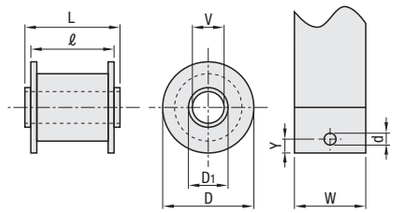
Constant Force Springs / Brackets for Constant Force Springs

■Constant Force Springs

■Brackets for Constant Force Springs

RoHS

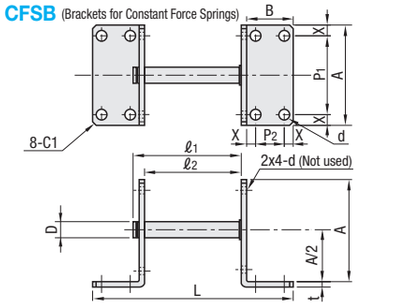
CFS (Constant Force Springs)



Material	
Main Body	Drum
SUS301EH	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	
SUS430	SWCH Equivalent	Nickel Plating	Retaining Ring-C Type (SUS304)

Part Number Type	Load (kgf)	Max. Stroke	Durability Times	Spring Plate Thickness	Accessory Plate Thickness	D	D1	V	ℓ	L	W	d	Y	Unit Price 1 - 19 pc(s).	Volume Discount Rate 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	1,000	37,000			34	13		25.6	27.6	20						
	0.6		25,000	0.15													
	0.8	1,500	25,000			34			30.6	32.6	25						
	1.0	1,000	19,000			38	14		26.2	27.6	20						
	1.2	1,500	34,000	0.2		44			40.6	42.6	35						
	1.4	1,000	9,000			34	13		25.6	27.6	20	4.5					
	1.8	1,500	9,000			34			30.6	32.6	25						
	2.0	1,000	6,000	0.25		38	14	10.2	26.2	27.6	20		8				
	2.2		8,000	0.3		44			25.6								
	2.4		6,000	0.25		38			30.6	32.6	25						
	2.6		9,000	0.3		44											
	2.9		20,000		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	44	14		40.6	42.6	35	4.5					
	4.7		9,000		2.0		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 Type	No.	t	A	B	P1	P2	X	d	D	ℓ1	ℓ2	L	Applicable Constant Force Spring	Unit Price 1 - 19 pc(s).	Volume Discount Rate 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				(35)	30.4	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				(65.4)	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	85	42.5	71	28.5	7	6.5		(47.4)	42.3	132.3	CFS5.2				
	5.7	2	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

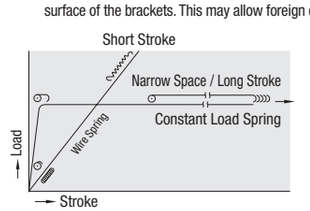
1. The side on which a shaft goes through the drum is regarded as one end, and the accessory plate side as the other end. Mount with screws using mounting holes of the accessory plate.
2. Can be used in either way of fixing the body and pulling out the accessory plate (Fig. 1) or fixing the accessory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

Cautions on Use

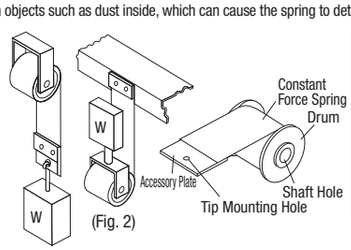
1. A spring is coiled around a drum, but the inner edge of the spring is not fixed to the drum. Do not pull out the stroke beyond the specified length: the spring may come off of the drum.
2. If a suitable load constant force spring can not be found, select a value one step higher and adjust using a counterweight on the mating load.
3. 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.
4. 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

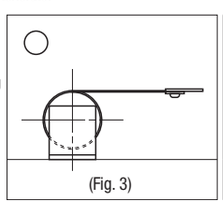
1. Make sure the spring doesn't contact other structures.
2. Spring draw direction should be perpendicular to the shaft axis.
3. Make sure a spring doesn't contact the accessory plate when retracting.
4. Set the spring so that it can be pulled out horizontally at any time in order to avoid deflection (bending).
5. If drum and shaft do not rotate smoothly, the spring will deteriorate due to excessive force.
6. 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.



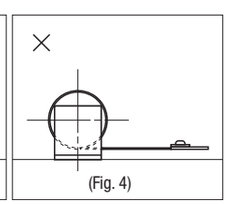
(Fig. 1)



(Fig. 2)



(Fig. 3)



(Fig. 4)

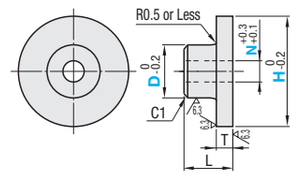
Washers for Coil Springs

Standard / Tapped

■Standard

RoHS

	Type	Material	Surface Treatment	Color
Metal	SPGCC	S45C	Black Oxide	-
	SPGCS	SUS304	-	-
Resin	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

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

D-N≥3

Part Number Type	H	1mm Increment D	Selection N	L	T	Unit Price SPGCJ	Unit Price SPGCM	Unit Price SPGCK	Unit Price SPGCW
(Resin) SPGCJ SPGCK SPGCM SPGCW	10	6~8	3	6	3				
			4						
	15	7~13	4	7					
			5						
			6						
	20	9~17	6						
			8						
			10						
	25	11~22	8	10	5				
			10						
			12						
	30	15~25	12						
			16						

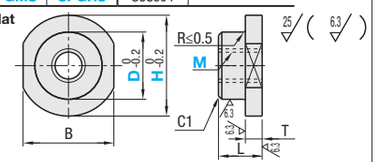
D-N≥3

■Tapped

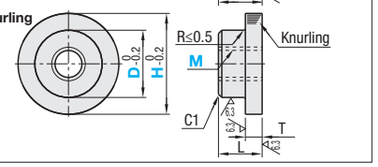
RoHS

Type 2-Flat	Type Knurling	Material	Surface Treatment
SPGMC	SPGRC	S45C	Black Oxide
SPGMS	SPGRS	SUS304	-

2-Flat



Knurling



Ordering Example: Part Number — D — M

SPGMC20 - 16 - 6
SPGRS25 - 20 - 12

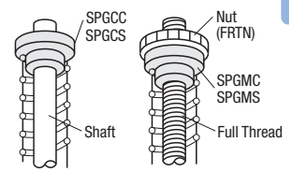
Part Number Type	H	1mm Increment D	Selection M (Course)	L	T	B	SPGMC Unit Price 1~9 pc(s).	SPGMC Unit Price 10~50	SPGMC Volume Discount Rate	SPGMS Unit Price 1~9 pc(s).	SPGMS Unit Price 10~50	SPGMS Volume Discount Rate
(2-Flat) SPGMC SPGMS	10	7~8	4	8	3	8						
	15	7~13	4 6	8	3	13						
	20	9~17	4 6 8 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 Type	H	1mm Increment D	Selection M (Course)	L	T	SPGRC Unit Price 1~9 pc(s).	SPGRC Unit Price 10~50	SPGRC Volume Discount Rate	SPGRS Unit Price 1~9 pc(s).	SPGRS Unit Price 10~50	SPGRS Volume Discount Rate
(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

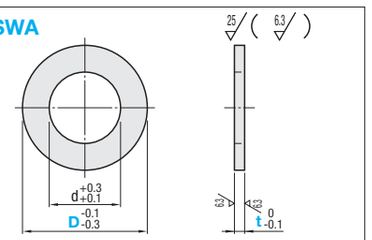
Example



■Washers

RoHS

SSWA



Ordering Example: Part Number — t

SSWA15 - 2.0

d	Applicable Springs	Part Number Type	Part Number D	t	Unit Price 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	3.0					
12.0	20		19						
12.0	22		21						
14.5	25		24	4.0					
15.0	27		26						
17.0	30		29	5.0					
20.0	35		34						
23.0	40		39						