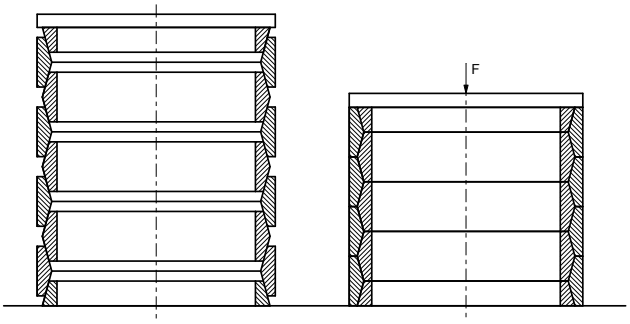
AXTONE
RAILWAY COMPONENTS

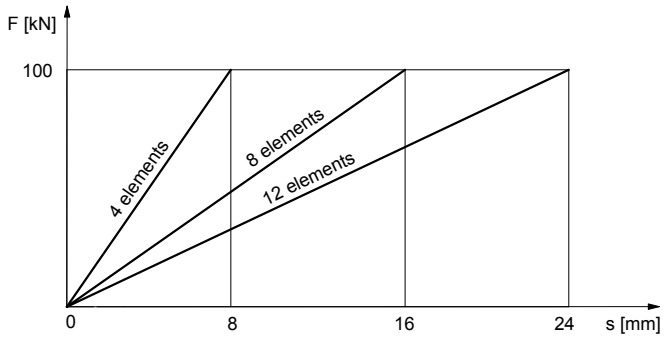
FRICTION SPRINGS

Friction springs act as buffers to absorb and dampen high levels of kinetic energy from a moving mass. They also work as overload-protection devices and handle high forces in a relatively small package. The springs are manufactured in wide range of various diameters from 80 to 400 mm.

FEATURES:

- Hot formed, highest quality materials;
- Various shapes possible;
- Linear characteristic;
- Safe against overloading;
- Big damping due to friction;
- Characteristic independent of the speed;
- Characteristic independent of the temperature;
- Proven in rail applications (buffers, draw gears, draw bars, semi/automatic couplers).





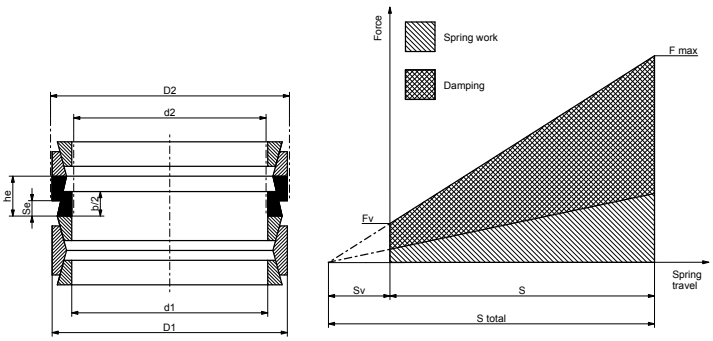
BASIC TECHNICAL DATES OF FRICTION SPRINGS:

Type	Closed rings										
	Diagram		Dimensions					Special grease	Guide		Weight
	F	S_e	W_e	h_e	D_1	d_1	$b/_2$	F_M	D_2	d_2	G_e
	kN	mm	J	mm	mm	mm	mm	kN	mm	mm	kg
08000	83	1,8	75,0	9,8	80,0	67,0	8,0	69,0	83,0	64,0	0,098
09000	100	2	100,0	11,0	90,0	75,5	9,0	83,0	93,0	72,5	0,137
10000	125	2,2	138,0	12,2	100,0	84,0	10,0	105,0	103,0	81,0	0,192
12400	200	2,6	260,0	15,0	124,0	102,0	12,4	165,0	128,0	98,0	0,393
14000	250	3	375,0	17,0	140,0	116,0	14,0	210,0	144,0	112,0	0,552
16600*	350	3,7	648,0	20,0	166,0	134,0	16,0	290,0	170,0	130,0	0,822
16604	400	3,8	788,0	19,8	166,0	140,0	16,0	330,0	170,0	136,0	0,840
20000	510	3,9	995,0	22,4	198,0	162,5	18,5	425,0	203,0	157,0	1,515
19600	600	4,4	1300,0	23,4	194,0	155,0	19,0	500,0	199,0	150,0	1,615
25301	600	6	1819,5	25,0	253,0	216,0	19,0	500,0	258,0	212,0	2,170
22000	720	4,4	1584,0	26,4	220,0	174,0	22,0	600,0	225,0	169,0	2,520
26200	860	4,8	2064,0	25,8	262,0	208,0	21,0	720,0	268,0	202,0	3,315
24301	930	8	3708,0	33,3	243,0	194,5	24,8	770,0	248,0	190,0	3,455
24201	1000	5,3	2674,0	27,3	242,0	200,0	22,0	830,0	247,0	195,0	2,625
26901	1250	7,5	4658,0	34,9	269,0	213,0	27,4	1040,0	274,0	205,0	4,785
34000	1450	7,5	5392,0	34,5	340,0	291,5	27,0	1200,0	346,0	286,0	5,490

*For the spring type 16600 a separate stroke limitation has to be provided

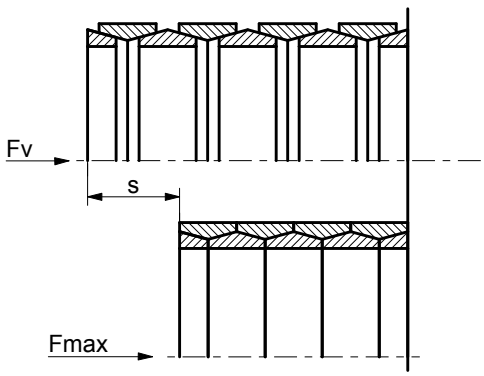
F Spring terminal force
d^1 Inner diameter
S_e Stroke for 1 element
$b/_2$ Half ring width
W_e Spring work for 1 element
D_2 Guide outer diameter
h_e Height of 1 element
d_2 Guide inner diameter

EXAMPLE OF SPRING CALCULATION:



This spring consists of 4 elements type 19600:
End force = 600 kN
Stroke = 4 x 4,4 (Se) = 17,6 mm
Spring work (Absorbed energy) = 4 x 1300 (We) = 5200 J
Spring length = 4 x 23,4 (he) = 93,6 mm
By adding additional elements, we increase the stroke (length of the spring), the absorbed energy (spring work) but the end force will remain the same.
End force still 600 kN.

During the operation of the friction spring two thirds of the input energy is dissipated as frictional heat. The recoil force at any point on the diagram is approximately equal 1 / 3 of the relative compressive force F. The capacity of the spring is represented by the total area shown below the load curve.



Friction springs are generally designed to 'block", so it is therefore ensured that the admissible stresses cannot be exceeded and the friction spring will not be damaged.

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We are looking forward to sending you detailed information on request!

www.axtone.eu