

# torsion springs for sectional doors

mollificio Pavano s.p.a

- Lecco (ITALY) -



Mollificio Pavano s.p.a

Via Overijse, 3 - 23.900 LECCO - ITALY

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Among its wide production of torsion springs Mollificio Pavano s.p.a. is also manufacturing torsion springs for sectional doors at international level with industrial and residential uses, in phosphated and galvanized steel.



**Spring for sectionals:  
Left coiling**



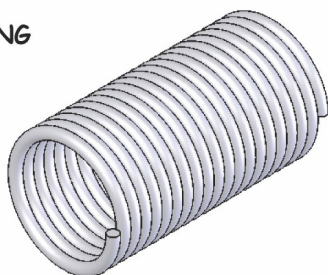
**Spring for sectionals:  
right coiling**



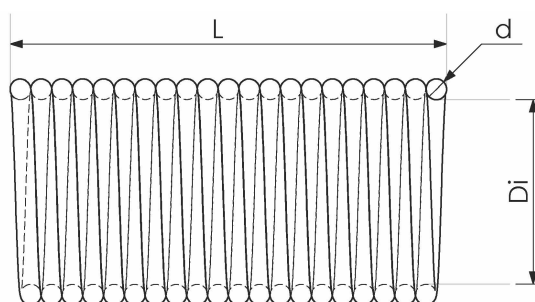
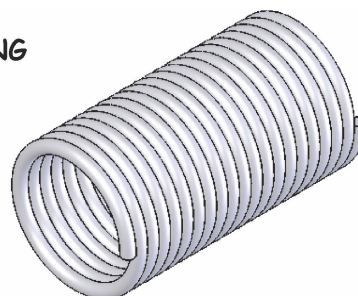
**Spring for sectionals: maximum length to be cut at  
the desired mounting length**

## Table of standard spring for sectional doors

RIGHT COILING  
(DX)



LEFT COILING  
(SX)



## General specifications

Int. Diameter (Di)	Wire Diameter (d)	Material	Maximum Length (L)
50,8 (+0/-1,5)	From 4,0 to 12,50	Phosfatated SH EN 10270:1 (C DIN 17223)	4000 max
	From 4,0 to 11,00	Galvanized SH EN 10270:1 (C DIN 17223)	
66,7 (+0/-1,5)	From 4,0 to 12,50	Phosfatated SH EN 10270:1 (C DIN 17223)	4000 max
	From 4,0 to 11,00	Galvanized SH EN 10270:1 (C DIN 17223)	
95,25 (±1,5)	From 4,0 to 12,50	Phosfatated SH EN 10270:1 (C DIN 17223)	4000 max
	From 4,0 to 11,00	Galvanized SH EN 10270:1 (C DIN 17223)	
133,3 (±2,5)	From 4,0 to 12,50	Phosfatated SH EN 10270:1 (C DIN 17223)	4000 max
	From 4,0 to 11,00	Galvanized SH EN 10270:1 (C DIN 17223)	
152,5 (±2,5)	From 4,0 to 12,50	Phosfatated SH EN 10270:1 (C DIN 17223)	4000 max
	From 4,0 to 11,00	Galvanized SH EN 10270:1 (C DIN 17223)	

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## Average Weights (per Meter)

Here below the weight per meter of each kind of spring (with different internal diameter and different wire diameter).

<b>WEIGHT PER METER [kg/m]</b>					
<b>Wire d.</b>	<b>50,8</b>	<b>66,7</b>	<b>95,25</b>	<b>133,35</b>	<b>152,4</b>
4,5	4,8 kg	6,2 kg	8,7 kg	12,0 kg	13,6 kg
5,0	5,4 kg	6,9 kg	9,7 kg	13,3 kg	15,2 kg
5,5	6,0 kg	7,7 kg	10,7 kg	14,7 kg	16,7 kg
6,0	6,6 kg	8,4 kg	11,7 kg	16,1 kg	18,3 kg
6,5	7,2 kg	9,2 kg	12,7 kg	17,5 kg	19,9 kg
7,0	7,8 kg	9,9 kg	13,8 kg	18,9 kg	21,5 kg
7,5	8,4 kg	10,7 kg	14,8 kg	20,3 kg	23,1 kg
8,0	9,0 kg	11,5 kg	15,9 kg	21,8 kg	24,7 kg
8,5	9,7 kg	12,3 kg	17,0 kg	23,2 kg	26,3 kg
9,0	10,3 kg	13,1 kg	18,0 kg	24,6 kg	27,9 kg
9,5	11,0 kg	13,9 kg	19,1 kg	26,1 kg	29,5 kg
10,0	11,7 kg	14,7 kg	20,2 kg	27,5 kg	31,2 kg
10,5	12,4 kg	15,6 kg	21,3 kg	29,0 kg	32,8 kg
11,0	13,0 kg	16,4 kg	22,4 kg	30,5 kg	34,5 kg
11,5	13,7 kg	17,2 kg	23,5 kg	31,9 kg	36,1 kg
12,0	14,4 kg	18,1 kg	24,7 kg	33,4 kg	37,8 kg
12,5	15,2 kg	19,0 kg	25,8 kg	34,9 kg	39,5 kg

### Springs cut and assembled with fittings

We can supply standard torsion springs cut at the required length or with the maximum length of 4000mm.



**Ref. 1: Standard springs: standard cut at each ends**

We can supply torsion springs with special length and assembled with fittings.



**Ref. 2:  
springs with different kind of fittings  
with custom length**



**Ref. 3:  
Springs assembled with torsion fittings**



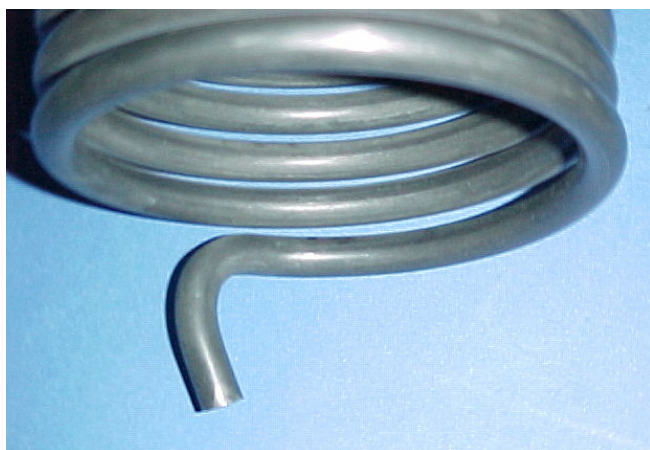
### Springs with special ends shape

We can supply springs with different kind of shaped ends



**Ref. 4:**  
**Ends with both shaped hooks**

**Ref. 5:**  
**Ends with both shaped hooks**



**Ref. 6:**  
**Ends with both shaped hooks**

## Materials

A careful suppliers selection and constant monitoring allow MOLLIFICIO PAVANO SPA to use homogeneous and qualified materials in its production process, according to International Rules.

Material used:

<b>Phosphated steel wire</b>	DIN 17223 – C EN10270-1 SH	For standard raw springs
<b>Galvanized steel wire</b>	DIN 17223 – C EN10270-1 SH	For standard galvanized springs
<b>Pretemperd steel wire</b>	EN 10270-2 : Si Cr FD / Si Cr VD	For hard stressed springs

## Heating treatment

Each springs is stress relived in special oven just after the coiling process in order to gain elasticity and homogeneity in the performances.

## Surface finishing

Springs can be delivered with different kind of surface finishing:

<b>Raw (Black)</b>	Produced with phosphated wire and stressed relived
<b>Galvanized</b>	Produced with pre-galvanized wire and stressed relived
<b>Varnished</b>	Produced with phosphated wire, stressed relived and then black epossidic coated
<b>Cataforesi varnished</b>	Produced with phosphated wire, stressed relived and then cataforesi black varnished
<b>Shot peened</b>	Produced with phosphated wire, stressed relived and then shot peened . After the shot peening the covering can be: - galvanized - varnished

## Tracing

The packaging of each spring on a pallet includes its tracing through the use of a plaque indicating wire diameter and bending direction.

It is also possible to adopt a different type of tracing according to customer's specific requirements.

The tracing of each delivered lot is also granted by both the production lot and the material used in production process.



**Details of Identification Plaques**

## Packaging

Due to the peculiarity of these types of springs, MOLLIFICIO PAVANO SPA developed specific packaging systems.



**Disposition of spring in its packaging**



## Iron Pallets, laid on

- Specific Dimensions which allow transport and stocking in warehouse, even laid on;
- Dimension of a single pallet: 1000 X 4000 H 800 mm. (ca)
- Maximum Loadable weight: 2.000 kg.

## Wood boxes

- Specific Dimensions which allow transport and stocking in warehouse, even laid on;
- Dimensions: they can be agreed with customers according to specific requirements
- Maximum Loadable weight: 2000 kg.



**Detail of Iron Pallets**



**Wood boxes**



**Wood boxes**



**Wood boxes for container export**

## Testing and controls: certification

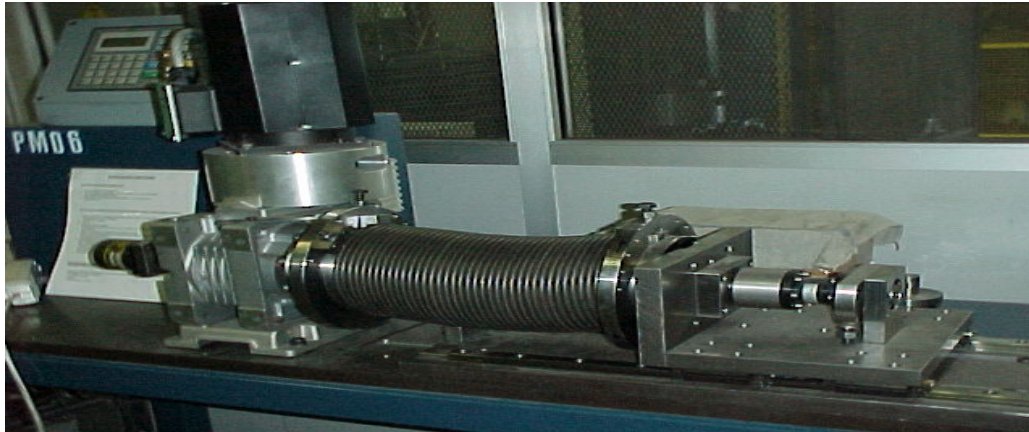
Our torsion springs guarantee the same or higher mechanical performances calculated by the most common calculation software for sectional doors.

Every production lot is traceable and is accompanied by a conformity and quality certificate, inclusive of material data sheet and mechanical characteristics of springs.

Always according to specific customer's requirements and for each production's lot, MOLLIFICIO PAVANO SPA can make dynamic torsion tests and can provide Specific Certificate for such tests, thanks to special torsion testing equipments.

Thanks to sophisticated calculation programs and countless years of experience, our staff is able to provide technical consultation during planning stages, granting the best type of spring to the customer.

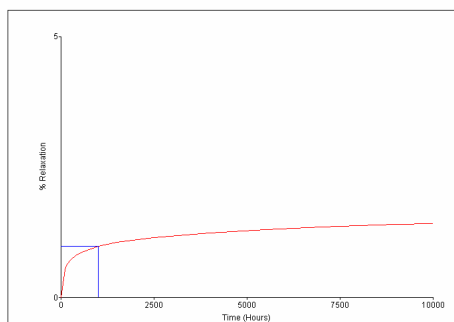
Calculations, performances, life cycle of the spring can be practically checked with static and fatigue tests on springs, thanks to the use of apposite digital torsionmeters.



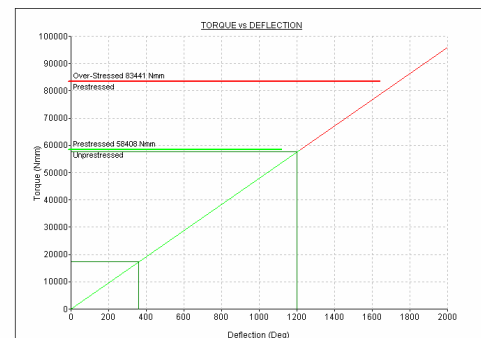
### **Torsion equipment : for static and dynamic tests .**

With the use of sophisticated calculations, supported by real applications, it's possible to know the relaxation diagram of the springs, as a function of working conditions.

Relaxation Prediction (based on IST data):  
Material: DIN 17223-1 Drawn  
Dynamic Relaxation: Operating between 1 and 2  
Corrected Stress: 371 N/mm<sup>2</sup> and 1237 N/mm<sup>2</sup>  
Time: 1000 Hours  
Temperature: 20 °C  
Shot Peened: No  
Prestressing: None  
Relaxation: 1 %



Torsion / Deflection Graph  
Material: DIN 17223-1 Drawn  
Grade: KLASSE C  
Upper Tensile (N/mm<sup>2</sup>): 1660  
Operating Positions: 1 2  
Deflection (Deg): 360,00 1200,0  
Torque (Nmm): 17263 57544  
Stress (N/mm<sup>2</sup>): 343,44 1144,8



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Torsion testing can be provided exclusively when agreed with customers before production. Customer has to provide to the manufacturer the following datas:

- Construction's datas of the spring
- Length of the spring to be tested ( or its number of coils)
- Pre-loaded Angle (**a**) of the spring
- Working Angle (**b**) of the spring

The relative couple are calculated:

- **C1<sub>a</sub>** and **C1<sub>b</sub>** , respectively initial pre-load couple and initial working couple
- **C2<sub>a</sub>** and **C2<sub>b</sub>**, respectively pre-load couple after "N" number of cycles and working couple after "N" number of cycles.

Below we are showing a sample of Report of Torsion Testing.

	<b>Report: torsion testing</b>			Date	
Spring Type				Production Lot	
Material					
Wire Diameter		Internal D.		Length	
<b>α</b> Preload Angle		<b>β</b> Working Angle		Nr. of cycles	
Couple [Nm] <b>C1<sub>α</sub></b>		Couple [Nm] <b>C1<sub>β</sub></b>		Nr. of cycles	
Couple [Nm] <b>C2<sub>α</sub></b>		Couple [Nm] <b>C2<sub>β</sub></b>		Nr. of cycles	
Notes:					
Testing Signature: .....			Responsible Signature: .....		

## FITTING FOR SECTIONAL SPRING DOORS DIAMETER 45 (120040)

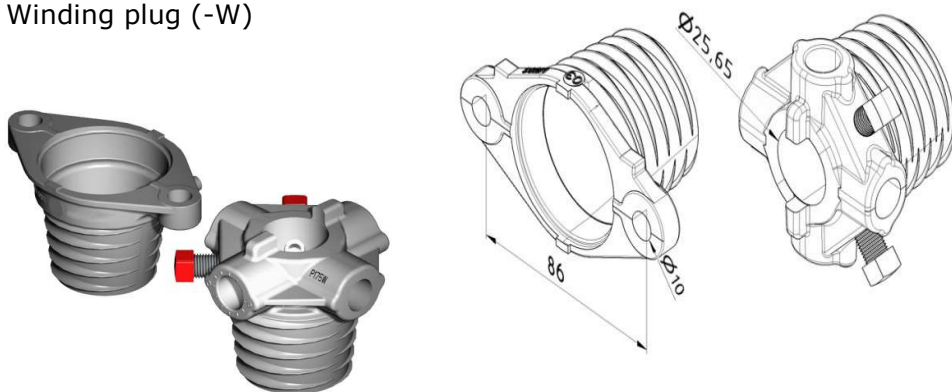
**Unit:** Pair (stationary plug (-S) + Winding plug (-W))

**Weight:** 0.28 kg / pr

**Material:** Aluminium

**Thread:** Universal, max. 7 mm

**Mark:** None



**Description:** Includes one winding plug and one stationary plug. Centre distance of mounting holes: 86 mm. The winding plug has two 3/8" set screws for fixing to the shaft. Stationary plug has a 50.8 mm hole for bearing placement. Max. Torque: 64Nm. Suitable for 1 inch (25.4mm) shaft. Max torque bolts 20Nm.

## FITTING FOR SECTIONAL SPRING DOORS DIAMETER 50 (120030)

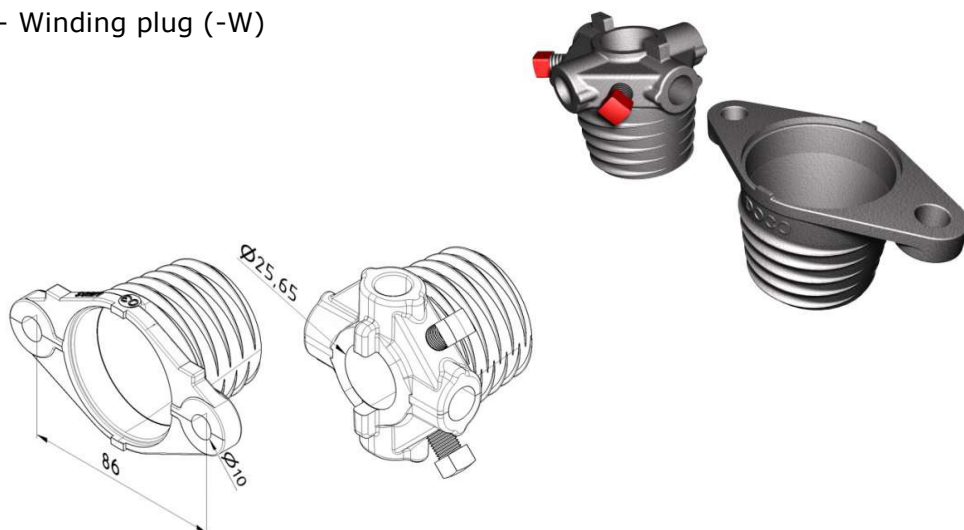
**Unit:** Pair (stationary plug (-S) + Winding plug (-W))

**Weight:** 0.28 kg / pr

**Material:** Aluminium

**Thread:** Universal, max. 7 mm

**Marking:** None



**Description:** Includes one winding plug and one stationary plug. Centre distance of mounting holes: 86 mm. The winding plug has two 3/8" set screws for fixing to the shaft. Stationary plug has a 50.8mm hole for bearing placement. Max. Torque: 72Nm. Suitable for 1 inch (25.4mm) shaft. Max torque bolts 20Nm.



## FITTING FOR SECTIONAL SPRING DOORS DIAMETER 67( 120020)

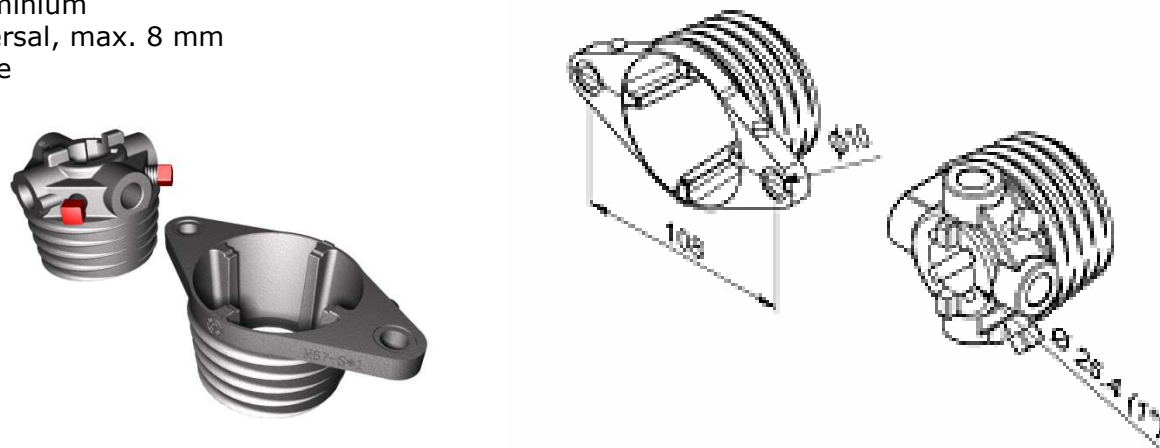
**Unit:** Pair (stationary plug (-S) + Winding plug (-W))

**Weight:** 0.42 kg / pr

**Material:** Aluminium

**Thread:** Universal, max. 8 mm

**Marking:** None



**Description:** Includes one winding plug and one stationary plug. Centre distance of mounting holes: 108 mm. The winding plug has two 3/8" set screws for fixing to the shaft. Stationary plug has a 50.8 mm hole for bearing placement. Max. Torque: 89Nm. Suitable for 1 inch (25.4mm) shaft. Max torque bolts 20Nm.

## FITTING FOR SECTIONAL SPRING DOORS DIAMETER 95 (120104)

**Unit:** Pair (Stationary plug (S) + Winding plug (W))

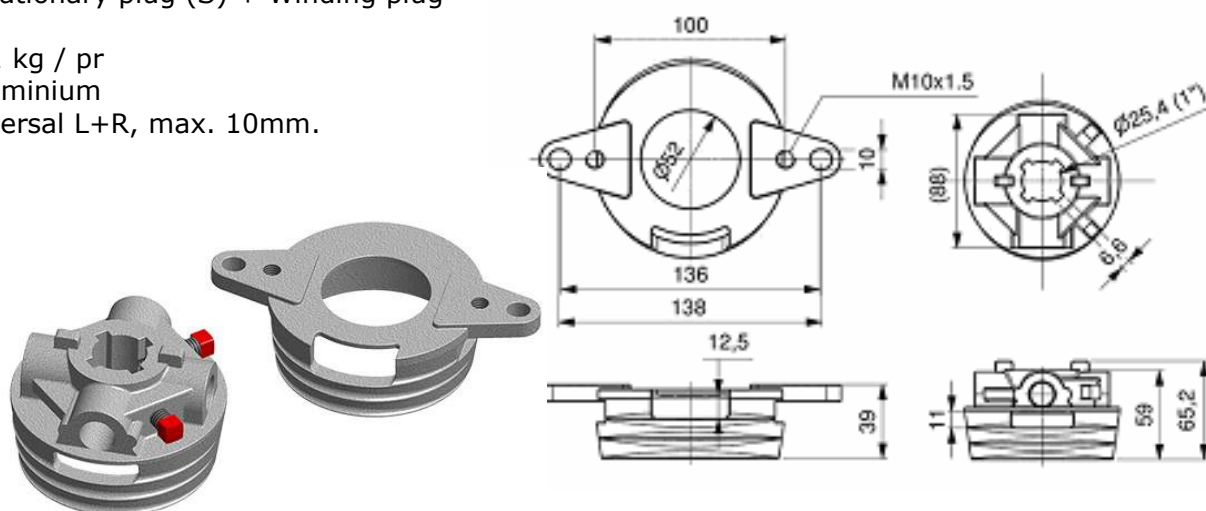
**Weight:** 0.61 kg / pr

**Material:** Aluminium

**Thread:** Universal L+R, max. 10mm.

**Marking:**

None



**Description:** Includes one winding plug and one stationary plug. Centre distance of mounting holes: 136-138 mm. The winding plug has two 3/8" set screws for fixing to the shaft. Stationary plug has a 50.8 mm hole for bearing placement. Max. Torque: 157Nm. Suitable for 1 inch (25.4mm) shaft. Max torque bolts 20Nm.



## FITTING FOR SECTIONAL SPRING DOORS DIAMETER 133 (120120)

**Unit:** Set (4 pieces: 2 x Stationary (L+R) + 2 Winding plug (L+R))

**Weight:** 1.75 kg / set

**Material:** Aluminium

**Thread:** Not universal, left hand and right hand thread, max 11mm

**Mark:** Black = Left, Red = Right



**Description:** Set spring plugs; 12012-WL + 12012-WR + 12012-SL + 2012-SR. The winding plug has two 3/8" set screws for fixing to the shaft. Stationary plug has a 50.8 mm hole for bearing placement. Max. Torque: 192 Nm. Suitable for 1 inch (25.4mm) shaft. Max torque bolts 20Nm.

## FITTING FOR SECTIONAL SPRING DOORS DIAMETER 152 (121050)

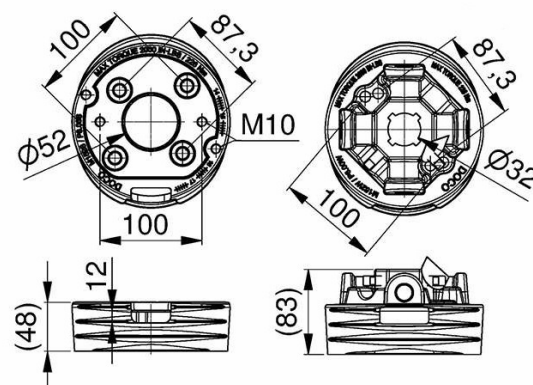
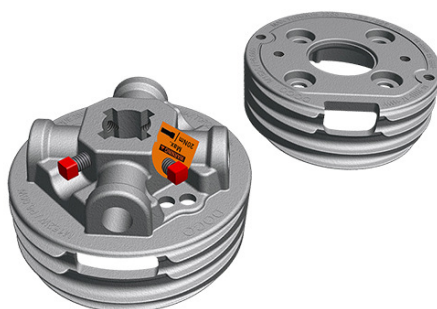
**Unit:** Pair (stationary plug (-S) + Winding plug (-W))

**Weight:** 1.41 kg / pr

**Material:** Aluminium

**Thread:** Universal, max 11mm

**Mark:** None



**Description:** Includes one winding plug (one-piece) and one stationary plug. Centre distance of mounting holes: 87 and 100 mm (W-plug). Centre distance of M10 holes; 100 and 138 mm (S-plug). The winding plug has two 3/8" set screws for fixing to the shaft. Stationary plug has a 50.8 mm hole for bearing placement. Max. Torque: 226Nm. Suitable for 31.75mm shaft. Max torque bolts 20Nm.

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## FITTING FOR BOOSTER SPRINGS DIAMETER 95 – 152 (120100)

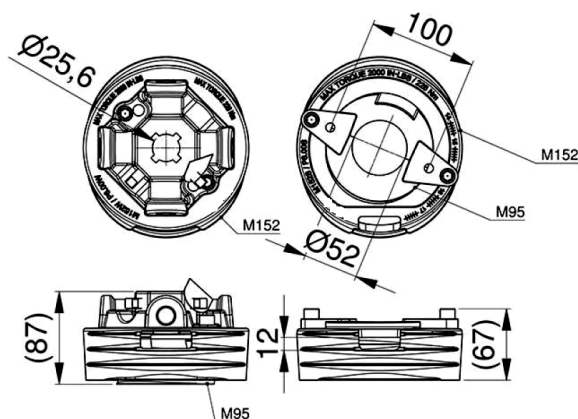
**Unit:** Set (4 pieces: 2x Stationary (L+R) + 2x Winding plug (L+R))

**Weight:** 2.29 kg / set

**Material:** Aluminium

**Thread:** Universal, max M152: 11mm, M95: 10mm

**Marking:** None



**Description:** One set includes two winding plugs and two stationary plugs. Centre distance of mounting holes: 87/100 mm. The winding plug has two 3/8" set screws for fixing to the shaft. Stationary plug has a 50.8 mm hole for bearing placement. Max. Torque: 224Nm. Suitable for 1 inch (25.4mm) shaft. Max torque bolts 20Nm.

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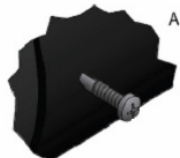
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## FILLER FOR SECTIONAL SPRING DOORS DIAMETER 152-133

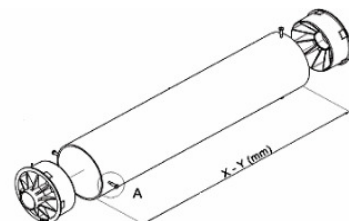
### SCREW

Our item:  
VITE4219



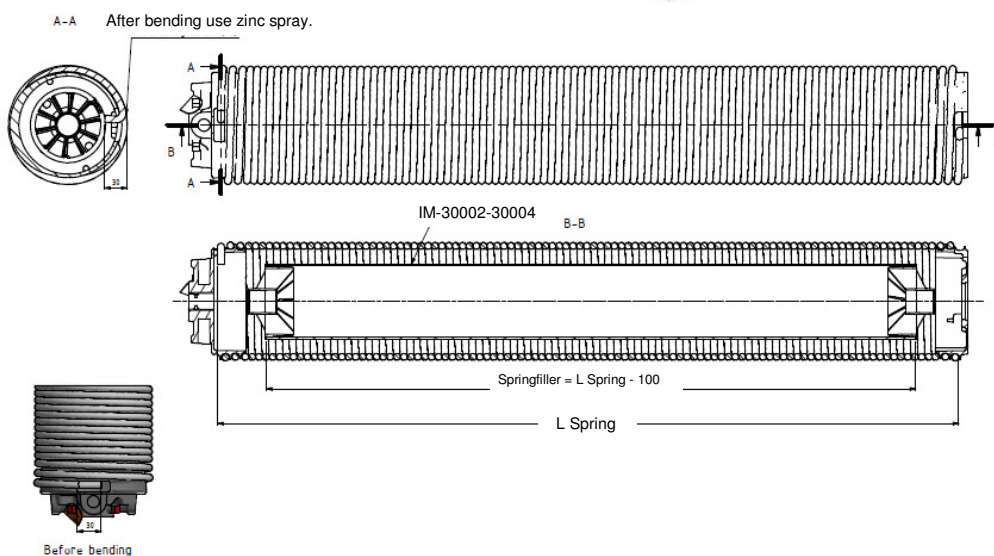
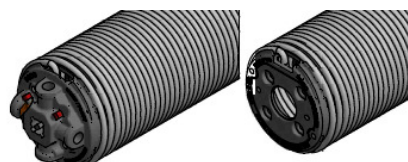
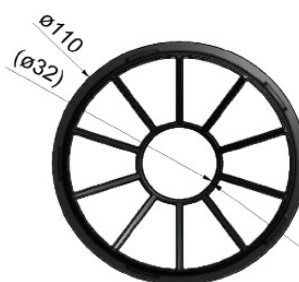
### FILLER length 3 metres

Our item:  
FLLR1331523000



### STOPPER

Two for filler (one for each side)  
Our item:  
STPFLR133152



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