

# Dimensioning of compression spring for h

## Specifications of springs

		Spring 1 60/3	Spring 2 62/3
Shear module	G [MPa]	82500	82500
Diameter wire	d [mm]	1.6	2
Diameter spring	D [mm]	12.5	16
Slope spring	s [mm]	6	7.5
Max. force for L0 = 1m	FN [N]	139.8	202.94
Weight for L0=1m	m [g]	107	175
Diameter for casing	De [mm]	14.1	18
Costs per 1m	[CHF]	10	16

## Requirements

		Option 1	Option 2	Option 3
Max. force for max. displacement	Fmax [N]	150	150	100
max. displacement	S [mm]	200	150	200

	Spring 1			
	Option 1	Option 2	Option 3	Option 4
Number of windings	48.137344	34.603008	69.206016	51.904512
Springcoefficient	0.75	1	0.5	0.66666667
L0 = relaxed length	288.824064	207.618048	415.236096	311.427072
L1 = length after preloading to 25N	255.490731	182.618048	365.236096	273.927072
L2 = length at coil-bound deflexion	77.0197504	55.3648128	110.7296256	83.0472192
dL = possible suspension	178.47098	127.253235	254.5064704	190.879853
Smin = preloading suspension	33.3333333	25	50	37.5
Weight per spring [g]	30.9041748	22.2151311	44.43026227	33.3226967

L1 is the space needed in the crutch -->  
limiting factor due to amount of space  
available

# eight adjustable crutch

Design space		
Duct	Diameter	Length
Upper	20.5 mm	350 mm
Lower	17 mm	310 mm

length together	
long	690 mm
short	490 mm

Option 4

100

150

Spring 2			
Option 1	Option 2	Option 3	Option 4
53.7109375	42.2832031	80.5664063	60.4248047
0.75	1	0.5	0.66666667
402.832031	317.124023	604.248047	453.186035
369.498698	292.124023	554.248047	415.686035
107.421875	84.5664063	161.132813	120.849609
262.076823	207.557617	393.115234	294.836426
33.3333333	25	50	37.5
70.4956055	55.4967041	105.743408	79.3075562

due to  
L0>0.5m,  
two springs  
would have  
to be  
bought