

# Constant Force Springs / Brackets for Constant Force Springs

# Washers for Coil Springs

Standard / Tapped

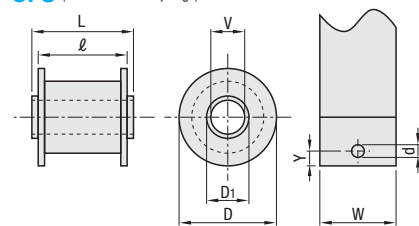
## Constant Force Springs



## Brackets for Constant Force Springs

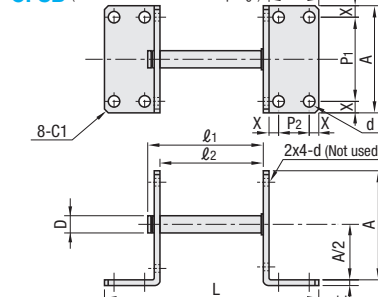


## CFS (Constant Force Springs)



Material	
Main Body	Drum
EN 1.4319 Equiv.	Polypropylene
Material of the Drums: CFS0.1, CFS0.2 and CFS5.2 are polyethylene, CFS3.5 is ABS.	

## CFSB (Brackets for Constant Force Springs)



Material		Surface Treatment		Accessory	
Main Body	Shaft	Shaft			
EN 1.4016 Equiv.	SWCH Equivalent	Nickel Plating		Retaining Ring-C Type (EN 1.4301 Equiv.)	

Part Number	Max. Stroke	Durability Times	Spring Plate Thickness	Accessory Plate Thickness	D	D1	V	ℓ	L	W	Y	Unit Price	Volume	Discount Rate			
Type	Load (kg)											1- 19 pcs	20-34	35-49	50-100		
CFS	0.1	500	50,000	0.1	1.0	26	8.2	5.2	17	18	10	3.2	5				
	0.2		35,000	0.13													
	0.4		37,000														
	0.6	1,000	25,000	0.15					25.6	27.6	20						
	0.8		1,500			25,000				30.6	32.6	25					
	1.0	1,000	19,000			38	14		26.2	27.6	20						
	1.2		1,500	34,000			44		40.6	42.6	35						
	1.4	1,000	9,000	0.2		34	13		25.6	27.6	20	4.5					
	1.8	1,500	9,000				34		30.6	32.6	25						
	2.0		6,000	0.25		38			26.2	27.6	20						
	2.2		8,000	0.3		44	14	10.2	25.6	27.6	20	8					
	2.4		6,000	0.25		38				30.6	32.6	25					
	2.6		9,000			44											
	2.9	1,000	20,000	0.3		2.0	54	16		46	49	40	6.5				
	3.2		8,000			1.0	44	14		35.6	37.6	30	4.5				
	3.5		21,000			2.0	54	16		56	58	50	6.5				
	3.9		8,000			1.0	1.0	44		40.6	42.6	35	4.5				
4.7		9,000	2.0		2.0	44	14	50.6	52.6	45	6.5						
5.2	1,500	6,000	0.45		1.0	60	16		37	40	30	4.5					
5.7	1,000	8,000	0.3		2.0	44	14		55.6	57.6	50	6.5					

Part Number	t	A	B	P1	P2	X	d	D	ℓ1	ℓ2	L	Applicable	Unit Price	Volume	Discount Rate	
Type	No.											Constant Force Spring	- 15 pcs	20-34	35-49	50-100
CFSB	0.1	1.5	45	22.5	35	12.5	5	4.5	5	24.9	20.5	68.5	CFS0.1 CFS0.2			
	0.4		55	27.5	43	15.5				(35)	30.4	89.4	CFS0.4 CFS0.6 CFS1.4			
	0.8		55	27.5	43	15.5				(40)	35.4	94.4	CFS0.8 CFS1.8			
	1.0		60	30	48	18				(35)	30.4	94.4	CFS1.0 CFS2.0			
	1.2		65	32.5	53	20.5				(50)	45.4	114.4	CFS1.2 CFS3.9			
	2.2		65	32.5	53	20.5				(35)	30.4	99.4	CFS2.2			
	2.4	2	60	30	48	18	6	5.5		(40)	35.4	99.4	CFS2.4			
	2.6		65	32.5	53	20.5			10	(40)	35.4	104.4	CFS2.6			
	2.9		75	37.5	63	25.5				(56)	51.4	130.4	CFS2.9			
	3.2		65	32.5	53	20.5				(45)	40.4	109.4	CFS3.2			
	3.5		75	37.5	63	25.5				(65)	60.8	139.8	CFS3.5			
	4.7		65	32.5	53	20.5				(60)	55.4	124.4	CFS4.7			
5.2	2.5	65	32.5	53	20.5	7	6.5		(47)	42.3	132.3	CFS5.2				
5.7		65	32.5	53	20.5	6	5.5		(65)	60.4	129.4	CFS5.7				

Ordering Example  
Part Number  
CFS2.4  
CFSB2.4

All load tolerances are from 0 to +15%.

## Features

- A long strip of material that is wound into a role. When the strip is extended, the inherent stress resists the loading force at a constant rate.
- Once it reaches the maximum load, the resistance is constant regardless of the stroke. (The drums reach the max. output only after approximately half a rotation.)

## How to Use

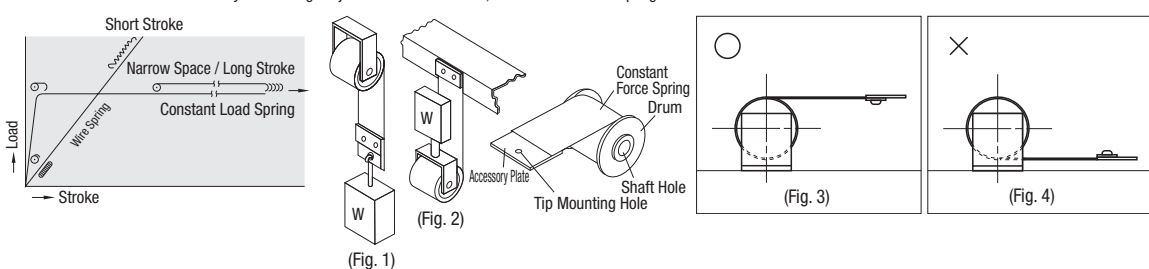
- The side on which a shaft goes through the drum is regarded as one end, and the accessory plate side as the other end. Mount with screws using mounting holes of the accessory plate.
- Can be used in either way of fixing the body and pulling out the accessory plate (Fig. 1) or fixing the accessory plate and pulling out the body (Fig. 2).

## Cautions on Use

- A spring is coiled around a drum, but the inner edge of the spring is not fixed to the drum. Do not pull out the stroke beyond the specified length: **the spring may come off of the drum.**
- If a suitable load constant force spring can not be found, select a value one step higher and adjust using a counterweight on the mating load.
- Durability is as shown in specification table. A set of extension and contraction is counted as one cycle. If durability expectancy is exceeded, load capacity may decrease and cracks may appear partly on the spring surface. **Continuous use under such condition is dangerous.** If used in pairs, both will reach the end of their service life at the same time. Please replace both of them at the same time.
- The above durability is for reference only. Actual durability may differ from the given value depending on factors such as the environment and conditions of use.
- After prestressing of springs (5 ~ 10 sets of extension and contraction over the entire stroke) the load will be stable. Load capacity may be higher before prestressing.

## Cautions on Installation

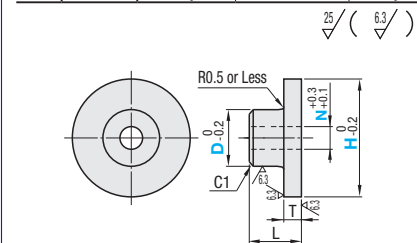
- Make sure the spring doesn't contact other structures.
- Spring draw direction should be perpendicular to the shaft axis.
- Make sure a spring doesn't contact the accessory plate when retracting.
- Set the spring so that it can be pulled out horizontally at any time in order to avoid deflection (bending).
- If drum and shaft do not rotate smoothly, the spring will deteriorate due to excessive force.
- When using brackets, orient them in the position as shown in Fig. 3. Orienting them in the position as shown in Fig. 4 may cause the spring to come into contact with the installation surface of the brackets. This may allow foreign objects such as dust inside, which can cause the spring to deteriorate.



## Standard



Type	Material	Surface Treatment	Color
SPGCC	EN 1.1191 Equiv.	Black Oxide	-
SPGCS	EN 1.4301 Equiv.	-	-
SPGCJ	Polyacetal	-	White
SPGCK	Polyacetal	-	Black
SPGCM	MC Nylon	-	Blue
SPGCW	MC Nylon	-	Ivory

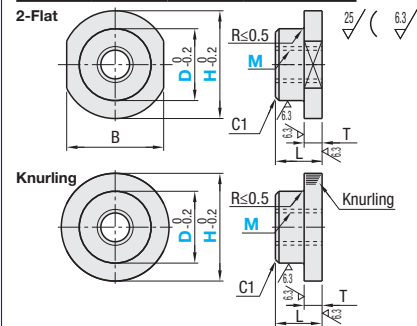


Ordering Example  
Part Number - D - N  
SPGCS20 - 9 - 6  
SPGCC10 - 6 - 3

## Tapped

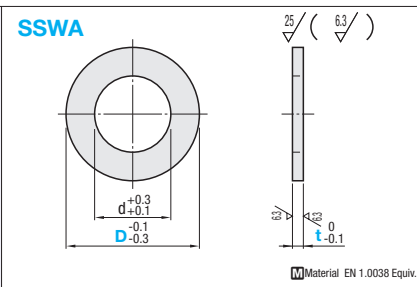


Type	Material	Surface Treatment
2-Flat	EN 1.1191 Equiv.	Black Oxide
Knurling	EN 1.4301 Equiv.	-



Ordering Example  
Part Number - D - M  
SPGMC20 - 16 - 6  
SPGRS25 - 20 - 12

## Washers



Ordering Example  
Part Number - t  
SSWA15 - 2.0

Part Number		1mm Increment	Selection	L	T	Unit Price	
Type	H	D	N			SPGCC	SPGCS
(Metal) SPGCC SPGCS	8	6	3	5	2		
	10	6~8	3				
			4				
			4				
	12	7~10	5				
			6				
			4	6			
			5				
	15	7~13	6				
			8				
			10				
			12				
			6	3			
	20	9~17	8				
			10				
			12				
			16				
	25	11~22	8			8	
10							
12							
30	15~25	12	5				
		16					

D-N≥3

Part Number	1mm Increment	Selection	L	T	Unit Price
Type	H	D	N		SPGCJ SPGCK SPGCM SPGCW
(Resin) SPGCJ SPGCK SPGCM SPGCW	10	6-8	3	6	
			4		
			5		
	15	7-13	6		
			8		
			10		
	20	9-17	8	7	
			10		
			12		
			16		
	25	11-22	10	5	
			12		

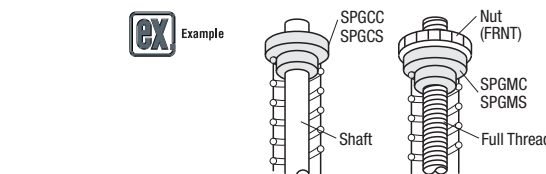
D-N≥3

Part Number	1mm Increment D	Selection M (Course)	L	T	B	SPGMC		SPGMS	
						Unit Price 1-9 pc[s]	Volume Discount Rate 10-50	Unit Price 1-9 pc[s]	Volume Discount Rate 10-50
(2-Flat) SPGMC SPGMS	10	7-8	4		8	3	8		
	15	7-13	4 6		8	3	13		
	20	9-17	4 6 8 10		8	3	17		
	25	12-20	4 6 8 10 12		10	5	22		
	30	16-25	6 8 10 12 16	10	5	27			

D-M≥3

Part Number	1mm Increment D	Selection M (Course)	L	T	SPGRC		SPGRS	
					Unit Price 1-9 pcs	Volume Discount Rate 10-50	Unit Price 1-9 pcs	Volume Discount Rate 10-50
(Knurling) SPGRC SPGRS	10	7-8	4	8	3			
	15	7-13	4 6	8	3			
	20	9-17	4 6 8 10	8	3			
	25	12-20	4 6 8 10 12	10	5			
	30	16-25	6 8 10 12 16	10	5			

D-M≥3



d	Applicable Springs	Part Number	D	t	Unit Price
		Type			t=1.0 t=2.0 t=3.0 t=4.0 t=5.0
3.0	6	SSWA	5	1.0	
5.0	8		7		
6.0	10		9		
7.0	12		11.5		
8.0	14		13	2.0	
9.0	16		15		
10.0	18		17		
12.0	20		19		
12.0	22		21	3.0	
14.5	25		24		
15.0	27		26		
17.0	30		29		
20.0	35	SSWA	34	5.0	
23.0	40		39		