.0		
4.00	+0.00 -0.10	95.0	+0.54 -1.30	122.4	9.2	9.7	3.5	482.3	98.0	+0.00 -0.54	4.15	6.0	104.6		
4.00	+0.00 -0.10	98.0	+0.54 -1.30	125.8	9.3	9.9	3.5	471.8	101.0	+0.00 -0.54	4.15	6.0	107.6		
4.00	+0.00 -0.10	101.0	+0.54 -1.30	129.0	9.5	10.0	3.5	459.8	104.0	+0.00 -0.54	4.15	6.0	111.0		
4.00	+0.00 -0.10	103.0	+0.54 -1.30	131.2	9.6	10.1	3.5	457.0							

# Retaining rings for shafts

## 轴用挡圈

- DIN471
- Imperial size standard



Circlip Dimensions										Croove Dimensions						
(T)	Tolerance	(D)	Tolerance	(C)	(B)	(L)	(H)	Fr KN	(G)	Tolerance	(W)	(N)	F <sub>n</sub> KN			
5.00	+0.00	-0.12	233.0	+0.72	-1.70	275.0	14.0	14.2	4.0	512.2	239.0	+0.00	-0.72	5.15	9.0	380.0
5.00	+0.00	-0.12	238.0	+0.72	-1.70	280.0	14.0	14.2	4.0	504.3	244.0	+0.00	-0.72	5.15	9.0	388.3
5.00	+0.00	-0.12	240.0	+0.72	-1.70	289.0	16.0	16.2	5.0	557.1	247.0	+0.00	-0.72	5.15	12.0	525.0
5.00	+0.00	-0.12	245.0	+0.72	-1.70	294.0	16.0	16.2	5.0	540.6	252.0	+0.00	-0.81	5.15	12.0	535.8
5.00	+0.00	-0.12	250.0	+0.72	-1.70	299.0	16.0	16.2	5.0	536.2	257.0	+0.00	-0.81	5.15	12.0	546.6
5.00	+0.00	-0.12	255.0	+0.81	-2.0	304.0	16.0	16.2	5.0	525.3	262.0	+0.00	-0.81	5.15	12.0	556.6
5.00	+0.00	-0.12	260.0	+0.81	-2.0	309.0	16.0	16.2	5.0	516.7	267.0	+0.00	-0.81	5.15	12.0	566.6
5.00	+0.00	-0.12	265.0	+0.81	-2.0	314.0	16.0	16.2	5.0	508.2	272.0	+0.00	-0.81	5.15	12.0	576.6
5.00	+0.00	-0.12	270.0	+0.81	-2.0	319.0	16.0	16.2	5.0	499.1	277.0	+0.00	-0.81	5.15	12.0	587.5
5.00	+0.00	-0.12	275.0	+0.81	-2.0	324.0	16.0	16.2	5.0	490.8	282.0	+0.00	-0.81	5.15	12.0	599.1
5.00	+0.00	-0.12	280.0	+0.81	-2.0	329.0	16.0	16.2	5.0	481.8	287.0	+0.00	-0.81	5.15	12.0	609.1
5.00	+0.00	-0.12	285.0	+0.81	-2.0	334.0	16.0	20.2	6.0	475.0	292.0	+0.00	-0.81	5.15	12.0	619.1
6.00	+0.00	-0.18	293.0	+0.81	-2.0	352.5	20.0	20.2	6.0	1016.9	300.0	+0.00	-0.81	6.2	15.0	796.6
6.00	+0.00	-0.18	303.0	+0.81	-2.0	362.5	20.0	20.2	6.0	988.6	310.0	+0.00	-0.81	6.2	15.0	825.0
6.00	+0.00	-0.18	313.0	+0.81	-2.0	372.5	20.0	20.2	6.0	958.4	320.0	+0.00	-0.89	6.2	15.0	850.0
6.00	+0.00	-0.18	323.0	+0.90	-2.50	382.5	20.0	20.2	6.0	932.7	330.0	+0.00	-0.89	6.2	15.0	876.6
6.00	+0.00	-0.18	333.0	+0.90	-2.50	392.5	20.0	20.2	6.0	905.6	340.0	+0.00	-0.89	6.2	15.0	903.3
6.00	+0.00	-0.18	343.0	+0.90	-2.50	402.5	20.0	20.2	6.0	880.7	350.0	+0.00	-0.89	6.2	15.0	928.3
6.00	+0.00	-0.18	353.0	+0.90	-2.50	412.5	20.0	20.2	6.0	856.7	360.0	+0.00	-0.89	6.2	15.0	955.0
6.00	+0.00	-0.18	363.0	+0.90	-2.50	422.5	20.0	20.2	6.0	833.5	370.0	+0.00	-0.89	6.2	15.0	980.0
6.00	+0.00	-0.18	373.0	+0.90	-2.50	432.5	20.0	20.2	6.0	814.3	380.0	+0.00	-0.89	6.2	15.0	1008.0
6.00	+0.00	-0.18	383.0	+0.90	-2.50	442.5	20.0	20.2	6.0	793.4	390.0	+0.00	-0.89	6.2	15.0	1033.0

Material:

Spring steel S60C / 65Mn / SKS

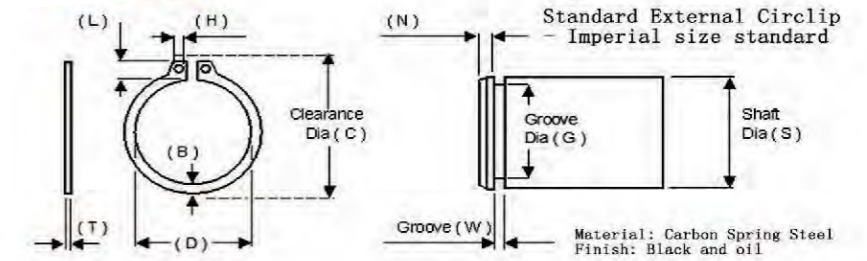
Stainless steel SUS304 / 316 / 301 / 420

Surface treatment: Zinc /Black / Phosphating / Mechanical galvanizing

# Retaining rings for shafts

## 轴用挡圈

- DIN471
- Imperial size standard



(T)	Circlip Dimensions							Croove Dimensions										
	Shaft (Frac)	(Dec)	(T) Tol	(D) Tol	(C) Tol	(B) Tol	(L) Tol	(H) Tol	Force (lb f)	(G) Tol	(W) Tol	(N) Tol	F <sub>n</sub> KN					
N140012	1/8	0.125	0.010	+0.001	0.112		0.22	0.018	0.048	0.024	110	0.117		0.012		0.014	28	
N140015	5/32	0.156	0.010	-0.001	0.142		0.27	0.026	0.056	0.024	130	0.146		0.012		0.017	44	
N140018	3/16	0.188	0.015		0.168	+0.002	0.30	0.025	0.052	0.023	240	0.175	+0.0015	+0.002	0.018	0.022	69	
N140021	7/32	0.219	0.015		0.196	-0.004	0.34	0.028	0.058	0.024	280	0.205	-0.0015	-0.000	0.018	0.023	87	
N140023	15/64	0.236	0.015		0.215		0.36	0.300	0.058	0.024	310	0.222			0.018	0.023	93	
N140025	1/4	0.250	0.025		0.225		0.45	0.035	0.083	0.039	880	0.230			0.029	0.032	141	
N140028	9/32	0.281	0.025		0.256		0.49	0.038	0.083	0.039	990	0.261			0.029	0.035	160	
N140031	5/16	0.312	0.025		0.281		0.54	0.040	0.090	0.039	1100	0.290			0.029	0.036	194	
N140034	11/32	0.344	0.025		0.309		0.57	0.042	0.090	0.039	1210	0.321			0.029	0.038	224	
N140037	3/8	0.375	0.025		0.338	+0.002	0.61	0.050	0.091	0.039	1320	0.352			0.029	0.038	244	
N140040	13/32	0.406	0.025		0.366	-0.005	0.63	0.054	0.090	0.039	4130	0.382			0.029	0.039	275	
N140043	7/16	0.438	0.025		0.395		0.66	0.055	0.091	0.039	1550	0.412	+0.002		0.029	0.042	322	
N140046	15/32	0.469	0.025		0.428		0.68	0.060	0.091	0.039	1660	0.443	-0.002		0.029	0.042	345	
N140050	1/2	0.500	0.035		0.461		0.77	0.065	0.111	0.045	2470	0.468			0.039	0.051	452	
N140056	9/16	0.562	0.035		0.521		0.82	0.072	0.111	0.045	2780	0.530			0.039	0.051	508	
N140059	19/32	0.594	0.035		0.550		0.86	0.076	0.112	0.045	2940	0.590			0.039	0.057	588	
N140062	5/8	0.625	0.035	+0.002	0.579	-0.002	0.90	0.080	0.113	0.045	3090	0.588			0.039	+0.003	0.060	654
N140066	43/64	0.672	0.035		0.621		0.93	0.082	0.113	0.045	3320	0.631			0.039	-0.000	0.066	780
N140068	11/16	0.688	0.042		0.635		1.01	0.084	0.140	0.050	4080	0.646			0.046	0.068	817	
N140075	3/4	0.750	0.042		0.693	+0.005	1.09	0.092	0.140	0.050	4450	0.704			0.046	0.074	975	
N140078	25/32	0.781	0.042		0.722	-0.010	1.12	0.094	0.140	0.050	4600	0.733	+0.003		0.046	0.076	1060	
N140081	13/16	0.812	0.042		0.751		1.15	0.096	0.140	0.050	4800	0.762	-0.003		0.046	0.080	1150	
N140087	7/8	0.875	0.042		0.810		1.21	0.104	0.141	0.050	5200	0.821			0.046	0.085	1340	
N140093	15/16	0.938	0.042		0.867		1.34	0.110	0.170	0.076	5600	0.882			0.046	0.088	1480	
N140098	63/64	0.984	0.042		0.910		1.39	0.114	0.171	0.076	5800	0.984			0.046	0.091	1610	
N140100	1	1.000	0.042		0.925		1.41	0.116	0.171	0.076	5900	0.940			0.046	0.094	1700	
N140106	1.1/16	1.062	0.050		0.982		1.50	0.122	0.185	0.076	7500	0.998			0.056	0.102	1920	
N140112	1.1/8	1.125	0.050		1.041		1.55	0.128	0.186	0.076	7900	1.059			0.056	0.105	2100	
N140118	1.3/16	1.188	0.050		1.098		1.61	0.132	0.186	0.076	8400	1.118			0.056	0.111	2350	
N140125	1.1/4	1.250	0.050		1.156	+0.010	1.69	0.140	0.187	0.076	8800	1.176	+0.004		0.056	0.117	2610	
N1400131	1.5/16	1.312	0.050		1.214	-0.015	1.75	0.146	0.187	0.076	9300	1.322	-0.004		0.056	0.126	2970	
N140137	1.3/8	1.375	0.050		1.272		1.80	0.152	0.188	0.076	9700	1.291			0.056	0.132	3270	
N140143	1.7/16	1.438	0.050		1.333		1.87	0.160	0.188	0.076	10200	1.350			0.056	0.138	3580	
N140150	1.1/2	1.500	0.050		1.387		1.99	0.168	0.218	0.118	10600	1.406			0.056	+0.004	0.147	3990
N140156	1.9/16	1.562	0.062		1.446		1.95	0.180	0.189	0.100	10700	1.468			0.068	-0.000	0.148	4150
N140162	1.5/8	1.625	0.062		1.503		2.17	0.180	0.189	0.100	11100	1.529			0.068		0.151	4410
N140168	1.11/16	1.688	0.062		1.560		2.04	0.197	0.205	0.100	11500	1.589	+0.005		0.068	0.156	4720	
N140175	1.3/4	1.750	0.062		1.618	+0.013	2.11	0.197	0.205	0.100	11900	1.650	-0.005		0.068	0.157	4950	
N140181	1.13/16	1.812	0.062		1.675	-0.020	2.23	0.197	0.205	0.100	12400	1.708			0.068	0.163	5330	
N140187	1.7/8	1.875	0.062		1.735		2.29	0.197	0.205	0.100	12800	1.769			0.068	0.166	5620	
N140200	2	2.000	0.062		1.850		2.48	0.224	0.232	0.123	13600	1.886			0.068	0.178	6450	
N140212	2.1/8	2.125	0.078		1.964		2.61	0.228	0.236	0.123	18200	2.003			0.086		0.192	7330
N140225	2.1/4	2.250	0.078		2.081	+0.015	2.87	0.217	0.225	0.123	19300	2.120			0.086		0.204	8270
N140237	2.3/8	2.375	0.078		2.197	-0.025	2.86	0.228	0.236	0.123	20400	2.239			0.086		0.213	9130
N140250	2.1/2	2.500	0.078		2.313		2.98	0.228	0.236	0.123	21400	2.360			0.086		0.219	9900
N140162	2.5/8	2.625	0.078		2.428		3.11	0.228	0.236	0.123	22500	2.481			0.086		0.225	10700
N140175	2.3/4	2.750	0.093		2.543		3.33	0.276	0.284	0.123	28100	2.602			0.103		0.231	11500
N140287	2.7/8	2.875	0.															

## Retaining rings for bores DIN472 孔用挡圈 DIN472



### Product introduction

Retaining rings for shafts and bores are the most common retaining rings. These rings provide the favorable solution with respect to thickness and radial width. They transfer large axial forces from the located mating component onto the groove wall. The external rings can also be used for relatively higher shaft rotational speeds.

### Features

Circlips have been designed to fix seals or scraper rings on the cylinder rod. The advantages of the circlip are reduction of material waste and the number of components.

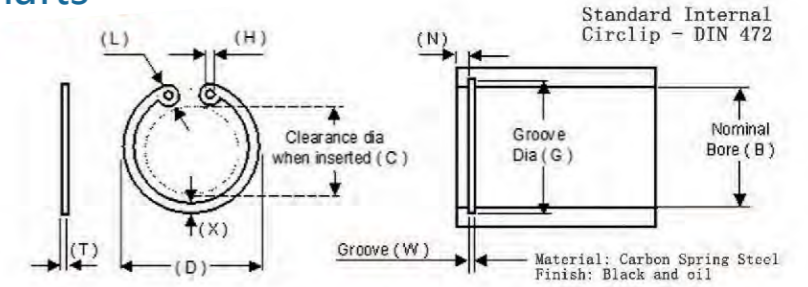
### Product application:

- Mechanical engineering
- Automotive engineering
- Gear systems
- Electrical engineering
- Precision mechanics



## Retaining rings for shafts 轴用挡圈

- DIN472
- Imperial size stand

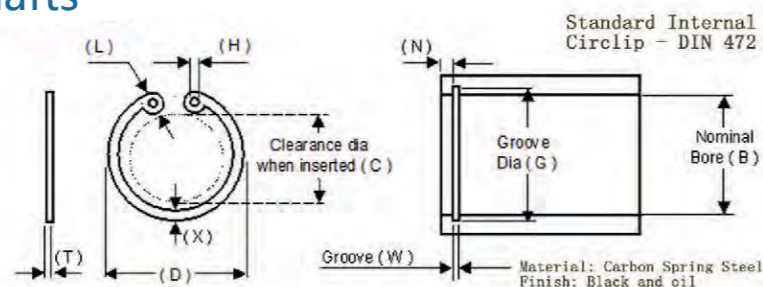


Part no	Circlip Dimensions										Groove Dimensions				
	Bore	(T)	Tolerance	(D)	Tolerance	(C)	(X)	(L)	(H)	Fr KN	(G)	Tolerance	(W)	(N)	Fr KN
472008	8	0.80	+0.00 -0.05	8.7	+0.36 -0.10	3.0	1.1	2.4	1.0	2.0	8.4	+0.09 -0.00	0.9	0.6	0.9
472009	9	0.80	+0.00 -0.05	9.8	+0.36 -0.10	3.7	1.3	2.5	1.0	2.0	9.4	+0.09 -0.00	0.9	0.6	1.0
472010	10	1.00	+0.00 -0.06	10.8	+0.36 -0.10	3.3	1.4	3.2	1.2	4.0	10.4	+0.11 -0.00	1.1	0.6	1.1
472011	11	1.00	+0.00 -0.06	11.8	+0.36 -0.10	4.1	1.5	3.3	1.2	4.0	11.4	+0.11 -0.00	1.1	0.6	1.2
472012	12	1.00	+0.00 -0.06	13.0	+0.36 -0.10	4.9	1.7	3.4	1.5	4.0	12.5	+0.11 -0.00	1.1	0.8	1.6
472013	13	1.00	+0.00 -0.06	14.1	+0.36 -0.10	5.4	1.8	3.6	1.5	4.2	13.6	+0.11 -0.00	1.1	0.9	2.1
472014	14	1.00	+0.00 -0.06	15.1	+0.36 -0.10	t	1.9	3.7	1.7	4.5	14.6	+0.11 -0.00	1.1	0.9	2.3
472015	15	1.00	+0.00 -0.06	16.2	+0.36 -0.10	7.2	2.0	3.7	1.7	5.0	15.7	+0.11 -0.00	1.1	1.1	2.8
472016	16	1.00	+0.00 -0.06	17.3	+0.36 -0.10	8.0	2.0	3.8	1.7	5.5	16.8	+0.11 -0.00	1.1	1.2	3.4
472017	17	1.00	+0.00 -0.06	18.3	+0.42 -0.13	8.8	2.1	3.9	1.7	6.0	17.8	+0.11 -0.00	1.1	1.2	3.6
472018	18	1.00	+0.00 -0.06	19.5	+0.42 -0.13	9.4	2.2	4.1	2.0	6.5	19.0	+0.13 -0.00	1.1	1.5	4.8
472019	19	1.00	+0.00 -0.06	20.5	+0.42 -0.13	10.4	2.2	4.1	2.0	6.8	20.0	+0.13 -0.00	1.1	1.5	5.1
472020	20	1.00	+0.00 -0.06	21.5	+0.42 -0.13	11.2	2.3	4.2	2.0	7.2	21.0	+0.13 -0.00	1.1	1.5	5.4
472021	21	1.00	+0.00 -0.06	22.5	+0.42 -0.13	12.2	2.4	4.2	2.0	7.6	22.0	+0.13 -0.00	1.1	1.5	5.7
472022	22	1.00	+0.00 -0.06	23.5	+0.42 -0.13	13.2	2.5	4.2	2.0	8.0	23.0	+0.13 -0.00	1.1	1.5	5.9
472023	23	1.20	+0.00 -0.06	24.6	+0.42 -0.21	14.2	2.5	4.2	2.0	13.8	24.1	+0.21 -0.00	1.3	1.5	6.8
472024	24	1.20	+0.00 -0.06	25.9	+0.42 -0.21	14.8	2.6	4.4	2.0	13.9	25.2	+0.21 -0.00	1.3	1.8	7.7
472025	25	1.20	+0.00 -0.06	26.9	+0.42 -0.21	15.5	2.7	4.5	2.0	14.6	26.2	+0.21 -0.00	1.3	1.8	8.0
472026	26	1.20	+0.00 -0.06	27.9	+0.42 -0.21	16.1	2.8	4.7	2.0	13.9	27.2	+0.21 -0.00	1.3	1.8	8.4
472027	27	1.20	+0.00 -0.06	29.1	+0.42 -0.21	17.1	2.9	4.7	2.0	13.3	28.4	+0.21 -0.00	1.3	2.1	10.1
472028	28	1.20	+0.00 -0.06	30.1	+0.50 -0.25	17.9	2.9	4.8	2.0	13.3	29.4	+0.21 -0.00	1.3	2.1	10.5
472029	29	1.20	+0.00 -0.06	31.1	+0.50 -0.25	18.9	3.0	4.8	2.0	13.6	30.4	+0.25 -0.00	1.3	2.1	10.9
472030	30	1.20	+0.00 -0.06	32.1	+0.50 -0.25	19.9	3.0	4.8	2.0	13.7	31.4	+0.25 -0.00	1.3	2.1	11.3
472031	31	1.20	+0.00 -0.06	33.4	+0.50 -0.25	20.0	3.2	5.2	2.5	13.8	32.7	+0.25 -0.00	1.3	2.6	14.1
472032	32	1.20	+0.00 -0.06	34.4	+0.50 -0.25	20.6	3.2	5.4	2.5	13.8	33.7	+0.25 -0.00	1.3	2.6	14.6
472033	33	1.20	+0.00 -0.06	35.5	+0.50 -0.25	21.6	3.3	5.4	2.5	14.3	34.7	+0.25 -0.00	1.3	2.6	15.0
472034	34	1.50	+0.00 -0.06	36.5	+0.50 -0.25	22.6	3.3	5.4	2.5	26.2	35.7	+0.25 -0.00	1.6	2.6	15.4
472035	35	1.50	+0.00 -0.06	37.8	+0.50 -0.25	23.6	3.4	5.4	2.5	26.9	37.0	+0.25 -0.00	1.6	3.0	18.8
472036	36	1.50	+0.00 -0.06	38.8	+0.50 -0.25	24.6	3.5	5.4	2.5	26.4	38.0	+0.25 -0.00	1.6	3.0	19.4
472037	37	1.50	+0.00 -0.06	39.8	+0.50 -0.25	25.4	3.6	5.5	2.5	27.1	39.0	+0.25 -0.00	1.6	3.0	19.8
472038	38	1.50	+0.00 -0.06	40.8	+0.50 -0.25	26.4	3.7	5.5	2.5	28.2	40.0	+0.25 -0.00	1.6	3.0	22.5
472039	39	1.50	+0.00 -0.06	42.0	+0.90 -0.39	27.2	3.8	5.6	2.5	28.8	41.0	+0.25 -0.00	1.6	3.0	26.0
472040	40	1.75	+0.00 -0.06	43.5	+0.90 -0.39	27.8	3.9	5.8	2.5	44.6	42.5	+0.25 -0.00	1.9	3.8	27.0
472041	41	1.75	+0.00 -0.06	44.5	+0.90 -0.39	28.6	4.0	5.9	2.5	45.0	43.5	+0.25 -0.00	1.9	3.8	27.6
472042	42	1.75	+0.00 -0.06	45.5	+0.90 -0.39	29.6	4.1	5.9	2.5	44.7	44.5	+0.25 -0.00	1.9	3.8	28.4
472043	43	1.75	+0.00 -0.06	46.5	+0.90 -0.39	30.6	4.2	5.9	2.5	44.5	45.5	+0.25 -0.00	1.9	3.8	28.8
472044	44	1.75	+0.00 -0.06	47.5	+0.90 -0.39	31.4	4.2	6.0	2.5	43.3	46.5	+0.25 -0.00	1.9	3.8	29.5
472045	45	1.75	+0.00 -0.06	48.5	+0.90 -0.39	32.0	4.3	6.2	2.5	43.1	47.5	+0.25 -0.00	1.9	3.8	30.2
472046	46	1.75	+0.00 -0.06	49.5	+0.90 -0.39	32.7	4.4	6.3	2.5	42.9	48.5	+0.25 -0.00	1.9	3.8	30.8
472047	47	1.75	+0.00 -0.06	50.5	+1.10 -0.46	33.5	4.4	6.4	2.5	43.5	49.5	+0.25 -0.00	1.9	3.8	31.4
472048	48	1.75	+0.00 -0.06	51.5	+1.10 -0.46	34.5	4.5	6.4	2.5	43.2	50.5	+0.30 -0.00	1.9	3.8	32.0
472050	50	2.00	+0.00 -0.07	54.2	+1.10 -0.46	36.3	4.6	6.5	2.5	60.8	53.0	+0.30 -0.00	2.2	4.5	40.5
472051	51	2.00	+0.00 -0.07	55.2	+1.10 -0.46	37.3	4.7	6.5	2.5	60.2	54.0	+0.30 -0.00	2.2	4.5	41.2
472052	52	2.00	+0.00 -0.07	56.2	+1.10 -0.46	37.9	4.7	6.7	2.5	60.3	55.0	+0.30 -0.00	2.2	4.5	42.0
472053	53	2.00	+0.00 -0.07	57.2	+1.10 -0.46	38.9	4.9	6.7	2.5	60.7	56.0	+0.30 -0.00	2.2	4.5	42.9
472054	54	2.00	+0.00 -0.07	58.2	+1.10 -0.46	39.9	5.0	6.7	2.5	60.4	57.0	+0.30 -0.00	2.2	4.5	43.6
472055	55	2.00	+0.00 -0.07	59.2	+1.10 -0.46	40.7	5.0	6.8	2.5	60.3	58.0	+0.30 -0.00	2.2	4.5	44.4
472058	58	2.00	+0.00 -0.07	62.2	+1.10 -0.46	43.5	5.2	6.9	2.5	60.8	61.0	+0.30 -0.00	2.2	4.5	46.7
472060	60	2.00	+0.00 -0.07	64.2	+1.10 -0.46	44.7	5.4	7.3	2.5	61.0	63.0	+0.30 -0.00	2.2	4.5	48.3
472062	62	2.00	+0.00 -0.07	66.2	+1.10 -0.46	46.7	5.5	7.3	2.5	60.9	65.0	+0.30 -0.00	2.2	4.5	49.8
472063	63	2.00	+0.00 -0.07	67.2	+1.10 -0.46	47.7	5.6	7.3	2.5	60.8	66.0	+0.30 -0.00	2.2	4.5	50.6
472064	64	2.00	+0.00 -0.07	68.2	+1.10 -0.46	48.7	5.7	7.5	2.5	60.6	67.0	+0.30 -0.00	2.2	4.5	51.4
472065	65	2.50	+0.00 -0.07	69.2	+1.10 -0.46	49.0	5.8	7.6	3.0	121.0	68.0	+0.30 -0.00	2.7	4.5	51.8
472067	67	2.50	+0.00 -0.07	71.5	+1.10 -0.46	50.8	6.0	7.7	3.0	121.0	70.0	+0.30 -0.00	2.7	4.5	53.8
472068	68	2.50	+0.00 -0.07	72.5	+1.10 -0.46	51.6	6.1	7.8	3.0	121.5	71.0	+0.30 -0.00	2.7	4.5	54.5
472070	70	2.50	+0.00 -0.07	74.5	+1.10 -0.46	53.6	6.2	7.8	3.0	119.0	73.0	+0.30 -0.00	2.7	4.5	56.2



Retaining rings for shafts  
轴用挡圈

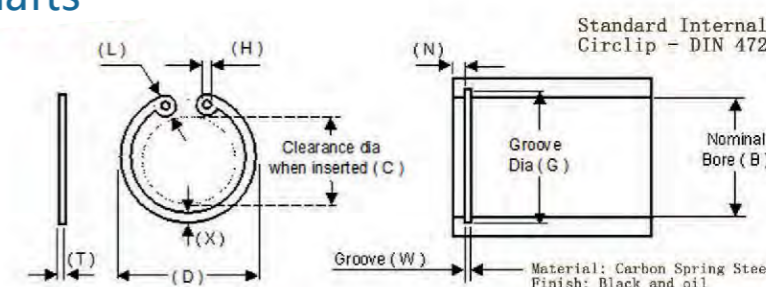
- DIN472
- Imperial size stand



Part no	Circlip Dimensions										Groove Dimensions							
	Bore	(T)	Tolerance	(D)	Tolerance	(C)	(X)	(L)	(H)	Fr KN	(G)	Tolerance	(W)	(N)	Fr KN			
472072	72	2.50	+0.00	-0.07	76.5	+1.10	-0.46	55.6	6.4	7.8	3.0	119.2	75.0	+0.30	-0.00	2.7	4.5	58.0
472075	75	2.50	+0.00	-0.07	79.5	+1.10	-0.46	58.6	6.6	7.8	3.0	118.0	78.0	+0.30	-0.00	2.7	4.5	60.0
472077	77	2.50	+0.00	-0.07	81.5	+1.10	-0.46	60.4	6.7	7.9	3.0	121.1	80.0	+0.30	-0.00	2.7	4.5	61.6
472078	78	2.50	+0.00	-0.07	82.5	+1.30	-0.54	60.1	6.8	8.5	3.0	122.5	81.0	+0.35	-0.00	2.7	4.5	62.3
472080	80	2.50	+0.00	-0.07	85.5	+1.30	-0.54	62.1	7.0	8.5	3.0	120.9	83.5	+0.35	-0.00	2.7	5.3	74.6
472082	82	2.50	+0.00	-0.07	87.5	+1.30	-0.54	64.1	7.0	8.5	3.0	119.0	85.5	+0.35	-0.00	2.7	5.3	76.6
472085	85	3.00	+0.00	-0.08	90.5	+1.30	-0.54	66.9	7.2	8.6	3.5	201.4	88.5	+0.35	-0.00	3.2	5.3	79.5
472087	87	3.00	+0.00	-0.08	92.5	+1.30	-0.54	68.9	7.3	8.6	3.5	204.5	90.5	+0.35	-0.00	3.2	5.3	81.3
472088	88	3.00	+0.00	-0.08	93.5	+1.30	-0.54	69.9	7.4	8.6	3.5	209.4	91.5	+0.35	-0.00	3.2	5.3	82.1
472090	90	3.00	+0.00	-0.08	95.5	+1.30	-0.54	71.9	7.6	8.6	3.5	199.0	93.5	+0.35	-0.00	3.2	5.3	84.0
472092	92	3.00	+0.00	-0.08	97.5	+1.30	-0.54	73.7	7.8	8.7	3.5	201.0	95.5	+0.35	-0.00	3.2	5.3	85.8
472095	95	3.00	+0.00	-0.08	100.5	+1.30	-0.54	76.5	8.1	8.8	3.5	195.0	98.5	+0.35	-0.00	3.2	5.3	88.6
472097	97	3.00	+0.00	-0.08	102.5	+1.30	-0.54	78.5	8.2	8.8	3.5	193.0	100.5	+0.35	-0.00	3.2	5.3	90.5
472098	98	3.00	+0.00	-0.08	103.5	+1.30	-0.54	79.0	8.3	9.0	3.5	191.0	101.5	+0.35	-0.00	3.2	5.3	91.3
472100	100	3.00	+0.00	-0.08	105.5	+1.30	-0.54	80.6	8.4	9.2	3.5	188.0	103.5	+0.35	-0.00	3.2	5.3	93.1
472102	102	4.00	+0.00	-0.10	108.0	+1.30	-0.54	82.0	8.5	9.5	3.5	439.0	106.0	+0.54	-0.00	4.2	6.0	108.8
472105	105	4.00	+0.00	-0.10	112.0	+1.30	-0.54	85.0	8.7	9.5	3.5	436.0	109.0	+0.54	-0.00	4.2	6.0	112.0
472108	108	4.00	+0.00	-0.10	115.0	+1.30	-0.54	89.0	8.9	9.5	3.5	419.0	112.0	+0.54	-0.00	4.2	6.0	115.0
472110	110	4.00	+0.00	-0.10	117.0	+1.30	-0.54	88.2	9.0	10.4	3.5	415.0	114.0	+0.54	-0.00	4.2	6.0	117.0
472112	112	4.00	+0.00	-0.10	119.0	+1.30	-0.54	90.0	9.1	10.5	3.5	418.0	116.0	+0.54	-0.00	4.2	6.0	119.0
472115	115	4.00	+0.00	-0.10	122.0	+1.50	-0.63	93.0	9.3	10.5	3.5	409.0	119.0	+0.54	-0.00	4.2	6.0	122.0
472120	120	4.00	+0.00	-0.10	127.0	+1.50	-0.63	96.9	9.7	11.0	3.5	396.0	124.0	+0.63	-0.00	4.2	6.0	127.0
472125	125	4.00	+0.00	-0.10	132.0	+1.50	-0.63	101.9	10.0	11.0	4.0	385.0	129.0	+0.63	-0.00	4.2	6.0	132.0
472130	130	4.00	+0.00	-0.10	137.0	+1.50	-0.63	106.9	10.2	11.0	4.0	374.0	134.0	+0.63	-0.00	4.2	6.0	138.0
472135	135	4.00	+0.00	-0.10	142.0	+1.50	-0.63	111.5	10.5	11.2	4.0	358.0	139.0	+0.63	-0.00	4.2	6.0	143.0
472140	140	4.00	+0.00	-0.10	147.0	+1.50	-0.63	116.5	10.7	11.2	4.0	350.0	144.0	+0.63	-0.00	4.2	6.0	148.0
472145	145	4.00	+0.00	-0.10	152.0	+1.50	-0.63	121.0	10.9	11.4	4.0	336.0	149.0	+0.63	-0.00	4.2	6.0	153.0
472150	150	4.00	+0.00	-0.10	158.0	+1.50	-0.63	124.8	11.2	12.0	4.0	326.0	155.0	+0.63	-0.00	4.2	7.5	191.0
472155	155	4.00	+0.00	-0.10	164.0	+1.50	-0.63	129.8	11.4	12.0	4.0	324.0	160.0	+0.63	-0.00	4.2	7.5	206.0
472160	160	4.00	+0.00	-0.10	169.0	+1.50	-0.63	132.7	11.6	13.0	4.0	321.0	165.0	+0.63	-0.00	4.2	7.5	212.0
472165	165	4.00	+0.00	-0.10	174.5	+1.50	-0.63	137.7	11.8	13.0	4.0	319.0	170.0	+0.63	-0.00	4.2	7.5	219.0
472170	170	4.00	+0.00	-0.10	179.5	+1.50	-0.63	141.6	12.2	13.5	4.0	349.0	175.0	+0.63	-0.00	4.2	7.5	225.0
472175	175	4.00	+0.00	-0.10	184.5	+1.70	-0.72	146.6	12.7	13.5	4.0	351.0	180.0	+0.63	-0.00	4.2	7.5	232.0
472180	180	4.00	+0.00	-0.10	189.5	+1.70	-0.72	150.2	13.2	14.2	4.0	347.0	185.0	+0.72	-0.00	4.2	7.5	238.0
472185	185	4.00	+0.00	-0.10	194.5	+1.70	-0.72	155.2	13.7	14.2	4.0	349.0	190.0	+0.72	-0.00	4.2	7.5	245.0
472190	190	4.00	+0.00	-0.10	199.5	+1.70	-0.72	160.2	13.8	14.2	4.0	340.0	195.0	+0.72	-0.00	4.2	7.5	251.0
472195	195	4.00	+0.00	-0.10	204.5	+1.70	-0.72	165.2	13.8	14.2	4.0	330.0	200.0	+0.72	-0.00	4.2	7.5	258.0
472200	200	4.00	+0.00	-0.10	209.5	+1.70	-0.72	170.2	14.0	14.2	4.0	325.0	205.0	+0.72	-0.00	4.2	7.5	265.0
472205	205	5.00	+0.00	-0.12	217.0	+1.70	-0.72	175.2	14.0	14.2	4.0	616.0	211.0	+0.72	-0.00	5.2	9.0	326.0
472210	210	5.00	+0.00	-0.12	222.0	+1.70	-0.72	180.2	14.0	14.2	4.0	601.0	216.0	+0.72	-0.00	5.2	9.0	333.0
472215	215	5.00	+0.00	-0.12	227.0	+1.70	-0.72	185.2	14.0	14.2	4.0	586.0	221.0	+0.72	-0.00	5.2	9.0	341.0
472220	220	5.00	+0.00	-0.12	232.0	+1.70	-0.72	190.2	14.0	14.2	4.0	574.0	226.0	+0.72	-0.00	5.2	9.0	349.0
472225	225	5.00	+0.00	-0.12	237.0	+1.70	-0.72	195.2	14.0	14.2	4.0	560.0	231.0	+0.72	-0.00	5.2	9.0	357.0
472230	230	5.00	+0.00	-0.12	242.0	+1.70	-0.72	200.2	14.0	14.2	4.0	549.0	236.0	+0.72	-0.00	5.2	9.0	365.0
472235	235	5.00	+0.00	-0.12	247.0	+1.70	-0.72	205.2	14.0	14.2	4.0	536.0	241.0	+0.72	-0.00	5.2	9.0	373.0
472240	240	5.00	+0.00	-0.12	252.0	+2.00	-0.81	210.2	14.0	14.2	4.0	525.0	246.0	+0.72	-0.00	5.2	9.0	380.0
472245	245	5.00	+0.00	-0.12	257.0	+2.00	-0.81	215.2	14.0	14.2	4.0	514.0	251.0	+0.81	-0.00	5.2	9.0	389.0
472250	250	5.00	+0.00	-0.12	262.0	+2.00	-0.81	220.2	14.0	14.2	4.0	504.0	256.0	+0.81	-0.00	5.2	9.0	396.0
472255	255	5.00	+0.00	-0.12	270.0	+2.00	-0.81	221.0	16.0	16.2	5.0	549.0	263.0	+0.81	-0.00	5.2	12.0	541.0
472260	260	5.00	+0.00	-0.12	275.0	+2.00	-0.81	226.0	16.0	16.2	5.0	538.0	268.0	+0.81	-0.00	5.2	12.0	553.0
472265	265	5.00	+0.00	-0.12	280.0	+2.00	-0.81	231.0	16.0	16.2	5.0	528.0	273.0	+0.81	-0.00	5.2	12.0	563.0
472270	270	5.00	+0.00	-0.12	285.0	+2.00	-0.81	236.0	16.0	16.2	5.0	518.0	278.0	+0.81	-0.00	5.2	12.0	573.0
472275	275	5.00	+0.00	-0.12	290.0	+2.00	-0.81	241.0	16.0	16.2	5.0	509.0	283.0	+0.81	-0.00	5.2	12.0	585.0
472280	280	5.00	+0.00	-0.12	295.0	+2.00	-0.81	246.0	16.0	16.2	5.0	499.0	288.0	+0.81	-0.00	5.2	12.0	593.0
472285	285	5.00	+0.00	-0.12	300.0	+2.00	-0.81	251.0	16.0	16.2	5.0	491.0	293.0	+0.81	-0.00	5.2	12.0	605.0
472290	290	5.00	+0.00	-0.12	305.0	+2.00	-0.81	256.0	16.0	16.2	5.0	482.0	298.0	+0.81	-0.00	5.2	12.0	615.0

Retaining rings for shafts  
轴用挡圈

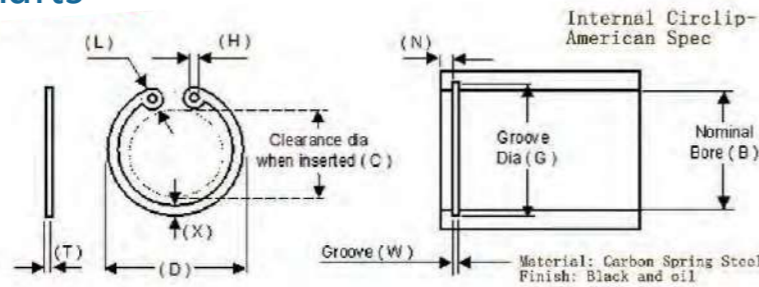
- DIN472
- Imperial size stand



Part no	Circlip Dimensions										Groove Dimensions							
	Bore	(T)	Tolerance	(D)	Tolerance	(C)	(X)	(L)	(H)	Fr KN	(G)	Tolerance	(W)	(N)	Fr KN			
472295	295	5.00	+0.00	-0.12	310.0	+2.00	-0.81	261.0	16.0	16.2	5.0	474.0	303.0	+0.81	-0.00	5.2	12.0	625.0
472300	300	5.00	+0.00	-0.12	315.0	+2.00	-0.81	266.0	16.0	16.2	5.0	466.0	308.0	+0.81	-0.00	5.2	12.0	636.0
472310	310	5.00	+0.00	-0.18	327.0	+2.50	-1.00	268.0	20.0	20.2	6.0	947.0	320.0	+0.89	-0.00	6.2	15.0	823.0
472320	320	5.00	+0.00	-0.18	337.0	+2.50	-1.00	278.0	20.0	20.2	6.0	919.0	330.0	+0.89	-0.00	6.2	15.0	850.0
472330	330	5.00	+0.00	-0.18	347.0	+2.50	-1.00	288.0	20.0	20.2	6.0	894.0	340.0	+0.89	-0.00	6.2	15.0	876.0
472340	340	5.00	+0.00	-0.18	357.0	+2.50	-1.00	298.0	20.0	20.2	6.0	869.0	350.0	+0.89	-0.00	6.2	15.0	903.0
472350	350	5.00	+0.00	-0.18	367.0	+2.50	-1.00	308.0	20.0	20.2	6.0	846.0	360.0	+0.89	-0.00	6.2	15.0	929.0
472360	360	5.00	+0.00	-0.18	377.0	+2.50	-1.00	318.0	20.0	20.2	6.0	823.0	370.0	+0.89	-0.00	6.2	15.0	955.0
472370	370	5.00	+0.00	-0.18	387.0	+2.50	-1.00	328.0	20.0	20.2	6.0	803.0	380.0	+0.89	-0.00	6.2	15.0	981.0
472380	380																	

# Retaining rings for shafts 轴用挡圈

- DIN472
- Imperial size stand



Part no	Circlip Dimensions											Groove Dimensions					
	Shaft		(T)		(D)		(C)	(X)	(L)	(H)	Force	(G)	(W)	(N)	Fr KN		
	(N)	(N)	Inch	Tol	Inch	Tol	Inch	Inch	Inch	Inch	(ib f)	Inch	Tol	Inch	Tol	Inch	(ib f)
N130025	1/4"	0.250	.015		0.280		0.11	0.025	0.068	0.029	530	0.268	+0.001	0.018	0.002	0.027	130
N130031	5/16	0.312	.015		0.346		0.17	0.033	0.069	0.029	660	0.330	-0.001	0.018	0.000	0.027	160
N130037	3/8	0.375	.025		0.415		0.20	0.040	0.085	0.039	1320	0.397		0.029		0.033	235
N130043	7/16	0.438	.025		0.482		0.23	0.049	0.101	0.039	1550	0.461		0.029		0.036	285
N130045	29/64	0.453	.025		0.498	+0.010	0.25	0.050	0.101	0.045	1600	0.477		0.029		0.036	310
N130050	1/2	0.500	.035		0.548	-0.005	0.26	0.053	0.117	0.045	2470	0.530	+0.002	0.039		0.045	425
N130056	9/16"	0.562	.035		0.620		0.28	0.053	0.137	0.045	2780	0.596	-0.002	0.039		0.051	540
N130062	5/8	0.625	.035		0.694		0.35	0.060	0.138	0.060	3090	0.665		0.039	-0.003	0.060	705
N130068	11/16	0.688	.035		0.763		0.41	0.063	0.137	0.060	3400	0.732		0.039	-0.003	0.066	855
N130075	3/4	0.750	.035		0.831		0.45	0.070	0.147	0.060	3710	0.796		0.039		0.069	975
N130081	13/16	0.812	.042	+0.002	0.901		0.49	0.077	0.160	0.060	4820	0.862		0.046		0.075	1150
N130087	7/8	0.875	.042	-0.002	0.971	+0.015	0.55	0.084	0.160	0.060	5190	0.920	+0.003	0.046		0.084	1390
N130093	15/16	0.938	.042		1.041	-0.010	0.61	0.091	0.160	0.060	5570	1.000	-0.003	0.046		0.093	1640
N130100	1	1.000	.042		1.111		0.68	0.104	0.160	0.060	5940	1.066		0.046		0.099	1870
N130106	1.1/16	1.062	.050		1.180		0.69	0.110	0.185	0.076	7500	1.130		0.056		0.102	2040
N130112	1.1/8	1.125	.050		1.249		0.75	0.116	0.185	0.076	7950	1.197		0.056		0.108	2290
N130118	1.3/16	1.188	.050		1.319		0.81	0.120	0.185	0.076	8400	1.262		0.056		0.111	2490
N130125	1.1/4	1.250	.050		1.388	+0.025	0.88	0.124	0.185	0.076	8850	1.330	+0.004	0.056		0.120	2830
N130131	1.5/16	1.312	.050		1.456	-0.020	0.94	0.130	0.185	0.076	9300	1.396	-0.004	0.056		0.126	3120
N130137	1.3/8	1.375	.050		1.526		1.00	0.130	0.185	0.076	9700	1.461		0.056		0.129	3340
N130143	1.7/16	1.438	.050		1.593		1.06	0.133	0.185	0.076	10200	1.528		0.056	0.004	0.135	3660
N130150	1.1/2	1.500	.050		1.660		1.13	0.133	0.185	0.076	10600	1.594		0.056	0.000	0.141	3990
N130156	1.9/16	1.562	.062		1.734		1.15	0.160	0.205	0.076	11400	1.658		0.068		0.144	4240
N130162	1.5/8	1.625	.062		1.804		1.21	0.160	0.205	0.076	11800	1.725		0.068		0.150	4590
N130168	1.11/16	1.688	.062		1.874		1.27	0.170	0.205	0.076	12300	1.792		0.068		0.156	4960
N130175	1.3/4	1.750	.062		1.942	+0.035	1.34	0.175	0.205	0.076	12800	1.858	+0.005	0.068		0.162	5340
N130181	1.13/16	1.812	.062		2.012	-0.025	1.40	0.170	0.205	0.091	13200	1.922	-0.005	0.068		0.165	5630
N130187	1.7/8	1.875	.062		2.072		1.48	0.170	0.205	0.091	13700	1.989		0.068		0.171	6040
N130193	1.15/16	1.938	.062		2.141		1.52	0.165	0.205	0.091	14100	2.056		0.068		0.177	6470
N130200	2.00	2.000	.062		2.210		1.59	0.170	0.205	0.091	14600	2.122		0.068		0.183	6900
N130206	2.1/16	2.062	.078		2.280		1.61	0.186	0.225	0.091	18900	2.186		0.086		0.186	7230
N130212	2.1/8	2.125	.078		2.350		1.65	0.195	0.236	0.091	19500	2.251		0.086		0.189	7570
N130218	2.3/16	2.188	.078		2.415		1.71	0.199	0.236	0.091	20000	2.318		0.086		0.195	8040
N130225	2.1/4	2.250	.078		2.490		1.77	0.203	0.236	0.091	20600	2.382		0.086		0.198	8400
N130231	2.5/16	2.312	.078		2.560		1.84	0.205	0.236	0.091	21200	2.450		0.086		0.207	9020
N130237	2.3/8	2.375	.078		2.630		1.90	0.207	0.236	0.091	21700	2.517		0.086		0.213	9540
N130244	2.7/16	2.440	.078		2.702		1.96	0.205	0.236	0.108	22300	2.584		0.086		0.216	10100
N130250	2.1/2	2.500	.078	+0.003	2.775	+0.035	2.02	0.210	0.236	0.108	22900	2.648		0.086		0.222	1300
N130256	2.9/16	2.562	.093	-0.003	2.844	-0.025	2.02	0.222	0.268	0.108	28000	2.714		0.103		0.228	11000
N130262	2.5/8	2.625	.093		2.910		2.08	0.226	0.268	0.108	28600	2.781		0.103		0.234	11600
N130268	2.11/16	2.688	.093		2.980		2.15	0.236	0.268	0.108	29300	2.848		0.103		0.240	12200
N130275	2.3/4	2.750	.093		3.050		2.18	0.234	0.284	0.108	30000	2.914	+0.006	0.103	0.005	0.246	12800
N130281	2.13/16	2.812	.093		3.121		2.24	0.230	0.284	0.108	30800	2.980	-0.006	0.103	0.000	0.252	13400
N130287	2.7/8	2.875	.093		3.191		2.30	0.240	0.284	0.108	31500	3.051		0.103		0.264	14300
N130300	3.00	3.000	.093		3.325		2.43	0.250	0.284	0.108	32900	3.182		0.103		0.273	15400
N130306	3.1/16	3.062	.109		3.418		2.46	0.254	0.299	0.123	39300	3.182		0.120		0.279	16100
N130312	3.1/8	3.125	.109		3.488		2.52	0.260	0.299	0.123	40100	3.315		0.120		0.285	16800
N130325	3.1/4	3.250	.109		3.623		2.65	0.269	0.299	0.123	41700	3.446		0.120		0.294	18000
N130334	3.11/32	3.346	.109		3.734	+0.055	2.69	0.276	0.323	0.123	43000	3.546		0.120		0.300	18900
N130347	3.15/32	3.469	.109		3.857	-0.065	2.77	0.294	0.350	0.123	44500	3.675		0.120		0.309	20200
N130350	3.1/2	3.500	.109		3.890		2.80	0.294	0.350	0.123	44900	3.710		0.120		0.315	20800
N130362	3.5/8	3.625	.109		4.024		2.92	0.298	0.350	0.123	46500	3.841		0.120		0.324	22100
N130375	3.3/4	3.750	.109		4.157		3.04	0.309	0.350	0.123	48200	3.974		0.120		0.336	23700
N130387	3.7/8	3.875	.109		4.291	+0.065	3.17	0.312	0.350	0.123	49800	4.107		0.120		0.348	25400
N130393	3.15/16	3.938	.109		4.358	-0.065	3.23	0.319	0.350	0.123	50600	4.174		0.120		0.354	26300
N130400	4.00	4.000	.109		4.424		3.24	0.330	0.378	0.123	51400	4.240		0.120		0.360	27100

# Circlips E-type E型卡簧

- DIN6799
- Imperial size standard



## Product introduction

Also known as E-style rings, these rings have three prongs that make contact with the shaft and provide a wider shoulder than other external rings for a larger retaining surface. Use a side-mount retaining ring tool (sold separately) to push them into the groove from the side of the shaft. Ring OD is measured with the ring uninstalled.

## Features

Circlips have been designed to fix seals or scraper rings on the cylinder rod. The advantages of the circlip are reduction of material waste and the number of components.

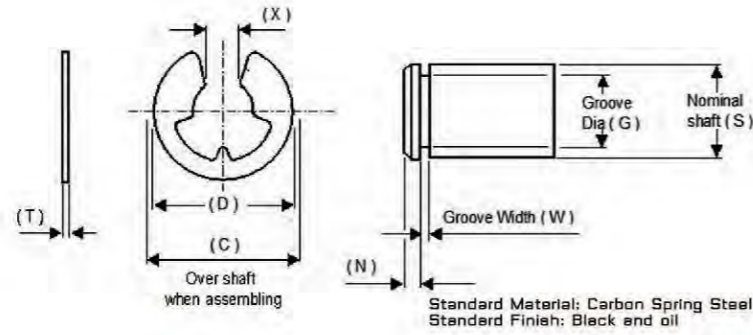
## Product application:

- Mechanical engineering
- Automotive engineering
- Gear systems
- Electrical engineering
- Precision mechanics



## Circlips E-type E型卡簧

- DIN6799
- Imperial size st



Part no	Shaft			Circlip Dimensions							Groove Dimensions					
	Nom	Min	Max	Tnk	Tolerance	(D)	(C)	(X)	Tolerance	Fr KN	(N)	Tolerance	(W)	(N)	Fr KN	
ETC0008	1.2	1.0	1.4	0.20	+0.02 -0.02	1.95	2.25	0.58	+0.04 -0.04	0.1	0.8	+0.00	0.04	0.24	0.4	0.03
ETC0012	1.7	1.4	2.0	0.30	+0.02 -0.02	2.9	3.25	1.01	+0.04 -0.04	0.1	1.2	+0.00	0.06	0.34	0.6	0.04
ETC0015	2.3	2.0	2.5	0.40	+0.02 -0.02	3.85	4.25	1.28	+0.04 -0.04	0.2	1.5	+0.00	0.06	0.44	0.8	0.07
ETC0019	2.8	2.5	3.0	0.50	+0.02 -0.02	4.4	4.8	1.61	+0.04 -0.04	0.4	1.9	+0.00	0.06	0.54	1.0	0.10
ETC0023	3.5	3.0	4.0	0.60	+0.02 -0.02	5.9	6.3	1.94	+0.04 -0.04	0.5	2.3	+0.00	0.06	0.64	1.0	0.15
ETC0032	4.5	4.0	5.0	0.60	+0.02 -0.02	6.8	7.3	2.7	+0.04 -0.04	0.7	3.2	+0.00	0.075	0.64	1.0	0.22
ETC0040	6.0	5.0	7.0	0.70	+0.02 -0.02	8.8	9.3	3.34	+0.05 -0.05	1.0	4.0	+0.00	0.075	0.74	1.2	0.25
ETC0050	7.0	6.0	8.0	0.70	+0.02 -0.02	10.75	11.3	4.11	+0.05 -0.05	1.2	5.0	+0.00	0.075	0.74	1.2	0.90
ETC0060	8.0	7.0	9.0	0.70	+0.02 -0.02	11.75	12.3	5.26	+0.05 -0.05	1.4	6.0	+0.00	0.075	0.74	1.2	1.10
ETC0070	9.5	8.0	11.0	0.90	+0.02 -0.02	13.8	14.3	5.84	+0.05 -0.05	1.8	7.0	+0.00	0.09	0.94	1.5	1.25
ETC0080	10.5	9.0	12.0	1.00	+0.03 -0.03	15.6	16.3	6.52	+0.06 -0.06	2.5	8.0	+0.00	0.09	1.05	1.8	1.42
ETC0090	12.0	10.0	14.0	1.10	+0.03 -0.03	18.2	18.8	7.63	+0.06 -0.06	3.0	9.0	+0.00	0.09	1.15	2.0	1.60
ETC0100	13.0	11.0	15.0	1.20	+0.03 -0.03	19.65	20.4	8.32	+0.06 -0.06	3.5	10.0	+0.00	0.09	1.25	2.0	1.70
ETC0120	15.5	13.0	18.0	1.30	+0.03 -0.03	22.65	23.4	10.45	+0.07 -0.07	4.7	12.0	+0.00	0.11	1.35	2.5	3.10
ETC0150	20.0	16.0	24.0	1.50	+0.03 -0.03	28.6	29.4	12.61	+0.07 -0.07	7.8	15.0	+0.00	0.11	1.55	3.0	7.00
ETC0190	25.5	20.0	31.0	1.75	+0.03 -0.03	36.7	37.6	15.92	+0.07 -0.07	11.0	19.0	+0.00	0.13	1.8	3.5	10.00
ETC0240	31.5	25.0	38.0	2.00	+0.03 -0.03	43.65	44.6	21.88	+0.08 -0.08	15.0	24.0	+0.00	0.13	2.05	4.0	13.00

Part no	Shaft		T Inch	Tol Inch	D Inch	C Inch	A Inch	Tol Inch	Groove Dimensions				
	s Inch	Tol Inch							Dia G	Tol Inch	W Inch	N Inch	Fn KN
1500/X004	0.040	+0.010/-0.00	0.010	+0.001	0.079	0.090	0.025		0.026		0.012	0.014	5
1500/X006	0.062		0.010	-0.001	0.140	0.150	0.051	+0.001	0.052		0.012	0.010	6
1500/006	0.062		0.010		0.156	0.165	0.051	-0.003	0.052		0.012	0.010	6
1500/Y006	0.062	+0.030	0.020		0.187	0.200	0.051		0.052		0.023	0.010	6
1500/X009	0.094	-0.000	0.015		0.230	0.245	0.069	+0.002/-0.002	0.074		0.018	0.020	17
1500/009	0.094		0.015		0.187	0.200	0.073		0.074		0.018	0.020	17
1500/X011	0.110		0.015		0.375	0.390	0.076		0.079		0.018	0.030	32
1500/0012	0.125		0.015		0.230	0.240	0.094		0.095	+0.002	0.018	0.030	35
1500/X014	0.140	+0.040	0.015		0.203	0.214	0.100		0.102	-0.000	0.018	0.038	50
1500/Y014	0.140	-0.000	0.015		0.250	0.265	0.108		0.110		0.018	0.030	39
1500/0014	0.140		0.025		0.270	0.285	0.102	+0.001	0.105		0.029	0.034	46
1500/0015	0.156	+0.050	0.025		0.282	0.295	0.114	-0.003	0.116		0.029	0.040	58
1500/X017	0.172	-0.000	0.025	+0.002	0.312	0.325	0.125		0.127		0.029	0.044	72
1500/X018	0.188	+0.0600	0.025	-0.002	0.375	0.390	0.122		0.125		0.029	0.062	110
1500/0018	0.188	-0.000	0.025		0.335	0.350	0.145		0.147		0.029	0.040	72
1500/X021	0.219		0.025		0.437	0.450	0.185		0.188		0.029	0.030	63
1500/0025	0.250		0.025		0.527	0.540	0.207		0.210		0.029	0.040	93
1500/X031	0.312	+0.100	0.025		0.500	0.520	0.243		0.250		0.029	0.062	180
1500/0037	0.375	-0.000	0.035		0.660	0.680	0.300		0.303		0.039	0.072	252
1500/0043	0.438		0.035		0.687	0.710	0.337	+0.002	0.343		0.039	0.094	388
1500/X043	0.438		0.035		0.600	0.620	0.375	-0.004	0.380		0.039	0.058	237
1500/0050	0.500		0.042		0.800	0.820	0.392		0.396	+0.003	0.046	0.104	485
1500/0062	0.625		0.042		0.940	0.960	0.480		0.485	-0.000	0.046	0.140	816
1500/X074	0.744	+0.120	0.050		1.000	1.020	0.616		0.625		0.056	0.118	1190
1500/0075	0.750	-0.000	0.050		1.120	1.140	0.574	+0.003	0.580		0.056	0.170	1630
1500/0087	0.875		0.050		1.300	1.320	0.668	-0.004	0.675		0.056	0.200	1370
1500/X098	0.984		0.050		1.500	1.530	0.822		0.835		0.056	0.148	1210
1500/X118	1.188	+0.200	0.062	+0.003	1.626	1.670	1.066	+0.006	1.079	+0.005	0.068	0.108	1860
1500/X137	1.375	-0.000	0.062	-0.003	1.875	1.920	1.213	-0.010	1.230	-0.000	0.068	0.144	1860

Material:

Spring steel S60C / 65Mn / SK5

Stainless steel SUS304 / 316 / 301 / 420

Surface treatment: Zinc /Black / Phosphating / Mechanical galvanizing

## Types and characteristics of stainless steel Type/Feature

### sus302

The benchmark type of 18Cr-8Ni steel. SUS303 and SUS304 are stainless steels modified from SUS302. By adding nickel (Ni), corrosion resistance and mechanical properties are excellent.

### sus303

Adding sulfur and phosphorus to SUS302 improves the machinability of stainless steel. But the corrosion resistance is slightly worse. Added molybdenum for improved corrosion.

### sus304/304L

SUS304 is an improved version of SUS302, with less carbon content, and excellent corrosion resistance and weldability. The most standard steel in austenitic stainless steel. SUS304L has a lower carbon content than SUS304, which improves intergranular corrosion resistance and weldability.

### sus310s

By adding nickel and chromium, it has excellent corrosion resistance and acid resistance, as excellent temperature characteristics, and can be used as a heat-resistant steel. Cold-rolled work suppresses work hardenability and weakens magnetic properties. It can be used as low work hardened steel and non-magnetic steel.

### sus316/316L

By adding molybdenum (Mo), SUS316 has excellent corrosion resistance (pitting corrosion) and acid resistance. At the same time, it has high temperature strength and can be used as a heat-resistant steel. SUS316L has a lower carbon content than SUS316, which improves intergranular corrosion resistance and weldability.

### sus430

The standard type of 18Cr steel has good cold workability and corrosion resistance. Due to its low price, it is widely used in various applications.

### sus434

Copper is added to SUS430, and the work-hardening stainless steel is suppressed by cold rolling.

### sus410

Representative martensitic stainless steel. Excellent mechanical properties and corrosion resistance after heat treatment.

### sus403

A stainless steel that reduces the composition range of silicon and chromium. Improves corrosion resistance, and improves toughness after heat treatment. For valves, pump shafts, props, nuts, steam turbine blades, jet engine parts, etc.

### sus416

By adding sulfur and phosphorus, the machinability of 13Cr steel is improved. Corrosion resistance is slightly worse than the reference type.

### sus431

The addition of nickel improves the toughness, and the addition of chromium the corrosion resistance. Among martensite that can be heat-treated, the corrosion resistance is the best. Used in paper machines, marine shafts and aircraft parts.

### sus440C

It has the highest hardness and excellent wear resistance is stainless steel, and is used for concave molds and ball bearings.

### sus6311

It belongs to precipitation hardening stainless steel and has particularly good heat resistance. It is used for thin plates and wire springs.

### 常规垫圈和冲压件材料表

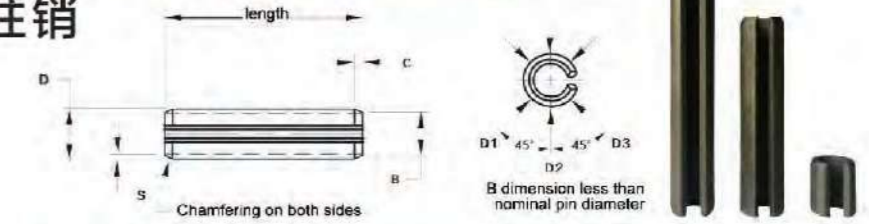
Material	牌号	材料
Carbon Steel	Q235	碳钢
Carbon Steel	SAE 1008	碳钢
Carbon Steel	SAE 1010	碳钢
Carbon Steel	SAE 1018	碳钢
Carbon Steel	SAE 1020	碳钢
Carbon Steel	SAE 1030	碳钢
Carbon Steel	SAE 1045	碳钢
Carbon Steel	SAE 1050	碳钢
Carbon Steel	SAE 1070	碳钢
Carbon Steel	06SMN	碳钢
Stainless Steel	SS304 (A2)	不锈钢
Stainless Steel	SS316(A4)	不锈钢
Stainless Steel	SS202	不锈钢
Stainless Steel	SS410	不锈钢
Bronze	CuSn10	磷编
Copper	Cu	紫铜
Brass	C2700	黄铜
Brass	C2800	黄铜
Brass	C3600	黄铜
Aluminum	A16061	铝
Aluminum	Al6063	铝

### 碟形弹簧标准材料表

材料名称	牌号	德标DIN	法制 France Armor	英制 Britain B.S	美制 AIST	美制 USA SAEI	美制 ASTM
Ck67	1.1231	17 222	XC 68	060 A 67	1070	-	-
Ck75	1.1248	17 222	XC 75	060 A 68	1080	1078	-
50CrV4	1.8159	17 222	50CV4	735 A 50	6150	-	-
51CrMoV4	1.7701	17 221	51 CDV 4	-	-	-	-
48CrMoV67	1.2323	17 350	-	-	-	-	-
X30W&V S3	1.2567	-	Z 32WCV5	-	-	-	-
X22QMO121	1.4923	17 240	-	-	-	-	-
X7CrNiAl 177	1.4568	17 224	-	-	-	-	-
X12CrNi 177	1.431	17 224	Z 8 CAN 17.07	-	631-AMS 55283529,5673	-	-
X5CrNiMo17 121	1.4401	17 224	Z 8 CAN 17.07	301 S21	301	-	-
NiCr19NbMo(Inconel718)	2.4668	65 021	Z 8 CAN 17.07	316S 16 316S31	316	30316	A 182
NiCr15Fe7TiAl(Inconel X750)	2.4669	-	NC 19 FeNb	HR8	-	AMS 5596 D	-
NiCr20Co18Ti(Ni mobic90)	2.4969	17754 59745	NC 15 Tnba	HR 505	-	AMS 5598A	-
Duratherm 600	-	-	NC20KTA	2HR 2 2 HR 202	-	AMS 5829	-
CuBe1.7	2.1245	17 666 17670	-	-	-	-	-
CuBe2	2.1247	17 666 17670	CuBe 1.7	-	-	-	-
TiAl6V4	3.7165	17851 17 860	CuBe 1.9	2870	-	J461 J463	B194

### Heavy Straight Slot Elastic Cylindrical Pin 重型直槽弹性圆柱销

- ISO 8752
- DIN 1481



Unit:mm

Nominal pin diamet	pin diamet		Chamfer length		wall thickness	Recommended hole size		shear strength
	min <sup>1</sup>	max <sup>2</sup>	min	max <sup>2</sup>	nominal	min	max <sup>2</sup>	
1.5	1.7	1.8	0.25	0.45	0.3	1.5	1.60	1.58
2	2.3	2.4	0.35	0.55	0.4	2.0	2.10	2.82
2.5	2.8	2.9	0.40	0.60	0.5	2.5	2.60	4.38
3	3.3	3.5	0.50	0.70	0.6	3.0	3.10	6.32
3.5	3.8	4.0	0.60	0.80	0.8	3.5	3.62	9.09
4	4.4	4.6	0.65	0.85	0.8	4.0	4.12	11.24
4.5	4.9	5.1	0.80	1.00	1.0	4.5	4.62	15.36
5	5.4	5.6	0.90	1.10	1.0	5.0	5.12	17.54
6	6.4	6.7	1.20	1.40	1.2	6.0	6.12	26.04
8	8.5	8.8	1.60	2.00	1.5	8.0	8.15	42.76
10	10.5	10.8	2.00	2.40	2.0	10.0	10.15	70.16
12	12.5	12.8	2.00	2.40	2.5	12.0	12.18	104.1
14	14.5	14.8	2.00	2.40	3.0	14.0	14.18	144.7 <sup>3</sup>
16	16.5	16.8	2.00	2.40	3.0	16.0	16.18	171.0 <sup>3</sup>
18	18.5	18.9	2.00	2.40	3.5	18.0	18.18	222.5 <sup>3</sup>
20	20.5	20.9	3.00	3.40	4.0	20.0	20.21	280.6 <sup>3</sup>

Rverage of <sup>1</sup> minimum diameter D1 D2 D3 The <sup>2</sup> maximum diameter can be measured by general gauge <sup>3</sup> Carbon steel only

### Standard length

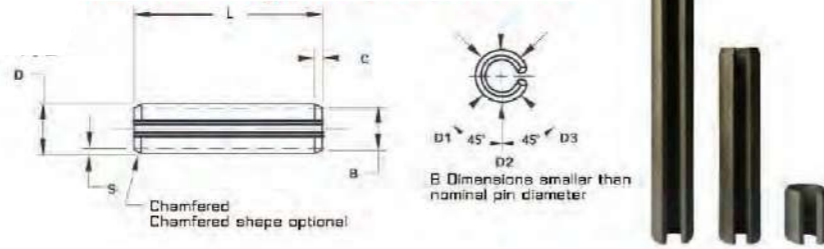
length	Nominal diameter															
	1.5	2	2.5	3	3.5	4	4.5	5	6	8	10	12	14	16	18	20
4																
5																
6																
8																
10																
12																
14																
16																
18																
20																
22																
24																
26																
28																
30																
32																
35																
40																
45																
50																
55																
60																
65																
70																
75																
80																
85																
90																
95																
100																

Length tolerance-ISO 8752  
 4-10mm ±0.25mm  
 12-50mm ±0.25mm  
 55-100mm ±0.25mm  
 Length tolerance-DIN 14819  
 4-10mm ±0.5mm  
 12-50mm ±1.0mm  
 55-100mm ±1.5mm

## Light Straight Slot Elastic Cylindrical Pin

### 轻型直槽弹性圆柱销

- ISO 13337
- DIN 7346



Unit:mm

Nominal pin diamet	Diameter D		Chamfer length C		wall thickne ss S	Recommended hole size		Aecommeded hole size Carbon steel and martensitic stainless steel kN
	min	max	min	max		min	max	
2	2.3	2.4	0.20	0.40	0.20	2.0	2.10	1.50
2.5	2.8	2.9	0.25	0.45	0.25	2.5	2.60	2.40
3	3.3	3.5	0.25	0.45	0.30	3.0	3.10	3.50
3.5	3.8	4	0.30	0.50	0.35	3.5	3.62	4.60
4	4.4	4.6	0.50	0.70	0.50	4.0	4.12	8.00
4.5	4.9	5.1	0.50	0.70	0.50	4.5	4.62	8.80
5	5.4	5.6	0.50	0.70	0.50	5.0	5.12	10.40
6	6.4	6.7	0.70	0.90	0.75	6.0	6.12	18.00
8	8.5	8.8	1.50	1.80	0.75	8.0	8.15	24.00
10	10.5	10.8	2.00	2.40	1.00	10.0	10.15	40.00
12	12.5	12.8	1.00	2.00	1.00	12.0	12.18	48.00
13	13.5	13.8	1.20	2.00	1.20	13.0	13.18	66.00
14	14.5	14.8	2.00	2.40	1.50	14.0	14.18	84.00
16	16.5	16.8	2.00	2.40	1.50	16.0	16.18	98.00
18	18.5	18.9	2.00	2.40	1.70	18.0	18.18	126.00
20	20.5	20.9	2.00	3.40	2.00	20.0	20.21	158.00

### Standard length

length	Nominal diameter															
	1.5	2	2.5	3	3.5	4	4.5	5	6	8	10	12	14	16	18	20
4																
5																
6																
8																
10																
12																
14																
16																
18																
20																
22																
24																
26																
28																
30																
32																
35																
40																
45																
50																
55																
60																
65																
70																
75																
80																
85																
90																
95																
100																

Nominal pin length    Length tolerance  
length tolerance-ISO 8752

4-10mm	±0.25mm
12-50mm	±0.50mm
55-100mm	±0.75mm

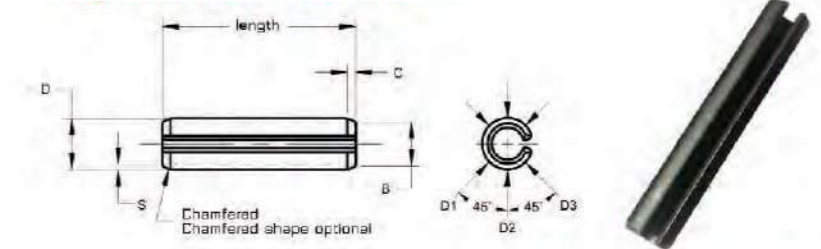
Length tolerance-DIN14819 reference

4-10mm	+0.5mm
12-50mm	+1.0mm
55-100mm	+1.5mm

## Straight Slot Elastic Cylindrical Pin

### 直槽弹性圆柱销

- ASME B18.8.4M
- 美标公制尺寸



Unit:mm

Nominal pin diamet	Pin Diameter D		chamfer diameter B	Chamfer length C		Wall thickness S	Recommended hole size		Minimum double shear strenth	
	min <sup>1</sup>	max <sup>2</sup>		min	max		nom	min	max	Carbon steel and martensitic stainless steel
1.5	1.58	1.66	1.4	0.15	0.7	0.35	1.5	1.56	1.8	1.00
2	2.10	2.19	1.9	0.2	0.8	0.45	2.0	2.07	3.5	2.0
2.5	2.62	2.72	2.4	0.2	0.9	0.55	2.5	2.58	5.5	3.2
3	3.14	3.25	2.9	0.2	1.0	0.65	3.0	3.10	7.8	4.5
4	4.16	4.30	3.9	0.3	1.2	0.8	4.0	4.12	12.3	7.2
5	5.17	5.33	4.8	0.3	1.4	1.0	5.0	5.12	19.6	11.4
6	6.18	6.36	5.8	0.4	1.6	1.2	6.0	6.12	28.5	16.6
8	8.22	8.45	7.8	0.4	2.0	1.6	8.0	8.15	48.8	28.4
10	10.25	10.51	9.7	0.5	2.4	2.0	10.0	10.15	79.1	46.1
12	12.28	12.55	11.7	0.6	2.8	2.5	12.0	12.18	111.6	60.7
14	14.30	14.60	13.7	0.8	2.8	3.0	14.0	14.18	170.0 <sup>3</sup>	--
16	16.32	16.65	15.6	1.0	3.0	3.0	16.0	16.18	190.0 <sup>3</sup>	--
18	18.35	18.71	17.6	1.2	3.2	3.5	18.0	18.18	250.0 <sup>3</sup>	--
20	20.40	20.80	19.5	1.4	3.4	4.0	20.0	20.21	320.0 <sup>3</sup>	--

<sup>1</sup>The minimum diameter is the average of D1,D2, and D3. <sup>2</sup>The maximum diameter is measured with a gauge. <sup>3</sup>Carbon steel only

### Standard metric size

length	Nominal diameter															
	1.5	2	2.5	3	4	5	6	8	10	12	14	16	18	20		
4																
5																
6																
8																
10																
12																
14																
16																
18																
20																
22																
24																
26																
28																
30																
32																
35																
40																
45																
50																
55																
60																
65																
70																
75																
80																
85																
90																
95																
100																

Nominal pin length    Length tolerance

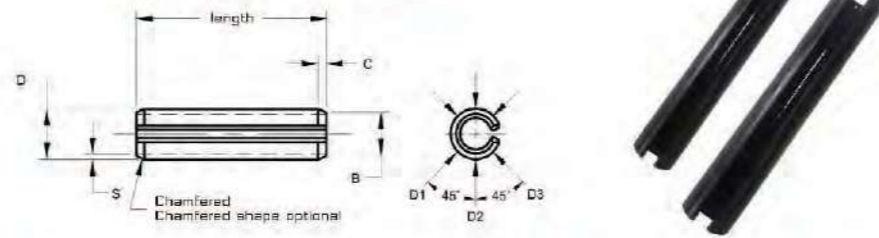
longest 24mm	±0.40mm
exceed 24-50mm	±0.50mm
exceed 50-75mm	±0.60mm
exceed 75mm	±0.75mm

↑ Compliant but not HSME 18.8.4M

## Straight Slot Elastic Cylindrical Pin

### 直槽弹性圆柱销

- ASME 日18.8.2
- 美标英制尺寸



Unit:inch

Nominal pin diameter	Pin Diameter D		chamfer diameter B	Chamfer length C		Wall thickness S	Recommended hole size		Minimum double shear strength				
									Carbon steel and martensitic stainless steel		Austemitic stainless steel		
	min <sup>1</sup>	max <sup>2</sup>	max	min	max	nom	min	max	Lb	kN	Lb	kN	
1/16	0.062	0.066	0.069	0.059	0.007	0.028	0.012	0.062	0.065	430	2	250	1.1
5/64	0.078	0.083	0.086	0.075	0.008	0.032	0.018	0.078	0.081	800	3.56	460	2.05
3/32	0.94	0.099	0.103	0.091	0.008	0.038	0.022	0.094	0.097	1150	5.12	670	2.98
1/8	0.125	0.131	0.135	0.122	0.008	0.044	0.028	0.125	0.129	1875	8.34	1090	4.85
5/32	0.156	0.162	0.167	0.151	0.01	0.048	0.032	0.156	0.16	2750	12.23	1600	7.12
3/16	0.187	0.194	0.199	0.182	0.011	0.055	0.04	0.187	0.192	4150	18.46	2425	10.79
7/32	0.219	0.226	0.232	0.214	0.011	0.065	0.048	0.219	0.224	5850	26.02	3400	15.12
1/4	0.250	0.258	0.264	0.245	0.012	0.065	0.048	0.250	0.256	7050	31.36	4100	18.24
5/16	0.312	0.321	0.33	0.306	0.014	0.080	0.062	0.312	0.318	10800	48.04	6300	28.02
3/8	0.375	0.385	0.395	0.368	0.016	0.095	0.077	0.375	0.382	16300	72.5	9500	42.25
7/16	0.437	0.448	0.459	0.430	0.017	0.095	0.077	0.437	0.445	19800	88.08	11500	51.16
1/2	0.500	0.513	0.524	0.485	0.025	0.11	0.094	0.500	0.51	27100	120.55	15800	70.28
5/8	0.625	0.640	0.653	0.608	0.03	0.125	0.118	0.625	0.637	42500	189.06	--	--
3/4	0.750	0.768	0.784	0.730	0.045	0.15	0.145	0.750	0.764	62500	278.02	--	--

### Standard size

length	Nominal diameter												
	1.5	2	2.5	3	4	5	6	8	10	12	14	16	18
4													
5													
6													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
35													
40													
45													
50													
55													
60													
65													
70													
75													
80													
85													
90													
95													
100													

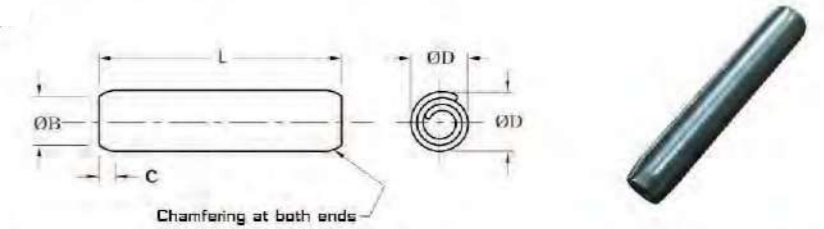
Nominal cylindrical pin length length tolerance

longest 1"	±0.015
exceed 1"-2"	±0.020
exceed 2"-3"	±0.025
exceed 3"-4"	±0.030
exceed 4"	±0.035

## Heavy-duty rolled elastic Cylindrical Pin

### 重型轧制弹性圆柱销

- ISO 8748
- ASME B18.8.3M
- 公制尺寸



		Nominal diameter										
		1.5	2	2.5	3	4	5	6	8	10	12	
diameter	Φ	max	1.71	2.21	2.73	3.25	4.3	5.35	6.40	8.55	10.65	12.75
		min	1.61	2.11	2.62	3.12	4.15	5.15	6.18	8.25	10.3	12.35
Chamfer	B diameter C length	max	1.40	1.90	2.40	2.90	3.90	4.85	5.85	7.80	9.75	11.70
		min	0.50	0.70	0.70	0.90	1.10	1.30	1.50	2.00	2.50	3.00
Recommended hole size		max	1.60	2.10	2.60	3.10	4.12	5.12	6.15	8.15	10.15	12.18
		min	1.50	2.00	2.50	3.00	4.00	5.00	6.00	8.00	10.00	12.00

\*All dimensions apply before plating

### Minimum double shear strength

Minimum double shear strength	1.5	2	2.5	3	4	5	6	8	10	12
Carbon steel/alloy steel Chromium stainless steels	1.9	3.5	5.5	7.6	13.5	20	30	53	84	120
Nickel stainless steel	1.45	2.5	3.8	5.7	10	15.5	23	41	64	91

\*Shear test in accordance with HSME B18.8.3M and ISO8749

### Standard length

Nominal length	1.5	2	2.5	3	4	5	6	8	10	12
4										
5										
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										
26										
28										
30										
32										
35										
40										
45										
50										
55										
60										
65										
70										
75										
80										
85										
90										
95										
100										

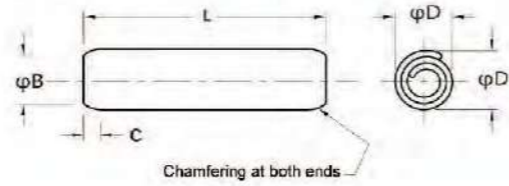
Applicable to all materials except alloy steel

↑ The cylindrical pin must pass through the hole gauge by its own weight

## Standard type elastic Cylindrical Pin

### 标准型弹性圆柱销

- ISO 8750
- ASME B18.8.3M



			Nominal diameter														
			0.8	1	1.2	1.5	2	2.5	3	4	5	6	8	10	12	16	20
diameter	φ	max	0.91	1.15	1.35	1.73	2.25	2.78	3.30	4.40	5.50	6.50	8.63	10.80	12.85	17.00	21.10
		min	0.85	1.05	1.25	1.62	2.13	2.65	3.15	4.20	5.25	6.25	8.30	10.35	12.40	16.45	20.40
Chamfer	B diameter C length	max	0.75	0.95	1.15	1.40	1.90	2.40	2.90	3.90	4.85	5.85	7.80	9.75	11.70	15.60	19.60
		min	0.30	0.30	0.40	0.50	0.70	0.70	0.90	1.10	1.30	1.50	2.00	2.50	3.00	4.00	4.50
Recommended hole size		max	0.84	1.04	1.24	1.60	2.10	2.60	3.10	4.12	5.12	6.15	8.15	10.15	12.18	16.18	20.21
		min	0.80	1.00	1.20	1.50	2.00	2.50	3.00	4.00	5.00	6.00	8.00	10.00	12.00	16.00	20.00

\*All dimensions apply before plating

### Minimum double shear strength

Nominal diameter	0.8	1	1.2	1.5	2	2.5	3	4	5	6	8	10	12	16	20
Carbon steel/alloy steel Nickel stainless steels	0.4	0.6	0.9	1.45	2.5	3.9	5.5	9.6	15	22	39	39	89	155	250
Chromium stainless steel	0.3	0.45	0.65	1.05	1.9	2.9	4.2	7.6	11.5	16.8	30	30	67	--	--

\*Shear test in accordance with HSME B18.8.3M and ISO8749

### Standard length

Nominal length	0.8	1	1.2	1.5	2	2.5	3	4	5	6	8	10	12	16	20
5															
6															
8															
10															
12															
14															
16															
18															
20															
22															
24															
26															
28															
30															
35															
40															
45															
50															
55															
60															
65															
75															
80															
85															
90															
95															
100															

Applicable for stainless steel

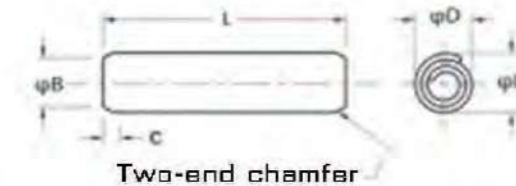
Applicable to all materials except alloy steel

Applicable to all types of alloy steel

## Light-duty rolled elastic Pin

### 轻型滚动弹性销

- ISO 8750
- ASME B18.8.3M



			Nominal diameter							
			1.5	2	2.5	3	4	5	6	
diameter	φD	max	1.75	2.28	2.82	3.35	4.45	5.5	6.55	
		Minimums	1.62	2.13	2.65	3.15	4.2	5.2	6.25	
Chamfer Angle	B diameter	max	1.4	1.9	2.4	2.9	3.9	4.85	5.85	
	C length	Aeference	0.5	0.7	0.7	0.9	1.1	1.3	1.5	
Recommended hole size		max	1.6	2.1	2.6	3.1	4.12	5.12	6.12	
		Minimums	1.5	2	2.5	3	4	5	6	

All sizes apply before plating

### Minimum Double Shear strength in Kn

Nominal diameter	1.5	2	2.5	3	4	5	6
Carbon steel alloy steel	0.8	1.5	2.3	3.3	5.7	9	13
Chrome stainless steel							
Nickel stainless steel	0.65	1.1	1.8	2.5	4.4	7	10

### Standard length

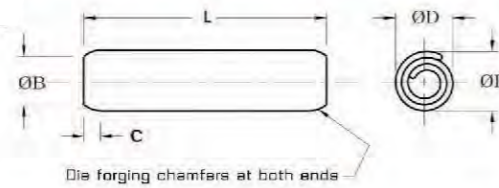
Nominal length		1.5	2	2.5	3	4	5	6
Nominal length	10							
	12							
	14							
	16							
	18							
	20							
	22							
	24							
	26							
	28							
	30							
	35							
40								
45								
50								
55								
60								

Suitable for chromium stainless steel and nickel stainless steel

Suitable for all materials except alloy steel

## Heavy-duty rolled elastic Cylindrical Pin 重型轧制弹性圆柱销

- ASME B18.8.2
- 英制尺寸



Nominal diameter			62	78	94	125	156	187	250	312	375	500
			1/16	5/64	3/32	1/8	5/32	3/16	1/4	5/16	3/8	1/2
Φ	ΦD	max	70	86	103	136	168	202	268	334	400	532
		min	66	82	98	130	161	194	258	332	386	514
Chamfer	ΦB	Minimum	59	75	91	121	152	182	243	304	366	488
		reference	28	32	38	44	48	55	65	80	95	110
Recommended hole size	C length	max	65	81	97	129	160	192	256	319	383	510
		min	62	78	94	125	156	187	250	312	375	500

\*All sizes apply before plating.

### Minimum double shear strength in pounds

Nominal diameter	62	78	94	125	156	187	250	312	375	500
	1/16	5/64	3/32	1/8	5/32	3/16	1/4	5/16	3/8	1/2
Carbon steel/alloy steel Chrome stainless steel*	475	800	1150	2000	3100	4500	7800	12000	12000	32000
Nickel stainless steel*	360	575	825	1700	2400	3500	6200	9300	9300	25000

### Standard length

Nominal diameter			62	78	94	125	156	187	250	312	375	500
			1/16	5/64	3/32	1/8	5/32	3/16	1/4	5/16	3/8	1/2
length	187	3/16										
	250	1/4										
	312	5/16										
	375	3/8										
	437	7/16										
	500	1/2										
	562	9/16										
	625	5/8										
	750	3/4										
	875	7/8										
	1000	1										
	1250	1-1/4										
	1500	1-1/2										
	1750	1-3/4										
	2000	2										
2250	2-1/4											
2500	2-1/2											
2750	2-3/4											
3000	3											
3250	3-1/4											
3500	3-1/2											
3750	3-3/4											
4000	4											

universal  
Millimeter and inch  
cylindrical pins  
mm inch  
Φ Φ  
2.0 78 5/64  
4.0 156 5/32  
8.0 321 5/16

Cylindrical pin length  
Nominal cylindrical pin size  
L ≤ 2000 ±0.010  
2000 < L ≤ 3000 ±0.015  
3000 < L ±0.025  
cylindrical pin  
Length  
L ≤ 1000 007  
1000 < L ≤ 2000 010  
2000 < L 013

Length tolerance  
Φ1/16-3/8 ±0.025  
Φ1/2 ±0.025

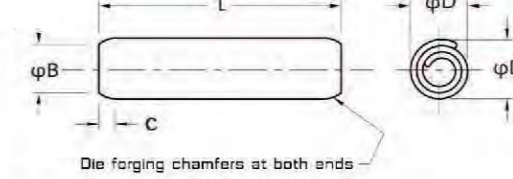
Straightness tolerance  
Gauge  
±0.005  
1.000  
2.000  
3.000

Suitable for all materials-except alloy steel  
Special sizes, loads, materials and surface treatments are available on request, including oil-free cylindrical pins

↑ The cylindrical pin must pass through the hole gauge by its own weight, where the length of the hole gauge is equal to the length of the cylindrical pin plus 1 mm (25.4 mm), and the diameter of the hole is equal to the maximum cylindrical pin diameter plus straightness tolerance.

## Standard typerolled elastic Cylindrical Pin 标准滚筒式弹性圆柱销

- ASME B18.8.2
- 英制尺寸



Nominal diameter			31	47	62	78	94	125	156	187	250	312	375	500	625	750
			1/32	3/64	1/16	5/64	3/32	1/8	5/32	3/16	1/4	5/16	3/8	1/2	5/8	3/4
Φ	ΦD	max	35	52	72	88	105	138	171	205	271	337	403	535	661	787
		min	33	49	67	83	99	131	163	196	260	324	388	516	642	768
Chamfer	ΦB	Minimum	29	45	59	75	91	121	152	182	243	304	366	488	613	738
		reference	24	24	28	32	38	44	48	55	65	80	95	110	125	150
Recommended hole size	C length	max	32	48	65	81	97	129	160	192	256	319	383	510	635	760
		min	31	47	62	78	94	125	156	187	250	312	375	500	625	750

\*All sizes apply before plating.

### Minimum double shear strength in kN

Nominal diameter	31	47	62	78	94	125	156	187	250	312	375	500	625	750
	1/32	3/64	1/16	5/64	3/32	1/8	5/32	3/16	1/4	5/16	3/8	1/2	5/8	3/4
Carbon steel/alloy steel Chrome stainless steel*	90	190	330	550	775	1400	2200	3150	5500	8700	12600	22500	35000	50000
Nickel stainless steel*	65	145	265	425	600	1100	1700	2400	4300	6700	9600	17500	--	--

### Standard length

Nominal diameter			31	47	62	78	94	125	156	187	250	312	375	500	625	750
			1/32	3/64	1/16	5/64	3/32	1/8	5/32	3/16	1/4	5/16	3/8	1/2	5/8	3/4
length	187	3/16														
	250	1/4														
	312	5/16														
	375	3/8														
	437	7/16														
	500	1/2														
	562	9/16														
	625	5/8														
	750	3/4														
	875	7/8														
	1000	1														
	1250	1-1/4														
	1500	1-1/2														
	1750	1-3/4														
	2000	2														
2250	2-1/4															
2500	2-1/2															
2750	2-3/4															
3000	3															
3250	3-1/4															
3500	3-1/2															
3750	3-3/4															
4000	4															

Universal  
Millimeter and inch  
cylindrical pins  
mm inch  
031 1/32 0.8  
047 3/64 1.2  
078 5/64 2.0  
156 5/32 4.0  
312 5/16 8.0  
625 5/8 16.0

Cylindrical pin length  
Nominal cylindrical pin size  
L ≤ 2000 ±0.010  
2000 < L ≤ 3000 ±0.015  
3000 < L ±0.025  
cylindrical pin  
Length  
L ≤ 1000 007  
1000 < L ≤ 2000 010  
2000 < L 013

Length tolerance  
Φ1/16-3/8 ±0.025  
Φ1/2 ±0.025

Straightness tolerance  
Gauge  
±0.005  
1.000  
2.000  
3.000

available for chrome and nickel stainless steel only      Suitable for all materials-except alloy steel      Only for alloy steel

↑ The cylindrical pin must pass through the hole gauge by its own weight, where the length of the hole gauge is equal to the length of the cylindrical pin plus 1 inch (25.4 mm), and the diameter of the hole is equal to the maximum cylindrical pin diameter plus straightness tolerance.



## Light-duty rolled elastic Pin 轻型滚动弹性销

- ASME B18.8.2
- 英制尺寸

Nominal diameter			62	78	94	125	156	187	250
Φ	ΦD	max	73	89	106	139	171	207	273
		min	67	83	99	131	163	196	260
Chamfer	ΦB	Minimum reference	59	75	91	121	152	182	243
	C length		28	32	38	44	48	55	65
Recommended hole size	max		65	81	97	129	160	192	256
	min		62	78	94	125	156	187	250

\*All sizes apply before plating.

Minimum double shear strength in kN

Nominal diameter		62	78	94	125	156	187	250
Carbon steel/alloy steel Chrome stainless steel*	1/16	205	325	475	825	1300	1900	3300
	5/64	160	250	360	650	1000	1450	2600

\*Shear test according to ASME B18.8.2.

Standard length

Nominal diameter			62	78	94	125	156	187	250
length	187	3/16							
	250	1/4							
	312	5/16							
	375	3/8							
	437	7/16							
	500	1/2							
	562	9/16							
	625	5/8							
	750	3/4							
	875	7/8							
	1000	1							
	1250	1-1/4							
	1500	1-1/2							
	1750	1-3/4							
	2000	2							
2250	2-1/4								

Universal Millimeter and inch cylindrical pins

mm	inch
078	5/64
156	5/32
2.0	4.0

Cylindrical pin length  
Nominal cylindrical pin size  
L ≤ 2000  
2000 < L

length tolerance  
1/16-1/4  
±0.010  
±0.015

cylindrical pin Length  
L ≤ 1000  
1000 < L ≤ 2000  
2000 < L

Straightness tolerance  
0.007  
0.010  
0.013

Gauge  
±0.005  
1.000  
2.000  
3.000

available for chrome and nickel stainless steel only

Suitable for all materials-except alloy steel

↑ The cylindrical pin must pass through the hole gauge by its own weight, where the length of the hole gauge is equal to the length of the cylindrical pin plus 1 inch (25.4 mm), and the diameter of the hole is equal to the maximum cylindrical pin diameter plus straightness tolerance.



## Standard spacer 标准垫片



CHANNDV provides the standard range of spacers, including British and metric specifications, two kinds of wall thickness and several kinds of materials. When the British size is converted to metric size, very wide range of sizes is available and vice versa. The standard spacers are as follows:

Reduce costs, especially in medium or low volume applications, without tooling and mold costs. Channov's product inventory can ensure timely delivery and reduce the initial order of customers. No need to develop internal standards and specifications, saving design time.

metric size

Standard spacer size		3mm	3.5mm	4mm	5mm	6mm	8mm	10mm	12mm	14mm	16mm	20mm	24mm
Heavy wall	inside diameter min	3.15	3.65	4.15	5.2	6.2	8.2	10.2	12.25	14.25	16.25	20.4	24.4
	diameter max	3.3	3.8	4.3	5.4	6.4	8.5	10.5	12.7	14.8	16.8	21	25.2
	wall thickness	0.5	0.5	0.7	0.7	0.9	1.1	1.2	1.6	1.8	1.8	2	2.4
Standard wall	inside diameter min	3.1	3.6	4.1	5.1	6.1	8.1	10.1	12.15	--	16.15	20.2	--
	diameter max	3.3	3.85	4.35	5.4	6.4	8.6	10.6	13	--	17.1	21.2	--
	wall thickness	0.7	0.9	1	1.2	1.5	1.7	2	2.2	--	2.6	2.8	--
outside diameter		4.6	5.55	6	7.65	9.25	11.75	14.35	17	--	21.85	26.3	--

Standard size

Nominal diameter		3mm	3.5mm	4mm	5mm	6mm	8mm	10mm	12mm	14mm	16mm	20mm	24mm
length	4												
	5												
	6												
	8												
	10												
	12												
	14												
	16												
	18												
	20												
	22												
	25												
	28												
	30												
	35												
	40												
	45												
	50												
	55												
	60												
65													
70													
75													
80													
85													
90													
95													
100													
110													
120													
130													
140													
150													

Length tolerance  
SP100 ± 0.15mm  
SP150 ± 0.20mm

Length tolerance  
SP100 ± 0.25mm  
SP150 ± 0.40mm

Length tolerance  
SP100 ± 0.4mm  
SP150 ± 0.5mm

Length tolerance  
SP100 ± 0.25mm  
SP150 ± 0.30mm

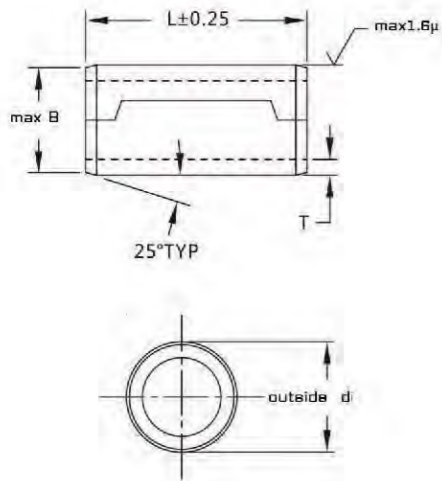
Length tolerance  
SP100 ± 0.4mm  
SP150 ± 0.5mm

Length tolerance  
SP100 ± 0.5mm  
SP150 ± 0.6mm

## Precision locating pin 精密定位销

- Precision alignment pins are designed to ensure
- precise alignment and significantly reduce costs

The precision locating pin is designed to directly replace the solid cylindrical locating pin of ISO8734 standard, and is used in applications requiring precise alignment and positioning



- Precision hollow cylinder outer diameter can ensure that the pipe fitting alignment dimension is accurate to within 20 μm
- 1.6 micron surface treatment and accurate chamfering can prevent scratches or scratches during installation
- The roll forming design makes the cost much less than the solid locating pin
- The hollow feature allows it to weigh less than a solid pin and can leave a gap for bolts, liquids, or gases

### Technical specifications

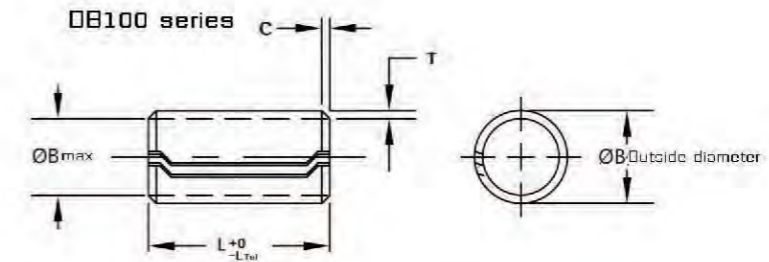
Standard material	Standard surface treatment
low carbon	Oiling

### Standard length

Nominal outer diameter	Outside diameter (mm)		B max (mm)		Recommended hole size		length (mm)										
	min	max			min	max	6	8	12	15	20	24	30	32			
6	6.004	6.012	0.55	0.9	5.987	6.000											
8	8.006	8.015	0.75	1.2	7.987	8.000											
10	10.006	10.015	1.05	1.6	9.987	10.000											
12	12.007	12.018	1.2	1.8	11.985	12.000											
16	16.007	16.018	1.5	2.2	15.985	16.000											

## Positioning bushing 定位衬套

The locating bushing is used to tie in with the Bolt fixing part, and after installation the bolt will pass through the inner hole of the bushing. There is no longer a need for separate holes for positioning sales. Hardened positioning bushings also absorb shear loads. Isolate the bolts from these forces



### Dimensional data

Metric system									
Diameter of standard locating pin	Minimum inside diameter installation	Outside diameter		Wall thickness s T <sup>2</sup>	Chamfer Angles C <sup>2</sup>	ΦB Max	Recommended Φ hole size		Minimum Simple Shear force (KN) <sup>3</sup>
		Minimums	Max				Minimums	Max	
6	6.2	7.92	8.18	0.7	1.4	7.5	7.67	7.8	10.9
8	8.2	10.35	10.61	0.9	1.4	9.85	10.1	10.23	18.7
10	10.2	12.75	13.01	1.1	1.4	12.2	12.25	12.63	28.4
12	12.25	15.5	15.76	1.45	1.8	14.85	15.25	15.38	45.4
16	16.14	20.25	20.51	1.8	1.8	19.5	20	20.13	74.6

Metric system										
Diameter of standard locating pin	Minimum inside diameter installation	Outside diameter		Wall thickness s T <sup>2</sup>	Chamfer Angles C <sup>2</sup>	ΦB Max	Recommended Φ hole size		Minimum Simple Shear force (KN) <sup>3</sup>	
		Minimums	Max				Minimums	Max		
250	1/4	256	325	335	028	050	308	315	320	2.500
312	5/16	318	401	411	035	050	381	391	396	4.000
375	3/8	381	479	489	042	050	457	469	474	5.750
500	1/2	510	640	650	057	060	615	630	635	10.500

Metric system						Inches						
Nominal scale	Length L					Nominal scale	Length L					
	Bolt	12	15	20	25		30	35	Bolt	500	750	1000
Diameter	6	8	10	12	16	Diameter	1/2	3/4	1	1-1/4		

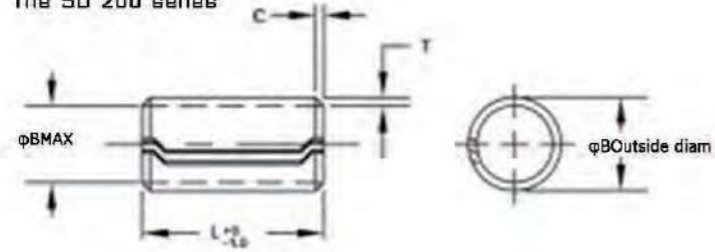
1. when installed in recommended Hole Sutra.
2. is a reference size only.
3. The minimum one-way Shear Force was measured by reference to ISO8749 and Appendix of Hameb 18.8.2. The test is only applicable to bushings of length greater than times straight. For special product orders with coating. All dimensions are pre-coated.
4. can be customized according to the requirements of larger size and special size.

## Elastic locating pin 弹性定位销

The elastic locating pin is used to accurately locate each component. They are shaped using mandrel rolls. To make sure that the shape of the circle, it is recommended that one half of the hole tolerance be allocated to the hole at one end of the pin. The other half goes to the hole you want to mate with.



The SD 200 series



materials	Surface treatment
B Carbon Steel	Common, oiled

### Dimensional

Metric system								
Diameter of standard locating pin	φ Outside diameter		Wall thickness S T <sup>1</sup>	Chamfer Angies C <sup>2</sup>	φB Max	Recommended φ hole size		Minimum Simple Shear force(KN) <sup>3</sup>
	Minimums	Max				Minimums	Max	
6	6.25	6.5	0.55	1	5.85	6	6.13	6.6
8	8.5	8.5	0.7	1.4	7.8	8	8.13	11.5
10	10.25	10.5	0.9	1.4	9.75	10	10.13	18.5
12	12.25	12.5	1.1	1.4	11.7	12	12.13	27.1

Metric system					
Nominal scale Bolt	Length L				
Diameter	12	15	20	25	30
6					
8					
10					
12					

1. eference Dimension Only

2. Minimum one-way Shear Force. Test methods refer to Iso8749 Test only for bushing with length greater than times straight. For special product orders with coating. All dimensions are pre-coated. Can Be customized to larger size and special size. Available in inch size according to special requirements.

## Material analysis 材质分析

常规材质	Corrosion-resistant steel grades												
材质简称 Short name	AIAI ASTM	材质编号 Material no	学名 Norm	C	Si	Mn	P max	S Max	Cr	V	Mo	Ni	N
C675	1070	1.231	DIN EN10132-4	0.6-0.73	0.15-0.35	0.60-0.90	0.025	0.025	MAX0.04		MAX0.10	MAX0.40	
S1crV4	6150	1.8159	DIN EN10132-4	0.47-0.55	MAX0.40	0.70-1.10	0.025	0.025	0.90-1.20	0.10-0.25	MAX0.10	MAX0.40	

抗腐蚀材质	Corrosion-resistant steel grades												
材质简称 Short name	AIAI ASTM	材质编号 Material no	学名 Norm	C	Si	Mn	P max	S Max	Cr	V	Mo	Ni	N
X10crNi18-8	301	1.431	DIN EN10151	0.05-0.15	max.2.0	max.2.0	0.045	0.015	16.0-19.0		max.0.8	6.0-9.5	
XsCrNiMo17-12-2	316	1.4401	DIN EN10151	max.0.07	max.1.0	max.2.0	0.045	0.015	16.5-18.5		2.0-2.5	10.0-13.0	max.0.11
X10crNi18-10	304	1.4301	DIN EN10151	max.0.07	max.1.0	max.2.0	0.045	0.015	17.5-19.5			8.0-10.5	max.0.11
X30C13	420	1.4028	DIN EN10151	0.26-0.35	max.1.0	max.1.5	0.04	0.03	12.0-14.0				

## Surface treatment analysis 表面处理分析

表面处理 Finish	盐雾测试锈蚀 (小时)(DIN50021) Salt spray testtime
磷酸盐膜 Phosphating salt film	24
薄锌层系列 (同等CEOMET, DELTA Zinc layer system)	480
机械镀锌 Mecjanical zinc plating	196
金属锌涂层+钝化 zinc coating+passivating	96