

# Rubber Spring SRV [Overview]

## Pressure Source Components

**Load is increased twice compared to the previous type.**

With innovation of material and manufacturing, SRV has improved performances in various characteristics; load, permanent set, durability, etc. The cost effectiveness is excellent compared to coil springs or urethane springs.

### Features

- **Durability:** With 35% deflection, durability of 300,000 strokes is achieved. It is excellent in oil resistance, chemical resistance, heat resistance, dust resistance and corrosion resistance.
- **Permanent set:** With 35% deflection, 4% or less permanent set is achieved at 300,000 strokes. Permanent distortion appears extreme by 10,000 strokes, progresses gradually to 50,000 strokes, and then stabilizes.
- **Maximum deflection:** 35%
- **Double stack can be allowed** when the allowable maximum deflection is 30% or less and L/D is 1.6 or less.

### Bulge of Outer Diameter

When the SRV is compressed, the outer diameter is bulged. The bulge rate is not relevant to the spring size. It is proportional to the deflection rate and the rate is almost constant of  $\Delta D = 0.86 \delta$ . The required clearance between the maximum bulge diameter and the wall is at least 5 mm.

$$\text{Bulge rate of outer diameter : } \Delta D = \frac{\phi D \delta - \phi D_0}{\phi D_0} \times 100\%$$

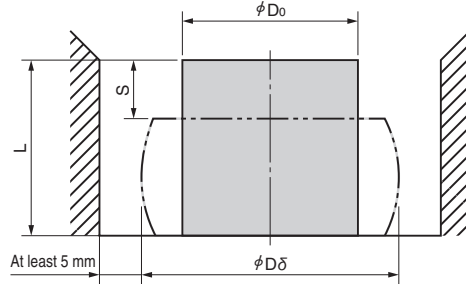
$$\text{Deflection rate: } \delta = \frac{S}{L} \times 100\%$$

Where

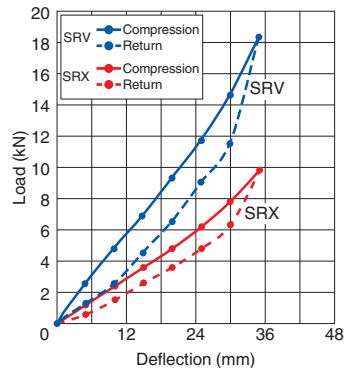
$\phi D_0$  : Initial outer diameter mm, L : Initial length mm

$\phi D\delta$  : Maximum outer diameter mm, S : Deflection mm

$$\text{Therefore, } \phi D\delta = (1 + 0.86 \frac{S}{L}) \times \phi D_0$$



● Load comparison: Example of φ63-100



### Load - Stroke Design

Refer to the SRV "load - deflection diagram" for load design. Use the compression line (solid line) for the load - deflection diagram.

### Application range

1. **Heat resistance**  
When the SRV is repeatedly compressed, it generates heat with hysteresis effect. Temperature rise reaches a balanced value and becomes constant around 1,000 strokes. The larger volume, deflection rate and strokes per minute (spm) are, the larger temperature. Continuous heat resistance of the SRV is 80°C.
2. **Dust resistance**  
The SRV is very resistant to the atmosphere with much dust or machined powder. If such dust or powder is buried in the pressurizing surface or fixed area, crack does not grow. Use the SRV as it is.
3. **Scratch resistance**  
If the SRV has scratches in the compression direction, it may not be broken immediately. It is better to replace it at an early stage.

### 4. Durability

At the deflection of 35%, the durability is 300,000 strokes.

### 5. Oil resistance and chemical resistance

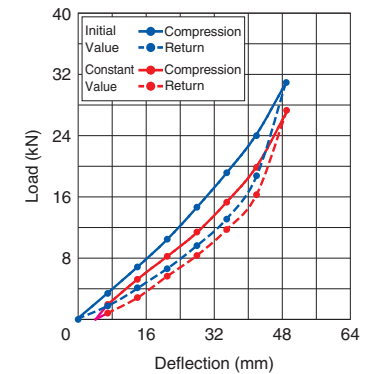
Water	1	Acetone	3
Ethyl Alcohol	2	Ammonia	2
Paint Thinner	2	Rust Proofing Oil	×
Hydrochloric Acid	×	Trichlene	×
Sulfuric Acid	×	Oxalic Acid	2
Nitric Acid	×	Tar	2
Grinding Oil	2	Toluene	×
Machine Oil	3	Phenol	3
Grease	3	Benzene	×
Gasoline	×	Acetic Acid	×
Brine	1	Glycerin	2
Methyl alcohol	2		

1 = excellent resistance  
2 = good resistance  
3 = mediocre resistance  
× = not resistant

### Conditions for Use

- Use at or below the stated deflection ratio.
- The urethane spring seating surface requires an external diameter of > 20 mm.
- The clearance around each spring must be sufficient to prevent any contact with the neighboring components.
- Exposure to ultraviolet and sunlight must be avoided.
- Guide pins should be S25C equivalent or better and finished within Ra1.6.
- Since rubber springs have adsorptive properties, be careful not to drop parts when disassembling press dies.
- Note that the rubber spring may come loose from the retainer due to its adsorptive properties and may not hit the seat parallel to the seat surface.
- If holding force is required to prevent the Rubber Spring from coming off, use a Rubber Spring with SORTB of the Retainer with enhanced holding force.

SRV80-140





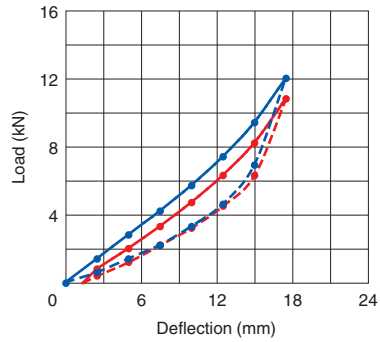
# Rubber Spring

## SRV Load-Deflection Diagrams

### Pressure Source Components

Initial Value —●— Compression    Constant Value —●— Compression  
 —○— Return                                    —○— Return

SRV50-50

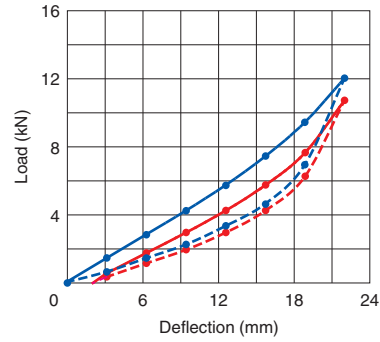


Load	Deflection mm								
	0	2.5	5	7.5	10	12.5	15	17.5	20
Initial Value	Compression	0.0	1.4	2.8	4.2	5.7	7.4	9.4	12.0
	Return	0.0	0.6	1.4	2.2	3.3	4.6	6.9	12.0
Constant value 5~300,000 strokes	Compression	—	0.8	2.0	3.3	4.7	6.3	8.2	10.8
	Return	—	0.4	1.2	2.2	3.2	4.5	6.3	10.8

● Load in compression (reference)

Deflection [mm]	9.5	11.5	13.5	15.5
Load [kN]	4.4	5.5	7.0	8.6

SRV50-63

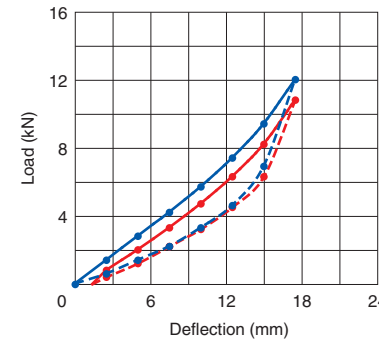


Load	Deflection mm								
	0	3.0	6.3	9.0	13.0	16.0	19.0	22.0	24.0
Initial Value	Compression	0.0	1.4	2.8	4.2	5.7	7.4	9.4	12.0
	Return	0.0	0.6	1.4	2.2	3.3	4.6	6.9	12.0
Constant value 5~300,000 strokes	Compression	—	0.5	1.7	2.9	4.2	5.7	7.6	10.7
	Return	—	0.3	1.1	1.9	2.9	4.2	6.2	10.7

● Load in compression (reference)

Deflection [mm]	14.0	16.0	18.0	20.0
Load [kN]	4.7	5.7	6.9	8.4

SRV63-63

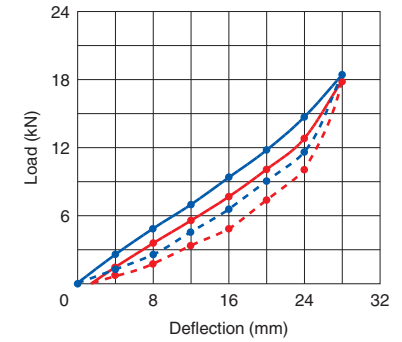


Load	Deflection mm								
	0	3.0	6.3	9.0	13.0	16.0	19.0	22.0	24.0
Initial Value	Compression	0.0	2.5	4.8	6.9	9.3	11.7	14.6	18.3
	Return	0.0	1.2	2.5	4.5	6.5	9.0	11.5	18.3
Constant value 5~300,000 strokes	Compression	—	1.6	3.7	5.6	7.6	10.0	12.7	16.5
	Return	—	1.0	2.3	3.6	5.5	7.5	10.2	16.5

● Load in compression (reference)

Deflection [mm]	14.0	16.0	18.0	20.0
Load [kN]	8.5	10.0	12.0	14.0

SRV63-80

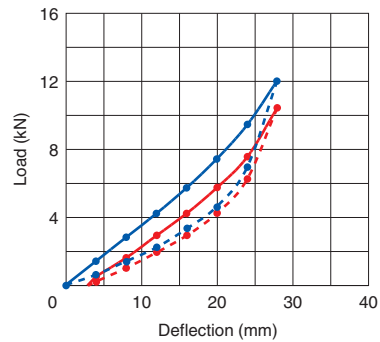


Load	Deflection mm								
	0	4	8	12	16	20	24	28	32
Initial Value	Compression	0.0	2.5	4.8	6.9	9.3	11.7	14.6	18.3
	Return	0.0	1.2	2.5	4.5	6.5	9.0	11.5	18.3
Constant value 5~300,000 strokes	Compression	—	1.4	3.5	5.5	7.6	10.0	12.7	17.8
	Return	—	0.7	1.7	3.3	4.8	7.3	9.9	17.8

● Load in compression (reference)

Deflection [mm]	20.0	22.0	24.0	26.0
Load [kN]	10.0	11.3	12.7	15.2

SRV50-80

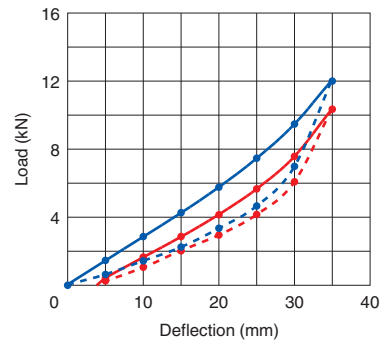


Load	Deflection mm								
	0	4	8	12	16	20	24	28	32
Initial Value	Compression	0.0	1.4	2.8	4.2	5.7	7.4	9.4	12.0
	Return	0.0	0.6	1.4	2.2	3.3	4.6	6.9	12.0
Constant value 5~300,000 strokes	Compression	—	0.5	1.6	2.9	4.2	5.7	7.5	10.4
	Return	—	0.2	1.0	1.9	2.9	4.2	6.2	10.4

● Load in compression (reference)

Deflection [mm]	20.0	22.0	24.0	26.0
Load [kN]	5.7	6.4	7.5	8.6

SRV50-100

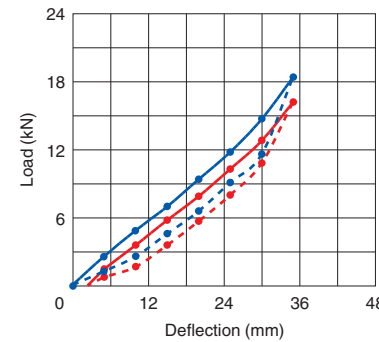


Load	Deflection mm								
	0	5	10	15	20	25	30	35	40
Initial Value	Compression	0.0	1.4	2.8	4.2	5.7	7.4	9.4	12.0
	Return	0.0	0.6	1.4	2.2	3.3	4.6	6.9	12.0
Constant value 5~300,000 strokes	Compression	—	0.4	1.6	2.8	4.1	5.6	7.5	10.3
	Return	—	0.2	1.0	2.0	2.9	4.1	6.0	10.3

● Load in compression (reference)

Deflection [mm]	27.0	29.0	31.0	33.0
Load [kN]	6.3	7.0	8.0	9.0

SRV63-100

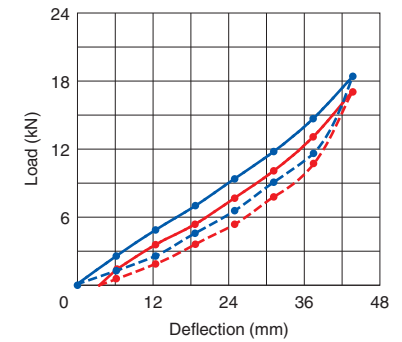


Load	Deflection mm								
	0	5	10	15	20	25	30	35	40
Initial Value	Compression	0.0	2.5	4.8	6.9	9.3	11.7	14.6	18.3
	Return	0.0	1.2	2.5	4.5	6.5	9.0	11.5	18.3
Constant value 5~300,000 strokes	Compression	—	1.4	3.5	5.7	7.8	10.2	12.7	16.1
	Return	—	0.7	1.6	3.5	5.6	7.9	10.7	16.1

● Load in compression (reference)

Deflection [mm]	27.0	29.0	31.0	33.0
Load [kN]	11.1	12.2	13.4	14.7

SRV63-125



Load	Deflection mm								
	0	6	13	19	25	31	38	44	48
Initial Value	Compression	0.0	2.5	4.8	6.9	9.3	11.7	14.6	18.3
	Return	0.0	1.2	2.5	4.5	6.5	9.0	11.5	18.3
Constant value 5~300,000 strokes	Compression	—	1.3	3.5	5.3	7.6	10.0	13.0	17.0
	Return	—	0.5	1.8	3.5	5.3	7.7	10.6	17.0

● Load in compression (reference)

Deflection [mm]	36.0	38.0	40.0	42.0
Load [kN]	12.2	13.0	14.5	15.8

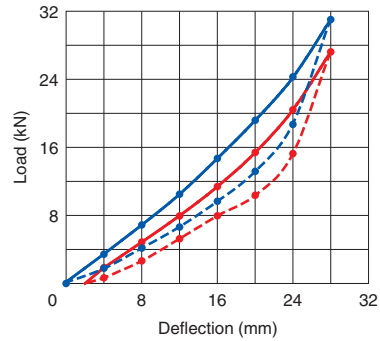
# Rubber Spring

## SRV Load-Deflection Diagrams

### Pressure Source Components

Initial Value —●— Compression    Constant Value —●— Compression  
 Return —●— Return                      Return —●— Return

SRV80-80

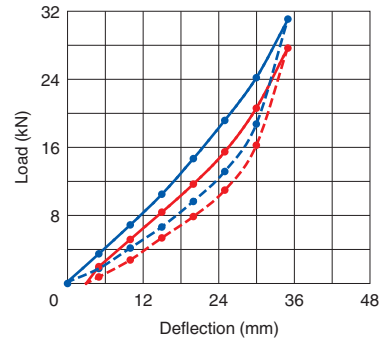


Load	Deflection mm								
	0	4	8	12	16	20	24	28	
Initial Value	Compression	0.0	3.3	6.7	10.3	14.5	19.0	24.0	30.8
	Return	0.0	1.6	4.0	6.5	9.5	13.0	18.5	30.8
Constant value 5~300,000 strokes	Compression	—	1.7	4.7	7.8	11.2	15.2	20.2	27.0
	Return	—	0.5	2.5	5.1	7.8	10.2	15.0	27.0

● Load in compression (reference)

Deflection [mm]	20.0	22.0	24.0	26.0
Load [kN]	15.2	17.5	20.2	23.4

SRV80-100

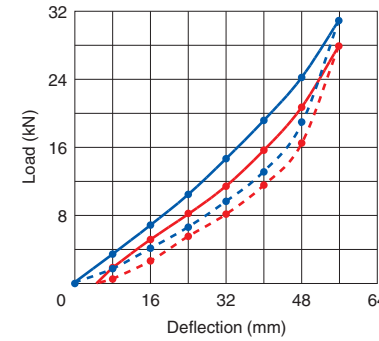


Load	Deflection mm								
	0	5	10	15	20	25	30	35	
Initial Value	Compression	0.0	3.3	6.7	10.3	14.5	19.0	24.0	30.8
	Return	0.0	1.6	4.0	6.5	9.5	13.0	18.5	30.8
Constant value 5~300,000 strokes	Compression	—	1.8	5.0	8.2	11.5	15.3	20.4	27.5
	Return	—	0.6	2.6	5.2	7.7	10.8	16.0	27.5

● Load in compression (reference)

Deflection [mm]	27.0	29.0	31.0	33.0
Load [kN]	17.2	19.3	21.7	24.4

SRV80-160

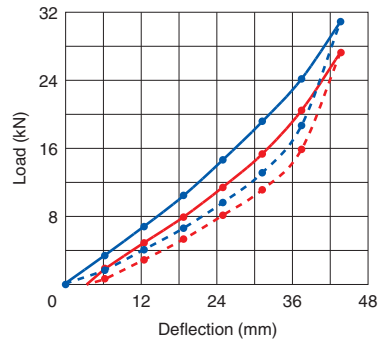


Load	Deflection mm								
	0	8	16	24	32	40	48	56	
Initial Value	Compression	0.0	3.3	6.7	10.3	14.5	19.0	24.0	30.8
	Return	0.0	1.6	4.0	6.5	9.5	13.0	18.5	30.8
Constant value 5~300,000 strokes	Compression	—	1.7	5.0	8.0	11.3	15.5	20.5	27.8
	Return	—	0.4	2.5	5.4	8.0	11.4	16.2	27.8

● Load in compression (reference)

Deflection [mm]	48.0	50.0	52.0	54.0
Load [kN]	20.5	22.2	24.0	25.8

SRV80-125

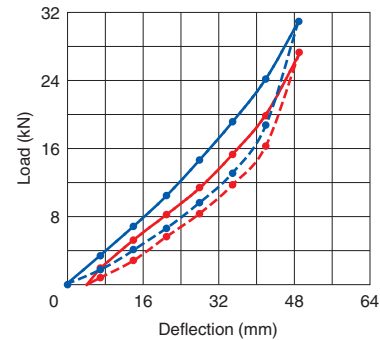


Load	Deflection mm								
	0	6.0	12.5	19.0	25.0	31.0	38.0	44.0	
Initial Value	Compression	0.0	3.3	6.7	10.3	14.5	19.0	24.0	30.8
	Return	0.0	1.6	4.0	6.5	9.5	13.0	18.5	30.8
Constant value 5~300,000 strokes	Compression	—	1.7	4.8	7.8	11.3	15.2	20.3	27.2
	Return	—	0.5	2.8	5.2	8.0	11.0	15.7	27.2

● Load in compression (reference)

Deflection [mm]	36.0	38.0	40.0	42.0
Load [kN]	19.0	20.3	22.9	25.1

SRV80-140



Load	Deflection mm								
	0	7	14	21	28	35	42	49	
Initial Value	Compression	0.0	3.3	6.7	10.3	14.5	19.0	24.0	30.8
	Return	0.0	1.6	4.0	6.5	9.5	13.0	18.5	30.8
Constant value 5~300,000 strokes	Compression	—	1.8	5.1	8.1	11.2	15.2	19.8	26.8
	Return	—	0.7	2.7	5.5	8.2	11.6	16.1	26.8

● Load in compression (reference)

Deflection [mm]	41.0	43.0	45.0	47.0
Load [kN]	19.2	20.8	22.6	24.6

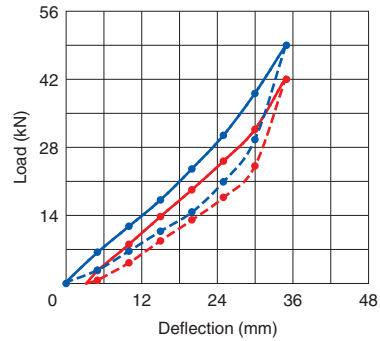
# Rubber Spring

## SRV Load-Deflection Diagrams

### Pressure Source Components

Initial Value —●— Compression    Constant Value —●— Compression  
 Return —○— Return                      Return —○— Return

SRV100-100

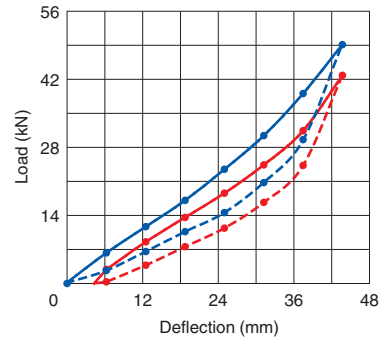


Load	Deflection mm								
	0	5	10	15	20	25	30	35	
Initial Value	Compression	0.0	6.1	11.5	16.9	23.3	30.2	38.8	48.9
	Return	0.0	2.5	6.4	10.5	14.4	20.6	29.2	48.9
Constant value 5~300,000 strokes	Compression	-	2.4	7.8	13.5	19.0	24.9	31.4	42.2
	Return	-	0.4	4.0	8.5	12.8	17.4	23.8	42.2

● Load in compression (reference)

Deflection [mm]	27.0	29.0	31.0	33.0
Load [kN]	27.4	30.4	33.8	37.7

SRV100-125



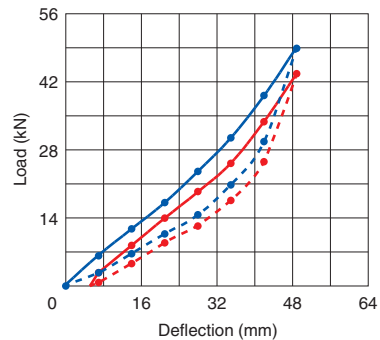
Load	Deflection mm								
	0	6.0	12.5	19.0	25.0	31.0	38.0	44.0	
Initial Value	Compression	0.0	6.1	11.5	16.9	23.3	30.2	38.8	48.9
	Return	0.0	2.5	6.4	10.5	14.4	20.6	29.2	48.9
Constant value 5~300,000 strokes	Compression	-	2.7	8.4	13.4	18.4	24.2	31.2	42.5
	Return	-	0.2	3.6	7.4	11.2	16.5	24.0	42.5

● Load in compression (reference)

Deflection [mm]	36.0	38.0	40.0	42.0
Load [kN]	29.5	31.2	35.5	39.0

This page intentionally left blank

SRV100-140

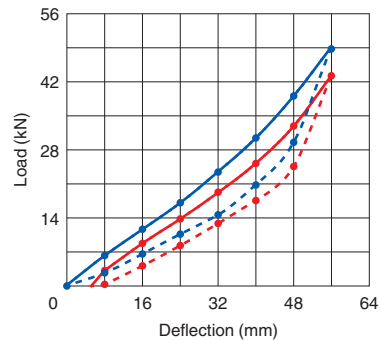


Load	Deflection mm								
	0	7	14	21	28	35	42	49	
Initial Value	Compression	0.0	6.1	11.5	16.9	23.3	30.2	38.8	48.9
	Return	0.0	2.5	6.4	10.5	14.4	20.6	29.2	48.9
Constant value 5~300,000 strokes	Compression	-	2.5	8.1	13.7	19.1	25.0	33.5	43.5
	Return	-	0.5	4.4	8.7	12.2	17.4	25.2	43.5

● Load in compression (reference)

Deflection [mm]	41.0	43.0	45.0	47.0
Load [kN]	32.0	34.6	37.4	40.3

SRV100-160



Load	Deflection mm								
	0	8	16	24	32	40	48	56	
Initial Value	Compression	0.0	6.1	11.5	16.9	23.3	30.2	38.8	48.9
	Return	0.0	2.5	6.4	10.5	14.4	20.6	29.2	48.9
Constant value 5~300,000 strokes	Compression	-	3.0	8.6	13.6	19.0	25.0	32.6	43.0
	Return	-	0.2	4.0	8.2	12.6	17.4	24.2	43.0

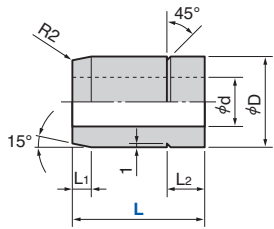
● Load in compression (reference)

Deflection [mm]	48.0	50.0	52.0	54.0
Load [kN]	32.6	35.0	37.5	40.1

# Retainer, Spacer

## Pressure Source Components

### SORTA



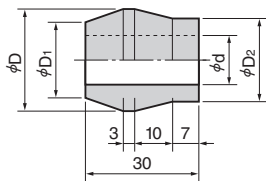
〈Material〉 SS400 or S25C

Catalog No.	Nominal	L	D	d	L <sub>1</sub>	L <sub>2</sub>	Applicable Rubber Spring, Urethane Spring	
							Outer Diameter	Length
SORTA	14	10	16	9	2	3	30, 40	~40
		20			3	7	30~63	50~63
	20	30	22	13	5	10	60~	60~125
		35	24				70~100	60~200



Catalog No. **SORTA** Nominal **20** - L **30**

### SORTB



〈Material〉 SS400 or S25C

Catalog No.	Nominal	D	D <sub>1</sub>	D <sub>2</sub>	d	Outer Diameter	
						SORTB	14
	22	27	20	22	13	80	100

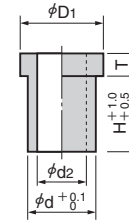


When installing SORTB, set the straight part to the fixed surface side.



Catalog No. **SORTB** Nominal **14**

### K



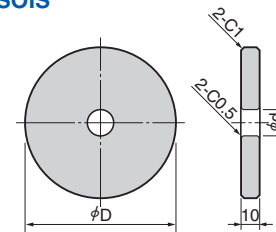
〈Material〉 SS400

Catalog No.	Nominal	D <sub>1</sub>	d	d <sub>2</sub>	H	T
K	10	19.5	15	11	12	5
	12	22	18	13	20	6



Catalog No. **K** Nominal **10**

### SOIS



〈Material〉 Neodel (#25-61N)

Catalog No.	Nominal	D	d	Applicable Rubber Spring, Urethane Spring		
				Outer Diameter	Inner Diameter	Guide Pin Diameter
SOIS	50	65	13	30	40	50
	63			60	63	14
	80	100	21	70	80	20
	100			90	100	110



Guide pins should be S25C equivalent or better and finished within Ra1.6.



Catalog No. **SOIS** Nominal **63**