ROUND WIRE COIL SPRINGS
—WY (75% DEFLECTION) —

MORE ITEMS　SGP Stock　Printed in Red

The quantity discount rate is also applicable to alteration cost.
All price & lead time are to be quoted.

■Instructions and notes for coil springs

MISUMI coil springs (excluding wire springs) are constantly undergoing design of optimal crossectional form in an effort to improve durability. Take great care of the notes below in order to use it as ease.

① Always use with a spring guide
When used without a spring guide, the coil spring may buckle or bend midway.
This can cause it to break since the internal surface of the bend is subjected to concentrated high stress. Be sure to use a spring guide, such as a shaft and OD (outside diameter) guide, with the coil spring.
※The best results are obtained by inserting a shaft all the way through the coil spring, from top to bottom, as an ID (inside diameter) guide.

② Clearance between spring ID and shaft
It is recommended that the shaft diameter be set approximately 1.0 mm smaller than the ID of the coil spring. When clearance between the spring and the shaft is insufficient, the coil springs internal surface may come into contact with the shaft and be subject to abrasion at that point. This will lead to the spring eventually breaking at the point of wear. Excessive clearance, on the other hand, can lead to buckling of the coil spring. When the coil spring has a long free length (i.e., free length / OD is 4 or higher), set up a step on the shaft as shown in Fig. 1 to prevent the coil spring's internal surface from touching the shaft when it bends.

③ Clearance between spring OD and spotfaced hole
It is recommended that the spotfaced hole diameter be set approximately 1.5 mm larger than the coil spring OD. The coil spring expands in the outward direction when it deflects. Insufficient clearance between the spring and the spotfaced hole restrains expansion, and the resulting concentration of stress can cause the coil spring to break. The spotfaced hole configuration shown in Fig. 1 is ideal for a coil spring with a long free length.

④ Avoid a short shaft length and shallow spotfaced hole depth
If the guide is too short, the coil spring may touch the guides tip when it is compressed. The resulting friction could cause the coil spring to break. It is recommended that the guide length be set longer than half of the initial height. Also make sure to chamfer the shaft to around C3 level.

⑤ Do not use in excess of maximum deflection (300,000-times limit) (or use near solid height)
When the coil spring is used in excess of the 300,000-times limit, the cross section begins to receive a stress higher than the theoretical value. This will cause the coil spring to break.
And when the coil spring is used at around its solid height its active coils gradually adhere each other, increasing the spring constant value and causing the load curve to rise, as shown in Fig. 2. The resulting high stress that develops will cause the coil spring to break. Avoid using in conditions of over 300,000 cycles.

⑥ Set up an initial deflection
When there is room for the coil spring to move vertically, it receives an impact force that causes it to bend midway or to buckle. Setting up an initial deflection stabilizes the top and bottom ends of the spring.

⑦ Avoid entrapment of debris or foreign matter
Debris or foreign matter that gets caught between the coils causes that part of the coil spring to stop functioning as active coils, making the other coils deflect as shown in Fig. 3.
This effectively reduces the number of active coils, increasing the stress on the spring, and causing it eventually to break. Be careful not to let debris or foreign matter foul the coils.

⑧ Keep mounting faces parallel
The coil spring should be mounted properly, with its mounting faces (top and bottom faces) parallel to each other. Misalignment can cause the spring to bend midway, subjecting the bend to high stress.This can cause to spring to break at that point. The same applies to the dies in which the coil spring is used, if the parallel alignment between the dies is poor, as shown in Fig. 4, the coil spring can bend midway or exceed the 300,000-times limit prematurely. Keep the coil springs mounting faces as perfectly parallel as possible to prevent this from occurring.

⑨ Do not use coil springs in series
If you use two coil springs in series, they will tend to bend, as shown in Fig. 5. This can cause them to move out of the shaft or spotfaced holes. If this happens, the coil spring will eventually break for the same reasons described in ① above.Due to spring load differences, moreover, the weaker spring is overcome by (and deflects more than) the stronger spring, as shown in Fig. 6. This will make the weaker spring more prone to damage, or cause it to break. Moreover, each spring constant when placing 2 springs in series is 1/2 that of a single spring.

⑩ Do not use two coil springs in parallel
Use of two coil springs in parallel may result in the inner coils being sandwiched between the outer coils, or vice versa, when they contract as shown in Fig.7. This can cause the coil springs to break for the same reason noted in ④.

⑪ Do not use the coil spring horizontally
When the coil spring is used horizontally, the internal surface of the spring will come into contact with the shaft, causing abrasion at those spots. The spring will eventually break at these weakened spots.

MISUMI endurance test conditions

① **Spring guide formula**
Shaft penetration:
1.0 mm less than shaft diameter d

② **Initial deflection**
1.0mm

③ **Amplitude**
Deflection with 300,000-times limit value

④ **Speed**
180spm

※The maximum number of durable operating times may vary depending on the service conditions.

Fig. 1

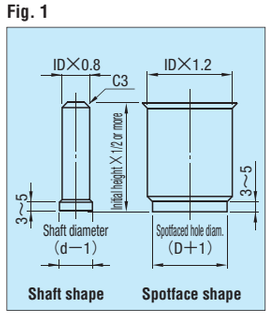


Fig. 2

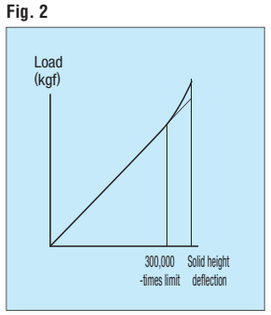


Fig. 3

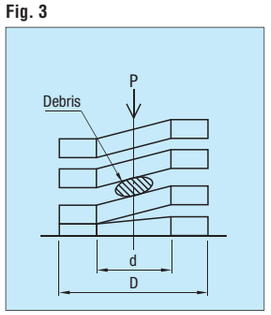


Fig. 4

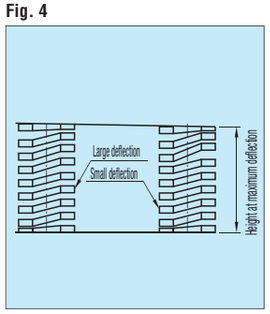


Fig. 5

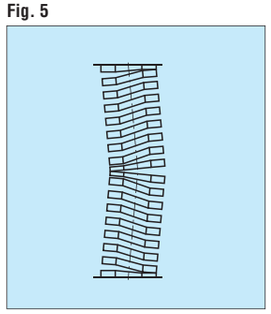


Fig. 6

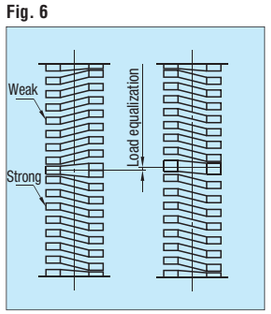
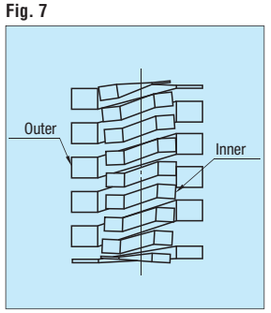
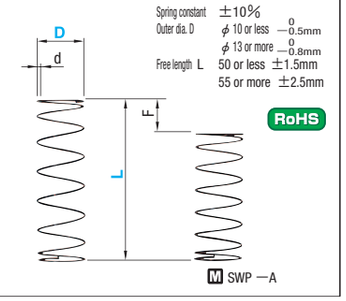


Fig. 7



WY



■Spring constant

WY type D12 and D14 are not available.

D \ Type	WY	WR	WF	WL	WT	WM	WH	WB
2	N/mm 0.1 {kgf/mm} {0.01}	N/mm 0.3 {kgf/mm} {0.03}	N/mm 0.5 {kgf/mm} {0.05}	0.5{0.05}	1.5 {0.15}	2.0 {0.2}	2.9{0.3}	3.9{0.4}
3								4.9{0.5}
4							N/mm 5.9 {kgf/mm} {0.6}	N/mm 9.8 {kgf/mm} {1.0}
5								
6								
8								
10	N/mm 0.2 {kgf/mm} {0.02}			N/mm 1.0 {kgf/mm} {0.1}	N/mm 2.0 {kgf/mm} {0.2}	N/mm 2.9 {kgf/mm} {0.3}	N/mm 9.8 {kgf/mm} {1.0}	N/mm 19.6 {kgf/mm} {2.0}
12								29.4{3.0}
13								
14								N/mm 29.4 {kgf/mm} {3.0}
16								
18		N/mm 0.5 {kgf/mm} {0.05}	N/mm 1.0 {kgf/mm} {0.1}	N/mm 2.9 {kgf/mm} {0.3}	N/mm 3.9 {kgf/mm} {0.4}	N/mm 4.9 {kgf/mm} {0.5}	N/mm 14.7 {kgf/mm} {1.5}	
20								
22								
27								
Fmax.	F=L×75%	F=L×60%	F=L×45%	F=L×40%	F=L×40%	F=L×35%	F=L×30%	F=L×25%

Order　Catalog No. WY 13−60　Delivery

● Printed in Red　SGP Stock
● Printed in Blue　3 Days

For area out of Singapore please refer to P.i.

■Quantity discount rate

Quantity	1~9	10~19	20~99	100~500
Rate	—	5%	10%	15%

■WY : Fmax.(Allowable deflection)=L×75%

d	Solid height	F max.	N{kgf} max.	Catalog No. Type D−L	U/Price Q'ty : 1~9
0.16	1.0	3.75	0.38{0.04}	WY 3− 5	
0.2	2.0	7.5	0.75{0.08}	10	
0.23	3.6	11.2	1.12{0.11}	15	
0.23	3.6	15	1.5 {0.15}	20	
0.25	5.5	18.7	1.87{0.19}	25	
0.26	6.5	22.5	2.25{0.23}	30	
0.2	1.1	3.75	0.38{0.04}	WY 4− 5	Quotation
0.23	1.9	7.5	0.7 {0.08}	10	
0.23	1.9	11.2	1.1 {0.11}	15	
0.25	2.7	15	1.5 {0.15}	20	
0.29	5	18.7	1.8 {0.19}	25	
0.29	5	22.5	2.2 {0.23}	30	
0.32	7.7	26.2	2.6 {0.26}	35	
0.32	7.7	30	2.9 {0.3 }	40	
0.25	1.7	7.5	0.7 {0.08}	WY 5−10	
0.25	1.7	11.2	1.1 {0.11}	15	
0.3	3.2	15	1.5 {0.15}	20	
0.3	3.2	18.7	1.8 {0.19}	25	
0.35	6.3	22.5	2.2 {0.23}	30	
0.35	6.3	26.2	2.6 {0.26}	35	
0.38	9.2	30	2.9 {0.3 }	40	
0.38	9.2	33.7	3.3 {0.34}	45	
0.38	9.2	37.5	3.7 {0.38}	50	
0.3	2.1	7.5	0.75{0.08}	WY 6−10	
0.32	2.8	11.2	1.1 {0.11}	15	
0.32	2.8	15	1.5 {0.15}	20	
0.35	4.1	18.7	1.8 {0.19}	25	
0.38	5.6	22.5	2.2 {0.23}	30	
0.38	5.6	26.2	2.6 {0.26}	35	
0.4	7.2	30	2.9 {0.3 }	40	
0.4	7.2	33.7	3.3 {0.34}	45	
0.4	7.2	37.5	3.7 {0.38}	50	
0.45	12.2	41.2	4.0 {0.41}	55	
0.45	12.2	45	4.4 {0.45}	60	
0.45	12.2	48.7	4.8 {0.49}	65	
0.45	12.2	52.5	5.1 {0.53}	70	

d	Solid height	F max.	N{kgf} max.	Catalog No. Type D−L	U/Price Q'ty : 1~9
0.35	2.1	7.5	0.75{0.08}	WY 8−10	
0.38	3	11.2	1.1 {0.11}	15	
0.4	3.5	15	1.5 {0.15}	20	
0.4	3.5	18.7	1.8 {0.19}	25	
0.45	5.7	22.5	2.2 {0.23}	30	
0.45	5.7	26.2	2.6 {0.26}	35	
0.45	5.7	30	2.9 {0.3 }	40	
0.45	5.7	33.7	3.3 {0.34}	45	
0.5	9	37.5	3.7 {0.38}	50	
0.5	9	41.2	4.0 {0.41}	55	
0.5	9	45	4.4 {0.45}	60	
0.5	9	48.7	4.8 {0.49}	65	
0.5	9	52.5	5.1 {0.53}	70	
0.5	3	11.2	2.26{0.23}	WY10−15	
0.55	4.6	15	2.9 {0.3 }	20	
0.55	4.6	18.7	3.7 {0.37}	25	
0.6	6.6	22.5	4.4 {0.45}	30	
0.6	6.6	26.2	5.1 {0.52}	35	
0.65	9.1	30	5.9 {0.6 }	40	
0.65	9.1	33.7	6.6 {0.67}	45	
0.65	9.1	37.5	7.4 {0.75}	50	
0.7	12.6	41.2	8.1 {0.82}	55	
0.7	12.6	45	8.8 {0.9 }	60	
0.7	12.6	48.7	9.6 {0.97}	65	
0.7	12.6	52.5	10.3 {1.05}	70	

d	Solid height	F max.	N{kgf} max.	Catalog No. Type D−L	U/Price Q'ty : 1~9
0.6	3.9	15	2.9{0.3 }	WY13−20	
0.65	5.1	18.7	3.7{0.37}	25	
0.65	5.1	22.5	4.4{0.45}	30	
0.7	6.7	26.2	5.1{0.52}	35	
0.75	8.7	30	5.9{0.6 }	40	
0.75	8.7	33.7	6.6{0.67}	45	
0.8	11.6	37.5	7.4{0.75}	50	
0.8	11.6	41.2	8.1{0.82}	55	
0.8	11.6	45	8.8{0.9 }	60	
0.85	15.3	48.7	9.6{0.97}	65	
0.85	15.3	52.5	10.3{1.05}	70	
0.65	3.6	15	2.9{0.3 }	WY16−20	
0.7	4.6	18.7	3.7{0.37}	25	
0.75	5.7	22.5	4.4{0.45}	30	
0.8	7	26.2	5.1{0.52}	35	
0.85	9	30	5.9{0.6 }	40	
0.85	9	33.7	6.6{0.67}	45	
0.9	11.3	37.5	7.4{0.75}	50	
0.9	11.3	41.2	8.1{0.82}	55	
0.9	11.3	45	8.8{0.9 }	60	
0.9	11.3	48.7	9.6{0.97}	65	
0.9	11.3	52.5	10.3{1.05}	70	

Quotation

●Load calculation method : N (load) = N/mm (spring constant) × F (deflection)
(International units) N = N/mm × Fmm
kgf = kgf/mm × Fmm
(kgf = N × 0.101972)

No grinding on both ends of all WY type springs.
The solid height values are reference only.
There may be some variations depending on lots.
Operation frequency : 1 million times.
Product Outline
Directions and precautions for coil springs

Stocks Availability Subjected to Prior Sales.