MEFA Spring insulators

MEFA Spring insulators are suited to be also used as flexible pipe hanger or for the elastic storage of assemblies.

Applications:

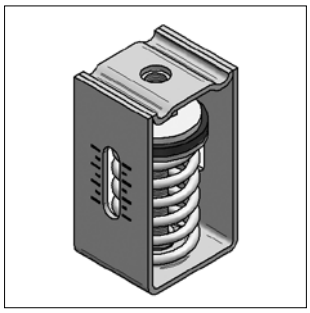
a) Applicable as a compensating element for thermal pipeline expansions
b) Suitable for sound- and vibrance insulation
c) Applicable as shock-absorbing element

Spring hangers or -insulator can be used for installations where no rigid storage of plant systems (e.g. pipelines, assemblies) are allowed. For example a pipeline exposed to a certain temperature which requires due to its temperature bending an elastic storage.

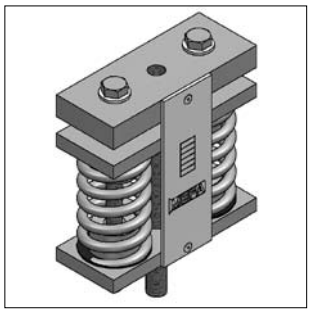
An important advantage of the MEFA spring insulators and hangers is, that there is no metallic contact between the construction and the pipeline. In combination with a sound absorbing decoupling element, the transfer of the structure-born-sound via the steel spring can be avoided.

MEFA spring insulators meet the requirements of vibration insulation and disconnection of structure-borne-sound.

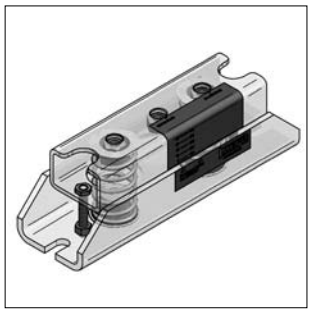
For an optimum dimensioning of the spring hangers/ -insulators please contact our technical department.



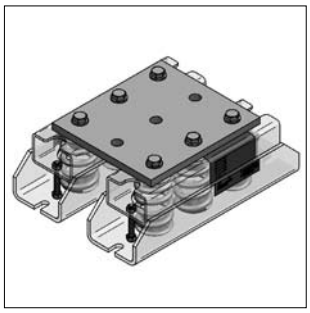
Spring insulator FH1
Page 3c/2



Spring insulator FH2
Page 3c/2

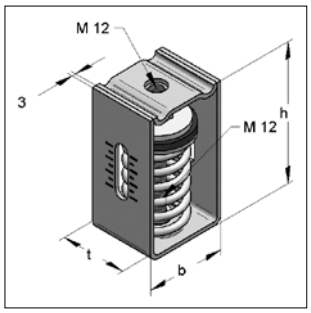


Spring hanger FL
Page 3c/3



Spring hanger FLD
Page 3c/3

Spring insulator FH 1 with one spring



Spring insulator FH1
Load range: up to 3000 N

3c

Specification:

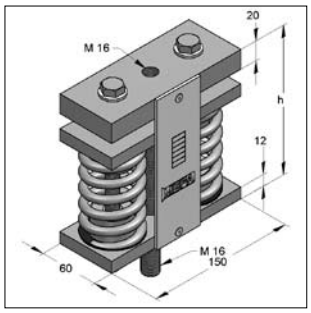
Number of springs:	1 piece
Load range:	up to 3000 N
Spring deflection:	up to 32 mm

Technical data:

Material:	steel
Material type:	S235JR
Surface:	galvanized

Identification	Load range [N]	Spring deflection [mm]	Dimension h [mm]	b [mm]	t [mm]	Weight [kg/pc.]	Packing [pc.]	Part-No.
FH 1 - 400	0 - 390	0 - 30	105	60	50	0,620	1	0794040
FH 1 - 600	0 - 620	0 - 30	105	60	50	0,657	1	0794060
FH 1 - 1000	0 - 1000	0 - 32	105	60	50	0,659	1	0794100
FH 1 - 1300	0 - 1300	0 - 31	130	80	60	1,040	1	0794130
FH 1 - 2100	0 - 2140	0 - 28	130	80	60	1,228	1	0794210
FH 1 - 3000	0 - 3000	0 - 23	130	80	60	1,266	1	0794300

Spring insulator FH 2 with two springs



Spring insulator FH2
Load range: up to 9300 N

Specification:

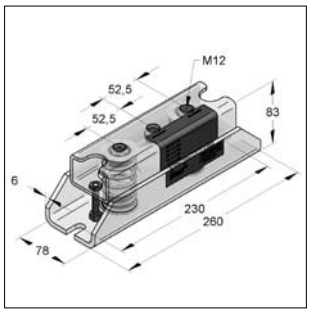
Number of springs:	2 pieces
Load range:	up to 9300 N
Spring deflection:	up to 28,5 mm

Technical data:

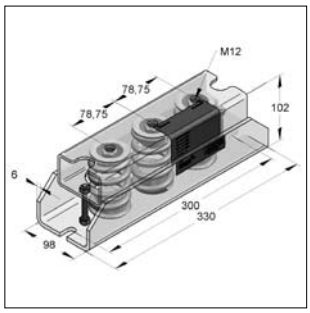
Material:	steel
Material type:	S235JR
Surface:	galvanized

Identification	Load range [N]	Spring deflection [mm]	Dimension h [mm]	width [mm]	Length [mm]	Weight [kg/pc.]	Packing [pc.]	Part-No.
FH 2 - 4300	0 - 4300	0 - 28,5	150	60	150	4,395	1	0789080
FH 2 - 6000	0 - 6000	0 - 22,6	150	60	150	4,485	1	0789130
FH 2 - 9300	0 - 9300	0 - 19,5	160	60	150	4,975	1	0789250

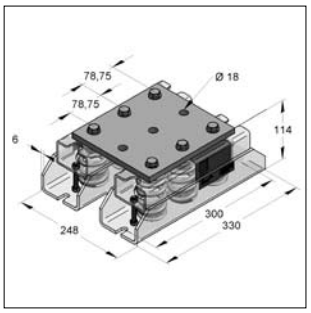
Spring hanger FL



Spring hanger FL
2 springs



Spring hanger FL
3 springs



Spring hanger FLD
two spring hangers connected
with interface

Specification:

Number of springs:	2 pieces / 3 pieces
Casing:	type 1 / type 2
Load range:	up to 21000 N
Spring deflection:	up to 25 mm
Recommended anchor:	Bolt anchor BZ plus

Technical data:

Material:	steel
Material type:	S235JR
Surface:	galvanized

3c

Identification	Casing	Load range [N]	Number of springs	Spring Deflection [mm]	Weight [kg/pc.]	VPE [pc.]	Part-No.
Spring hanger FL							
FL-700	**Type 1**	0 - 700	2	0 - 25	3,0	1	07919007
FL-1000	**Type 1**	0 - 1000	3	0 - 25	3,1	1	07919010
FL-2300	**Type 2**	0 - 2300	2	0 - 25	5,7	1	07919023
FL-3800	**Type 2**	0 - 3800	2	0 - 25	5,7	1	07919038
FL-5700	**Type 2**	0 - 5700	3	0 - 25	6,0	1	07919057
FL-7200	**Type 2**	0 - 7200	2	0 - 25	5,7	1	07919072
FL-10500	**Type 2**	0 - 10500	3	0 - 25	6,0	1	07919105
Spring hanger FLD							
FLD-21000		0 - 21000	2 x 3	0 - 25	16,3	1	07929210

Design of the spring hangers

In this short documentation the procedure for the correct construction of the spring insulators with critical bending will be explained. The base should be in any case a calculation of the pipeline for the mentioned sector:

Please notice the following production steps:

1. The „free“ forming of the tested pipeline should be detected
2. In case of vertical forming Δs **(Δs ≥ 10mm)** mounting the spring insulators is necessary
3. The static load should be detected on the point of support **(→operation load $F_{V, operation}$)**
4. Spring insulators should be choosed with help of the detected point of support and the suited selection chart (page 3cl5). Please notice that the point of support is situated in the middle of the grid of the selected insulator. The choice of the rigidity is very important as due to the forming the **operation load $\Delta F_V = R \times \Delta s$** cannot cause any **incorrect additional load to the mounted pipeline**
5. Spring insulators **carry the load basically via pressure.** A vertical mounted spring insulator with a negative forming increases the **point of support ΔF**

The effective bearing strength is

$$F_{V,compl.} = F_{V,operation} + (R \times (\pm \Delta s))$$

(in case of positive, on top formings the bearing strength will be reduced → spring insulator will be unload.)

Example: Expansion compensation
Expansion movement of a heating installation pipe of a defined fixpoint line

Known data:	- detected expansion movement	Δs = 16 mm
	- load on the mounting bracket	F_V = 1.300 N
Solution method (see shedule):		
	ⓐ Outlet spring deflection	Δs = 16 mm
	ⓑ Load allocation	F_V = 1.300 N
Result:	ⓒ Choice spring insulators	FH 1 - 2100

Combination of spring hangers:

Series connection
e.g. for the enlargement of spring deflections

F_V = vertical operation load
Δs = spring deflection / vertical forming
R = spring rate
Series connection with 2 equal spring insulators:

$$R_{compl} = (R_1 + R_2)/2$$
$$\Delta S_{compl} = \Delta s_1 + \Delta s_2$$

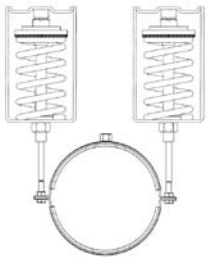
Series connection with 2 different spring insulators:

$$R_{compl} = (R_1 \times R_2)/(R_1 + R_2)$$
$$\Delta S_{compl} = \Delta s_1 + \Delta s_2$$

Parallel connection
e.g for the increasing of bearing pressure

F_V = vertical operation load
Δs = spring deflection / vertical forming
R = spring rate

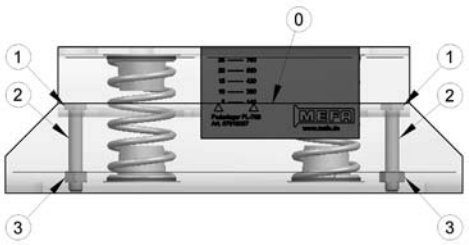
$$R_{compl} = R_1 + R_2$$
$$\Delta S_{compl} = \Delta s/2$$



Spring insulator selection table

Spring-insulator	Spring rate	Max. working load	Distance at max. working load	Load dependent on spring deflection s								max. spring deflection
					suitable section							
				5 [mm]	10 [mm]	15 [mm]	20 [mm]	24 [mm]	25 [mm]	28 [mm]	30 [mm]	
[Type]	[N/mm]	[N]	[mm]	[N]	[N]	[N] ⓐ	[N]	[N]	[N]	[N]	[N]	[mm]
FH1-400	12,5	370	29,6	63	125	188	250	300	313	350	375	30
FH1-600	24,0	600	25,0	120	240	360	480	576	600	672	720	30
FH1-1000	35,9	1.000	27,9	180	359	539	718	862	898	1.005	1.077	30
FH1-1300	38,3	1.150	30,0	192	383	575	766	919	958	1.072	1.149	30
FH1-2100 ⓒ	78,0	2.100	26,9	390	780	1.170 ⓑ	1.560	1.872	1.950	2.184	-	28
FH1-3000	117,9	2.800	23,7	590	1.179	1.769	2.358	2.830	-	-	-	24
FH2-4300	143,4	3.500	24,4	717	1.434	2.151	2.868	3.442	3.585	-	-	25
FH2-6000	252,9	6.000	23,7	1.265	2.529	3.794	5.058	6.070	-	-	-	24
FH2-9300	392,8	9.300	23,7	1.964	3.928	5.892	7.856	9.427	-	-	-	24
FL-700	28,0	700	25,0	140	280	420	560	672	700	784	-	28
FL-1000	40,0	1.000	25,0	200	400	600	800	960	1.000	1.120	-	28
FL-2300	92,0	2.300	25,0	460	920	1.380	1.840	2.208	2.300	2.576	-	28
FL-3800	152,0	3.800	25,0	760	1.520	2.280	3.040	3.648	3.800	4.256	-	28
FL-5700	228,0	5.700	25,0	1.140	2.280	3.420	4.560	5.472	5.700	6.384	-	28
FL-7200	270,0	7.200	26,7	1.350	2.700	4.050	5.400	6.480	6.750	7.560	-	28
FL-10500	411,0	10.500	25,5	2.055	4.110	6.165	8.220	9.864	10.275	11.508	-	28

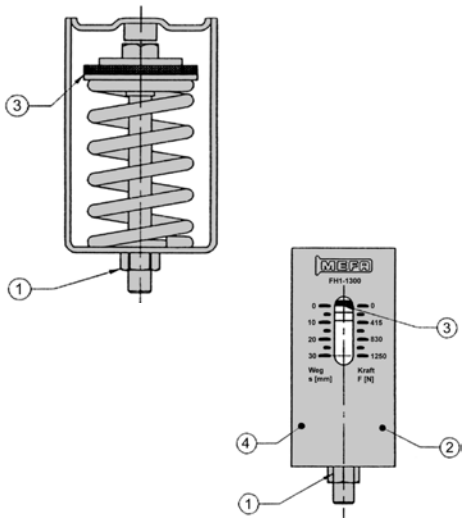
Assembly instruction for Spring hanger FL



Target: Vibration isolation

1. The spring hanger can be clamped via 2 hex. screws with the suitable load for the stationary handling with help of the prestressed hex. screws M8 (SW13 mm) [1]. (values for direct reading, significant value for direct reading on the upper edge of casing base part [0])
2. Spring hanger should be mounted on the substructure
3. Spring hanger can be mounted with the pipeline or a compressor via:
   3.1 pipe clamp and suitable threaded rod or
   3.2 supporting elements or the compressor
4. After achieving the operation load at the stationary handling the prestressed nut M8 has to be screwed out (SW 13 mm) [1]. The equalisation of load of the spring hanger sets automatically
5. After balancing the spring pot the threaded pins [2] can be removed. Remove the counter nuts [3] and screw out the threaded pins [2]

Assembly instruction for spring insulator FH 1 and FH 2

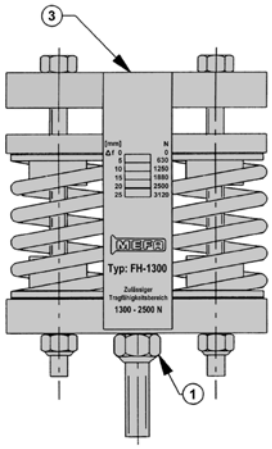


Target: Vibration isolation

1. The spring insulator is prestressed to absorb the load, for stationary handling, via the suitable hex. nut M12 (SW19 mm) [1] (for direct reading scale on the outside [2], bottom edge red washer [3])
2. The spring insulator has to be mounted on the structure
3. Spring insulator with the pipe clamp can be mounted via pipe clamp, compressor or a traverse, with the help of the suitable connecting elements (threaded rod, treaded coupling and counter nut)

   After achieving the operation load at the stationary handling, the hexagon screw [1] of the spring insulator should be mounted on the towards-mounted element (e.g. threaded coupling) and used as a counter nut
5. The equalisation of load of the spring pot sets automatically

Target: Compensation of expansion movement



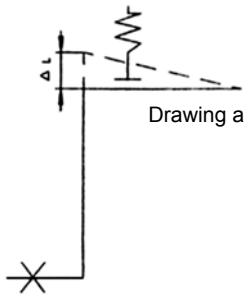
1. In a defined, vertical fixpoint pipeline (see drawing a and b) the spring pot can be...

   - pestressed according to **drawing a**, via the hex. screw M12 (SW19 mm) [1] for direct reading scale on the outside [3], bottom edge red washer [4])

     During mounting the pipeline is prestressed !

   - according to **drawing b**, not prestressed

   The pipeline load of this bracket has to be noticed when choosing the spring hanger. The load and the spring deflection have to be regarded. The load of the pipeline increases, in the stationary section, about the amount of the equivalent spring rate to the spring deflection
2. The spring insulator has to be mounted on the structure
3. Spring insulator with the pipe clamp can be mounted via pipe clamp, compressor or a traverse, with the help of the suitable connecting elements (threaded rod, treaded coupling and counter nut or adapted traverse mountings)

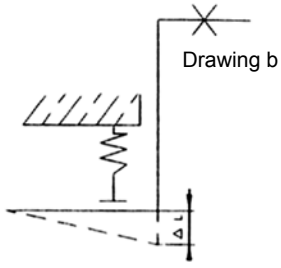


Drawing a

4. Releasing the springs:

   4.1 After successful mounting of the pipeline according to the **drawing a**, should the hex. screw M12 (SW 19 mm) [1] be mounted on the towards-mounted element (e.g. threaded coupling) and used as a counter nut, before using the pipeline

   4.2 After succesful mounting of the pipeline according to the **drawing b**, should the hex. screw M12 (SW 19 mm) [1] be mounted on the towards-mounted element (e.g. threaded coupling) and used as a counter nut, before using the pipeline
5. The equalisation of load of the spring pot sets automatically



Drawing b