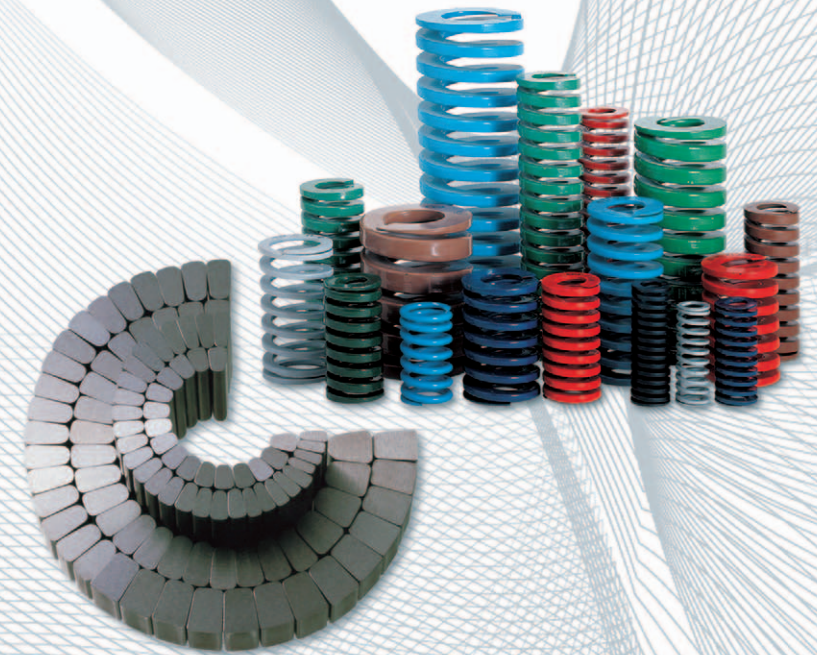


# DAEWON Die Spring



DAEWON Die Spring

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# 금형스프링 사용시 주의사항

고객께서 당사 제품을 안심하고 사용하실 수 있도록 반드시 주의 사항을 읽어주십시오.

## ■ 카탈로그 표시항목에 대하여

- 내경, 외경 치수  
스프링의 끝단에서 1~2권째의 Coil 치수입니다.
- 스프링의 정수  
각 변형량에 대한 하중값 계산을 위한 이론치입니다.
- 스프링 하중  
스프링 정수에 의한 하중 계산치에 대한 실측의 하중값이 허용차에서 벗어나는 경우가 있습니다.

구 격	저 하중 사용구간 (低 荷重 使用區間)	고 하중 사용 구간 (高 荷重 使用區間)	사용 불가 구간 (使用 不可區間)
DWF 경소하중 (輕少荷重)	40.0% 변형량 (變形用)	50.0% 변형량 (變形用)	50.0% 초과 밀착높이
DWL 경하중 (輕荷重)	32.0% 변형량 (變形用)	40.0% 변형량 (變形用)	40.0% 초과 밀착높이
DWLR 경하중 (輕荷重)	32.0% 변형량 (變形用)	40.0% 변형량 (變形用)	40.0% 초과 밀착높이
DWM 중하중 (中荷重)	25.6% 변형량 (變形用)	32.0% 변형량 (變形用)	32.0% 초과 밀착높이
DWH 중하중 (重荷重)	19.2% 변형량 (變形用)	24.0% 변형량 (變形用)	24.0% 초과 밀착높이
DWB 극중하중 (極重荷重)	16.0% 변형량 (變形用)	20.0% 변형량 (變形用)	20.0% 초과 밀착높이
DWR 고변형용 (高變形用)	40.0% 변형량 (變形用)	50.0% 변형량 (變形用)	50.0% 초과 밀착높이
DWY 고변형용 (高變形用)	40.0% 변형량 (變形用)	50.0% 변형량 (變形用)	50.0% 초과 밀착높이

## ■ 설치 및 효과적인 사용조건

- 밀착(최대변형량)은 참고 치수이며, 30만회 변형량 이상은 사용하지 말아 주십시오.  
밀착시까지 사용하면 영구변형이나 힘이 발생할 수 있습니다.
- 설치할 경우에는 스프링의 압축량(사용 압축량)의 약 10% 이상을 예압하여 주십시오.  
상판에 틈이 있는 상태로 작동할 시 절손 또는 구부러지는 현상이 발생할 수 있습니다.
- 스프링은 압축에 의한 변형(구부러짐)이 발생합니다.  
스프링 자유장이 외경의 4배 이상일 경우 스프링의 내경 또는 외경에 반드시 Guide를 설치하여 사용하시기 바랍니다.

# Cautions when Die Spring is used

Please refer the following cautions when our products are used so that you may use our products with confidence.

## ■ About indicative items described in catalog

- Dimensions of inside diameter and outside diameter  
They mean dimensions of the inside/outside diameters of the coil wound 1st to 2nd from the end of the spring.
- Spring rate  
It means a theoretical value for calculation of a load value against each strain amount
- Spring load  
There is a case that the actual measured load value against the calculated load value based on the spring rate deviates from tolerance.

Model	Section where a low load is used	Section where a high load is used	Section where can't be used
DWF	Strain amount of 40.0%	Strain amount of 50.0%	Solid height beyond 50.0%
DWL	Strain amount of 32.0%	Strain amount of 40.0%	Solid height beyond 40.0%
DWLR	Strain amount of 32.0%	Strain amount of 40.0%	Solid height beyond 40.0%
DWM	Strain amount of 25.6%	Strain amount of 32.0%	Solid height beyond 32.0%
DWH	Strain amount of 19.2%	Strain amount of 24.0%	Solid height beyond 24.0%
DWB	Strain amount of 16.0%	Strain amount of 20.0%	Solid height beyond 20.0%
DWR	Strain amount of 40.0%	Strain amount of 50.0%	Solid height beyond 50.0%
DWY	Strain amount of 40.0%	Strain amount of 50.0%	Solid height beyond 50.0%

## ■ Installation and conditions for effective use

- Close adhesion (maximum strain amount) is of a reference dimension, and do not use any die spring over 300,000 times. if it is used until close adhesion thereof, a permanent strain or bending may take place.
- In case any die spring is installed, preload about 10% or more of compression amount (available compression amount) thereof. in case of operation with an upper plate having a gap, it is likely to be extinct or bent.
- A strain (bending) resulting from compression takes place in a die spring. in case the overall length of a die spring is 4 times as long as the external diameter thereof or more, be sure to install a guide in the inside diameter or the outside diameter thereof. then, its life gets to be much longer.

## 금형스프링 사용시 주의사항

### ※Guide의 사용

스프링의 좌면 상태가 불안정하거나 몸체의 구부러짐 등은 Guide 없이 사용함으로써 발생합니다. 스프링 내경에 Guide를 위에서 밑바닥까지 관통시켜 사용하는 것이 가장 이상적입니다.

### ※내경 Guide 사용시

Guide 굵기를 스프링 내경보다 -1.0mm정도 설정하여 Setting하십시오.

### ※외경 Guide 사용시

Bush경을 스프링 외경보다 +1.5mm정도 설정하여 Setting하십시오.

### ※Guide 사용시

Bush경을 스프링 외경보다 +0.15mm정도 설정하여 Setting하십시오.

### ※Guide가 길고 앉은 자리의 깊이가 짧은 경우

Guide 높이를 초기설정 높이의 1/2 이상으로 하고 C3정도의 면취를 하면 수명은 오래갑니다.

- 스프링 이외의 용도에는 사용하지 말아 주십시오.  
스프링 이외의 용도의 사용은 생각하지 못하는 사고 및 부상의 원인이 됩니다.
- 스프링 장착면의 평행도가 좋지 않은 경우 스프링이 구부러지면서 안쪽부분에 국소적인 응력집중으로 파손의 원인이 됩니다.
- 다른 종류의 스프링을 직렬로 사용할 경우  
하중의 흠어짐을 방지하도록 약한 하중의 스프링을 강한 하중의 스프링 위에 Setting하십시오.
- 상기 이외의 사용방법에 대하여서는 당사에 문의하여 주십시오.

## ■ 사용환경에 대하여

- 스프링 사용 온도 구간  
DWF, DWL, DWLR, DWM, DWH, DWB, DWR, DWY : 150°C~-30°C  
DWML, DWMM, DWMH, DWMB, DWMV, DWMZ : 100°C~-30°C  
상기 이상의 환경에서 사용하는 경우에는 절손, 영구변형, 구부러짐의 원인이 될 수 있으므로 당사에 문의하여 주십시오.
- 온도가 높은 곳, 물에 닿는 곳에서는 사용을 하지 말아 주십시오.  
녹의 발생, 절손, 영구변형, 구부러짐의 원인이 될 수 있습니다.

## ■ 정기점검 및 보관에 대하여

- 필요에 따라서 교환을 하여 주십시오.  
스프링의 사용 빈도가 높아짐에 따라서 영구변형이 발생되므로 용도에 따라서 주기적인 교환이 필요합니다.
- 안전한 장소에 보관하여 주십시오.  
고온 다습한 장소를 피하고 낙하 등에 의한 부상 및 스프링이 파손되지 않도록 주의를 요망합니다.

## Cautions when Die Spring is used

### ※Use of guide

If a die spring is used without a guide, it causes the seated condition of the die spring to be unstable or the body of the spring to be bent. it is most desirable to use the die spring with a guide being fully inserted through the internal diameter of the spring.

### ※When an internal diameter guide is used :

Set the guide thickness so that it may be about 1.0mm less than the internal diameter of the spring.

### ※When an external diameter guide is used :

Set the diameter of a bush so that it may be about 1.5mm greater than the external diameter of the spring.

### ※When a guide is used :

Set the diameter of a bush so that it may be about 0.15mm greater than the external diameter of the spring.

### ※In case a guide is long and the depth of its seat is short :

Set the guide height over than 1/2 of the initial setting height and trim it at c3 or so. then, its life gets to be longer.

- A die spring may not be used for other purposes, including tension, torsion, etc.  
Than compression. if it is used for other purposes than compression, it may cause the die spring to be extinct, permanent deformation or bent.
- Do not use the die spring for other purposes than the purposes of a spring.  
If the die spring is used for other purposes than the purposes of spring, it may cause an unexpected accident or injury to take place.
- If the parallelism of the lower plate is bed, a high stress takes place to cause the die spring to be bent or extinct.  
Therefore, even though it is not easy to set the parallelism, set the parallelism exactly and use the die spring.
- In case a different kind of spring is used in series ;  
Set a die spring with a weak load on another die spring with a strong load in order to prevent a load from being dispersed.
- For other methods than the above mentioned methods to use the die spring, please contact us.

## ■ Using condition

- Temperature range for use of spring  
DWF, DWL, DWLR, DWM, DWH, DWB, DWR, DWY : 150°C~-30°C  
DWML, DWMM, DWMH, DWMB, DWMV, DWMZ : 100°C~-30°C  
In case the die spring is used in the environment where the temperature exceeds the above range, it may cause the die spring to be extinct, permanent deformation or bent, and so, consult with us before the use.
- Do not use the die spring where the temperature is high or water is within one's reach.  
If the die spring is used where the temperature is high or water is within one's reach, it may cause the die spring to be rust, extinct, permanent deformation or bent.

## ■ About periodical check and storage.

- Replace a worn die spring with a new one, if necessary.  
As the frequency of using a die spring gets to be high, a permanent deformation takes place in the spring. therefore it is necessary to replace a worn die spring with a new one periodically, depending upon the use thereof.
- Keep a die spring in a safe place.  
Keep a die spring in a safe place, avoiding a place which is hot and humid. and pay attention so that anyone may not be injured and the die spring may not be broken due to falling of the die spring.

## ※금형스프링 선정방법

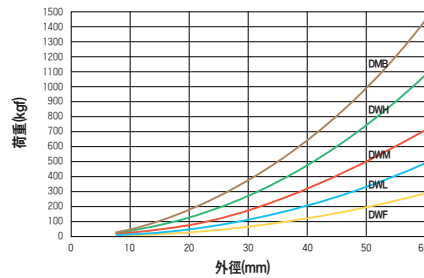
### ■ 원하는 하중으로 스프링 사이즈 구하는 방법(예)

- 오른쪽 조건표에서 다음의 순서로 선택하여 주십시오.
  - 100만회 하중곡선을 참조하여 주십시오.
  - 종축에 ①사용하중600Kgf를, 횡축에 ②스프링 코일 외경D50을 정하여 그 교점을 통해, 녹색·중하중(DWH)을 구합니다.
  - 다음에 규격표·중하중을 보아 주십시오. ③사용횟수 100만회란에서, ④사용변형량 48mm를 구합니다.
  - 다음과 같이 DWH 50×250을 선택하실 수 있습니다.

項目	①使用 荷重	②Spring 外徑	③使用回數	④變形量
內容	600Kgf	D 50mm	100만회	48mm

Catalogue NO.	外徑	內徑	自由長	Spring 定數	100萬回	
					變形量	荷重
DWH 50×250	50	25	250	12.5	48	600

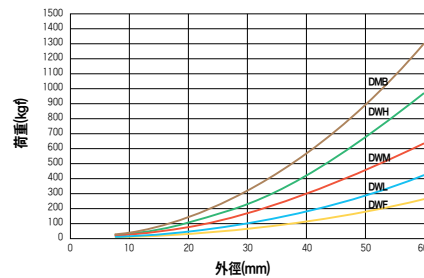
### ■ 30萬回 荷重曲線



### ■ Spring 使用回數와 壓縮比 關係

種類	使用回數	30萬回
輕少荷重	DWF	自由長の 50.0%
輕荷重	DWL, LR	自由長の 40.0%
中荷重	DWM	自由長の 32.0%
重荷重	DWH	自由長の 24.0%
極重荷重	DWB	自由長の 20.0%

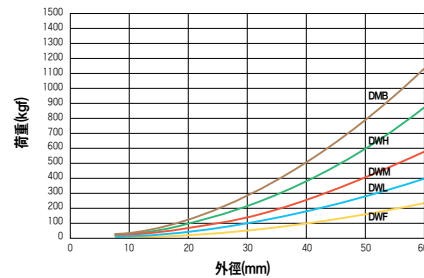
### ■ 50萬回 荷重曲線



### ■ Spring 使用回數와 壓縮比 關係

種類	使用回數	50萬回
輕少荷重	DWF	自由長の 45.0%
輕荷重	DWL, LR	自由長の 38.0%
中荷重	DWM	自由長の 28.8%
重荷重	DWH	自由長の 21.6%
極重荷重	DWB	自由長の 18.0%

### ■ 100萬回 荷重曲線



### ■ Spring 使用回數와 壓縮比 關係

種類	使用回數	100萬回
輕少荷重	DWF	自由長の 40.0%
輕荷重	DWL, LR	自由長の 32.0%
中荷重	DWM	自由長の 25.6%
重荷重	DWH	自由長の 19.2%
極重荷重	DWB	自由長の 16.0%

## ※How to Choose Die Spring

### ■ Example : Selection of Spring size by Load required.

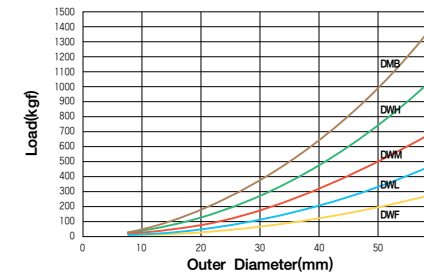
Item	①Load	②Spring Outer-Diameter	③Working Times	④Variation
Contents	600kgf	D 50mm	Million times	48mm

● Please select one by one from the Table on the right in the following order.

- Please refer to the 1million Working Times Load Resistance Curve.
- Get the Heavy Load (DWH) - Blue by the contact point of the ①Load 600Kgf on the vertical axis and ②Spring Outer-Diameter D50 on the horizontal axis.
- Next, please find Heavy Load referring to the specification table. Get the ④Variation 48mm from the ③Working Times 1million times column.
- You can select DWH 50×250 as follows.

Catalogue NO.	Outer Diameter	Inner Diameter	Free Length	Spring Constant	1 million times	
					Variation	Load
DWH 50×250	50	25	250	12.5	48	600

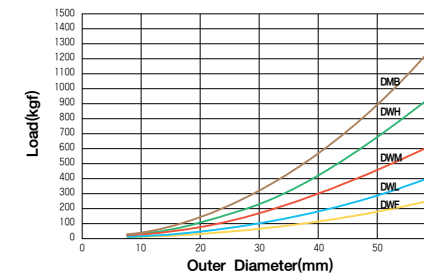
### ■ 300,000 Times Trial Load Resistance Curve



### ■ Relationship between working times of spring and description rate

Deflection	Working Time	300,000 Times
Lightest Load	DWF	50.0% of Free Length
Light Load	DWL, LR	40.0% of Free Length
Medium Load	DWM	32.0% of Free Length
Heavy Load	DWH	24.0% of Free Length
Ultra Heavy Load	DWB	20.0% of Free Length

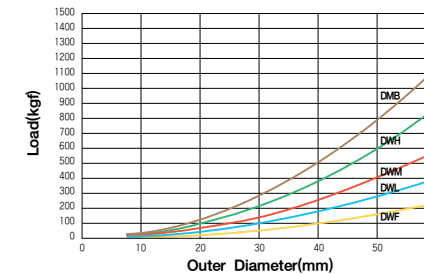
### ■ 500,000 Times Trial Load Resistance Curve



### ■ Relationship between working times of spring and description rate

Deflection	Working Time	500,000 Times
Lightest Load	DWF	45.0% of Free Length
Light Load	DWL, LR	38.0% of Free Length
Medium Load	DWM	28.8% of Free Length
Heavy Load	DWH	21.6% of Free Length
Ultra Heavy Load	DWB	18.0% of Free Length

### ■ Million Times Trial Load Resistance Curve



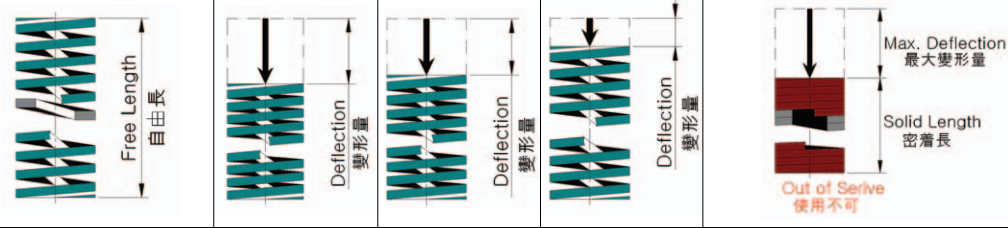
### ■ Relationship between working times of spring and description rate

Deflection	Working Time	Million Times
Lightest Load	DWF	40.0% of Free Length
Light Load	DWL, LR	32.0% of Free Length
Medium Load	DWM	25.6% of Free Length
Heavy Load	DWH	19.2% of Free Length
Ultra Heavy Load	DWB	16.0% of Free Length

# 대원 금형스프링 (D.W.S.)

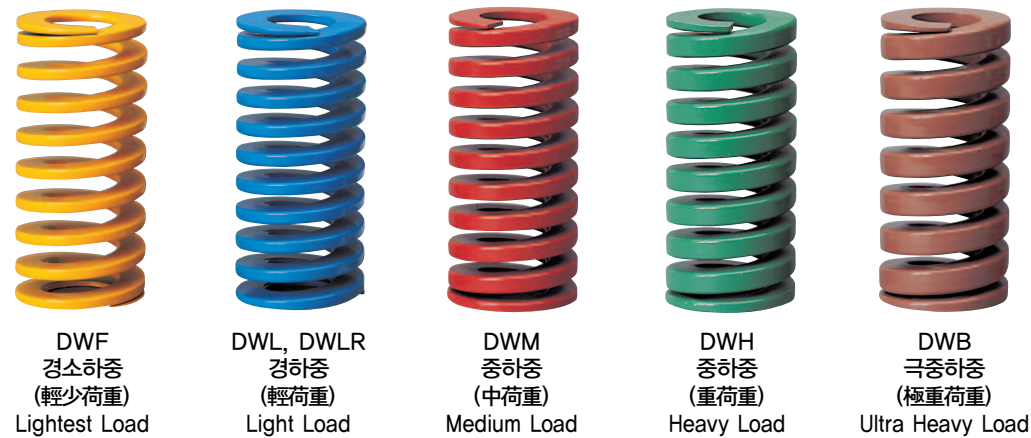
## ■ 금형스프링 사용횟수와 압축비 관계(Relationship between working times of spring and description rate)

사용횟수(使用回數) Working Time 종류(種類) Type	30만회(자유장×%) 30萬回(自由長×%) 0.3 million (% of free length)	50만회(자유장×%) 50萬回(自由長×%) 0.5 million (% of free length)	100만회(자유장×%) 100萬回(自由長×%) 1 million (% of free length)	최대변형량(자유장×%) 最大變形量(自由長×%) Max. Description (% of free length)	색별(色別) Color
	DWF 경소하중(輕少荷重) Lightest Load	50.0%	45.0%	40.0%	Approx. 58.0%
DWL 경하중(輕荷重) Light Load	40.0%	36.0%	32.0%	Approx. 48.0%	청색(靑色) Blue
DWLR 경하중(輕荷重) Light Load	40.0%	36.0%	32.0%		청색(靑色) Blue
DWM 중하중(中荷重) Medium Load	32.0%	28.8%	25.6%	Approx. 38.0%	적색(赤色) Red
DWH 중하중(重荷重) Heavy Load	24.0%	21.6%	19.2%	Approx. 28.0%	녹색(綠色) Green
DWB 극중하중(極重荷重) Ultra Heavy Load	20.0%	18.0%	16.0%	Approx. 24.0%	갈색(褐色) Brown



## ■ 금형스프링 허용공차 (Tolerance of Die Spring)

외경(外徑) Outer Dia.	내경(內徑) Inner Dia.	자유장(自由長) Free Length		하중(荷重) Load kgf	권방향(卷方向) Coil Direction
		50mm 이하(以下) below 50mm	55mm 이상(以上) over 55mm		
+0mm -0.7mm	+0.7mm +0.1mm	±0.5mm	±1%	±10%	右 right



# DWF 輕小荷重 Lightest Load

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回(自由長%) 0.3 million (% of free length)		50萬回(自由長%) 0.5 million (% of free length)		100萬回(自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWF 8 × 10	8	4	10	1.56	5.0	8.00 (78.5)	4.5	7.00 (68.6)	4.0	6.00 (58.8)
15			1.04	7.5	6.8					
20			0.78	10.0	9.0					
25			0.62	12.5	11.2					
30			0.52	15.0	13.5					
35			0.44	17.5	15.7					
40			0.39	20.0	18.0					
45			0.35	22.5	20.2					
50			0.31	25.0	22.5					
55			0.28	27.5	24.7					
60			0.26	30.0	27.0					
65			0.24	32.5	29.3					
70			0.22	35.0	31.5					
75	0.21	37.5	33.8							
80	0.19	40.0	36.0							
DWF 10 × 20	10	5	20	1.00	10.0	10 (98.1)	9.0	9 (88.3)	8.0	8 (78.5)
25			0.80	12.5	11.2					
30			0.67	15.0	13.5					
35			0.57	17.5	15.7					
40			0.50	20.0	18.0					
45			0.44	22.5	20.2					
50			0.40	25.0	22.5					
55			0.36	27.5	24.7					
60			0.33	30.0	27.0					
65			0.31	32.5	29.2					
70			0.29	35.0	31.5					
75			0.27	37.5	33.7					
80			0.25	40.0	36.0					
90	0.22	45.0	40.5							
DWF 12 × 20	12	6	20	1.40	10.0	14 (137.3)	9.0	12.5 (122.6)	8.0	11 (107.9)
25			1.12	12.5	11.2					
30			0.93	15.0	13.5					
35			0.80	17.5	15.7					
40			0.70	20.0	18.0					
45			0.62	22.5	20.2					
50			0.56	25.0	22.5					
55			0.51	27.5	24.7					
60			0.47	30.0	27.0					
65			0.43	32.5	29.2					
70			0.40	35.0	31.5					
75			0.37	37.5	33.7					
80			0.35	40.0	36.0					
90	0.31	45.0	40.5							

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWF 14×25	14	7	25	1.44	12.5	18 (176.5)	11.2	16 (156.9)	10.0	14.5 (142.2)
30			30	1.20	15.0		13.5		12.0	
35			35	1.03	17.5		15.7		14.0	
40			40	0.90	20.0		18.0		16.0	
45			45	0.80	22.5		20.2		18.0	
50			50	0.72	25.0		22.5		20.0	
55			55	0.65	27.5		24.7		22.0	
60			60	0.60	30.0		27.0		24.0	
65			65	0.55	32.5		29.2		26.0	
70			70	0.51	35.0		31.5		28.0	
75			75	0.48	37.5		33.7		30.0	
80			80	0.45	40.0		36.0		32.0	
90			90	0.40	45.0		40.5		36.0	
100	100	0.36	50.0	45.0	40.0					
DWF 16×25	16	8	25	1.68	12.5	21 (206)	11.2	19 (186.3)	10.0	17 (166.7)
30			30	1.40	15.0		13.5		12.0	
35			35	1.20	17.5		15.7		14.0	
40			40	1.05	20.0		18.0		16.0	
45			45	0.94	22.5		20.2		18.0	
50			50	0.84	25.0		22.5		20.0	
55			55	0.77	27.5		24.7		22.0	
60			60	0.70	30.0		27.0		24.0	
65			65	0.65	32.5		29.2		26.0	
70			70	0.60	35.0		31.5		28.0	
75			75	0.56	37.5		33.7		30.0	
80			80	0.53	40.0		36.0		32.0	
90			90	0.47	45.0		40.5		36.0	
100	100	0.42	50.0	45.0	40.0					
125	125	0.34	62.5	56.3	50.0					
DWF 18×25	18	9	25	2.08	12.5	26 (255)	11.2	23 (256)	10.0	21 (206)
30			30	1.74	15.0		13.5		12.0	
35			35	1.49	17.5		15.7		14.0	
40			40	1.30	20.0		18.0		16.0	
45			45	1.16	22.5		20.2		18.0	
50			50	1.04	25.0		22.5		20.0	
55			55	0.95	27.5		24.7		22.0	
60			60	0.87	30.0		27.0		24.0	
65			65	0.80	32.5		29.2		26.0	
70			70	0.74	35.0		31.5		28.0	
75			75	0.70	37.5		33.7		30.0	
80			80	0.65	40.0		36.0		32.0	
90			90	0.58	45.0		40.5		36.0	
100	100	0.52	50.0	45.0	40.0					
125	125	0.41	62.5	56.3	50.0					

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWF 20×25	20	11	25	2.56	12.5	32 (314)	11.2	29 (284)	10.0	26 (255)
30			30	2.13	15.0		13.5		12.0	
35			35	1.83	17.5		15.7		14.0	
40			40	1.60	20.0		18.0		16.0	
45			45	1.42	22.5		20.2		18.0	
50			50	1.28	25.0		22.5		20.0	
55			55	1.16	27.5		24.7		22.0	
60			60	1.07	30.0		27.0		24.0	
65			65	0.98	32.5		29.2		26.0	
70			70	0.91	35.0		31.5		28.0	
75			75	0.85	37.5		33.7		30.0	
80			80	0.80	40.0		36.0		32.0	
90			90	0.71	45.0		40.5		36.0	
100			100	0.64	50.0		45.0		40.0	
125			125	0.51	62.5		56.2		50.0	
150	150	0.43	75.0	67.5	60.0					
DWF 22×25	22	11	25	3.20	12.5	40 (392)	11.2	36 (353)	10.0	32 (314)
30			30	2.67	15.0		13.5		12.0	
35			35	2.29	17.5		15.7		14.0	
40			40	2.00	20.0		18.0		16.0	
45			45	1.78	22.5		20.2		18.0	
50			50	1.60	25.0		22.5		20.0	
55			55	1.46	27.5		24.7		22.0	
60			60	1.33	30.0		27.0		24.0	
65			65	1.23	32.5		29.2		26.0	
70			70	1.14	35.0		31.5		28.0	
75			75	1.07	37.5		33.7		30.0	
80			80	1.00	40.0		36.0		32.0	
90			90	0.89	45.0		40.5		36.0	
100			100	0.80	50.0		45.0		40.0	
125			125	0.64	62.5		56.2		50.0	
150	150	0.53	75.0	67.5	60.0					

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWF 25×25	25	13.5	25	4.00	12.5	50 (490)	11.2	45 (441)	10.0	40 (392)
30			30	3.33	15.0		13.5		12.0	
35			35	2.85	17.5		15.7		14.0	
40			40	2.50	20.0		18.0		16.0	
45			45	2.22	22.5		20.2		18.0	
50			50	2.00	25.0		22.5		20.0	
55			55	1.82	27.5		24.7		22.0	
60			60	1.67	30.0		27.0		24.0	
65			65	1.54	32.5		29.2		26.0	
70			70	1.43	35.0		31.5		28.0	
75			75	1.33	37.5		33.7		30.0	
80			80	1.25	40.0		36.0		32.0	
90			90	1.11	45.0		40.5		36.0	
100			100	1.00	50.0		45.0		40.0	
125			125	0.80	62.5		56.2		50.0	
150			150	0.67	75.0		67.5		60.0	
175	175	0.57	87.5	78.7	70.0					
200	200	0.50	100.0	90.0	80.0					
DWF 27×25	27	13.5	25	4.80	12.5	60 (588)	11.2	54 (530)	10.0	48 (471)
30			30	4.00	15.0		13.5		12.0	
35			35	3.43	17.5		15.7		14.0	
40			40	3.00	20.0		18.0		16.0	
45			45	2.67	22.5		20.2		18.0	
50			50	2.40	25.0		22.5		20.0	
55			55	2.18	27.5		24.7		22.0	
60			60	2.00	30.0		27.0		24.0	
65			65	1.85	32.5		29.2		26.0	
70			70	1.71	35.0		31.5		28.0	
75			75	1.60	37.5		33.7		30.0	
80			80	1.50	40.0		36.0		32.0	
90			90	1.33	45.0		40.5		36.0	
100			100	1.20	50.0		45.0		40.0	
125			125	0.96	62.5		56.2		50.0	
150			150	0.80	75.0		67.5		60.0	
175	175	0.69	87.5	78.7	70.0					
200	200	0.60	100.0	90.0	80.0					

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWF 30×25	30	16	25	5.80	12.5	72 (706)	11.2	65 (637)	10.0	58 (569)
30			30	4.80	15.0		13.5		12.0	
35			35	4.13	17.5		15.7		14.0	
40			40	3.60	20.0		18.0		16.0	
45			45	3.21	22.5		20.2		18.0	
50			50	2.88	25.0		22.5		20.0	
55			55	2.63	27.5		24.7		22.0	
60			60	2.40	30.0		27.0		24.0	
65			65	2.22	32.5		29.2		26.0	
70			70	2.05	35.0		31.5		28.0	
75			75	1.93	37.5		33.7		30.0	
80			80	1.80	40.0		36.0		32.0	
90			90	1.60	45.0		40.5		36.0	
100			100	1.44	50.0		45.0		40.0	
125			125	1.15	62.5		56.2		50.0	
150			150	0.96	75.0		67.5		60.0	
175	175	0.82	87.5	78.7	70.0					
200	200	0.72	100.0	90.0	80.0					
DWF 35×40	35	19	40	4.90	20.0	98 (961)	18.0	88 (863)	16.0	78 (765)
45			45	4.36	22.5		20.2		18.0	
50			50	3.92	25.0		22.5		20.0	
55			55	3.56	27.5		24.7		22.0	
60			60	3.26	30.0		27.0		24.0	
65			65	3.02	32.5		29.2		26.0	
70			70	2.80	35.0		31.5		28.0	
75			75	2.61	37.5		33.7		30.0	
80			80	2.45	40.0		36.0		32.0	
90			90	2.17	45.0		40.5		36.0	
100			100	1.96	50.0		45.0		40.0	
125			125	1.57	62.5		56.2		50.0	
150			150	1.30	75.0		67.5		60.0	
175			175	1.12	87.5		78.7		70.0	
200			200	0.98	100.0		90.0		80.0	



呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWF 40×40	40	22	40	6.38	20.0	128 (1,255)	18.0	115 (1,128)	16.0	102 (1,000)
45			45	5.68	22.5		20.3		18.0	
50			50	5.12	25.0		22.5		20.0	
55			55	4.65	27.5		24.8		22.0	
60			60	4.26	30.0		27.0		24.0	
65			65	3.93	32.5		29.3		26.0	
70			70	3.65	35.0		31.5		28.0	
75			75	3.41	37.5		33.8		30.0	
80			80	3.20	40.0		36.0		32.0	
90			90	2.84	45.0		40.5		36.0	
100			100	2.56	50.0		45.0		40.0	
125			125	2.04	62.5		56.2		50.0	
150			150	1.70	75.0		67.5		60.0	
175			175	1.46	87.5		78.7		70.0	
200			200	1.28	100.0		90.0		80.0	
250			250	1.02	125.0		112.5		100.0	
275			275	0.93	137.5		123.8		110.0	
300	300	0.85	150.0	135.0	120.0					
DWF 50×50	50	27.5	50	8.00	25.0	200 (1,961)	22.5	180 (1,765)	20.0	160 (1,569)
55			55	7.27	27.5		24.8		22.0	
60			60	6.66	30.0		27.0		24.0	
65			65	6.15	32.5		29.3		26.0	
70			70	5.71	35.0		31.5		28.0	
75			75	5.33	37.5		33.8		30.0	
80			80	5.00	40.0		36.0		32.0	
90			90	4.44	45.0		40.5		36.0	
100			100	4.00	50.0		45.0		40.0	
125			125	3.20	62.5		56.2		50.0	
150			150	2.66	75.0		67.5		60.0	
175			175	2.28	87.5		78.7		70.0	
200			200	2.00	100.0		90.0		80.0	
225			225	1.78	112.5		101.3		90.0	
250			250	1.60	125.0		112.5		100.0	
275			275	1.45	137.5		123.8		110.0	
300			300	1.33	150.0		135.0		120.0	
350	350	1.14	175.0	157.5	140.0					
400	400	1.00	200.0	180.0	160.0					
450	450	0.89	225.0	202.5	180.0					
500	500	0.80	250.0	225.0	200.0					

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWF 60×60	60	33	60	9.59	30.0	288 (2,820)	27.0	259 (2,540)	24.0	230 (2,260)
70			70	8.22	35.0		31.5		28.0	
80			80	7.19	40.0		36.0		32.0	
90			90	6.40	45.0		40.5		36.0	
100			100	5.76	50.0		45.0		40.0	
125			125	4.60	62.5		56.2		50.0	
150			150	3.84	75.0		67.5		60.0	
175			175	3.29	87.5		78.7		70.0	
200			200	2.88	100.0		90.0		80.0	
225			225	2.56	112.5		101.3		90.0	
250			250	2.30	125.0		112.5		100.0	
275			275	2.09	137.5		123.8		110.0	
300			300	1.92	150.0		135.0		120.0	
350			350	1.65	175.0		157.5		140.0	
400			400	1.44	200.0		180.0		160.0	
450			450	1.28	225.0		202.5		180.0	
500			500	1.15	250.0		225.0		200.0	

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWL 8×10	8	4	10	2.50	4.0	10.00 (98.1)	3.6	9.00 (88.3)	3.2	8.00 (78.5)
15			15	1.67	6.0		5.4		4.8	
20			20	1.25	8.0		7.2		6.4	
25			25	1.00	10.0		9.0		8.0	
30			30	0.83	12.0		10.8		9.6	
35			35	0.71	14.0		12.6		11.2	
40			40	0.63	16.0		14.4		12.8	
45			45	0.56	18.0		16.2		14.4	
50			50	0.50	20.0		18.0		16.0	
55			55	0.46	22.0		19.8		17.6	
60			60	0.42	24.0		21.6		19.2	
65			65	0.39	26.0		23.4		20.8	
70			70	0.36	28.0		25.2		22.4	
75	75	0.33	30.0	27.0	24.0					
80	80	0.31	32.0	28.8	25.6					
DWL 10×20	10	5	20	1.81	8.0	14.5 (142.2)	7.2	13 (127.5)	6.4	11.5 (112.8)
25			25	1.45	10.0		9.0		8.0	
30			30	1.21	12.0		10.8		9.6	
35			35	1.03	14.0		12.6		11.2	
40			40	0.90	16.0		14.4		12.8	
45			45	0.80	18.0		16.2		14.4	
50			50	0.73	20.0		18.0		16.0	
55			55	0.66	22.0		19.8		17.6	
60			60	0.60	24.0		21.6		19.2	
65			65	0.55	26.0		23.4		20.8	
70			70	0.51	28.0		25.2		22.4	
75			75	0.48	30.0		27.0		24.0	
80			80	0.45	32.0		28.8		25.6	
90	90	0.40	36.0	32.4	28.8					
DWL 12×20	12	6	20	2.63	8.0	21 (206)	7.2	19 (186.3)	6.4	17 (166.7)
25			25	2.10	10.0		9.0		8.0	
30			30	1.75	12.0		10.8		9.6	
35			35	1.50	14.0		12.6		11.2	
40			40	1.32	16.0		14.4		12.8	
45			45	1.17	18.0		16.2		14.4	
50			50	1.05	20.0		18.0		16.0	
55			55	0.96	22.0		19.8		17.6	
60			60	0.88	24.0		21.6		19.2	
65			65	0.81	26.0		23.4		20.8	
70			70	0.75	28.0		25.2		22.4	
75			75	0.70	30.0		27.0		24.0	
80			80	0.66	32.0		28.8		25.6	
90	90	0.59	36.0	32.4	28.8					

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWL 14×25	14	7	25	2.80	10.0	28 (275)	9.0	25 (245)	8.0	22 (216)
30			30	2.34	12.0		10.8		9.6	
35			35	2.00	14.0		12.6		11.2	
40			40	1.75	16.0		14.4		12.8	
45			45	1.56	18.0		16.2		14.4	
50			50	1.40	20.0		18.0		16.0	
55			55	1.27	22.0		19.8		17.6	
60			60	1.17	24.0		21.6		19.2	
65			65	1.08	26.0		23.4		20.8	
70			70	1.00	28.0		25.2		22.4	
75			75	0.93	30.0		27.0		24.0	
80			80	0.87	32.0		28.8		25.6	
90			90	0.77	36.0		32.4		28.8	
100	100	0.69	40.0	36.0	32.0					
DWL 16×25	16	8	25	3.50	10.0	35 (343)	9.0	32 (314)	8.0	28 (275)
30			30	2.92	12.0		10.8		9.6	
35			35	2.50	14.0		12.6		11.2	
40			40	2.19	16.0		14.4		12.8	
45			45	1.95	18.0		16.2		14.4	
50			50	1.75	20.0		18.0		16.0	
55			55	1.60	22.0		19.8		17.6	
60			60	1.46	24.0		21.6		19.2	
65			65	1.35	26.0		23.4		20.8	
70			70	1.25	28.0		25.2		22.4	
75			75	1.17	30.0		27.0		24.0	
80			80	1.10	32.0		28.8		25.6	
90			90	0.98	36.0		32.4		28.8	
100	100	0.88	40.0	36.0	32.0					
125	125	0.71	50.0	45.0	40.0					
DWL 18×25	18	9	25	4.30	10.0	43 (422)	9.0	39 (382)	8.0	34 (333)
30			30	3.58	12.0		10.8		9.6	
35			35	3.07	14.0		12.6		11.2	
40			40	2.69	16.0		14.4		12.8	
45			45	2.39	18.0		16.2		14.4	
50			50	2.15	20.0		18.0		16.0	
55			55	1.96	22.0		19.8		17.6	
60			60	1.79	24.0		21.6		19.2	
65			65	1.66	26.0		23.4		20.8	
70			70	1.54	28.0		25.2		22.4	
75			75	1.44	30.0		27.0		24.0	
80			80	1.35	32.0		28.8		25.6	
90			90	1.20	36.0		32.4		28.8	
100	100	1.07	40.0	36.0	32.0					
125	125	0.87	50.0	45.0	40.0					

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWL 20×25	20	10	25	5.40	10.0	9.0	8.0	54 (530)	49 (481)	43 (422)
30			30	4.50	12.0	10.8	9.6			
35			35	3.86	14.0	12.6	11.2			
40			40	3.38	16.0	14.4	12.8			
45			45	3.00	18.0	16.2	14.4			
50			50	2.70	20.0	18.0	16.0			
55			55	2.45	22.0	19.8	17.6			
60			60	2.25	24.0	21.6	19.2			
65			65	2.08	26.0	23.4	20.8			
70			70	1.93	28.0	25.2	22.4			
75			75	1.80	30.0	27.0	24.0			
80			80	1.69	32.0	28.8	25.6			
90			90	1.50	36.0	32.4	28.8			
100			100	1.35	40.0	36.0	32.0			
125			125	1.08	50.0	45.0	40.0			
150	150	0.90	60.0	54.0	48.0					
DWL 22×25	22	11	25	6.70	10.0	9.0	8.0	67 (657)	60 (588)	54 (530)
30			30	5.60	12.0	10.8	9.6			
35			35	4.80	14.0	12.6	11.2			
40			40	4.20	16.0	14.4	12.8			
45			45	3.72	18.0	16.2	14.4			
50			50	3.35	20.0	18.0	16.0			
55			55	3.05	22.0	19.8	17.6			
60			60	2.80	24.0	21.6	19.2			
65			65	2.58	26.0	23.4	20.8			
70			70	2.40	28.0	25.2	22.4			
75			75	2.23	30.0	27.0	24.0			
80			80	2.10	32.0	28.8	25.6			
90			90	1.86	36.0	32.4	28.8			
100			100	1.68	40.0	36.0	32.0			
125			125	1.34	50.0	45.0	40.0			
150	150	1.12	60.0	54.0	48.0					

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWL 25×25	25	12.5	25	8.40	10.0	9.0	8.0	84 (824)	76 (745)	67 (657)
30			30	7.00	12.0	10.8	9.6			
35			35	6.00	14.0	12.6	11.2			
40			40	5.25	16.0	14.4	12.8			
45			45	4.67	18.0	16.2	14.4			
50			50	4.20	20.0	18.0	16.0			
55			55	3.82	22.0	19.8	17.6			
60			60	3.50	24.0	21.6	19.2			
65			65	3.23	26.0	23.4	20.8			
70			70	3.00	28.0	25.2	22.4			
75			75	2.80	30.0	27.0	24.0			
80			80	2.63	32.0	28.8	25.6			
90			90	2.33	36.0	32.4	28.8			
100			100	2.10	40.0	36.0	32.0			
125			125	1.68	50.0	45.0	40.0			
150	150	1.40	60.0	54.0	48.0					
175	175	1.20	70.0	63.0	56.0					
200	200	1.06	80.0	72.0	64.0					
DWL 27×25	27	13.5	25	10.00	10.0	9.0	8.0	100 (981)	90 (883)	80 (785)
30			30	8.33	12.0	10.8	9.6			
35			35	7.14	14.0	12.6	11.2			
40			40	6.25	16.0	14.4	12.8			
45			45	5.56	18.0	16.2	14.4			
50			50	5.00	20.0	18.0	16.0			
55			55	4.55	22.0	19.8	17.6			
60			60	4.17	24.0	21.6	19.2			
65			65	3.85	26.0	23.4	20.8			
70			70	3.57	28.0	25.2	22.4			
75			75	3.33	30.0	27.0	24.0			
80			80	3.13	32.0	28.8	25.6			
90			90	2.78	36.0	32.4	28.8			
100			100	2.50	40.0	36.0	32.0			
125			125	2.00	50.0	45.0	40.0			
150	150	1.67	60.0	54.0	48.0					
175	175	1.43	70.0	63.0	56.0					
200	200	1.25	80.0	72.0	64.0					

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWL 30×25	30	15	25	12.11	10.0	9.0	8.0	121 (1,187)	109 (1,069)	97 (951)
30			30	10.08	12.0	10.8	9.6			
35			35	8.65	14.0	12.6	11.2			
40			40	7.56	16.0	14.4	12.8			
45			45	6.73	18.0	16.2	14.4			
50			50	6.05	20.0	18.0	16.0			
55			55	5.50	22.0	19.8	17.6			
60			60	5.04	24.0	21.6	19.2			
65			65	4.65	26.0	23.4	20.8			
70			70	4.32	28.0	25.2	22.4			
75			75	4.03	30.0	27.0	24.0			
80			80	3.78	32.0	28.8	25.6			
90			90	3.36	36.0	32.4	28.8			
100			100	3.02	40.0	36.0	32.0			
125			125	2.42	50.0	45.0	40.0			
150			150	2.01	60.0	54.0	48.0			
175	175	1.72	70.0	63.0	56.0					
200	200	1.51	80.0	72.0	64.0					
DWL 35×40	35	17.5	40	10.31	16.0	14.4	12.8	165 (1,618)	149 (1,461)	132 (1,295)
45			45	9.17	18.0	16.2	14.4			
50			50	8.25	20.0	18.0	16.0			
55			55	7.50	22.0	19.8	17.6			
60			60	6.87	24.0	21.6	19.2			
65			65	6.35	26.0	23.4	20.8			
70			70	5.89	28.0	25.2	22.4			
75			75	5.50	30.0	27.0	24.0			
80			80	5.15	32.0	28.8	25.6			
90			90	4.58	36.0	32.4	28.8			
100			100	4.12	40.0	36.0	32.0			
125			125	3.30	50.0	45.0	40.0			
150			150	2.75	60.0	54.0	48.0			
175			175	2.35	70.0	63.0	56.0			
200	200	2.06	80.0	72.0	64.0					

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWL 40×40	40	20	40	13.50	16.0	14.4	12.8	216 (2,120)	194 (1,903)	173 (1,697)
45			45	11.98	18.0	16.2	14.4			
50			50	10.80	20.0	18.0	16.0			
55			55	9.80	22.0	19.80	17.60			
60			60	9.00	24.0	21.6	19.2			
65			65	8.29	26.0	23.4	20.8			
70			70	7.71	28.0	25.2	22.4			
75			75	7.19	30.0	27.0	24.0			
80			80	6.75	32.0	28.8	25.6			
90			90	6.00	36.0	32.4	28.8			
100			100	5.40	40.0	36.0	32.0			
125			125	4.32	50.0	45.0	40.0			
150			150	3.60	60.0	54.0	48.0			
175			175	3.08	70.0	63.0	56.0			
200			200	2.70	80.0	72.0	64.0			
225			225	2.40	90.0	81.0	72.0			
250			250	2.16	100.0	90.0	80.0			
275			275	1.96	110.0	99.0	88.0			
300			300	1.80	120.0	108.0	96.0			
DWL 50×50			50	25	50	16.89	20.0			
55	55	15.35			22.0	19.8	17.6			
60	60	14.08			24.0	21.6	19.2			
65	65	12.99			26.0	23.4	20.8			
70	70	12.07			28.0	25.2	22.4			
75	75	11.25			30.0	27.0	24.0			
80	80	10.56			32.0	28.8	25.6			
90	90	9.38			36.0	32.4	28.8			
100	100	8.45			40.0	36.0	32.0			
125	125	6.76			50.0	45.0	40.0			
150	150	5.63			60.0	54.0	48.0			
175	175	4.82			70.0	63.0	56.0			
200	200	4.22			80.0	72.0	64.0			
225	225	3.75			90.0	81.0	72.0			
250	250	3.38			100.0	90.0	80.0			
275	275	3.07			110.0	99.0	88.0			
300	300	2.81			120.0	108.0	96.0			
350	350	2.41			140.0	126.0	112.0			
400	400	2.11	160.0	144.0	128.0					
450	450	1.88	180.0	162.0	144.0					
500	500	1.69	200.0	180.0	160.0					

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWL 60×60	60	30	60	20.25	24.0	21.6	19.2	486 (4,770)	437 (4,290)	389 (3,810)
70			70	17.35	28.0	25.2	22.4			
80			80	15.18	32.0	28.8	25.6			
90			90	13.50	36.0	32.4	28.8			
100			100	12.15	40.0	36.0	32.0			
125			125	9.72	50.0	45.0	40.0			
150			150	8.10	60.0	54.0	48.0			
175			175	6.94	70.0	63.0	56.0			
200			200	6.07	80.0	72.0	64.0			
225			225	5.40	90.0	81.0	72.0			
250			250	4.86	100.0	90.0	80.0			
275			275	4.42	110.0	99.0	88.0			
300			300	4.05	120.0	108.0	96.0			
350			350	3.47	140.0	126.0	112.0			
400			400	3.04	160.0	144.0	128.0			
450			450	2.70	180.0	162.0	144.0			
500	500	2.43	200.0	180.0	160.0					

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWLR 30×30	30	16	30	6.7	12.0	10.8	9.6	81	73	65
35			35	5.7	14.0	12.6	11.2			
40			40	5.0	16.0	14.4	12.8			
45			45	4.4	18.0	16.2	14.4			
50			50	4.0	20.0	18.0	16.0			
55			55	3.6	22.0	19.8	17.6			
60			60	3.3	24.0	21.6	19.2			
65			65	3.1	26.0	23.4	20.8			
70			70	2.9	28.0	25.2	22.4			
75			75	2.7	30.0	27.0	24.0			
80			80	2.5	32.0	28.8	25.6			
90			90	2.2	36.0	32.4	28.8			
100			100	2.0	40.0	36.0	32.0			
125			125	1.6	50.0	45.0	40.0			
150			150	1.30	60.0	54.0	48.0			
175			175	1.10	70.0	63.0	56.0			
DWLR 35×40	35	20	40	5.4	16.0	14.4	12.8	86	78	70
45			45	4.8	18.0	16.2	14.4			
50			50	4.3	20.0	18.0	16.0			
55			55	3.9	22.0	19.8	17.6			
60			60	3.6	24.0	21.6	19.2			
65			65	3.3	26.0	23.4	20.8			
70			70	3.1	28.0	25.2	22.4			
75			75	2.9	30.0	27.0	24.0			
80			80	2.7	32.0	28.8	25.6			
90			90	2.4	36.0	32.4	28.8			
100			100	2.2	40.0	36.0	32.0			
125			125	1.7	50.0	45.0	40.0			
150			150	1.4	60.0	54.0	48.0			
175			175	1.2	70.0	63.0	56.0			
200			200	1.1	80.0	72.0	64.0			
DWLR 40×50			40	26	50	8.70	20.0			
60	60	7.20			24.0	21.6	19.2			
70	70	6.20			28.0	25.2	22.4			
80	80	5.40			32.0	28.8	25.6			
90	90	4.80			36.0	32.4	28.8			
100	100	4.30			40.0	36.0	32.0			
125	125	3.50			50.0	45.0	40.0			
150	150	2.90			60.0	54.0	48.0			
175	175	2.50			70.0	63.0	56.0			
200	200	2.20			80.0	72.0	64.0			
250	250	1.70	100.0	90.0	80.0					

# DWLR

輕荷重  
Light Load

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWLR 50×60	50	30	60	10.80	24.0	260	21.6	233	19.2	207
70			70	9.30	28.0	25.2	22.4			
80			80	8.10	32.0	28.8	25.6			
90			90	7.20	36.0	32.4	28.8			
100			100	6.40	40.0	36.0	32.0			
125			125	5.20	50.0	45.0	40.0			
150			150	4.30	60.0	54.0	48.0			
175			175	3.70	70.0	63.0	56.0			
200			200	3.30	80.0	72.0	64.0			
250			250	2.60	100.0	90.0	80.0			
300			300	2.20	120.0	108.0	96.0			
350			350	1.90	140.0	126.0	112.0			
400			400	1.60	160.0	144.0	128.0			
450			450	1.40	180.0	162.0	144.0			
500			500	1.30	200.0	180.0	160.0			
DWLR 60×70	60	35	70	13.10	28.0	370	25.2	333	22.4	296
80			80	11.50	32.0	28.8	25.6			
90			90	10.20	36.0	32.4	28.8			
100			100	9.20	40.0	36.0	32.0			
125			125	7.40	50.0	45.0	40.0			
150			150	6.10	60.0	54.0	48.0			
175			175	5.30	70.0	63.0	56.0			
200			200	4.60	80.0	72.0	64.0			
250			250	3.70	100.0	90.0	80.0			
300			300	3.10	120.0	108.0	96.0			
400			400	2.30	160.0	144.0	128.0			
450			450	2.08	180.0	162.0	144.0			
500			500	1.85	200.0	180.0	160.0			

# DWM

中荷重  
Medium Load

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWM 8×10	8	4	10	4.34	3.2	14.00 (137.3)	2.9	12.50 (122.6)	2.6	11.00 (107.9)
15			15	2.89	4.8	4.3				
20			20	2.17	6.4	5.8				
25			25	1.74	8.0	7.2				
30			30	1.45	9.6	8.6				
35			35	1.24	11.2	10.1				
40			40	1.09	12.8	11.5				
45			45	0.97	14.4	13.0				
50			50	0.87	16.0	14.4				
55			55	0.79	17.6	15.8				
60			60	0.72	19.2	17.3				
65			65	0.67	20.8	18.7				
70			70	0.62	22.4	20.2				
75			75	0.58	24.0	21.6				
80			80	0.54	25.6	23.0				
DWM 10×20	10	5	20	3.13	6.4	20 (196.1)	5.8	18 (176.5)	5.1	16 (156.9)
25			25	2.50	8.0	7.2				
30			30	2.08	9.6	8.6				
35			35	1.78	11.2	10.1				
40			40	1.56	12.8	11.5				
45			45	1.38	14.4	13.0				
50			50	1.25	16.0	14.4				
55			55	1.13	17.6	15.8				
60			60	1.04	19.2	17.3				
65			65	0.96	20.8	18.7				
70			70	0.89	22.4	20.2				
75			75	0.83	24.0	21.6				
80			80	0.78	25.6	23.0				
90			90	0.69	28.8	25.9				
DWM 12×20			12	6	20	4.53	6.4	29 (284)	5.8	26 (255)
25	25	3.62			8.0	7.2				
30	30	3.02			9.6	8.6				
35	35	2.58			11.2	10.1				
40	40	2.27			12.8	11.5				
45	45	2.01			14.4	13.0				
50	50	1.81			16.0	14.4				
55	55	1.64			17.6	15.8				
60	60	1.51			19.2	17.3				
65	65	1.39			20.8	18.7				
70	70	1.29			22.4	20.2				
75	75	1.20			24.0	21.6				
80	80	1.13			25.6	23.0				
90	90	1.00			28.8	25.9				

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWM 14 × 25	14	7	25	4.87	8.0	7.2	6.4	39 (383)	35 (343)	31 (304)
30			30	4.06	9.6	8.6	7.7			
35			35	3.48	11.2	10.1	9.0			
40			40	3.04	12.8	11.5	10.2			
45			45	2.70	14.4	13.0	11.5			
50			50	2.43	16.0	14.4	12.8			
55			55	2.21	17.6	15.8	14.1			
60			60	2.03	19.2	17.3	15.4			
65			65	1.87	20.8	18.7	16.6			
70			70	1.74	22.4	20.2	17.9			
75			75	1.62	24.0	21.6	19.2			
80			80	1.52	25.6	23.0	20.5			
90			90	1.35	28.8	25.9	23.0			
100			100	1.21	32.0	28.8	25.6			
DWM 16 × 25	16	8	25	6.39	8.0	7.2	6.4	51 (500)	46 (451)	41 (402)
30			30	5.32	9.6	8.6	7.7			
35			35	4.55	11.2	10.1	9.0			
40			40	3.98	12.8	11.5	10.2			
45			45	3.54	14.4	13.0	11.5			
50			50	3.18	16.0	14.4	12.8			
55			55	2.89	17.6	15.8	14.1			
60			60	2.65	19.2	17.3	15.4			
65			65	2.45	20.8	18.7	16.6			
70			70	2.27	22.4	20.2	17.9			
75			75	2.11	24.0	21.6	19.2			
80			80	1.99	25.6	23.0	20.5			
90			90	1.77	28.8	25.9	23.0			
100			100	1.59	32.0	28.8	25.6			
125	125	1.28	40.0	36.0	32.0					
DWM 18 × 25	18	9	25	8.12	8.0	7.2	6.4	65 (637)	58 (569)	52 (510)
30			30	6.77	9.6	8.6	7.7			
35			35	5.80	11.2	10.1	9.0			
40			40	5.07	12.8	11.5	10.2			
45			45	4.51	14.4	13.0	11.5			
50			50	4.06	16.0	14.4	12.8			
55			55	3.69	17.6	15.8	14.1			
60			60	3.38	19.2	17.3	15.4			
65			65	3.12	20.8	18.7	16.6			
70			70	2.90	22.4	20.2	17.9			
75			75	2.70	24.0	21.6	19.2			
80			80	2.53	25.6	23.0	20.5			
90			90	2.25	28.8	25.9	23.0			
100			100	2.02	32.0	28.8	25.6			
125	125	1.61	40.0	36.0	32.0					

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWM 20 × 25	20	10	25	10.00	8.0	7.2	6.4	80 (785)	72 (706)	64 (628)
30			30	8.33	9.6	8.6	7.7			
35			35	7.14	11.2	10.1	9.0			
40			40	6.25	12.8	11.5	10.2			
45			45	5.55	14.4	13.0	11.5			
50			50	5.00	16.0	14.4	12.8			
55			55	4.54	17.6	15.8	14.1			
60			60	4.16	19.2	17.3	15.4			
65			65	3.84	20.8	18.7	16.6			
70			70	3.57	22.4	20.2	17.9			
75			75	3.33	24.0	21.6	19.2			
80			80	3.12	25.6	23.0	20.5			
90			90	2.77	28.8	25.9	23.0			
100			100	2.50	32.0	28.8	25.6			
125			125	2.00	40.0	36.0	32.0			
150			150	1.67	48.0	43.2	38.4			
DWM 22 × 25	22	11	25	12.13	8.0	7.2	6.4	97 (951)	87 (853)	78 (765)
30			30	10.10	9.6	8.6	7.7			
35			35	8.65	11.2	10.1	9.0			
40			40	7.57	12.8	11.5	10.2			
45			45	6.74	14.4	13.0	11.5			
50			50	6.06	16.0	14.4	12.8			
55			55	5.50	17.6	15.8	14.1			
60			60	5.05	19.2	17.3	15.4			
65			65	4.66	20.8	18.7	16.6			
70			70	4.33	22.4	20.2	17.9			
75			75	4.04	24.0	21.6	19.2			
80			80	3.78	25.6	23.0	20.5			
90			90	3.36	28.8	25.9	23.0			
100			100	3.03	32.0	28.8	25.6			
125			125	2.42	40.0	36.0	32.0			
150			150	2.01	48.0	43.2	38.4			

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWM 25 × 25	25	12.5	25	15.63	8.0	7.2	6.4	125 (1,226)	112 (1,098)	100 (981)
30			30	13.02	9.6	8.6	7.7			
35			35	11.20	11.2	10.1	9.0			
40			40	9.76	12.8	11.5	10.2			
45			45	8.68	14.4	13.0	11.5			
50			50	7.81	16.0	14.4	12.8			
55			55	7.10	17.6	15.8	14.1			
60			60	6.51	19.2	17.3	15.4			
65			65	6.00	20.8	18.7	16.6			
70			70	5.58	22.4	20.2	17.9			
75			75	5.21	24.0	21.6	19.2			
80			80	4.88	25.6	23.0	20.5			
90			90	4.34	28.8	25.9	23.0			
100			100	3.90	32.0	28.8	25.6			
125			125	3.12	40.0	36.0	32.0			
150			150	2.60	48.0	43.2	38.4			
175			175	2.23	56.0	50.4	44.8			
200	200	1.94	64.0	57.6	51.2					
DWM 27 × 25	27	13.5	25	18.25	8.0	7.2	6.4	146 (1,432)	131 (1,285)	117 (1,147)
30			30	15.20	9.6	8.6	7.7			
35			35	13.04	11.2	10.1	9.0			
40			40	11.40	12.8	11.5	10.2			
45			45	10.14	14.4	13.0	11.5			
50			50	9.12	16.0	14.4	12.8			
55			55	8.30	17.6	15.8	14.1			
60			60	7.60	19.2	17.3	15.4			
65			65	7.00	20.8	18.7	16.6			
70			70	6.51	22.4	20.2	17.9			
75			75	6.08	24.0	21.6	19.2			
80			80	5.70	25.6	23.0	20.5			
90			90	5.06	28.8	25.9	23.0			
100			100	4.56	32.0	28.8	25.6			
125			125	3.65	40.0	36.0	32.0			
150			150	3.04	48.0	43.2	38.4			
175			175	2.61	56.0	50.4	44.8			
200	200	2.27	64.0	57.6	51.2					

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWM 30 × 25	30	15	25	22.50	8.0	7.2	6.4	180 (1,765)	161 (1,579)	144 (1,412)
30			30	18.75	9.6	8.6	7.7			
35			35	16.10	11.2	10.1	9.0			
40			40	14.06	12.8	11.5	10.2			
45			45	12.50	14.4	13.0	11.5			
50			50	11.25	16.0	14.4	12.8			
55			55	10.23	17.6	15.8	14.1			
60			60	9.37	19.2	17.3	15.4			
65			65	8.65	20.8	18.7	16.6			
70			70	8.03	22.4	20.2	17.9			
75			75	7.50	24.0	21.6	19.2			
80			80	7.03	25.6	23.0	20.5			
90			90	6.25	28.8	25.9	23.0			
100			100	5.62	32.0	28.8	25.6			
125			125	4.50	40.0	36.0	32.0			
150			150	3.75	48.0	43.2	38.4			
175			175	3.21	56.0	50.4	44.8			
200	200	2.81	64.0	57.6	51.2					
DWM 35 × 40	35	17.5	40	19.14	12.8	11.5	10.2	245 (2,400)	220 (2,160)	195 (1,912)
45			45	17.01	14.4	13.0	11.5			
50			50	15.31	16.0	14.4	12.8			
55			55	13.92	17.6	15.8	14.10			
60			60	12.76	19.2	17.3	15.4			
65			65	11.77	20.8	18.7	16.6			
70			70	10.93	22.4	20.2	17.9			
75			75	10.20	24.0	21.6	19.2			
80			80	9.57	25.6	23.0	20.5			
90			90	8.50	28.8	25.9	23.0			
100			100	7.65	32.0	28.8	25.6			
125			125	6.12	40.0	36.0	32.0			
150			150	5.10	48.0	43.2	38.4			
175			175	4.37	56.0	50.4	44.8			
200			200	3.82	64.0	57.6	51.2			



呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWM 40×40	40	20	40	25.02	12.8	320 (3,140)	11.5	288 (2,820)	10.2	256 (2,510)
45			45	22.19	14.4		13.0		11.5	
50			50	20.00	16.0		14.4		12.8	
55			55	18.15	17.6		15.8		14.1	
60			60	16.60	19.2		17.3		15.4	
65			65	15.36	20.8		18.7		16.6	
70			70	14.28	22.4		20.2		17.9	
75			75	13.31	24.0		21.6		19.2	
80			80	12.50	25.6		23.0		20.5	
90			90	11.11	28.8		25.9		23.0	
100			100	10.00	32.0		28.8		25.6	
125			125	8.00	40.0		36.0		32.0	
150			150	6.66	48.0		43.2		38.4	
175			175	5.71	56.0		50.4		44.8	
200			200	5.00	64.0		57.6		51.2	
225			225	4.44	72.0		64.8		57.6	
250			250	4.00	80.0		72.0		64.0	
275			275	3.63	88.0		79.2		70.4	
300			300	3.33	96.0		86.4		76.8	
DWM 50×50			50	25	50		31.25		16.0	
55	55	28.39			17.6	15.8	14.1			
60	60	26.04			19.2	17.3	15.4			
65	65	24.02			20.8	18.7	16.6			
70	70	22.32			22.4	20.2	17.9			
75	75	20.82			24.0	21.6	19.2			
80	80	19.53			25.6	23.0	20.5			
90	90	17.36			28.8	25.9	23.0			
100	100	15.62			32.0	28.8	25.6			
125	125	12.50			40.0	36.0	32.0			
150	150	10.41			48.0	43.2	38.4			
175	175	8.92			56.0	50.4	44.8			
200	200	7.81			64.0	57.6	51.2			
225	225	6.94			72.0	64.8	57.6			
250	250	6.25			80.0	72.0	64.0			
275	275	5.68	88.0	79.2	70.4					
300	300	5.20	96.0	86.4	76.8					
350	350	4.46	112.0	100.8	89.6					

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWM 60×60	60	30	60	37.40	19.2	720 (7,060)	17.3	648 (6,350)	15.4	575 (5,640)
70			70	32.10	22.4		20.2		17.9	
80			80	28.12	25.6		23.0		20.5	
90			90	25.00	28.8		25.9		23.0	
100			100	22.50	32.0		28.8		25.6	
125			125	18.00	40.0		36.0		32.0	
150			150	15.00	48.0		43.2		38.4	
175			175	12.85	56.0		50.4		44.8	
200			200	11.25	64.0		57.6		51.2	
225			225	9.99	72.0		64.8		57.6	
250			250	9.00	80.0		72.0		64.0	
275			275	8.18	88.0		79.2		70.4	
300			300	7.50	96.0		86.4		76.8	
350			350	6.42	112.0		100.8		89.6	

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWH 8×10	8	4	10	8.80	2.4	21.0 (206)	2.2	19.00 (186.3)	1.9	17.00 (166.7)
15			15	5.86	3.6		3.2		2.9	
20			20	4.40	4.8		4.3		3.8	
25			25	3.52	6.0		5.4		4.8	
30			30	2.93	7.2		6.5		5.8	
35			35	2.51	8.4		7.5		6.7	
40			40	2.20	9.6		8.6		7.7	
45			45	1.95	10.8		9.7		8.6	
50			50	1.76	12.0		10.8		9.6	
55			55	1.60	13.2		11.8		10.6	
60			60	1.47	14.4		13.0		11.5	
65			65	1.35	15.6		14.0		12.5	
70			70	1.26	16.8		15.1		13.4	
75			75	1.17	18.0		16.2		14.4	
80	80	1.10	19.2	17.3	15.4					
DWH 10×20	10	5	20	6.25	4.8	30 (294)	4.3	27 (265)	3.8	24 (235)
25			25	5.00	6.0		5.4		4.8	
30			30	4.16	7.2		6.5		5.8	
35			35	3.57	8.4		7.5		6.7	
40			40	3.15	9.6		8.6		7.7	
45			45	2.77	10.8		9.7		8.6	
50			50	2.50	12.0		10.8		9.6	
55			55	2.27	13.2		11.8		10.6	
60			60	2.08	14.4		13.0		11.5	
65			65	1.92	15.6		14.0		12.5	
70			70	1.79	16.8		15.1		13.4	
75			75	1.67	18.0		16.2		14.4	
80			80	1.56	19.2		17.3		15.4	
90			90	1.39	21.6		19.4		17.3	
DWH 12×20	12	6	20	8.90	4.8	43 (422)	4.3	38 (373)	3.8	34 (333)
25			25	7.10	6.0		5.4		4.8	
30			30	5.97	7.2		6.5		5.8	
35			35	5.11	8.4		7.5		6.7	
40			40	4.47	9.6		8.6		7.7	
45			45	3.98	10.8		9.7		8.6	
50			50	3.58	12.0		10.8		9.6	
55			55	3.25	13.2		11.8		10.6	
60			60	2.98	14.4		13.0		11.5	
65			65	2.74	15.6		14.0		12.5	
70			70	2.54	16.8		15.1		13.4	
75			75	2.37	18.0		16.2		14.4	
80			80	2.21	19.2		17.3		15.4	
90			90	1.96	21.6		19.4		17.3	

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)						
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load					
DWH 14×25	14	7	25	9.83	6.0	59 (579)	5.4	53 (520)	4.8	47 (461)					
30			30	8.19	7.2		6.5		5.8						
35			35	7.02	8.4		7.5		6.7						
40			40	6.14	9.6		8.6		7.7						
45			45	5.46	10.8		9.7		8.6						
50			50	4.91	12.0		10.8		9.6						
55			55	4.46	13.2		11.8		10.6						
60			60	4.09	14.4		13.0		11.5						
65			65	3.78	15.6		14.0		12.5						
70			70	3.51	16.8		15.1		13.4						
75			75	3.27	18.0		16.2		14.4						
80			80	3.07	19.2		17.3		15.4						
90			90	2.72	21.6		19.4		17.3						
100			100	2.45	24.0		21.6		19.2						
DWH 16×25			16	8	25		12.83		6.0		77 (755)	5.4	69 (677)	4.8	62 (608)
30					30		10.69		7.2			6.5		5.8	
35	35	9.16			8.4	7.5	6.7								
40	40	8.02			9.6	8.6	7.7								
45	45	7.12			10.8	9.7	8.6								
50	50	6.41			12.0	10.8	9.6								
55	55	5.83			13.2	11.8	10.6								
60	60	5.34			14.4	13.0	11.5								
65	65	4.93			15.6	14.0	12.5								
70	70	4.58			16.8	15.1	13.4								
75	75	4.28			18.0	16.2	14.4								
80	80	4.01			19.2	17.3	15.4								
90	90	3.57			21.6	19.4	17.3								
100	100	3.21			24.0	21.6	19.2								
125	125	2.56			30.0	27.0	24.0								
DWH 18×25	18	9			25	16.16	6.0	97 (951)	5.4	87 (853)		4.8		78 (765)	
30			30	13.47	7.2	6.5	5.8								
35			35	11.54	8.4	7.5	6.7								
40			40	10.10	9.6	8.6	7.7								
45			45	8.98	10.8	9.7	8.6								
50			50	8.08	12.0	10.8	9.6								
55			55	7.34	13.2	11.8	10.6								
60			60	6.73	14.4	13.0	11.5								
65			65	6.21	15.6	14.0	12.5								
70			70	5.77	16.8	15.1	13.4								
75			75	5.39	18.0	16.2	14.4								
80			80	5.05	19.2	17.3	15.4								
90			90	4.50	21.6	19.4	17.3								
100			100	4.04	24.0	21.6	19.2								
125			125	3.22	30.0	27.0	24.0								

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWH 20×25	20	10	25	20.00	6.0	120	5.4	108	4.8	96
30			30	16.66	7.2	(1,177)	6.5	(1,059)	5.8	(941)
35			35	14.28	8.4		7.5		6.7	
40			40	12.50	9.6		8.6		7.7	
45			45	11.11	10.8		9.7		8.6	
50			50	10.00	12.0		10.8		9.6	
55			55	9.09	13.2		11.8		10.6	
60			60	8.33	14.4		13.0		11.5	
65			65	7.69	15.6		14.0		12.5	
70			70	7.14	16.8		15.1		13.4	
75			75	6.67	18.0		16.2		14.4	
80			80	6.25	19.2		17.3		15.4	
90			90	5.55	21.6		19.4		17.3	
100			100	5.00	24.0		21.6		19.2	
125			125	4.00	30.0		27.0		24.0	
150	150	3.33	36.0		32.4		28.8			
DWH 22×25	22	11	25	24.16	6.0	145	5.4	130	4.8	116
30			30	20.13	7.2	(1,422)	6.5	(1,275)	5.8	(1,138)
35			35	17.30	8.4		7.5		6.7	
40			40	15.10	9.6		8.6		7.7	
45			45	13.40	10.8		9.7		8.6	
50			50	12.08	12.0		10.8		9.6	
55			55	10.94	13.2		11.9		10.6	
60			60	10.06	14.4		13.0		11.5	
65			65	9.28	15.6		14.0		12.5	
70			70	8.63	16.8		15.1		13.4	
75			75	8.04	18.0		16.2		14.4	
80			80	7.55	19.2		17.3		15.4	
90			90	6.71	21.6		19.4		17.3	
100			100	6.04	24.0		21.6		19.2	
125			125	4.83	30.0		27.0		24.0	
150	150	4.02	36.0		32.4		28.8			

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWH 25×25	25	12.5	25	31.20	6.0	187	5.4	169	4.8	150
30			30	25.97	7.2	(1,834)	6.5	(1,657)	5.8	(1,471)
35			35	22.38	8.4		7.5		6.7	
40			40	19.47	9.6		8.6		7.7	
45			45	17.40	10.8		9.7		8.6	
50			50	15.58	12.0		10.8		9.6	
55			55	14.20	13.2		11.9		10.6	
60			60	12.98	14.4		13.0		11.5	
65			65	12.00	15.6		14.0		12.5	
70			70	11.13	16.8		15.1		13.4	
75			75	10.40	18.0		16.2		14.4	
80			80	9.73	19.2		17.3		15.4	
90			90	8.65	21.6		19.4		17.3	
100			100	7.79	24.0		21.6		19.2	
125			125	6.23	30.0		27.0		24.0	
150	150	5.20	36.0		32.4		28.8			
175	175	4.46	42.0		37.8		33.6			
200	200	3.91	48.0		43.2		38.4			
DWH 27×25	27	13.5	25	36.40	6.0	219	5.4	197	4.8	175
30			30	30.41	7.2	(2,150)	6.5	(1,932)	5.8	(1,716)
35			35	26.20	8.4		7.5		6.7	
40			40	22.81	9.6		8.6		7.7	
45			45	20.30	10.8		9.7		8.6	
50			50	18.25	12.0		10.8		9.6	
55			55	16.50	13.2		11.9		10.6	
60			60	15.20	14.4		13.0		11.5	
65			65	14.00	15.6		14.0		12.5	
70			70	13.03	16.8		15.1		13.4	
75			75	12.10	18.0		16.2		14.4	
80			80	11.40	19.2		17.3		15.4	
90			90	10.13	21.6		19.4		17.3	
100			100	9.12	24.0		21.6		19.2	
125			125	7.30	30.0		27.0		24.0	
150	150	6.08	36.0		32.4		28.8			
175	175	5.21	42.0		37.8		33.6			
200	200	4.56	48.0		43.2		38.4			

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWH 30×25	30	15	25	45.00	6.0	270 (2,550)	5.4	243 (2,380)	4.8	216 (2,120)
30			30	37.50	7.2		6.5		5.8	
35			35	32.26	8.4		7.5		6.7	
40			40	28.12	9.6		8.6		7.7	
45			45	25.00	10.8		9.7		8.6	
50			50	22.50	12.0		10.8		9.6	
55			55	20.40	13.2		11.9		10.6	
60			60	18.75	14.4		13.0		11.5	
65			65	17.30	15.6		14.0		12.5	
70			70	16.07	16.8		15.1		13.4	
75			75	15.00	18.0		16.2		14.4	
80			80	14.06	19.2		17.3		15.4	
90			90	12.50	21.6		19.4		17.3	
100			100	11.25	24.0		21.6		19.2	
125			125	9.00	30.0		27.0		24.0	
150			150	7.50	36.0		32.4		28.8	
175			175	6.42	42.0		37.8		33.6	
200	200	5.62	48.0	43.2	38.4					
DWH 35×40	35	17.5	40	38.22	9.6	367 (3,600)	8.6	330 (3,240)	7.7	293 (2,870)
45			45	33.98	10.8		9.7		8.6	
50			50	30.58	12.0		10.8		9.6	
55			55	27.80	13.2		11.9		10.5	
60			60	25.48	14.4		13.0		11.5	
65			65	23.53	15.6		14.0		12.5	
70			70	21.84	16.8		15.1		13.4	
75			75	20.39	18.0		16.2		14.4	
80			80	19.11	19.2		17.3		15.4	
90			90	16.99	21.6		19.4		17.3	
100			100	15.29	24.0		21.6		19.2	
125			125	12.23	30.0		27.0		24.0	
150			150	10.19	36.0		32.4		28.8	
175			175	8.73	42.0		37.8		33.6	
200	200	7.64	48.0	43.2	38.4					

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWH 40×40	40	20	40	50.00	9.6	480 (4,710)	8.6	432 (4,240)	7.7	384 (3,770)
45			45	44.48	10.8		9.7		8.6	
50			50	40.00	12.0		10.8		9.6	
55			55	36.39	13.2		11.9		10.6	
60			60	33.33	14.4		13.0		11.5	
65			65	30.79	15.6		14.0		12.5	
70			70	28.57	16.8		15.1		13.4	
75			75	26.69	18.0		16.2		14.4	
80			80	25.00	19.2		17.3		15.4	
90			90	22.22	21.6		19.4		17.3	
100			100	20.00	24.0		21.6		19.2	
125			125	16.00	30.0		27.0		24.0	
150			150	13.33	36.0		32.4		28.8	
175			175	11.42	42.0		37.8		33.6	
200			200	10.00	48.0		43.2		38.4	
225			225	8.90	54.0		48.6		43.2	
250			250	8.00	60.0		54.0		48.0	
275			275	7.28	66.0		59.4		52.8	
300			300	6.67	72.0		64.8		57.6	
DWH 50×50			50	25	50		62.50		12.0	
55	55	56.82			13.2	11.9	10.6			
60	60	52.08			14.4	13.0	11.5			
65	65	48.08			15.6	14.0	12.5			
70	70	44.64			16.8	15.1	13.4			
75	75	41.67			18.0	16.2	14.4			
80	80	39.06			19.2	17.3	15.4			
90	90	34.72			21.6	19.4	17.3			
100	100	31.25			24.0	21.6	19.2			
125	125	25.00			30.0	27.0	24.0			
150	150	20.83			36.0	32.4	28.8			
175	175	17.85			42.0	37.8	33.6			
200	200	15.62			48.0	43.2	38.4			
225	225	13.89			54.0	48.6	43.2			
250	250	12.50			60.0	54.0	48.0			
275	275	11.36			66.0	59.4	52.8			
300	300	10.41			72.0	64.8	57.6			
350	350	8.93	84.0	75.6	67.2					

# DWH

重荷重  
Heavy Load

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWH 60×60	60	30	60	75.00	14.4		13.0		11.5	
70			70	64.28	16.8		15.1		13.4	
80			80	56.25	19.2		17.3		15.4	
90			90	50.00	21.6		19.4		17.3	
100			100	45.00	24.0		21.6		19.2	
125			125	36.00	30.0		27.0		24.0	
150			150	30.00	36.0	1,080	32.4	973	28.8	864
175			175	25.71	42.0	(10,590)	37.8	(9,540)	33.6	(8,470)
200			200	22.50	48.0		43.2		38.4	
225			225	20.02	54.0		48.6		43.2	
250			250	18.00	60.0		54.0		48.0	
275			275	16.38	66.0		59.4		52.8	
300			300	15.00	72.0		64.8		57.6	
350			350	12.87	84.0		75.6		67.2	

# DWB

極重荷重  
Super Load

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)			
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load		
DWB 8×10	8	4	10	16.94	2.0		1.8		1.6			
15			15	11.30	3.0		2.7		2.4			
20			20	8.47	4.0		3.6		3.2			
25			25	6.78	5.0		4.5		4.0			
30			30	5.65	6.0		5.4		4.8			
35			35	4.84	7.0		6.3		5.6			
40			40	4.20	8.0		7.2		6.4			
45			45	3.77	9.0	35.0	8.1	30.5	7.2	26.0		
50			50	3.39	10.0	(343)	9.0	(299)	8.0	(255)		
55			55	3.08	11.0		9.9		8.8			
60			60	2.82	12.0		10.8		9.6			
65			65	2.61	13.0		11.7		10.4			
70			70	2.42	14.0		12.6		11.2			
75			75	2.26	15.0		13.5		12.0			
80			80	2.12	16.0		14.4		12.8			
DWB 10×20			10	5	20	11.25	4.0		3.6		3.2	
25	25	9.00			5.0		4.5		4.0			
30	30	7.50			6.0		5.4		4.8			
35	35	6.43			7.0		6.3		5.6			
40	40	5.63			8.0		7.2		6.4			
45	45	5.00			9.0		8.1		7.2			
50	50	4.50			10.0	45	9.0	41	8.0	36		
55	55	4.09			11.0	(441)	9.9	(402)	8.8	(353)		
60	60	3.75			12.0		10.8		9.6			
65	65	3.47			13.0		11.7		10.4			
70	70	3.21			14.0		12.6		11.2			
75	75	3.00			15.0		13.5		12.0			
80	80	2.82			16.0		14.4		12.8			
90	90	2.53			18.0		16.2		14.4			
DWB 12×20	12	6			20	14.50	4.0		3.6		3.2	
25					25	11.60	5.0		4.5		4.0	
30			30	9.67	6.0		5.4		4.8			
35			35	8.29	7.0		6.3		5.6			
40			40	7.25	8.0		7.2		6.4			
45			45	6.44	9.0		8.1		7.2			
50			50	5.80	10.0	58	9.0	52	8.0	46		
55			55	5.27	11.0	(569)	9.9	(510)	8.8	(451)		
60			60	4.83	12.0		10.8		9.6			
65			65	4.44	13.0		11.7		10.4			
70			70	4.13	14.0		12.6		11.2			
75			75	3.85	15.0		13.5		12.0			
80			80	3.61	16.0		14.4		12.8			
90			90	3.21	18.0		16.2		14.4			

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWB 14 × 25	14	7	25	15.00	5.0	75	4.5	68	4.0	60
30			30	12.50	6.0	(736)	5.4	(667)	4.8	(588)
35			35	10.72	7.0		6.3		5.6	
40			40	9.38	8.0		7.2		6.4	
45			45	8.34	9.0		8.1		7.2	
50			50	7.50	10.0		9.0		8.0	
55			55	6.82	11.0		9.9		8.8	
60			60	6.25	12.0		10.8		9.6	
65			65	5.77	13.0		11.7		10.4	
70			70	5.36	14.0		12.6		11.2	
75			75	5.00	15.0		13.5		12.0	
80			80	4.69	16.0		14.4		12.8	
90			90	4.17	18.0		16.2		14.4	
100	100	3.78	20.0		18.0		16.0			
DWB 16 × 25	16	8	25	20.00	5.0	100	4.5	90	4.0	80
30			30	16.67	6.0	(981)	5.4	(883)	4.8	(785)
35			35	14.29	7.0		6.3		5.6	
40			40	12.50	8.0		7.2		6.4	
45			45	11.11	9.0		8.1		7.2	
50			50	10.00	10.0		9.0		8.0	
55			55	9.09	11.0		9.9		8.8	
60			60	8.34	12.0		10.8		9.6	
65			65	7.69	13.0		11.7		10.4	
70			70	7.14	14.0		12.6		11.2	
75			75	6.67	15.0		13.5		12.0	
80			80	6.25	16.0		14.4		12.8	
90			90	5.56	18.0		16.2		14.4	
100	100	5.00	20.0		18.0		16.0			
125	125	4.00	25.0		22.5		20.0			
DWB 18 × 25	18	9	25	25.00	5.0	125	4.5	113	4.0	100
30			30	20.84	6.0	(1,226)	5.4	(1,108)	4.8	(981)
35			35	17.86	7.0		6.3		5.6	
40			40	15.63	8.0		7.2		6.4	
45			45	13.89	9.0		8.1		7.2	
50			50	12.50	10.0		9.0		8.0	
55			55	11.37	11.0		9.9		8.8	
60			60	10.42	12.0		10.8		9.6	
65			65	9.62	13.0		11.7		10.4	
70			70	8.93	14.0		12.6		11.2	
75			75	8.34	15.0		13.5		12.0	
80			80	7.82	16.0		14.4		12.8	
90			90	6.95	18.0		16.2		14.4	
100	100	6.26	20.0		18.0		16.0			
125	125	5.02	25.0		22.5		20.0			

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWB 20 × 25	20	10	25	32.00	5.0	160	4.5	144	4.0	128
30			30	26.67	6.0	(1,569)	5.4	(1,412)	4.8	(1,255)
35			35	22.86	7.0		6.3		5.6	
40			40	20.00	8.0		7.2		6.4	
45			45	17.78	9.0		8.1		7.2	
50			50	16.00	10.0		9.0		8.0	
55			55	14.55	11.0		9.9		8.8	
60			60	13.33	12.0		10.8		9.6	
65			65	12.31	13.0		11.7		10.4	
70			70	11.43	14.0		12.6		11.2	
75			75	10.67	15.0		13.5		12.0	
80			80	10.00	16.0		14.4		12.8	
90			90	8.89	18.0		16.2		14.4	
100	100	8.00	20.0		18.0		16.0			
125	125	6.40	25.0		22.5		20.0			
150	150	5.33	30.0		27.0		24.0			
DWB 22 × 25	22	11	25	39.00	5.0	195	4.5	176	4.0	156
30			30	32.50	6.0	(1,912)	5.4	(1,726)	4.8	(1,530)
35			35	27.86	7.0		6.3		5.6	
40			40	24.38	8.0		7.2		6.4	
45			45	21.67	9.0		8.1		7.2	
50			50	19.50	10.0		9.0		8.0	
55			55	17.73	11.0		9.9		8.8	
60			60	16.25	12.0		10.8		9.6	
65			65	15.00	13.0		11.7		10.4	
70			70	13.93	14.0		12.6		11.2	
75			75	13.00	15.0		13.5		12.0	
80			80	12.19	16.0		14.4		12.8	
90			90	10.83	18.0		16.2		14.4	
100	100	9.75	20.0		18.0		16.0			
125	125	7.80	25.0		22.5		20.0			
150	150	6.50	30.0		27.0		24.0			

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWB 25 × 25	25	12.5	25	49.00	5.00	245 (2,400)	4.5	221 (2,170)	4.0	196 (1,922)
30			30	40.80	6.0		5.4		4.8	
35			35	35.00	7.0		6.3		5.6	
40			40	30.60	8.0		7.2		6.4	
45			45	27.20	9.0		8.1		7.2	
50			50	24.50	10.0		9.0		8.0	
55			55	22.30	11.0		9.9		8.8	
60			60	20.40	12.0		10.8		9.6	
65			65	18.80	13.0		11.7		10.4	
70			70	17.50	14.0		12.6		11.2	
75			75	16.30	15.0		13.5		12.0	
80			80	15.30	16.0		14.4		12.8	
90			90	13.60	18.0		16.2		14.4	
100			100	12.30	20.0		18.0		16.0	
125			125	9.80	25.0		22.5		20.0	
150			150	8.17	30.0		27.0		24.0	
175	175	7.00	35.0	31.5	28.0					
200	200	6.15	40.0	36.0	32.0					
DWB 27 × 25	27	13.5	25	58.00	5.0	290 (2,840)	4.5	261 (2,560)	4.0	232 (2,280)
30			30	48.33	6.0		5.4		4.8	
35			35	41.43	7.0		6.3		5.6	
40			40	36.25	8.0		7.2		6.4	
45			45	32.22	9.0		8.1		7.2	
50			50	29.00	10.0		9.0		8.0	
55			55	26.36	11.0		9.9		8.8	
60			60	24.17	12.0		10.8		9.6	
65			65	22.31	13.0		11.7		10.4	
70			70	20.71	14.0		12.6		11.2	
75			75	19.33	15.0		13.5		12.0	
80			80	18.13	16.0		14.4		12.8	
90			90	16.11	18.0		16.2		14.4	
100			100	14.50	20.0		18.0		16.0	
125			125	11.60	25.0		22.5		20.0	
150			150	9.67	30.0		27.0		24.0	
175	175	8.28	35.0	31.5	28.0					
200	200	7.25	40.0	36.0	32.0					

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWB 30 × 25	30	15	25	72.00	5.0	360 (3,530)	4.5	324 (3,180)	4.0	288 (2,820)
30			30	60.00	6.0		5.4		4.8	
35			35	51.43	7.0		6.3		5.6	
40			40	45.00	8.0		7.2		6.4	
45			45	40.00	9.0		8.1		7.2	
50			50	36.00	10.0		9.0		8.0	
55			55	32.72	11.0		9.9		8.8	
60			60	30.00	12.0		10.8		9.6	
65			65	27.69	13.0		11.7		10.4	
70			70	25.71	14.0		12.6		11.2	
75			75	24.00	15.0		13.5		12.0	
80			80	22.50	16.0		14.4		12.8	
90			90	20.00	18.0		16.2		14.4	
100			100	18.00	20.0		18.0		16.0	
125			125	14.40	25.0		22.5		20.0	
150			150	12.00	30.0		27.0		24.0	
175	175	10.28	35.0	31.5	28.0					
200	200	9.00	40.0	36.0	32.0					
DWB 35 × 40	35	17.5	40	61.20	8.0	490 (4,810)	7.2	441 (4,320)	6.4	392 (3,840)
45			45	54.44	9.0		8.1		7.2	
50			50	49.00	10.0		9.0		8.0	
55			55	44.54	11.0		9.9		8.8	
60			60	40.83	12.0		10.8		9.6	
65			65	37.69	13.0		11.7		10.4	
70			70	35.00	14.0		12.6		11.2	
75			75	32.67	15.0		13.5		12.0	
80			80	30.62	16.0		14.4		12.8	
90			90	27.22	18.0		16.2		14.4	
100			100	24.50	20.0		18.0		16.0	
125			125	19.60	25.0		22.5		20.0	
150			150	16.33	30.0		27.0		24.0	
175			175	14.00	35.0		31.5		28.0	
200			200	12.25	40.0		36.0		32.0	

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWB 40×40	40	20	40	80.00	8.0	640 (6,280)	7.2	576 (5,650)	6.4	512 (5,020)
45			45	71.13	9.0		8.1		7.2	
50			50	64.00	10.0		9.0		8.0	
55			55	58.20	11.0		9.9		8.8	
60			60	53.33	12.0		10.8		9.6	
65			65	49.24	13.0		11.7		10.4	
70			70	45.71	14.0		12.6		11.2	
75			75	42.68	15.0		13.5		12.0	
80			80	40.00	16.0		14.4		12.8	
90			90	35.55	8.0		16.2		14.4	
100			100	32.00	20.0		18.0		16.0	
125			125	25.60	25.0		22.5		20.0	
150			150	21.33	30.0		27.0		24.0	
175			175	18.28	35.0		31.5		28.0	
200			200	16.00	40.0		36.0		32.0	
225			225	14.23	45.0		40.5		36.0	
250			250	12.80	50.0		45.0		40.0	
275			275	11.64	55.0		49.5		44.0	
300			300	10.67	60.0		54.0		48.0	
DWB 50×50			50	25	50		100.00		10.0	
55	55	90.95			11.0	9.9	8.8			
60	60	83.33			12.0	10.8	9.6			
65	65	76.96			13.0	11.7	10.4			
70	70	71.42			14.0	12.6	11.2			
75	75	66.70			15.0	13.5	12.0			
80	80	62.50			16.0	14.4	12.8			
90	90	55.55			18.0	16.2	14.4			
100	100	50.00			20.0	18.0	16.0			
125	125	40.00			25.0	22.5	20.0			
150	150	33.33			30.0	27.0	24.0			
175	175	28.57			35.0	31.5	28.0			
200	200	25.00			40.0	36.0	32.0			
225	225	22.23			45.0	40.5	36.0			
250	250	20.00			50.0	45.0	40.0			
275	275	18.19	55.0	49.5	44.0					
300	300	16.66	60.0	54.0	48.0					
350	350	14.29	70.0	63.0	56.0					

呼稱 Model	外徑 (mm) Outer Dia	内徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWB 60×60	60	30	60	120.00	12.0	1,440 (14,120)	10.8	1,296 (12,710)	9.6	1,152 (11,300)
70			70	102.86	14.0		12.6		11.2	
80			80	90.00	16.0		14.4		12.8	
90			90	80.00	18.0		16.2		14.4	
100			100	72.00	20.0		18.0		16.0	
125			125	57.60	25.0		22.5		20.0	
150			150	48.00	30.0		27.0		24.0	
175			175	41.14	35.0		31.5		28.0	
200			200	36.00	40.0		36.0		32.0	
225			225	32.00	45.0		40.5		36.0	
250			250	28.80	50.0		45.0		40.0	
275			275	26.18	55.0		49.5		44.0	
300			300	24.00	60.0		54.0		48.0	
350			350	20.57	70.0		63.0		56.0	

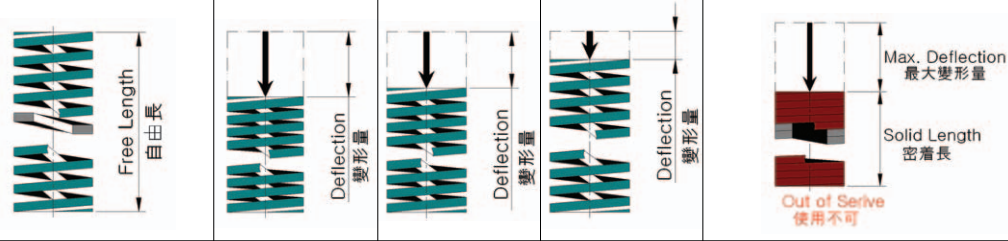


# DAEWON Mold Return Spring (D.W.S)

# DWR 高變形用 Mold Return Pin

## ■ 금형스프링 사용횟수와 압축비 관계(Relationship between working times of spring and description rate)

사용횟수(使用回數) Working Time 종류(種類) Type	30만회(자유장×%) 30萬回(自由長×%) 0.3 million (% of free length)	50만회(자유장×%) 50萬回(自由長×%) 0.5 million (% of free length)	100만회(자유장×%) 100萬回(自由長×%) 1 million (% of free length)	최대변형량(자유장×%) 最大變形量(自由長×%) Max. Description (% of free length)	색 별 色 別 Color
DWR 고변형용(高變形用)	50.0%	45.0%	40.0%	Approx. 60.0%	Ivory
DWY 고변형용(高變形用)	50.0%	45.0%	40.0%	Approx. 60.0%	Violet

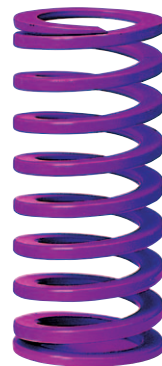


## ■ 금형스프링 허용공차 (Tolerance of Die Spring)

외경(外徑) Outer Dia.	내경(內徑) Inner Dia.	자유장(自由長) Free Length		하중(荷重) Load kgf	권방향(卷方向) Coil Direction
		50mm 이하(以下) below 50mm	55mm 이상(以上) over 55mm		
+0mm -1.2mm	+1.2mm -0mm	±0.5mm	±2%	±10%	우(右) right



DWR



DWY

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回(自由長%) 0.3 million (% of free length)		50萬回(自由長%) 0.5 million (% of free length)		100萬回(自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWR 14.5 × 20	14.5	9.0	20	1.11	10.0	11 (107.9)	9.0	10 (98.1)	8.0	9 (88.3)
25			0.89	12.5	11.3					
30			0.74	15.0	13.5					
35			0.64	17.5	15.8					
40			0.56	20.0	18.0					
45			0.49	22.5	20.3					
50			0.44	25.0	22.5					
55			0.40	27.5	24.8					
60			0.37	30.0	27.0					
65			0.34	32.5	29.3					
70			0.32	35.0	31.5					
75			0.30	37.5	33.8					
80			0.28	40.0	36.0					
90			0.25	45.0	40.5					
100			0.22	50.0	45.0					
125	0.18	62.5	56.3							
DWR 17 × 25	17.0	11.0	25	1.51	12.5	19 (186.3)	11.3	17 (166.7)	10.0	15 (147.1)
30			1.26	15.0	13.5					
35			1.08	17.5	15.8					
40			0.94	20.0	18.0					
45			0.84	22.5	20.3					
50			0.76	25.0	22.5					
55			0.69	27.5	24.8					
60			0.63	30.0	27.0					
65			0.58	32.5	29.3					
70			0.54	35.0	31.5					
75			0.50	37.5	33.8					
80			0.47	40.0	36.0					
90			0.42	45.0	40.5					
100			0.38	50.0	45.0					
125			0.30	62.5	56.3					
150	0.25	75.0	67.5							

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWR 21 × 30	21.0	13.0	30	1.41	15.0	13.5	12.0	21 (205.9)	19 (186.3)	17 (166.7)
35			35	1.21	17.5	15.8	14.0			
40			40	1.06	20.0	18.0	16.0			
45			45	0.94	22.5	20.3	18.0			
50			50	0.84	25.0	22.5	20.0			
55			55	0.77	27.5	24.8	22.0			
60			60	0.70	30.0	27.0	24.0			
65			65	0.65	32.5	29.3	26.0			
70			70	0.60	35.0	31.5	28.0			
75			75	0.56	37.5	33.8	30.0			
80			80	0.53	40.0	36.0	32.0			
90			90	0.47	45.0	40.5	36.0			
100			100	0.42	50.0	45.0	40.0			
125			125	0.34	62.5	56.3	50.0			
150			150	0.28	75.0	67.5	60.0			
DWR 26 × 30	26.0	16.5	30	2.74	15.0	13.5	12.0	41.0 (402.1)	37.0 (362.8)	33.0 (323.6)
35			35	2.35	17.5	15.8	14.0			
40			40	2.06	20.0	18.0	16.0			
45			45	1.83	22.5	20.3	18.0			
50			50	1.64	25.0	22.5	20.0			
55			55	1.49	27.5	24.8	22.0			
60			60	1.37	30.0	27.0	24.0			
65			65	1.26	32.5	29.3	26.0			
70			70	1.17	35.0	31.5	28.0			
75			75	1.10	37.5	33.8	30.0			
80			80	1.03	40.0	36.0	32.0			
90			90	0.91	45.0	40.5	36.0			
100			100	0.82	50.0	45.0	40.0			
110			110	0.75	55.0	49.5	44.0			
125			125	0.66	62.5	56.3	50.0			
150	150	0.55	75.0	67.5	60.0					
175	175	0.47	87.5	78.8	70.0					
200	200	0.41	100.0	90.0	80.0					

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWR 32 × 40	32.0	21.0	40	2.56	20.0	18.0	16.0	51.0 (500.1)	46.0 (451.1)	41.0 (402.1)
45			45	2.27	22.5	20.3	18.0			
50			50	2.04	25.0	22.5	20.0			
60			60	1.70	30.0	27.0	24.0			
70			70	1.46	35.0	31.5	28.0			
80			80	1.28	40.0	36.0	32.0			
90			90	1.14	45.0	40.5	36.0			
100			100	1.02	50.0	45.0	40.0			
110			110	0.93	55.0	49.5	44.0			
125			125	0.82	62.5	56.3	50.0			
150			150	0.68	75.0	67.5	60.0			
175			175	0.58	87.5	78.8	70.0			
200			200	0.51	100.0	90.0	80.0			
250			250	0.41	125.0	112.5	100.0			
300			300	0.34	150.0	135.0	120.0			
DWR 39 × 40	39.0	26.0	40	2.78	20.0	18.0	16.0	55.0 (539.4)	50.0 (490.3)	44.0 (431.5)
45			45	2.47	22.5	20.3	18.0			
50			50	2.22	25.0	22.5	20.0			
60			60	1.85	30.0	27.0	24.0			
70			70	1.59	35.0	31.5	28.0			
80			80	1.39	40.0	36.0	32.0			
90			90	1.23	45.0	40.5	36.0			
100			100	1.11	50.0	45.0	40.0			
110			110	1.01	55.0	49.5	44.0			
125			125	0.89	62.5	56.3	50.0			
150			150	0.74	75.0	67.5	60.0			
175			175	0.63	87.5	78.8	70.0			
200			200	0.56	100.0	90.0	80.0			
250			250	0.44	125.0	112.5	100.0			
300			300	0.37	150.0	135.0	120.0			
DWR 46 × 50	46.0	32.0	50	2.49	25.0	22.5	20.0	62.0 (608.0)	56.0 (549.2)	50.0 (490.3)
60			60	2.07	30.0	27.0	24.0			
70			70	1.78	35.0	31.5	28.0			
80			80	1.56	40.0	36.0	32.0			
90			90	1.38	45.0	40.5	36.0			
100			100	1.24	50.0	45.0	40.0			
110			110	1.13	55.0	49.5	44.0			
125			125	1.00	62.5	56.3	50.0			
150			150	0.83	75.0	67.5	60.0			
175			175	0.71	87.5	78.8	70.0			
200			200	0.62	100.0	90.0	80.0			
250			250	0.50	125.0	112.5	100.0			
300			300	0.41	150.0	135.0	120.0			

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWY 14.5 × 20	14.5	9.0	20	1.89	10.0	19.0 (186.3)	9.0	17.0 (166.7)	8.0	15.0 (147.1)
25			25	1.51	12.5		11.3		10.0	
30			30	1.26	15.0		13.5		12.0	
35			35	1.08	17.5		15.8		14.0	
40			40	0.94	20.0		18.0		16.0	
45			45	0.84	22.5		20.3		18.0	
50			50	0.76	25.0		22.5		20.0	
55			55	0.69	27.5		24.8		22.0	
60			60	0.63	30.0		27.0		24.0	
65			65	0.58	32.5		29.3		26.0	
70			70	0.54	35.0		31.5		28.0	
75			75	0.50	37.5		33.8		30.0	
80			80	0.47	40.0		36.0		32.0	
90			90	0.42	45.0		40.5		36.0	
100			100	0.38	50.0		45.0		40.0	
125	125	0.30	62.5	56.3	50.0					
DWY 17 × 25	17.0	11.0	25	2.22	12.5	28.0 (274.6)	11.3	25.0 (245.2)	10.0	22.0 (215.7)
30			30	1.85	15.0		13.5		12.0	
35			35	1.59	17.5		15.8		14.0	
40			40	1.39	20.0		18.0		16.0	
45			45	1.23	22.5		20.3		18.0	
50			50	1.11	25.0		22.5		20.0	
55			55	1.01	27.5		24.8		22.0	
60			60	0.93	30.0		27.0		24.0	
65			65	0.85	32.5		29.3		26.0	
70			70	0.79	35.0		31.5		28.0	
75			75	0.74	37.5		33.8		30.0	
80			80	0.69	40.0		36.0		32.0	
90			90	0.62	45.0		40.5		36.0	
100			100	0.56	50.0		45.0		40.0	
125			125	0.44	62.5		56.3		50.0	
150	150	0.37	75.0	67.5	60.0					

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWY 21 × 30	21.0	13.0	30	2.37	15.0	36.0 (353.0)	13.5	32.0 (313.8)	12.0	29.0 (284.4)
35			35	2.03	17.5		15.8		14.0	
40			40	1.78	20.0		18.0		16.0	
45			45	1.58	22.5		20.3		18.0	
50			50	1.42	25.0		22.5		20.0	
55			55	1.29	27.5		24.8		22.0	
60			60	1.19	30.0		27.0		24.0	
65			65	1.09	32.5		29.3		26.0	
70			70	1.02	35.0		31.5		28.0	
75			75	0.95	37.5		33.8		30.0	
80			80	0.89	40.0		36.0		32.0	
90			90	0.79	45.0		40.5		36.0	
100			100	0.71	50.0		45.0		40.0	
125			125	0.57	62.5		56.3		50.0	
150			150	0.47	75.0		67.5		60.0	
DWY 26 × 30	26.0	16.5	30	3.56	15.0	53.0 (519.8)	13.5	48.0 (470.0)	12.0	42.0 (411.9)
35			35	3.05	17.5		15.8		14.0	
40			40	2.67	20.0		18.0		16.0	
45			45	2.37	22.5		20.3		18.0	
50			50	2.13	25.0		22.5		20.0	
55			55	1.94	27.5		24.8		22.0	
60			60	1.78	30.0		27.0		24.0	
65			65	1.64	32.5		29.3		26.0	
70			70	1.52	35.0		31.5		28.0	
75			75	1.42	37.5		33.8		30.0	
80			80	1.33	40.0		36.0		32.0	
90			90	1.19	45.0		40.5		36.0	
100			100	1.07	50.0		45.0		40.0	
110			110	0.97	55.0		49.5		44.0	
125			125	0.85	62.5		56.3		50.0	
150	150	0.71	75.0	67.5	60.0					
175	175	0.61	87.5	78.8	70.0					
200	200	0.53	100.0	90.0	80.0					

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWY 32×40	32.0	21.0	40	3.56	20.0	71.0 (696.3)	18.0	64.0 (627.6)	16.0	57.0 (559.0)
45			45	3.16	22.5		20.3		18.0	
50			50	2.84	25.0		22.5		20.0	
60			60	2.37	30.0		27.0		24.0	
70			70	2.03	35.0		31.5		28.0	
80			80	1.78	40.0		36.0		32.0	
90			90	1.58	45.0		40.5		36.0	
100			100	1.42	50.0		45.0		40.0	
110			110	1.29	55.0		49.5		44.0	
125			125	1.14	62.5		56.3		50.0	
150			150	0.95	75.0		67.5		60.0	
175			175	0.81	87.5		78.8		70.0	
200			200	0.71	100.0		90.0		80.0	
250			250	0.57	125.0		112.5		100.0	
300			300	0.47	150.0		135.0		120.0	
DWY 39×40			39.0	26.0	40		4.67		20.0	
45	45	4.15			22.5	20.3	18.0			
50	50	3.73			25.0	22.5	20.0			
60	60	3.11			30.0	27.0	24.0			
70	70	2.67			35.0	31.5	28.0			
80	80	2.33			40.0	36.0	32.0			
90	90	2.07			45.0	40.5	36.0			
100	100	1.87			50.0	45.0	40.0			
110	110	1.70			55.0	49.5	44.0			
125	125	1.49			62.5	56.3	50.0			
150	150	1.24			75.0	67.5	60.0			
175	175	1.07			87.5	78.8	70.0			
200	200	0.93			100.0	90.0	80.0			
250	250	0.75			125.0	112.5	100.0			
300	300	0.62			150.0	135.0	120.0			

呼稱 Model	外徑 (mm) Outer Dia	內徑 (mm) Inner Dia	自由長(mm) Free Length	定數 (Kgf/mm) Spring Constant	30萬回 (自由長%) 0.3 million (% of free length)		50萬回 (自由長%) 0.5 million (% of free length)		100萬回 (自由長%) 1 million (% of free length)	
					變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load	變形量(mm) Deflection	荷重 Kgf(N) Load
DWY 46×50	46.0	32.0	50	4.98	25.0	124.0 (1,216)	22.5	112.0 (1,098)	20.0	99.0 (970.9)
60			60	4.15	30.0		27.0		24.0	
70			70	3.56	35.0		31.5		28.0	
80			80	3.11	40.0		36.0		32.0	
90			90	2.77	45.0		40.5		36.0	
100			100	2.49	50.0		45.0		40.0	
110			110	2.26	55.0		49.5		44.0	
125			125	1.99	62.5		56.3		50.0	
150			150	1.66	75.0		67.5		60.0	
175			175	1.42	87.5		78.8		70.0	
200			200	1.24	100.0		90.0		80.0	
250			250	1.00	125.0		112.5		100.0	
300			300	0.83	150.0		135.0		120.0	

## 접시스프링

### ■ 특징

- 접시스프링은 단위 체적당 축적 에너지가 코일스프링에 비교하여 상당히 크고, 좁은 공간에서도 적은 스트로크로 커다란 부하능력을 발휘할 수 있습니다.
- 하중/변형의 특성곡선은, 직선형, 특히 비선형특성을 사용조건에 의해 효과적으로 선택할 수 있습니다.
- 판수의 증감, 직렬, 병렬의 조합에 의해 스프링 특성을 변경시킬 수 있습니다.
- 적절한 사용을 행하면, 이용범위가 넓고, 다양한 목적에 맞게 효율적으로 사용할 수 있습니다.
- 허용 응력범위 내에서 사용하면 긴 내구수명을 유지할 수 있습니다.
- 충격완화가 우수하며, 겹쳐 사용할 경우 특히 완충효과가 큼니다.

### ■ 용도

- 원자력발전소 안전밸브, 대형 산업기계 완충기, 콘트롤 밸브, 유압실린더 내 완충스프링, 압연스탠드, 건축구조물 텐션바컨넥션, 기타 좁은 공간에서 큰 하중을 견디기 위한 완충장치 등.



### ■ Features

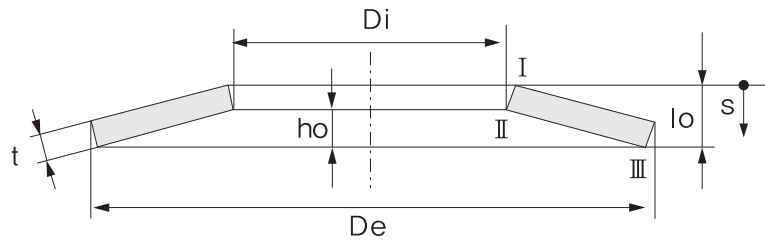
- The Daewon Disc Spring has a bigger accumulated energy per unit volume compared to that of the Coil Spring. It also has excellent load capabilities due to less strokes in a smaller space.
- The Load/Variation Characteristic Curve can be selected effectively according to the conditions of the environment.
- The Spring features can be changed by altering the number of plates, and using a combination of parallel and serial arrangement.
- You can use them effectively in a wide range of applications according to the required purposes.
- You can maintain a longer durability life by using them within the permitted stress range.
- The spring has strong shock absorption capabilities. You can enhance the shock absorption capability with multi-spring arrangements.

### ■ Usage

- Safety Valves in Atomic Power Plants, Shock Absorbers for Full-sized Industrial Machinery, Control Valves, Shock Absorbing Springs in Hydraulic Cylinder, Rolling Mill Stands, Infrastructure Tension Bar Connections, Other Shock Absorbing Equipment enduring heavy loads in confined space, etc.

## 접시스프링 용어

### ■ 좌면처리 안된 접시스프링 (Disc spring without contact surface)



De : 접시스프링 외경(mm)

lo : 접시스프링 자유높이(mm)

s : 접시스프링 변위(mm)

$\sigma_I$  : I 점에 작용하는 응력(N/mm<sup>2</sup>)

$\sigma_{III}$  : III 점에 작용하는 응력(N/mm<sup>2</sup>)

Di : 접시스프링 내경(mm)

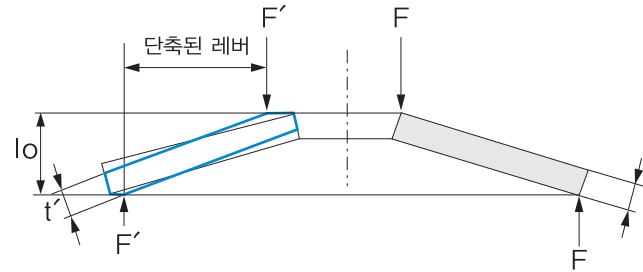
t : 두께(mm)

ho : 접시높이(mm) (lo - t)

$\sigma_{II}$  : II 점에 작용하는 응력(N/mm<sup>2</sup>)

### ■ 좌면처리 된 접시스프링 (Disc spring with contact surface)

하중 지지부의 응력집중과 마모방지를 위해 좌면을 설치한 접시스프링



F : 좌면처리 안된 접시스프링이 받는 하중(N)

F' : 좌면처리 된 접시스프링이 받는 하중(N)

t : 좌면처리 안된 접시스프링의 두께(mm)

t' : 좌면처리 된 접시스프링의 감소된 두께(mm)

lo : 접시스프링의 자유높이(mm) (좌면처리 안된 접시스프링과 동일)

## 접시스프링 분류(DIN2093)

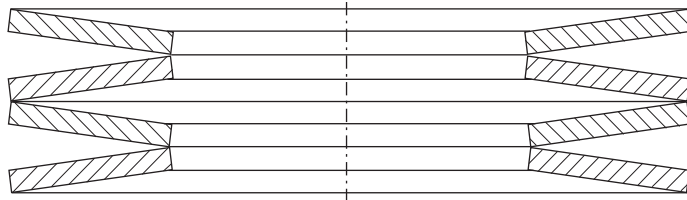
Group	Material Thickness t in mm	Load-Bearing Surfaces and Reduced Material Thickness (t')	Manufacturing Procedures
1	< 1.25	NO	Stamped, Cold-Formed, Edges Rounded
2	1.25 to 6.0	NO	Stamped, Cold-Formed, De and Di Machined, Edges Rounded
			Fine-Blanked, Cold-Formed, Edges Rounded
3	> 6.0 to 14.0	YES	Hot or Cold Forged, Machined on All Surfaces, Edges Rounded

## 접시스프링 시리즈 A, B and C 분류(DIN2093)

	Series		
	A	B	C
$\frac{D_e}{t}$	≈18	≈28	≈40
$\frac{h_o}{t}$ OR $K_4 \cdot \frac{h_o}{t}$	≈0.4	≈0.75	≈1.3
Shape of The Load/ Deflection Curve	Nearly Linear	Slightly Regressive	Strongly Regressive
Spring Load	High	Medium	Low

# 접시스프링 조합 방법

## ■ DISC SPRING 직렬연결 (Series)



For  $i$  disc springs arranged in single series

$$F_{total} = F$$

$$S_{total} = i \cdot s$$

$$L_o = i \cdot l_o$$

## ■ DISC SPRING 병렬연결 (Parallel)



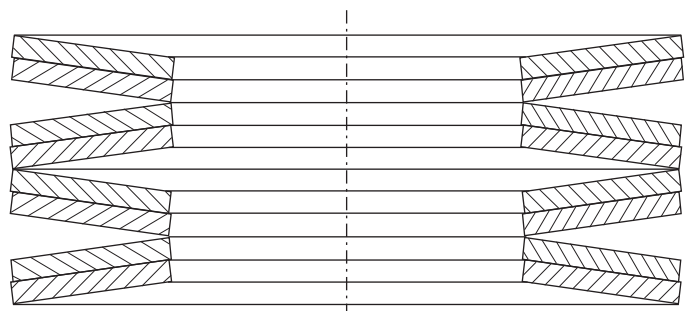
For  $n$  disc springs arranged in a parallel stack

$$F_{total} = n \cdot F$$

$$S_{total} = s$$

$$L_o = l_o + (n-1) \cdot t$$

## ■ DISC SPRING 혼합연결



For  $i$  disc spring in series, each component consisting of  $n$  disc springs in parallel

$$F_{total} = n \cdot F$$

$$S_{total} = i \cdot s$$

$$L_o = i \cdot [l_o + (n-1) \cdot t]$$

# Disc Spring

## 재료규격 (Materials)

	구분	기본재료			스테인레스		내열재료		
	Material	CK67	Ck75	51CrV4	X12CrNi177	X7CrNiAl177	X35CrMo17	NiCr19NbMo (INCONEL718)	NiCr20Co18Ti (NIMONIC90)
	DIN	17 222	17 222	17 222	17 224	17 224	-	65 021	17 754 59 745
CHEMICAL COMPOSITION (%)	C	0.65~0.72	0.7~0.8	0.47~0.55	≤0.12	≤0.09	0.33~0.43	0.03~0.08	≤0.10
	Si	0.15~0.35	0.15~0.35	0.15~0.40	≤1.50	≤1.00	≤1.00	≤0.35	≤1.00
	Mn	0.6~0.9	0.6~0.8	0.7~1.10	≤2.00	≤1.00	≤1.00	≤0.35	≤1.00
	P	≤0.035	≤0.035	≤0.035	≤0.045	≤0.045	≤0.045	≤0.015	≤0.03
	S	≤0.035	≤0.035	≤0.035	≤0.030	≤0.030	≤0.030	≤0.015	≤0.015
	Co	-	-	-	-	-	-	≤1.00	15.0~21.0
	Cr	-	-	0.9~1.20	16.0~18.0	16.0~18.0	15.5~17.5	17.0~21.0	18.0~21.0
	Mo	-	-	-	≤0.8	-	0.90~1.30	2.80~3.30	-
	Ni	-	-	-	6.00~9.00	6.5~7.75	≤1.00	50.0~55.0	-
	V	-	-	0.10~0.20	-	-	-	-	-
	Cu	-	-	-	-	-	-	≤1.00	≤0.20
	Nb	-	-	-	-	-	-	4.75~5.50	-
	Ti	-	-	-	-	-	-	0.65~1.15	2.00~3.00
Al	-	-	-	-	0.75~1.5	-	0.40~0.80	1.00~2.00	
사용온도(°C)		(-20)~60	(-20)~60	(-50)~100	(-200)~100	(-200)~350	(-60)~400	(-260)~700	(-260)~800

\* 그 외에 상기 재료표에 언급하지 않은 소재는 당사 기술진과 협의를 요합니다.

# 접시스프링

## 허용공차 / 외경 및 내경

기준외경(De)	외경 공차(mm)	내경 공차(mm)
3~6mm 이하	0 ~ -0.12	0 ~ +0.12
6~10mm 이하	0 ~ -0.15	0 ~ +0.15
10~18mm 이하	0 ~ -0.18	0 ~ +0.18
18~30mm 이하	0 ~ -0.21	0 ~ +0.21
30~50mm 이하	0 ~ -0.25	0 ~ +0.25
50~80mm 이하	0 ~ -0.30	0 ~ +0.30
80~120mm 이하	0 ~ -0.35	0 ~ +0.35
120~180mm 이하	0 ~ -0.40	0 ~ +0.40
180~250mm 이하	0 ~ -0.46	0 ~ +0.46
250~315mm 이하	0 ~ -0.52	0 ~ +0.52
315~400mm 이하	0 ~ -0.57	0 ~ +0.57

## 허용공차 / 두께, 자유고 및 하중

종류	두께(t) mm	두께(t, t')공차 mm	자유고(l <sub>0</sub> )공차 mm	하중공차 %
1그룹	0.2 이상 0.6 이하	+0.02 -0.06	+0.10 -0.05	+25 -7.5
	0.6 초과 1.25 미만	+0.03 -0.09		
2그룹	1.25 이상 2.0 이하	+0.04 -0.12	+0.15 -0.08	+15 -7.5
	2.0 초과 3.0 이하		+0.20 -0.10	
	3.0 초과 3.8 이하		+0.30 -0.15	+10 -5
	3.8 초과 6.0 이하			
3그룹	6.0 초과 14.0 이하	±0.10	±0.30	±5

# Disc Spring

## Tolerance / Outer and Inner Diameter

Outer Diameter(DE)	Outer Tolerance(mm)	Inner Tolerance(mm)
3 to 6mm	0 ~ -0.12	0 ~ +0.12
over 6 to 10mm	0 ~ -0.15	0 ~ +0.15
over 10 to 18mm	0 ~ -0.18	0 ~ +0.18
over 18 to 30mm	0 ~ -0.21	0 ~ +0.21
over 30 to 50mm	0 ~ -0.25	0 ~ +0.25
over 50 to 80mm	0 ~ -0.30	0 ~ +0.30
over 80 to 120mm	0 ~ -0.35	0 ~ +0.35
over 120 to 180mm	0 ~ -0.40	0 ~ +0.40
over 180 to 250mm	0 ~ -0.46	0 ~ +0.46
over 250 to 315mm	0 ~ -0.52	0 ~ +0.52
over 315 to 400mm	0 ~ -0.57	0 ~ +0.57

## Tolerance / Thickness, Free-Height and Spring-Load

Description	Thickness(t) mm	Thickness (t, t') Tolerance mm	Unloaded Free- Height Tolerances %	Spring-Load F Tolerance %
1Group	0.2 to 0.6	+0.02 -0.06	+0.10 -0.05	+25 -7.5
	0.6 to 1.25	+0.03 -0.09		
2Group	1.25 to 2.0	+0.04 -0.12	+0.15 -0.08	+15 -7.5
	over 2.0 to 3.0		+0.20 -0.10	
	over 3.0 to 3.8		+0.30 -0.15	+10 -5
	over 3.8 to 6.0			
3Group	over 6.0 to 14.0	±0.10	±0.30	±5



# Disc Spring

## 접시스프링 규격표

PART No.	Diameter – De (mm)	Diameter – Di (mm)	Thickness – t (mm)	Unloaded Free – Height – lo (mm)	Reduced material thickness – t' (mm)	ho/t	Load – F(0.75 ho) N	Weight per 1000 pcs. (KG)
104298	6	3.2	0.3	0.45		0.5	116.9	0.04
104299	8	3.2	0.2	0.4		1	25.8	0.06
104301	8	3.2	0.3	0.55		0.83	105.3	0.09
104302	8	3.2	0.4	0.6		0.5	185.5	0.12
104306	8	3.2	0.5	0.7		0.4	357.4	0.15
104308	8	4.2	0.2	0.45		1.25	39.4	0.05
104310	8	4.2	0.3	0.55		0.83	118.9	0.08
104313	8	4.2	0.4	0.6		0.5	209.6	0.11
104317	10	3.2	0.3	0.65		1.17	98.0	0.16
104318	10	3.2	0.4	0.7		0.75	182.0	0.21
104319	10	3.2	0.5	0.75		0.5	281.8	0.26
104321	10	4.2	0.4	0.7		0.75	192.1	0.19
104323	10	4.2	0.5	0.75		0.5	297.5	0.24
104326	10	4.2	0.6	0.85		0.42	508.4	0.29
104329	10	5.2	0.25	0.55		1.2	58.0	0.10
104330	10	5.2	0.4	0.7		0.75	212.6	0.17
104332	10	5.2	0.5	0.75		0.5	329.1	0.21
104336	12	4.2	0.4	0.8		1	178.4	0.30
104338	12	4.2	0.5	0.85		0.7	281.8	0.37
104339	12	4.2	0.6	1		0.67	556.8	0.44
104342	12	5.2	0.5	0.9		0.8	349.6	0.34
104345	12	5.2	0.6	0.95		0.58	502.2	0.41
104347	12	6.2	0.5	0.85		0.7	324.1	0.30
104351	12	6.2	0.6	0.95		0.58	547.5	0.36
104353	12.5	5.2	0.5	0.85		0.7	270.2	0.38
104354	12.5	6.2	0.35	0.8		1.29	151.6	0.24
104358	12.5	6.2	0.5	0.85		0.7	291.4	0.34
104361	12.5	6.2	0.7	1		0.43	672.7	0.47
104369	14	7.2	0.35	0.8		1.29	123.5	0.29
104372	14	7.2	0.5	0.9		0.8	279.2	0.42
104374	14	7.2	0.8	1.1		0.38	813.2	0.67
104379	15	5.2	0.4	0.95		1.38	175.4	0.47
104381	15	5.2	0.5	1		1	280.2	0.58
104382	15	5.2	0.6	1.05		0.75	409.3	0.70
104383	15	5.2	0.7	1.1		0.57	555.3	0.81
104384	15	6.2	0.5	1		1	291.4	0.55
104386	15	6.2	0.6	1.05		0.75	425.7	0.66
104389	15	6.2	0.7	1.1		0.57	577.5	0.76
104390	15	8.2	0.7	1.1		0.57	665.6	0.64
104395	15	8.2	0.8	1.2		0.5	982.3	0.73
104397	16	8.2	0.4	0.9		1.25	155.0	0.44
104404	16	8.2	0.6	1.05		0.75	412.2	0.66
104407	16	8.2	0.7	1.15		0.64	640.9	0.77

PART No.	Diameter – De (mm)	Diameter – Di (mm)	Thickness – t (mm)	Unloaded Height – lo (mm)	Thickness – t' (mm)	ho/t	Load – F(0.75 ho) N	Weight per 1000 pcs. (KG)
104408	16	8.2	0.8	1.2		0.5	825.3	0.88
104410	16	8.2	0.9	1.25		0.39	1,004.0	0.99
104417	18	6.2	0.4	1		1.5	138.7	0.68
104420	18	6.2	0.5	1.1		1.2	245.5	0.85
104422	18	6.2	0.6	1.2		1	400.4	1.02
104424	18	6.2	0.7	1.25		0.79	550.3	1.18
104426	18	6.2	0.8	1.3		0.63	733.4	1.35
104428	18	8.2	0.5	1.1		1.2	264.7	0.76
104431	18	8.2	0.7	1.25		0.79	593.6	1.05
104436	18	8.2	0.8	1.3		0.63	790.9	1.21
104499	18	8.2	1	1.4		0.4	1,181.0	1.54
104437	18	9.2	0.45	1.05		1.33	213.7	0.63
104439	18	9.2	0.7	1.2		0.71	572.0	0.98
104504	18	9.2	1	1.4		0.4	1,254.0	1.40
104441	20	8.2	0.5	1.15		1.3	231.1	0.98
104444	20	8.2	0.6	1.3		1.17	413.5	1.18
104445	20	8.2	0.7	1.35		0.93	570.2	1.37
104447	20	8.2	0.8	1.4		0.75	751.1	1.57
104450	20	8.2	0.9	1.45		0.61	949.0	1.77
104506	20	8.2	1	1.55		0.55	1,288.0	1.96
104451	20	10.2	0.4	0.9		1.25	98.9	0.69
104456	20	10.2	0.5	1.15		1.3	254.5	0.87
104459	20	10.2	0.8	1.35		0.69	744.8	1.38
104463	20	10.2	0.9	1.45		0.61	1,045.0	1.56
104513	20	10.2	1	1.55		0.55	1,418.0	1.73
104518	20	10.2	1.1	1.55		0.41	1,531.0	1.91
104520	20	10.2	1.2	1.55		0.29	1,503.0	2.08
104544	20	10.2	1.5	1.8		0.2	2,576.0	2.61
104464	22.5	11.2	0.6	1.4		1.33	425.5	1.35
104466	22.5	11.2	0.8	1.45		0.81	709.9	1.79
104546	22.5	11.2	1.25	1.75		0.4	1,952.0	2.81
104468	23	8.2	0.7	1.5		1.14	543.6	1.91
104470	23	8.2	0.8	1.55		0.94	716.8	2.19
104474	23	8.2	0.9	1.6		0.78	925.0	2.47
104521	23	8.2	1	1.7		0.7	1,249.0	2.74
104477	23	10.2	0.9	1.65		0.83	1,055.0	2.26
104522	23	10.2	1	1.7		0.7	1,325.0	2.51
104550	23	10.2	1.25	1.9		0.52	2,320.0	3.15
104524	23	12.2	1	1.6		0.6	1,217.0	2.23
104554	23	12.2	1.25	1.85		0.48	2,331.0	2.80
104558	23	12.2	1.5	2.1		0.4	3,986.0	3.36
104525	25	10.2	1	1.75		0.75	1,168.0	3.09
104478	25	12.2	0.7	1.6		1.29	600.8	1.96
104480	25	12.2	0.9	1.6		0.78	868.0	2.53
104526	25	12.2	1	1.8		0.8	1,359.0	2.81
104563	25	12.2	1.25	1.95		0.56	2,232.0	3.52
104565	25	12.2	1.5	2.05		0.37	2,910.0	4.24
104484	28	10.2	0.8	1.75		1.19	660.7	3.24
104528	28	10.2	1	1.9		0.9	1 135	4.05
104575	28	10.2	1.25	2.05		0.64	1,853.0	5.08



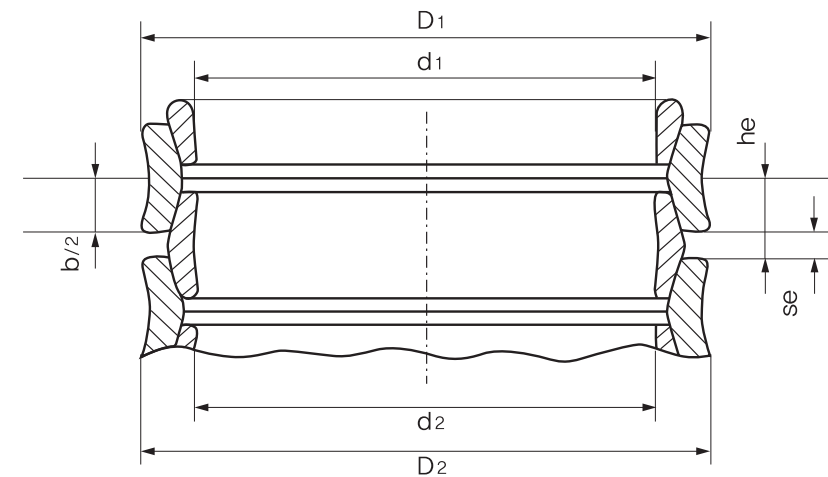


# Ring Spring 규격

## 특수 스프링 Special spring

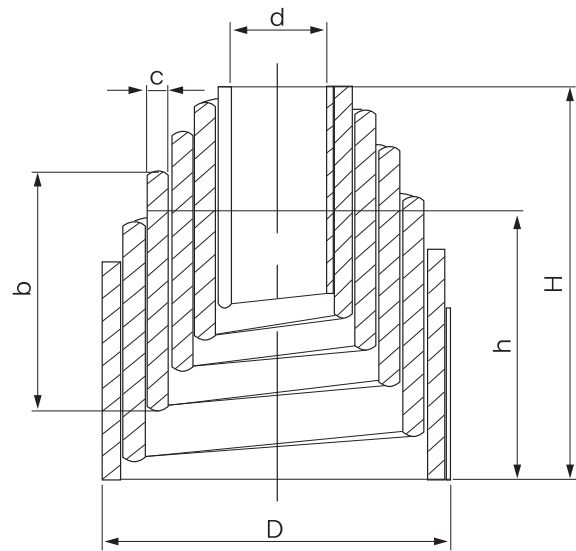


Typ/Type (ab/from 1.10.89)	Typ/Type alt/old	Ausführung Manuf.	Geschlossene Ringe/solid rings									
			Diagramm			Abmessungen/dimensions			Führung/guide		Gewicht/weight	
			F kN	S <sub>e</sub> mm	W <sub>e</sub> J	h <sub>e</sub> mm	D <sub>1</sub> mm	d <sub>1</sub> mm	b/2 mm	D <sub>2</sub> mm	d <sub>2</sub> mm	G <sub>e</sub> kg
01800	1201	gedreht turned	5	0.4	1.0	2.2	18.1	14.4	1.8	18.6	14.0	0.001
02500	1202		9	0.6	2.7	3.1	25.0	20.8	2.5	25.7	20.2	0.003
03200	1203		14	0.8	5.6	4.0	32.0	27.0	3.2	32.9	26.2	0.006
03800	1204		20	0.9	9.0	4.7	38.0	31.7	3.8	39.0	30.8	0.011
04200	1205		26	1.0	13.0	5.2	42.2	34.6	4.2	43.4	33.5	0.016
04800	1206		34	1.1	18.7	5.9	48.2	39.4	4.8	49.6	38.1	0.024
05500	1207		40	1.3	26.0	6.8	55.0	46.0	5.5	56.6	44.5	0.033
06300	1208		54	1.4	37.8	7.7	63.0	51.9	6.3	64.8	50.2	0.053
07000	1209		65	1.6	52.0	8.6	70.0	58.2	7.0	72.0	56.3	0.070
08000	1310	gewalzt roiled	83	1.8	75.0	9.8	80.0	67.0	8.0	83.0	64.0	0.098
09000	1311		100	2.0	100.0	11.0	90.0	75.5	9.0	93.0	72.5	0.137
10000	1312		125	2.2	138.0	12.2	100.0	84.0	10.0	103.0	81.0	0.192
13000	1313		160	2.6	208.0	15.0	130.0	111.5	12.4	134.0	107.5	0.357
12400	1314		200	2.6	260.0	15.0	124.0	102.0	12.4	128.0	98.0	0.393
14000	1315		250	3.0	375.0	17.0	140.0	116.0	14.0	144.0	112.0	0.552
16600	1316		350	3.7	648.0	20.0	166.0	134.0	16.0	170.0	130.0	0.822
20000	1317		510	3.9	995.0	22.4	198.0	162.0	18.5	203.0	157.0	1.515
19600	1318		600	4.4	1320.0	23.4	194.0	155.0	19.0	199.0	150.0	1.615
22000	1319		720	4.4	1584.0	26.4	220.0	174.0	22.0	225.0	169.0	2.520
26200	1320		860	4.8	2064.02	25.8	262.0	208.0	21.0	268.0	202.0	3.315
30000	1221	gewalzt roiled	1000	5.8	900.0	35.8	300.0	250.0	30.0	306.0	245.0	5.410
32000	1222	1200	6.2	3720.0	38.2	320.0	263.0	32.0	326.0	258.0	6.950	
35000	1223	gedreht turned	1400	6.6	4620.06	41.6	350.0	288.0	35.0	356.0	283.0	8.950
40000	1224	1800	7.6	840.0	47.6	400.0	330.0	40.0	407.0	324.0	13.350	



# Volute Spring 주문사양서

스프링 소재			
소재폭(=b)			[mm]
소재두께(=c)			[mm]
내경(=d)			[mm]
외경(=D)			[mm]
총권수			
권방향			
자유고(=H)			[mm]
하중조건	F1		[N]
	h1		[mm]
	F2		[N]
	h2		[mm]
	F3		[N]
	h3		[mm]



# 인서트코일 (Insert Coil)

## Insert Coil의 설명 및 특징 (Description and Features of Insert Coil)

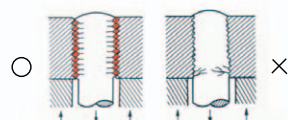


### ■ 모재의 암나사 강화

경합금, 주철, 플라스틱, 목재 등에 스테인레스 강도의 암나사를 형성합니다.

### ■ Strengthened Internal Thread of Base Metal

Internal thread having the strength of stainless steel is formed in light alloy, cast iron plastic, wood and the like.

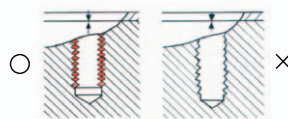


### ■ 피로 한도 증대

응력분포가 이상적이기 때문에 반복되는 하중에 잘 견디며 피로의 한도를 획기적으로 증대할 수 있습니다.

### ■ Increase of Fatigue Limit

Since stress is ideally distributed in it, it endures repetitive loads well, So, it can increase the fatigue limit remarkably.

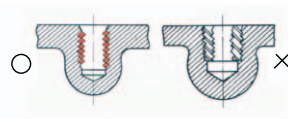


### ■ 내구성 있는 나사 결합

마모, 부식, 진동 등으로부터 나사산의 파손을 방지하고 빈번한 조립, 분해에도 내구성 있는 나사 결합이 가능합니다.

### ■ Durable Thread Combination

It prevents any breakage of the thread resulting from wear, corrosion, vibration or the like, and even if it is frequently assembled and disassembled, durable thread combination is available

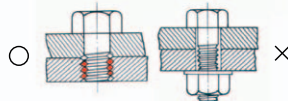


### ■ 용적, 중량의 감소

종래의 나사 부쉬와 비교해서 현저히 스페이스를 축소하고 용적 중량을 감소하여 재료를 절약할 수 있어 매우 경제적입니다.

### ■ Decrease of Volume and Weight

Compared to the conventional thread bush, it reduces the space, the volume substantially. Consequently, the material cost is much saved so that it is very economical.

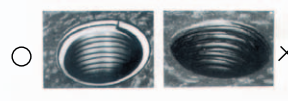


### ■ 간결한 설계가능

경량화 설계와 간결한 디자인이 가능하기 때문에 견고한 나사 결합에 의한 제품의 품질을 한층 더 향상시킬 수 있습니다.

### ■ Simple Design Available

Since it makes a lightweight-oriented design and a simple design available, firm thread combination can improve the product quality more greatly.



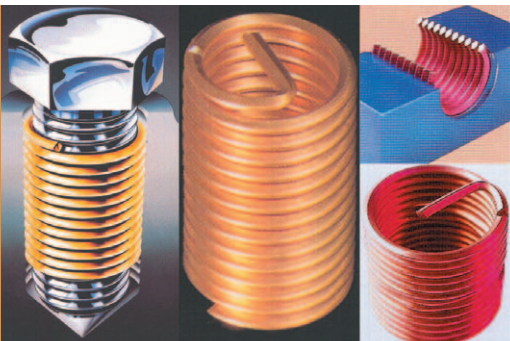
### ■ 손상된 암나사의 재생

생산시 불량품과 수리시 파손된 나사를 구제, 재생할 수 있습니다.

### ■ Reproduction of Damaged Internal Thread

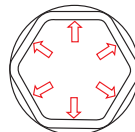
Any defective product and any thread damaged during the repairing work can be relieved and reproduced.

Revolution in Thread!  
Best Quality!



### ■ LOCK TYPE

- ▶ 코일 중앙부에 다각형의 LOCK부를 형성하여 볼트를 견고히 고정할 수 있습니다.
- ▶ A polygonal lock part is formed in the center of the coil so that it can fix the bolt firmly.



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## 주요 거래선

### CAR MAKER



### DIE MAKER



### STAMPING MAKER

