

# Springs Overview

\*The heat resistance temperatures shown in the tables are for the spring wire material. The data are obtained in room temperature. Allowable load and durability may decrease depending on the various conditions under higher temperature.

\* The load range shown is for material JIS-SWP-A.

\* Values for the Tension Springs Configurable Type are for coil length =50.

Type	Features	Type	Part Number				Load* N{kgf}	
			Material				min.	max.
			JIS-SWP-A		EN 1.4301 (WPB) Equiv.			
Tension Springs		Extra Light Load	P.329	AWA	P.329	AUA	0.69{0.07}	19.6{2.0}
		Light Load	P.329	AWY BWY	P.329	AUY BUU	1.86{0.19}	78.45{8.0}
		Light Medium Load	P.330	AWU BWU	P.330	AUU BUU	2.45{0.25}	98.07{10.0}
		Medium Load	P.330	AWS BWS	P.330	AUS BUSS	3.53{0.36}	225.55{23.01}
		Medium Heavy Load	P.331	AWF	-	-	6.47{0.66}	83.36{8.5}
		Heavy Load	P.331	AWT BWT	P.331	AUT BUT	8.8{0.9}	430.51{43.91}
		Configurable	P.332	WFSP BWFSP	P.332	UFSP BUFSP	2.37{0.2}	156{15.9}
		Long, No Hook	P.333	LWS	P.333	LUS	-	-

Type	Features	Type	Part Number				Max. Allowable Deflection % (Standard Usage Count)	Load* N{kgf}			
			Material					min.	max.		
			JIS-SWP-A		EN 1.4301 (WPB) Equiv.						
Round Coil Springs		O.D. Referenced	P.343	WY	P.353	UV, UY	75 (1 Million Times)	0.18{0.018}	1.75{0.179}		
			P.344	WR	P.353	UR	60 (1 Million Times)	0.9{0.09}	23.5{2.4}		
			P.345	WF	P.354	UF	45 (1 Million Times)	1.1{0.11}	35.3{3.6}		
			P.346	WL	P.355	UL	40 (1 Million Times)	0.98{0.1}	117.7{12}		
			P.347	WT	P.356	UTT	40 (1 Million Times)	2.9{0.3}	125.5{12.8}		
			P.348	WM	P.357	UM	28 ~ 35 (1 Million Times)	3.4{0.35}	171.6{17.5}		
			P.349	WH	P.358	UH	20 ~ 30 (1 Million Times)	4.4{0.45}	441.3{45}		
					P.350	P.359	UBB	25 (1 Million Times)	5.9{0.6}	735.5{75}	
					-	-	P.351	VUR	60 (1 Million Times)	2.65{0.27}	17.64{1.8}
					-	-	P.351	VUF	45 (1 Million Times)	3.33{0.34}	22.05{2.25}
					-	-	P.352	VUL	40 (1 Million Times)	5.88{0.60}	39.20{4.00}
					-	-	P.352	VUM	35 (1 Million Times)	15.39{1.57}	102.90{10.50}
					P.360	FWR	P.360	FUR	60 (1 Million Times)	2.5{0.25}	55.2{5.63}
					P.360	FWF	P.360	FUF	50 (1 Million Times)	4.5{0.46}	100.0{10.2}
			P.360	FWT	P.360	FUT	40 (1 Million Times)	7.1{0.73}	128.0{13.1}		

Type	Flat Springs			Torsion Springs			Constant Force Springs	
Features								
Type	Straight	One-Point-Bend	Two-Point-Bend	Arm Angle 90°	Arm Angle 135°	Arm Angle 180°	Main Body	Bracket
Material	EN 1.4301 (CSP) Equiv.			EN 1.4301 (WPB) Equiv.			EN 1.4319 Equiv.	EN 1.4016 Equiv.
Part Number	IBN	IBNS	IBNW	UA90	UA135	UA180	CFS	CFSB
Page	P.339			P.340			P.341	

Type	Features	Part Number		Max. Allowable Deflection % (Standard Usage Count)	Load N{kgf}		
		Material			min.	max.	
		Oil tempered wires for springs					
Irregular Shaped Coil Springs		P.361	SWY	Pastel green	65 (1 Million Times)	29.4{3}	392.3{40}
		P.362	SWU	Light Blue	70 (300,000 Times)	31.7{3.2}	425.6{43}
		P.363	SWR	Ivory	60 (1 Million Times)	68.6{7}	588.4{60}
		P.364	SWS	Orange	65 (300,000 Times)	73.9{7.5}	637.4{65}
		P.365	SWF	Yellow	50 (1 Million Times)	78.5{8}	1323.9{135}
		P.366	SWS	Orange	55 (300,000 Times)	87.2{8.8}	1456.3{148}
		P.367	SWL	Blue	40 (1 Million Times)	87.2{8.8}	1569.1{160}
		P.368	SWM	Red	45 (300,000 Times)	97.1{10}	1765.2{180}
		P.369	SWH	Green	40 (1 Million Times)	47.1{4.8}	3138.1{320}
		P.370	SWB	Brown	50 (300,000 Times)	58.8{6}	3922.6{400}
		P.371	SWL	Blue	32 (1 Million Times)	62.8{6.4}	657.0{67}
		P.372	SWM	Red	40 (300,000 Times)	78.5{8}	823.8{84}
P.373	SWH	Green	25.6 (1 Million Times)	78.5{8}	980.7{100}		
P.374	SWB	Brown	32 (300,000 Times)	98.1{10}	1225.8{125}		
P.375	SWH	Green	19.2 (1 Million Times)	109.8{11.2}	1471.0{150}		
P.376	SWB	Brown	24 (300,000 Times)	137.4{14}	1833.8{187}		
P.377	SWB	Brown	16 (1 Million Times)	141.2{14.4}	1922.1{196}		
P.378	SWB	Brown	20 (300,000 Times)	176.5{18}	2402.6{245}		

1N=0.101972kgf 1deg=1°(Angle)

## Tension Springs

$$\text{Load } P[N] = \text{Initial Tension } P_i[N] + (\text{Spring Constant } k[N/mm] \times \text{Deflection } F[mm])$$

- MISUMI Tension Springs (except for Specified Types) are standardized to maintain the maximum load constantly to the same diameter. Produced based on the maximum load value, the initial tension and spring constant are reference values.
- Use the springs within the range of the allowable deflection F max.(mm). Using at higher than the allowable deflection values may cause deformation or failure after a few uses. Also, do not extend tension springs more than its allowable deflection during the installation.
- For Tension Springs durability can not be shown because stress concentration may occur depending on the hook installation. It is recommended to use the springs within 70 % of allowable deflection F max.(mm).
- It is recommended to use the tension springs (AW□, BW□, AWFM, WFSP, LWS, LWSH) under ambient temperature (at 40°C or less). Load value attenuates when tension springs are used in temperature higher than 40°C, although it depends on other conditions.

## Round Coil Springs / Irregular Shaped Coil Springs

$$\text{Load } P[N] = (\text{Spring Constant } k[N/mm] \times \text{Deflection } F[mm])$$

- MISUMI Round Coil Springs are standardized to maintain the spring constant constantly to the same diameter. The tolerance of spring constant is ±10%.
- Irregular shaped coil springs are standardized to maintain the maximum load constantly to the same diameter. The load tolerances vary depending on the spring type, please refer to the respective page.
- Use the springs within the range of the allowable deflection F max.(mm). Using at higher than the allowable deflection values may cause deformation or failure.
- The values of solid length are for reference only. Using it compressed to the solid length may cause deformation or break after a few uses.
- Round Coil Springs are manufactured based on the following diametric tolerance priorities given. I.D. Selectable Type: Inner diameter tolerance prioritized / O.D. Selectable Type: Outer diameter tolerance prioritized.
- For inner/outer diameter tolerances of irregular shaped coil springs, refer to the respective pages.
- It is recommended to use the round coil springs and irregular shaped coil springs under ambient temperature (40°C or less). Load value attenuates when tension springs are used in temperature higher than 40°C, although it depends on other conditions. (Heat resistant springs are listed on "Standard Components for Plastic Mold".)
- Irregular Shaped Coil Springs are listed on "Standard Components for Press Dies" and "Standard Components for Plastic Mold". (Large Dia. Sizes are also available.)

## Relationship between Spring Length L and Load P

