Product catalogue

VICODA®
SPRING ELEMENTS

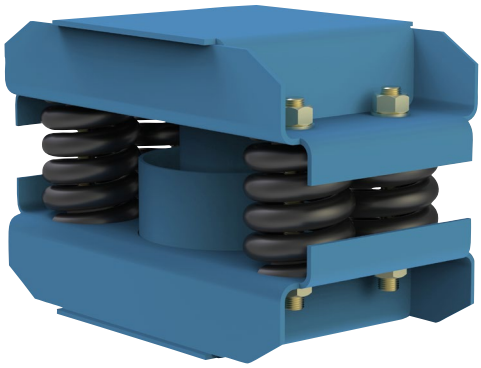
VICODA® is a product brand of LISEGA Group

About our product

VICODA® spring elements are effectively used for vibration isolation of machinery within power stations, e.g. turbine tables, feedwater pumps etc. They provide support of static loads and reduce the transmission of dynamic loads to the foundation. VICODA® spring elements are usually composed of three major parts: an upper and lower housing, helical coil springs and a viscoelastic damper. The system frequency usually has values between 2 and 7 Hz.

Design

The basic design of a spring element consists of a set of helical coil steel compression springs connected to a top and bottom plate. In general spring elements only have very low damping properties due to natural material damping of steel components. Whenever higher damping characteristics are needed, viscoelatic damping elements can be integrated into the spring element. An important feature of spring elements is the ability to lock them at a predetermined level of compression (Preloading). Preloaded spring elements are installed in a locked position thus acting as solid supports. At the end of the installation - which may be the installation of heavy machinery - the spring elements are activated: they are unlocked. From that moment on the devices act as vibration control elements.



Turbo groups

Product range

The VICODA® product portfolio covers most of the typical applications of base-isolation within power stations as well as for mounting of condensers. By combining a set of VICODA® spring elements in one application an optimum set-up can be realized. VICODA® spring elements are offered with and without additonal damping elements. Without damping the elements cover loads from 126 kN to 2096 kN and with damping loads up to 1300 kN. Even larger load ranges can be covered by modifying the housing.

Fields of application

Main fields of application are:

- elastic foundation of turbines/ turbo groups
- elastic foundation of coal mills
- elastic foundation of fans/ blowers
- mounting of condensers

Coal mills

Fans/ blowers

Parameters and construction

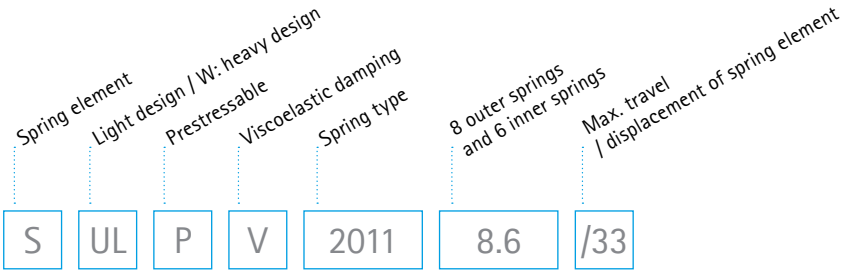
The basic parameters needed for the definition of a base isolation solution with spring elements are:

- the load [kN], determined by the weight of the supported machine and the load distribution
- the main excitation frequencies [Hz] of the vibrating source
- operation temperatures [°C] - in case of damping elements
- installation dimensions [mm] and geometrical limitations

LISEGA is pleased to provide you support when selecting spring elements.

Description of type designation on example

S-ULPV-2011-8.6/33



S-ULPV-2011-8.6/33
Spring element-light design-presstressable-viscous damping-spring set 2011-8 outer springs and 6 inner springs/maximum displacement 33 mm

S-WP-4020-10.8/24
Spring element-heavy design-presstressable-spring set 4020-10 outer springs and 8 inner springs/maximum displacement 24 mm

Product data sheets

A selection of product data sheets is presented on the following pages:

SPRING ELEMENTS FOR POWER PLANT APPLICATIONS			
Type	Maximum load [kN]	Natural frequency at nominal load [Hz]	Page
S-ULP-2011.../33	416	2.75	6
S-ULPV-2011.../33	416	2.75	7
S-ULP-2010.../47	414	2.3	8
S-ULPV-2011.../47	414	2.3	9
S-WP(R)-2071.../32	1585	2.75	10
S-WPV(R)-2071.../32	957	2.75	10
S-WP-3010.../32	1307	2.75	11
S-WPV-3010.../32	1307	2.75	12
S-WPVR-3010.../32	1307	2.75	12
S-WP-4020.../24	2092	3.5	13-14
S-WPV-4020.../24	1112	3.5	15
S-WP-4020.../32	1555	2.75	16-17
S-WPV-4020.../32	1325	2.75	18

SPRING ELEMENTS FOR CONDENSERS		
Type	Maximum load [kN]	Page
S-WLP-3021.../150	630	19
S-WLP-3030.../150	473	19
S-WLP-4030.../150	788	20
S-WLP-5010.../150	1279	21
S-WLP-50.../160	292	21
S-WLPV-50.../160	292	22

INSTRUCTION SHEET	
Pages	23 - 31

NOTE: This legend is valid for all following data sheets. The drawings are not true to scale. Other load ranges and natural frequencies are available on request. All data and dimensions are subject to change. General tolerances DIN ISO 2768-vL.

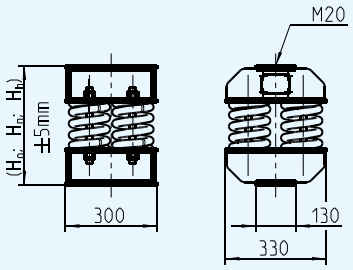
Spring element type: S-ULP-2011.../33

LEGEND

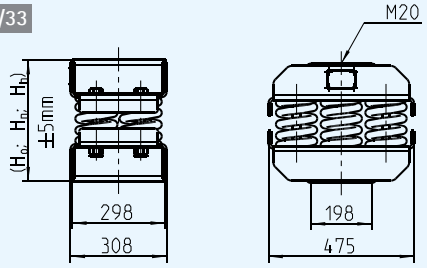
H_o: unloaded height H_n: height at nominal load H_b: height at blockload

DIMENSIONS

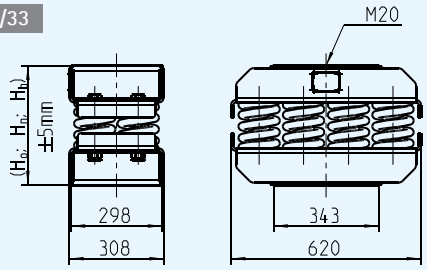
S-ULP-2011-4../33



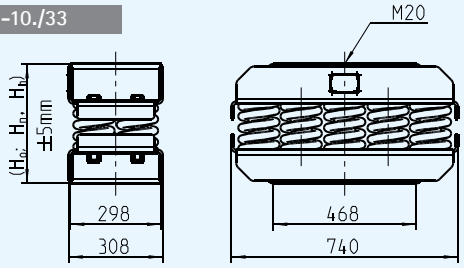
S-ULP-2011-6../33



S-ULP-2011-8../33



S-ULP-2011-10./33



S-ULP-2011

Type	Nom. load [kN]	Vertical stiffness[1)] [kN/mm]	Horizontal stiffness[1)] [kN/mm]	Height [mm]		
				H_o^*	H_n^*	H_b^*
S-ULP-2011-4.0/33	126	3.84	4.52	390	357	346
S-ULP-2011-4.1/33	136	4.14	4.68			
S-ULP-2011-4.2/33	146	4.44	4.84			
S-ULP-2011-4.3/33	156	4.75	5.00			
S-ULP-2011-4.4/33	166	5.05	5.16			
S-ULP-2011-6.0/33	190	5.76	6.78			
S-ULP-2011-6.1/33	200	6.06	6.94			
S-ULP-2011-6.2/33	210	6.36	7.10			
S-ULP-2011-6.3/33	220	6.67	7.26			
S-ULP-2011-6.4/33	230	6.97	7.42			
S-ULP-2011-6.5/33	240	7.27	7.58			
S-ULP-2011-6.6/33	250	7.57	7.74			
S-ULP-2011-8.0/33	253	7.68	9.04			
S-ULP-2011-8.1/33	263	7.98	9.20			
S-ULP-2011-8.2/33	273	8.28	9.36			
S-ULP-2011-8.3/33	283	8.59	9.52			
S-ULP-2011-8.4/33	293	8.89	9.68			
S-ULP-2011-8.5/33	303	9.19	9.84			
S-ULP-2011-8.6/33	313	9.49	10.00			
S-ULP-2011-8.7/33	323	9.79	10.16			
S-ULP-2011-8.8/33	333	10.09	10.32			
max. weight approx.: 129kg						
S-ULP-2011-10.0/33	316	9.60	11.30	390	357	346
S-ULP-2011-10.1/33	326	9.90	11.46			
S-ULP-2011-10.2/33	336	10.20	11.62			
S-ULP-2011-10.3/33	346	10.50	11.78			
S-ULP-2011-10.4/33	356	10.81	11.94			
S-ULP-2011-10.5/33	366	11.11	12.10			
S-ULP-2011-10.6/33	376	11.41	12.26			
S-ULP-2011-10.7/33	386	11.71	12.42			
S-ULP-2011-10.8/33	396	12.02	12.58			
S-ULP-2011-10.9/33	406	12.32	12.74			
S-ULP-2011-10.10/33	416	12.62	12.90			
max. weight approx.: 157kg						

(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:
1) calculated according to DIN EN 13906-1
2) natural frequency at nominal load 2.75 Hz
3) spring elements are fully prestressable
4) 2 x 4 mm adhesive pads and shims on request

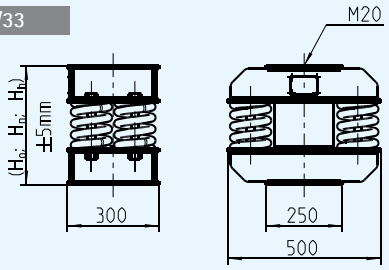
Spring element type: S-ULPV-2011.../33

LEGEND

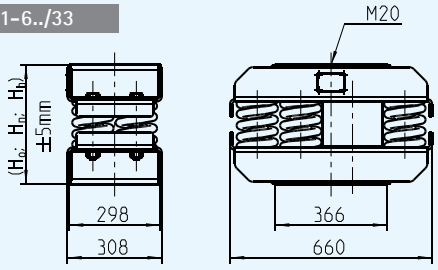
H_0: unloaded height H_n: height at nominal load H_b: height at blockload

DIMENSIONS

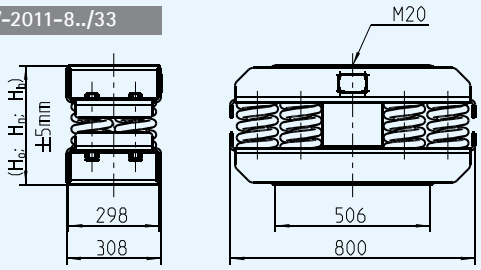
S-ULPV-2011-4../33



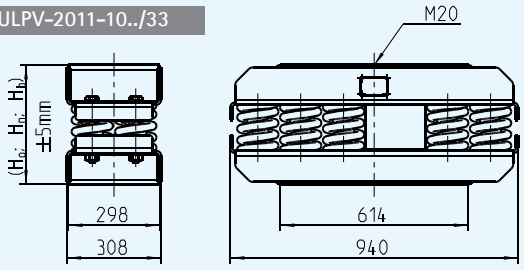
S-ULPV-2011-6../33



S-ULPV-2011-8../33



S-ULPV-2011-10../33



S-ULPV-2011

Type	Nom. load [kN]	Vert. stiffness[1] [kN/mm]	Hor. stiffness[1] [kN/mm]	Height [mm]			Damping parameter [kNs/m]	
				H_0*	H_n*	H_b*	d_v [5]	d_h [5]
S-ULPV-2011-4.0/33	126	3.84	4.52	390	357	346	85	170
S-ULPV-2011-4.1/33	136	4.14	4.68					
S-ULPV-2011-4.2/33	146	4.44	4.84					
S-ULPV-2011-4.3/33	156	4.75	5.00					
S-ULPV-2011-4.4/33	166	5.05	5.16					
S-ULPV-2011-6.0/33	190	5.76	6.78					
S-ULPV-2011-6.1/33	200	6.06	6.94					
S-ULPV-2011-6.2/33	210	6.36	7.10					
S-ULPV-2011-6.3/33	220	6.67	7.26					
S-ULPV-2011-6.4/33	230	6.97	7.42					
S-ULPV-2011-6.5/33	240	7.27	7.58					
S-ULPV-2011-6.6/33	250	7.57	7.74					
max. weight approx.: 130kg								
S-ULPV-2011-8.0/33	253	7.68	9.04	390	357	346	110	230
S-ULPV-2011-8.1/33	263	7.98	9.20					
S-ULPV-2011-8.2/33	273	8.28	9.36					
S-ULPV-2011-8.3/33	283	8.59	9.52					
S-ULPV-2011-8.4/33	293	8.89	9.68					
S-ULPV-2011-8.5/33	303	9.19	9.84					
S-ULPV-2011-8.6/33	313	9.49	10.00					
S-ULPV-2011-8.7/33	323	9.79	10.16					
S-ULPV-2011-8.8/33	333	10.09	10.32					
max. weight approx.: 162kg								
S-ULPV-2011-10.0/33	316	9.60	11.30	390	357	346	140	300
S-ULPV-2011-10.1/33	326	9.90	11.46					
S-ULPV-2011-10.2/33	336	10.20	11.62					
S-ULPV-2011-10.3/33	346	10.50	11.78					
S-ULPV-2011-10.4/33	356	10.81	11.94					
S-ULPV-2011-10.5/33	366	11.11	12.10					
S-ULPV-2011-10.6/33	376	11.41	12.26					
S-ULPV-2011-10.7/33	386	11.71	12.42					
S-ULPV-2011-10.8/33	396	12.02	12.58					
S-ULPV-2011-10.9/33	406	12.32	12.74					
S-ULPV-2011-10.10/33	416	12.62	12.90					
max. weight approx.: 189kg								

(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:
1) calculated according to DIN EN 13906-1
2) natural frequency at nominal load 2.75 Hz
3) spring elements are fully prestressable
4) 2x4 mm adhesive pads and shims on request
5) d_v; d_h: min. values are given for height H_n at natural frequencies f_v; f_h at 20°C

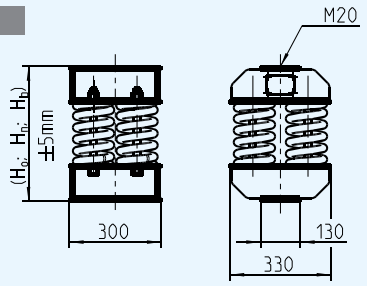
Spring element type: S-ULP-2011.../47

LEGEND

H_o: unloaded height H_n: height at nominal load H_b: height at blockload

DIMENSIONS

S-ULP-2011-4../47



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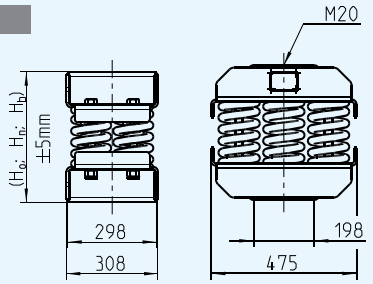

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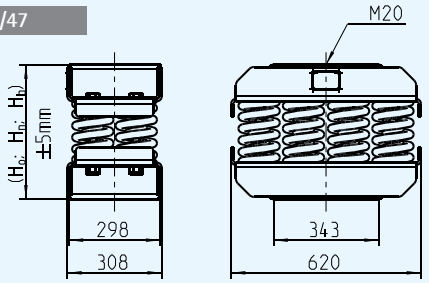

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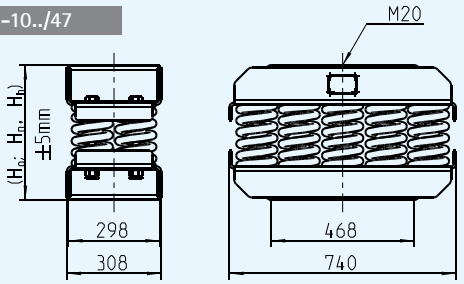


S-ULP-2011

Type	Nom. load [kN]	Vertical stiffness[1] [kN/mm]	Horizontal stiffness[1] [kN/mm]	Height [mm]		
				H_o*	H_n*	H_b*
S-ULP-2011-4.0/47	127	2.71	2.08	440	393	397
S-ULP-2011-4.1/47	137	2.92	2.10			
S-ULP-2011-4.2/47	146	3.12	2.12			
S-ULP-2011-4.3/47	156	3.33	2.14			
S-ULP-2011-4.4/47	165	3.53	2.16			
S-ULP-2011-6.0/47	191	4.07	3.12			
S-ULP-2011-6.1/47	200	4.27	3.14			
S-ULP-2011-6.2/47	210	4.48	3.16			
S-ULP-2011-6.3/47	219	4.68	3.18			
S-ULP-2011-6.4/47	229	4.89	3.20			
S-ULP-2011-6.5/47	239	5.09	3.22			
S-ULP-2011-6.6/47	248	5.29	3.24			
S-ULP-2011-8.0/47	254	5.42	4.16			
S-ULP-2011-8.1/47	264	5.63	4.18			
S-ULP-2011-8.2/47	274	5.83	4.20			
S-ULP-2011-8.3/47	283	6.04	4.22			
S-ULP-2011-8.4/47	293	6.24	4.24			
S-ULP-2011-8.5/47	302	6.45	4.26			
S-ULP-2011-8.6/47	312	6.65	4.28			
S-ULP-2011-8.7/47	322	6.85	4.30			
S-ULP-2011-8.8/47	331	7.06	4.31			
max. weight approx.: 145kg						
S-ULP-2011-10.0/47	318	6.78	5.20	440	393	377
S-ULP-2011-10.1/47	328	6.98	5.22			
S-ULP-2011-10.2/47	337	7.19	5.24			
S-ULP-2011-10.3/47	347	7.39	5.26			
S-ULP-2011-10.4/47	356	7.60	5.28			
S-ULP-2011-10.5/47	366	7.80	5.30			
S-ULP-2011-10.6/47	376	8.01	5.32			
S-ULP-2011-10.7/47	385	8.21	5.34			
S-ULP-2011-10.8/47	395	8.42	5.36			
S-ULP-2011-10.9/47	405	8.62	5.37			
S-ULP-2011-10.10/47	414	8.82	5.39			
max. weight approx.: 177kg						

(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:
1) calculated according to DIN EN 13906-1
2) natural frequency at nominal load 2.3 Hz
3) spring elements are fully prestressable
4) 2x4 mm adhesive pads and shims on request

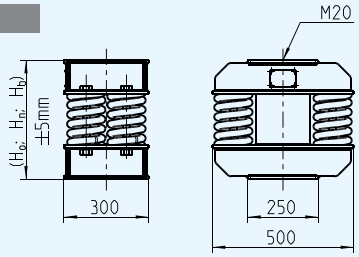
Spring element type: S-ULPV-2011.../47

LEGEND

H_0: unloaded height H_n: height at nominal load H_b: height at blockload

DIMENSIONS

S-ULPV-2011-4../47



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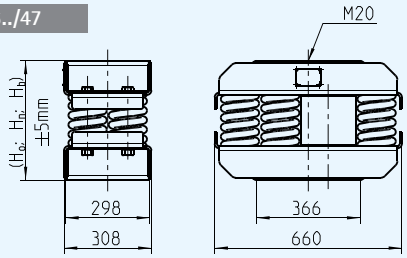
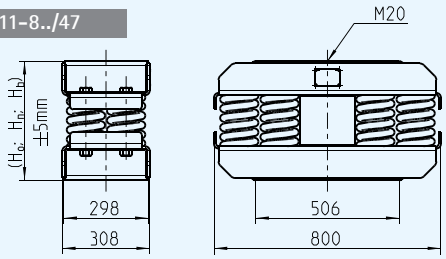


S-ULPV-2011-8../47



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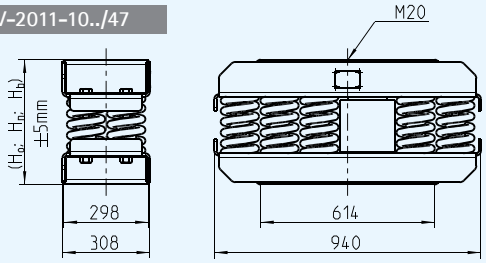


S-ULPV-2011

Type	Nom. load [kN]	Vert. stiffness[1] [kN/mm]	Hor. stiffness[1] [kN/mm]	Height [mm]			Damping parameter [kNs/m]	
				H_0*	H_n*	H_b*	d_v [5]	d_h [5]
S-ULPV-2011-4.0/47	127	2.71	2.08	440	393	377	85	170
S-ULPV-2011-4.1/47	137	2.92	2.10					
S-ULPV-2011-4.2/47	146	3.12	2.12					
S-ULPV-2011-4.3/47	156	3.33	2.14					
S-ULPV-2011-4.4/47	165	3.53	2.16					
S-ULPV-2011-6.0/47	191	4.07	3.12					
S-ULPV-2011-6.1/47	200	4.27	3.14					
S-ULPV-2011-6.2/47	210	4.48	3.16					
S-ULPV-2011-6.3/47	219	4.68	3.18					
S-ULPV-2011-6.4/47	229	4.89	3.20					
S-ULPV-2011-6.5/47	239	5.09	3.22					
S-ULPV-2011-6.6/47	248	5.29	3.24					
max. weight approx.: 141 kg								
S-ULPV-2011-8.0/47	254	5.42	4.16	440	393	377	110	230
S-ULPV-2011-8.1/47	264	5.63	4.18					
S-ULPV-2011-8.2/47	274	5.83	4.20					
S-ULPV-2011-8.3/47	283	6.04	4.22					
S-ULPV-2011-8.4/47	293	6.24	4.24					
S-ULPV-2011-8.5/47	302	6.45	4.26					
S-ULPV-2011-8.6/47	312	6.65	4.28					
S-ULPV-2011-8.7/47	322	6.85	4.30					
S-ULPV-2011-8.8/47	331	7.06	4.31					
max. weight approx.: 162kg								
S-ULPV-2011-10.0/47	318	6.78	5.20	440	393	377	140	300
S-ULPV-2011-10.1/47	328	6.98	5.22					
S-ULPV-2011-10.2/47	337	7.19	5.24					
S-ULPV-2011-10.3/47	347	7.39	5.26					
S-ULPV-2011-10.4/47	356	7.60	5.28					
S-ULPV-2011-10.5/47	366	7.80	5.30					
S-ULPV-2011-10.6/47	376	8.01	5.32					
S-ULPV-2011-10.7/47	385	8.21	5.34					
S-ULPV-2011-10.8/47	395	8.42	5.36					
S-ULPV-2011-10.9/47	405	8.62	5.37					
S-ULPV-2011-10.10/47	414	8.82	5.39					
max. weight approx.: 210kg								

(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:
1) calculated according to DIN EN 13906-1
2) natural frequency at nominal load 2.3 Hz
3) spring elements are fully prestressable
4) 2x4mm adhesive pads and shims on request
5) d_v; d_h: min. values are given for height H_n at natural frequencies f_v; f_h at 20°C

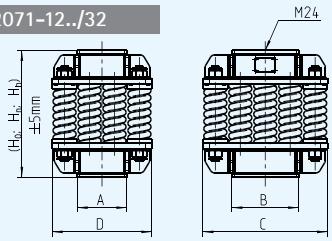
Spring element type: S-WP(R)-2071.../32
S-WPV(R)-2071.../32

LEGEND

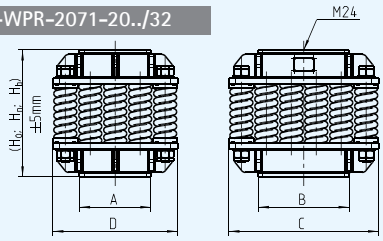
H_0: unloaded height H_n: height at nominal load H_b: height at blockload

DIMENSIONS

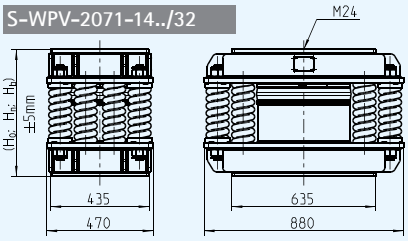
S-WP-2071-12../32



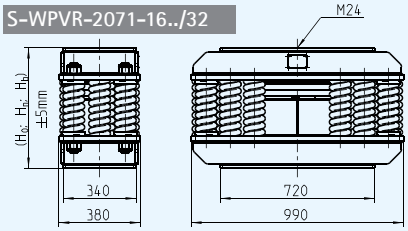
S-WPR-2071-20../32



S-WPV-2071-14../32



S-WPVR-2071-16../32



S-WP-2071

Type	Nom. load [kN]	Ver. stiffness[1)] [kN/mm]	Hor. stiffness[1)] [kN/mm]	A [mm]	B [mm]	C [mm]	D [mm]	Height [mm] H_0*	H_n*	H_b*
S-WP-2071-12.00/32	638	19.95	3.17	315	315	550	360	560	528	514
S-WP-2071-13.00/32	692	21.61	3.43							
S-WP-2071-14.00/32	745	23.27	3.70							
S-WP-2071-15.00/32	798	24.94	3.96							
S-WP-2071-16.00/32	851	26.60	4.22	220	295	550	440			
S-WP-2071-17.00/32	904	28.26	4.49							
S-WP-2071-18.00/32	957	29.92	4.75							
S-WP-2071-19.00/32	1011	31.59	5.02							
S-WP-2071-20.00/32	1064	33.25	5.28							
S-WP-2071-25.00/32	1330	41.56	6.60	315	480	575	575			
S-WP-2071-30.00/32	1596	49.87	7.92	360	480	660	550			
max. weight approx.: 547kg										

S-WPV-2071

Type	Nom. load [kN]	Vert. stiffness[1)] [kN/mm]	Hor. stiffness[1)] [kN/mm]	Height [mm] H_0*	H_n*	H_b*	Damping parameter [kNs/m] d_v [5)]	d_h [5)]
S-WPV-2071-14.00/32	745	23.27	3.70	560	528	514	300	800
S-WPV-2071-15.00/32	798	24.94	3.96					
S-WPV-2071-16.00/32	851	26.60	4.22					
max. weight approx.: 555kg								

S-WPVR-2071

Type	Nom. load [kN]	Vert. stiffness[1)] [kN/mm]	Hor. stiffness[1)] [kN/mm]	Height [mm] H_0*	H_n*	H_b*	Damping d_v [5)]	d_h [5)]
S-WPVR-2071-16.00/32	851	26.60	4.22	560	528	514	255	675
S-WPVR-2071-17.00/32	912	28.26	4.49					
S-WPVR-2071-18.00/32	957	29.92	4.75					
max. weight approx.: 490kg								

(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:
1) calculated according to DIN EN 13906-1
2) natural frequency at nominal load 2.75Hz
3) spring elements are fully prestressable
4) 2x4 mm adhesive pads and shims on request
6) d_v; d_h: min. values are given for height H_n at natural frequencies f_v; f_h at 20°C

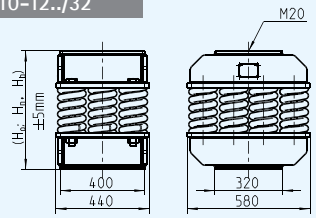
Spring element type: S-WP-3010.../32

LEGEND

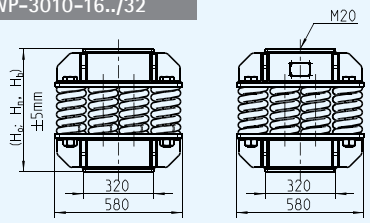
H_o: unloaded height H_n: height at nominal load H_b: height at blockload

DIMENSIONS

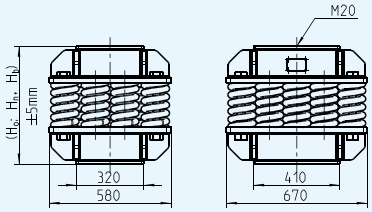
S-WP-3010-10../32
S-WP-3010-12../32



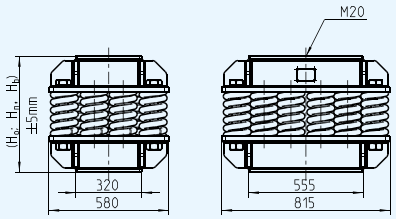
S-WP-3010-14../32
S-WP-3010-16../32



S-WP-3010-18../32



S-WP-3010-22../32



S-WP-3010

Type	Nom. load [kN]	Ver. stiffness 1) [kN/mm]	Hor. stiffness 1) [kN/mm]	Height [mm]		
				H_0*	H_n*	H_b*
S-WP-3010-10.00/32	510	15.97	9.94	560	528	514
S-WP-3010-12.00/32	613	19.16	11.93			
S-WP-3010-12.04/32	659	20.59	11.95			
S-WP-3010-14.04/32	761	23.79	13.94			
S-WP-3010-16.00/32	817	25.55	15.90			
S-WP-3010-16.12/32	955	29.85	15.97			
S-WP-3010-18.10/32	1034	32.33	17.94			
S-WP-3010-22.07/32	1204	37.64	21.90			
S-WP-3010-22.16/32	1307	40.86	21.95			
max. weight approx.: 820 kg						

(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:
1) calculated according to DIN EN 13906-1
2) natural frequency at nominal load 2.75Hz
3) spring elements are fully prestressable
4) 2x4 mm adhesive pads and shims on request

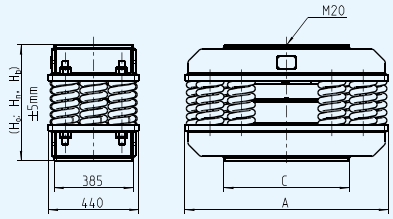
Spring element type: S-WPV(R)-3010.../32

LEGEND

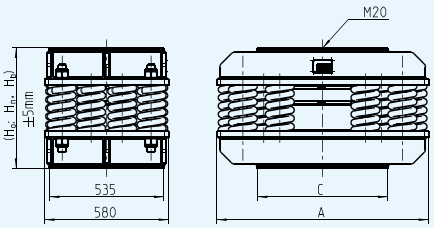
H_0: unloaded height H_n: height at nominal load H_b: height at blockload

DIMENSIONS

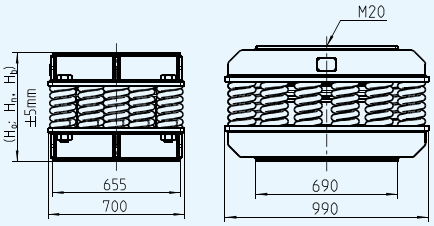
S-WPV-3010-10../32
S-WPV-3010-12../32



S-WPV-3010-14../32
S-WPV-3010-16../32
S-WPV-3010-18../32
S-WPV-3010-22../32



S-WPVR-3010-22../32



S-WP-3010

Type	Nom. load [kN]	Ver. stiffness[1)] [kN/mm]	Hor. stiffness[1)] [kN/mm]	Height [mm]			A [mm]	C [mm]	Damping parameter [kNs/m]	
				H_0*	H_n*	H_b*			d_v 5)	d_h 5)
S-WPV-3010-10.00/32	510	15.97	9.94	560	528	514	990	610	230	600
S-WPV-3010-12.00/32	613	19.16	11.93							
S-WPV-3010-12.04/32	659	20.59	11.95							
S-WPV-3010-14.04/32	761	23.79	13.94						300	800
S-WPV-3010-16.00/32	817	25.55	15.90							
S-WPV-3010-16.12/32	955	29.85	15.97							
S-WPV-3010-18.10/32	1034	32.33	17.94				1040	740		
S-WPV-3010-22.07/32	1204	37.64	21.90				1090	790		
S-WPV-3010-22.16/32	1307	40.86	21.95							
max. weight approx.: 875kg										

S-WPVR-3010

Type	Nom. load [kN]	Vert. stiffness[1)] [kN/mm]	Hor. stiffness[1)] [kN/mm]	Height [mm]			Damping parameter [kNs/m]	
				H_0*	H_n*	H_b*	d_v 5)	d_h 5)
S-WPVR-3010-22.07/32	1204	37.64	21.90	560	528	514	550	1100
S-WPVR-3010-22.16/32	1307	40.86	21.95					
max. weight approx.: 925kg								

(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:

1) calculated according to DIN EN 13906-1
2) natural frequency at nominal load 2.75Hz
3) spring elements are fully prestressable
4) 2x4 mm adhesive pads and shims on request
6) d_v; d_h: min. values are given for height H_n at natural frequencies f_v; f_h at 20°C

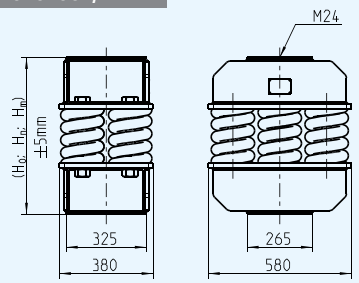
Spring element type: S-WP-4020.../24

LEGEND

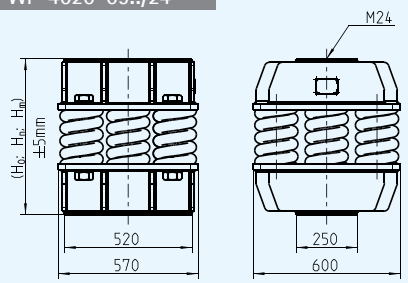
H_0: unloaded height H_n: height at nominal load H_m: height at maximum load

DIMENSIONS

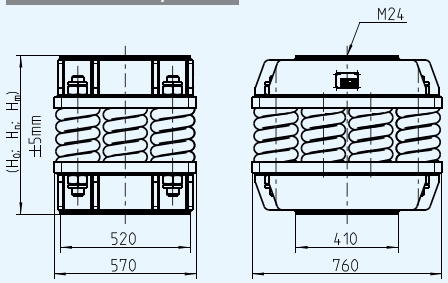
S-WP-4020-05../24
S-WP-4020-06../24



S-WP-4020-07../24
S-WP-4020-08../24
S-WP-4020-09../24



S-WP-4020-10../24
S-WP-4020-11../24
S-WP-4020-12../24



S-WP-4020

Type	Nom. load [kN]	Max. load [kN]	Ver. stiffness[1)] [kN/mm]	Hor. stiffness[1)] [kN/mm]	Height [mm]		
					H_0*	H_n*	H_m*
S-WP-4020-05.00/24	533	639	26.65	22.70	636	616	612
S-WP-4020-05.01/24	558	671	27.95	23.10			
S-WP-4020-05.02/24	584	703	29.25	23.50			
S-WP-4020-05.03/24	610	734	30.55	23.90			
S-WP-4020-06.00/24	639	767	31.98	27.20			
S-WP-4020-06.01/24	665	799	33.28	27.60			
S-WP-4020-06.02/24	691	831	34.58	28.00			
max. weight approx.: 315kg							
S-WP-4020-07.00/24	746	895	27.31	31.77	636	616	612
S-WP-4020-07.01/24	772	927	38.61	32.16			
S-WP-4020-07.02/24	798	959	39.91	32.55			
S-WP-4020-07.03/24	824	990	41.21	32.95			
S-WP-4020-08.00/24	853	1023	42.64	36.31			
S-WP-4020-08.01/24	879	1055	43.94	36.70			
S-WP-4020-08.02/24	905	1087	45.24	37.09			
S-WP-4020-08.03/24	931	1118	46.54	37.49			
S-WP-4020-09.00/24	959	1151	47.97	40.85			
S-WP-4020-09.01/24	985	1183	49.27	41.24			
S-WP-4020-09.02/24	1011	1215	50.57	41.63			
S-WP-4020-09.03/24	1037	1246	51.87	42.02			
max. weight approx.: 515kg							
S-WP-4020-10.00/24	1066	1279	53.30	45.60	636	616	612
S-WP-4020-10.01/24	1092	1311	54.60	45.97			
S-WP-4020-10.02/24	1117	1343	55.90	46.34			
S-WP-4020-10.03/24	1143	1374	57.20	46.72			
S-WP-4020-11.00/24	1172	1407	58.63	50.16			
S-WP-4020-11.01/24	1198	1439	59.93	50.53			
S-WP-4020-11.02/24	1224	1471	61.23	50.90			
S-WP-4020-11.03/24	1250	1502	62.53	51.28			
S-WP-4020-12.00/24	1279	1535	63.96	54.72			
S-WP-4020-12.01/24	1305	1567	65.26	55.09			
S-WP-4020-12.02/24	1331	1598	66.56	55.46			
S-WP-4020-12.03/24	1357	1630	67.86	55.84			
S-WP-4020-12.04/24	1383	1662	69.15	56.21			
S-WP-4020-12.05/24	1409	1693	70.45	56.58			
S-WP-4020-12.06/24	1435	1725	71.75	56.96			
S-WP-4020-12.07/24	1460	1757	73.05	57.33			
S-WP-4020-12.08/24	1486	1788	74.35	57.70			
max. weight approx.: 720kg							

(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:
1) calculated according to DIN EN 13906-1
2) natural frequency at nominal load 3.5 Hz
3) spring elements are prestressable
4) 2x4 mm adhesive pads and shims on request

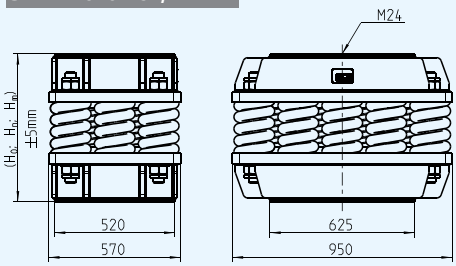
Spring element type: S-WP-4020.../24

LEGEND

H_0: unloaded height H_n: height at nominal load H_m: height at maximum load

DIMENSIONS

S-WP-4020-14../24
S-WP-4020-15../24



S-WP-4020

Type	Nom. load [kN]	Max. load [kN]	Ver.[1] stiffness [kN/mm]	Hor.[1] stiffness [kN/mm]	Height [mm]		
					H_0*	H_n*	H_m*
S-WP-4020-14.00/24	1492	1791	74.62	63.84	636	616	612
S-WP-4020-14.01/24	1518	1822	75.92	64.21			
S-WP-4020-14.02/24	1544	1853	77.22	64.58			
S-WP-4020-14.03/24	1570	1884	78.52	64.96			
S-WP-4020-15.00/24	1599	1919	79.95	68.40			
S-WP-4020-15.01/24	1625	1950	81.25	68.77			
S-WP-4020-15.02/24	1651	1981	82.55	69.14			
S-WP-4020-15.03/24	1677	2012	83.85	69.52			
S-WP-4020-15.04/24	1703	2044	85.15	69.89			
S-WP-4020-15.05/24	1729	2075	86.44	70.26			
S-WP-4020-15.06/24	1755	2106	87.74	70.63			
S-WP-4020-15.07/24	1781	2137	89.04	71.01			
S-WP-4020-15.08/24	1807	2168	90.34	71.38			
S-WP-4020-15.09/24	1833	2199	91.64	71.75			
S-WP-4020-15.10/24	1859	2230	92.93	72.13			
S-WP-4020-15.11/24	1885	2262	94.23	72.50			
S-WP-4020-15.12/24	1911	2293	95.53	72.87			
S-WP-4020-15.13/24	1937	2324	96.83	73.25			
S-WP-4020-15.14/24	1963	2355	98.13	73.62			
S-WP-4020-15.15/24	1988	2386	99.42	73.99			
S-WP-4020-15.16/24	2014	2417	100.72	74.36			
S-WP-4020-15.17/24	2040	2448	102.02	74.74			
S-WP-4020-15.18/24	2066	2480	103.32	75.11			
S-WP-4020-15.19/24	2092	2511	104.61	75.48			
max. weight approx.: 1000kg							

(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:
1) calculated according to DIN EN 13906-1
2) natural frequency at nominal load 3.5 Hz
3) spring elements are prestressable
4) 2x4 mm adhesive pads and shims on request

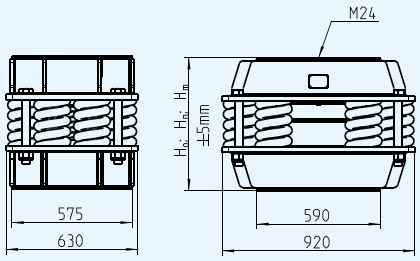
Spring element type: S-WPV-4020.../24

LEGEND

H_0: unloaded height H_n: height at nominal load H_m: height at maximum load

DIMENSIONS

S-WPV-4020-05../24
S-WPV-4020-06../24
S-WPV-4020-07../24
S-WPV-4020-08../24



S-WPV-4020

Type	Nom. load [kN]	Max. load [kN]	Vert.[1] stiffness [kN/mm]	Hor.[1] stiffness [kN/mm]	Height [mm]			Damping parameter [kNs/m]	
					H_0*	H_n*	H_m*	d_v [5]	d_h [5]
S-WPV-4020-05.00/24	533	640	26.65	22.69	636	616	612	350	950
S-WPV-4020-05.01/24	559	671	27.95	23.09					
S-WPV-4020-05.02/24	585	702	29.25	23.48					
S-WPV-4020-06.00/24	640	768	31.98	27.23					
S-WPV-4020-06.03/24	718	861	35.88	28.41					
S-WPV-4020-07.00/24	746	895	37.31	31.92					
S-WPV-4020-07.01/24	772	927	38.61	32.29					
S-WPV-4020-07.02/24	798	958	39.91	32.66					
S-WPV-4020-07.03/24	824	989	41.21	33.04					
S-WPV-4020-08.00/24	853	1023	42.64	36.48					
S-WPV-4020-08.01/24	879	1055	43.94	36.85					
S-WPV-4020-08.02/24	905	1086	45.24	37.22					
S-WPV-4020-08.03/24	931	1117	46.54	37.60					
S-WPV-4020-08.04/24	957	1148	47.83	37.97					
S-WPV-4020-08.05/24	983	1179	49.13	28.34					
S-WPV-4020-08.06/24	1009	1210	50.43	38.72					
S-WPV-4020-08.07/24	1035	1242	51.73	39.09					
S-WPV-4020-08.08/24	1061	1273	53.03	39.46					
S-WPV-4020-08.09/24	1086	1304	54.32	39.83					
S-WPV-4020-08.10/24	1112	1385	55.62	40.22					
max. weight approx.: 760kg									

(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:
1) calculated according to DIN EN 13906-1
2) natural frequency at nominal load 3.5 Hz
3) spring elements are fully prestressable
4) 2x4 mm adhesive pads and shims on request
5) d_v; d_h: min. values are given for height H_n at natural frequencies f_v; f_h at 20°C

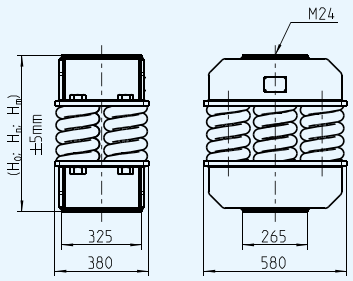
Spring element type: S-WP-4020.../32

LEGEND

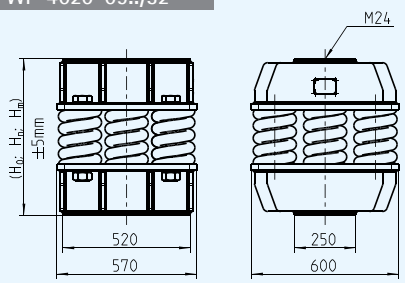
H_0: unloaded height H_n: height at nominal load H_m: height at maximum load

DIMENSIONS

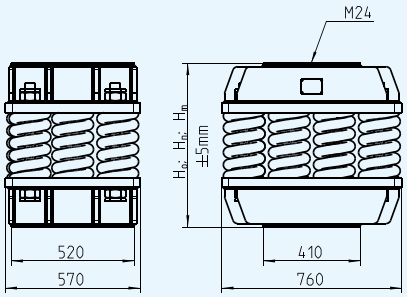
S-WP-4020-05../32
S-WP-4020-06../32



S-WP-4020-07../32
S-WP-4020-08../32
S-WP-4020-09../32



S-WP-4020-10../32
S-WP-4020-11../32
S-WP-4020-12../32



S-WP-4020

Type	Nom. load [kN]	Max. load [kN]	Ver.[1] stiffness [kN/mm]	Hor.[1] stiffness [kN/mm]	Height [mm]		
					H_0*	H_n*	H_m*
S-WP-4020-05.00/32	560	640	19.99	11.78	691	663	659
S-WP-4020-05.01/32	586	670	20.93	11.88			
S-WP-4020-05.02/32	613	700	21.88	11.97			
S-WP-4020-05.03/32	639	730	22.82	12.06			
S-WP-4020-06.00/32	672	768	23.99	14.14			
S-WP-4020-06.01/32	698	798	24.93	14.23			
S-WP-4020-06.02/32	724	828	25.87	14.32			
S-WP-4020-06.03/32	751	858	26.82	14.42			
max. weight approx.: 350kg							
S-WP-4020-07.00/32	783	895	27.98	16.50	691	663	659
S-WP-4020-07.01/32	810	926	28.93	16.59			
S-WP-4020-07.02/32	836	956	29.87	16.68			
S-WP-4020-07.03/32	863	986	30.82	16.77			
S-WP-4020-08.00/32	895	1023	31.98	18.85			
S-WP-4020-08.01/32	922	1054	32.93	18.94			
S-WP-4020-08.02/32	948	1084	33.87	19.04			
S-WP-4020-08.03/32	975	1114	34.81	19.13			
S-WP-4020-09.00/32	1007	1151	35.98	21.21			
S-WP-4020-09.01/32	1034	1181	36.92	21.30			
S-WP-4020-09.02/32	1060	1212	37.87	21.39			
S-WP-4020-09.03/32	1087	1242	38.81	21.49			
max. weight approx.: 565kg							
S-WP-4020-10.00/32	1119	1279	39.98	23.56	691	663	659
S-WP-4020-10.01/32	1145	1309	40.92	23.66			
S-WP-4020-10.02/32	1172	1340	41.86	23.75			
S-WP-4020-10.03/32	1198	1370	42.81	23.84			
S-WP-4020-11.00/32	1231	1407	43.97	25.92			
S-WP-4020-11.01/32	1257	1437	44.92	26.01			
S-WP-4020-11.02/32	1284	1468	45.86	26.11			
S-WP-4020-11.03/32	1310	1498	46.81	26.20			
S-WP-4020-12.00/32	1343	1535	47.97	28.28			
S-WP-4020-12.01/32	1369	1565	48.92	28.37			
S-WP-4020-12.02/32	1396	1596	49.86	28.46			
S-WP-4020-12.03/32	1422	1626	50.80	28.56			
S-WP-4020-12.04/32	1448	1656	51.75	28.65			
S-WP-4020-12.05/32	1475	1686	52.69	28.74			
S-WP-4020-12.06/32	1501	1716	53.64	28.84			
S-WP-4020-12.07/32	1528	1747	54.58	28.93			
S-WP-4020-12.08/32	1554	1777	55.52	29.02			
max. weight approx.: 800kg							

(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:
1) calculated according to DIN EN 13906-1
2) natural frequency at nominal load 2.75 Hz
3) spring elements are fully prestressable
4) 2x4 mm adhesive pads and shims on request

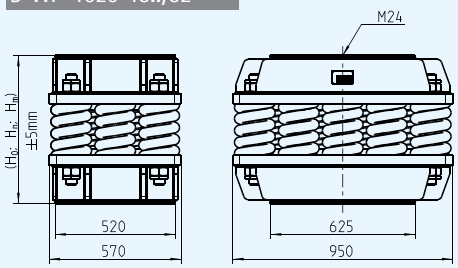
Spring element type: S-WP-4020.../32

LEGEND

H_0: unloaded height H_n: height at nominal load H_m: height at maximum load

DIMENSIONS

S-WP-4020-14../32
S-WP-4020-15../32



S-WP-4020

Type	Nom. load [kN]	Max. load [kN]	Ver.[1] stiffness [kN/mm]	Hor.[1] stiffness [kN/mm]	Height [mm]		
					H_0*	H_n*	H_m*
S-WP-4020-14.00/32	1567	1791	55.97	32.99	691	663	659
S-WP-4020-14.01/32	1593	1821	56.91	33.08			
S-WP-4020-14.02/32	1619	1852	57.86	33.18			
S-WP-4020-14.03/32	1646	1882	58.80	33.27			
S-WP-4020-15.00/32	1679	1919	59.97	35.35			
S-WP-4020-15.01/32	1705	1949	60.91	35.44			
S-WP-4020-15.02/32	1731	1979	61.85	35.53			
S-WP-4020-15.03/32	1758	2010	62.80	35.63			
S-WP-4020-15.04/32	1784	2040	63.74	35.72			
S-WP-4020-15.05/32	1811	2070	64.69	35.81			
S-WP-4020-15.06/32	1837	2100	65.63	35.91			
S-WP-4020-15.07/32	1864	2130	66.57	36.00			
S-WP-4020-15.08/32	1890	2161	67.52	36.09			
S-WP-4020-15.09/32	1916	2191	68.46	36.18			
S-WP-4020-15.10/32	1943	2221	69.40	36.28			
S-WP-4020-15.11/32	1969	2251	70.35	36.37			
S-WP-4020-15.12/32	1996	2281	71.29	36.46			
S-WP-4020-15.13/32	2022	2312	72.24	36.56			
S-WP-4020-15.14/32	2049	2342	73.18	36.65			
S-WP-4020-15.15/32	2075	2372	74.12	36.74			
S-WP-4020-15.16/32	2101	2402	75.07	36.84			
S-WP-4020-15.17/32	2128	2432	76.01	36.93			
S-WP-4020-15.18/32	2154	2463	76.96	37.02			
S-WP-4020-15.19/32	2181	2793	77.90	37.12			
max. weight approx.: 1095kg							

(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:
1) calculated according to DIN EN 13906-1
2) natural frequency at nominal load 2.75 Hz
3) spring elements are fully prestressable
4) 2x4 mm adhesive pads and shims on request

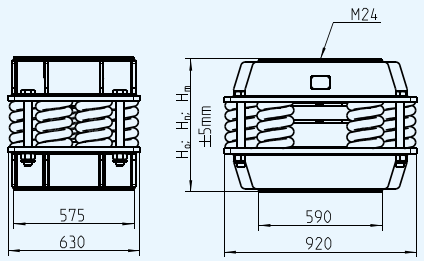
Spring element type: S-WPV-4020.../32

LEGEND

H_0: unloaded height H_n: height at nominal load H_m: height at maximum load

DIMENSIONS

S-WPV-4020-05../32
S-WPV-4020-06../32
S-WPV-4020-07../32
S-WPV-4020-08../32



S-WPV-4020

Type	Nom. load [kN]	Max. load [kN	Vert. stiff-ness[1] [kN/mm]	Hor. stiff-ness[1] [kN/mm	Height [mm]			Damping parameter [kNs/m]	
					H_0*	H_n*	H_m*	d_v [5]	d_h [5]
S-WPV-4020-05.00/32	560	640	19.99	11.78	691	663	659	350	950
S-WPV-4020-05.01/32	586	670	20.93	11.88					
S-WPV-4020-05.02/32	613	700	21.88	11.97					
S-WPV-4020-06.00/32	672	768	23.99	14.14					
S-WPV-4020-06.03/32	751	858	26.82	14.42					
S-WPV-4020-07.00/32	783	895	27.98	16.50					
S-WPV-4020-07.01/32	810	926	28.93	16.59					
S-WPV-4020-07.02/32	836	956	29.87	16.68					
S-WPV-4020-07.03/32	863	986	30.82	16.77					
S-WPV-4020-08.00/32	895	1023	31.98	18.85					
S-WPV-4020-08.01/32	922	1054	32.93	18.94					
S-WPV-4020-08.02/32	948	1084	33.87	19.04					
S-WPV-4020-08.03/32	975	1114	34.81	19.13					
S-WPV-4020-08.04/32	1001	1144	35.76	19.22					
S-WPV-4020-08.05/32	1028	1174	36.70	19.32					
S-WPV-4020-08.06/32	1054	1205	37.65	19.41					
S-WPV-4020-08.07/32	1081	1235	38.59	19.50					
S-WPV-4020-08.08/32	1107	1265	39.53	19.60					
S-WPV-4020-08.09/32	1133	1295	40.48	19.69					
S-WPV-4020-08.10/32	1160	1325	41.42	19.78					
max. weight approx.: 810kg									

(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:
1) calculated according to DIN EN 13906-1
2) natural frequency at nominal load 2.75 Hz
3) spring elements are fully prestressable
4) 2x4 mm adhesive pads and shims on request
5) d_v; d_h: min. values are given for height H_n at natural frequencies f_v; f_h at 20°C

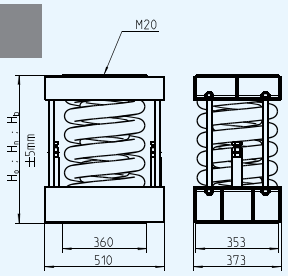
Spring element type: S-WLP-3021.../150
S-WLP-3030.../150

LEGEND

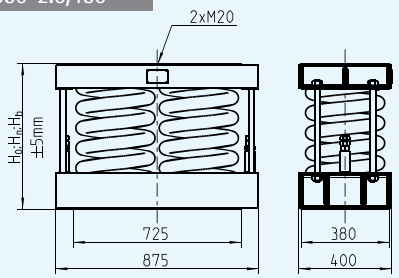
H_o: unloaded height H_n: height at nominal load H_d: delivery height (according to customer specifications)

DIMENSIONS

S-WLP-3021-1.0/150
S-WLP-3030-1.0/150



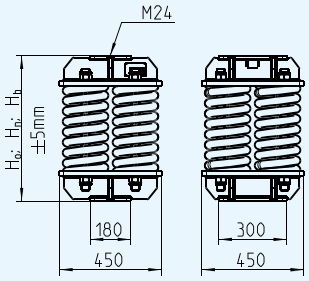
S-WLP-3021-2.0/150
S-WLP-3030-2.0/150



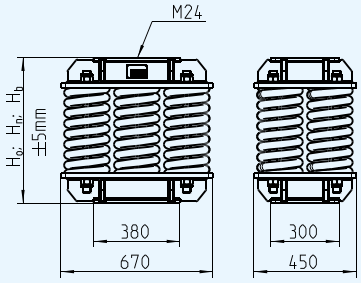
S-WLP

Type	Max. load [kN]	Vert. stiffness[1)] [kN/mm]	Hor. stiffness[1)] [kN/mm]	Height [mm]		
				H_o^*	H_n^*	H_b^*
S-WLP-3030-1.0/150	59	0.39	0.15	424	274	262
S-WLP-3030-2.0/150	118	0.79	0.30			
S-WLP-3030-4.0/150	236	1.58	0.61	665	515	503
S-WLP-3030-6.0/150	355	2.37	0.91			
S-WLP-3030-8.0/150	473	3.16	1.22			
max. weight approx.: 554kg						
S-WLP-3021-1.0/150	78	0.52	0.09	489	339	319
S-WLP-3021-2.0/150	157	1.05	0.18			
S-WLP-3021-4.0/150	314	2.10	0.36	730	580	560
S-WLP-3021-6.0/150	472	3.14	0.53			
S-WLP-3021-8.0/150	629	4.19	0.71			
max. weight approx.: 505kg						

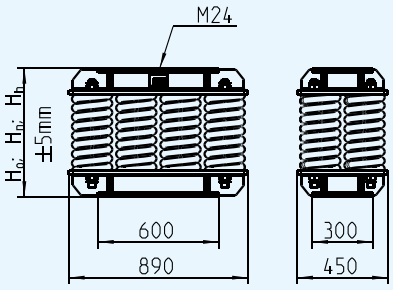
S-WLP-3021-4.0/150



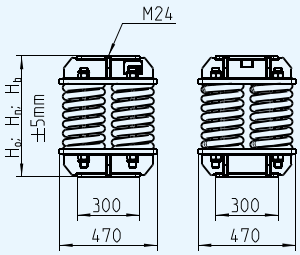
S-WLP-3021-6.0/150



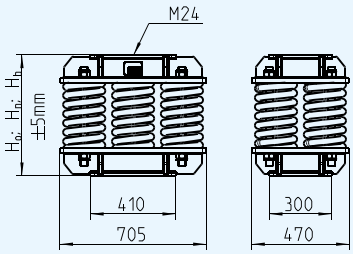
S-WLP-3021-8.0/150



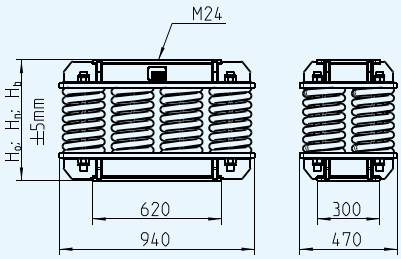
S-WLP-3030-4.0/150



S-WLP-3030-6.0/150



S-WLP-3030-8.0/150



(*) heights and weights exclude allowances for adhesive pads and shims
REMARKS:
1) calculated according to DIN EN 13906-1
2) 2x4 mm adhesive pads and shims on request
3) spring elements are prestressable

Spring element type: S-WLP-4030.../150
S-WLP-5030.../150

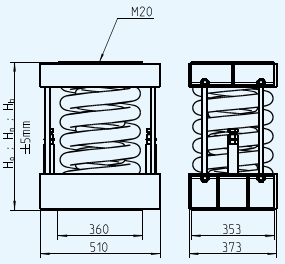
LEGEND

H_0: unloaded height H_n: height at nominal load H_d: delivery height (according to customer specifications)

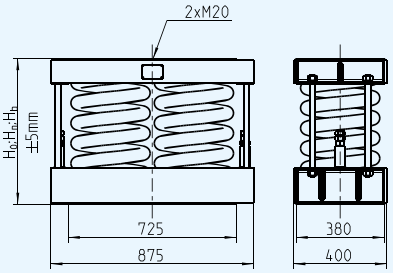
H_b: height at blockload

DIMENSIONS

S-WLP-4030-1.0/150
S-WLP-5030-1.0/150



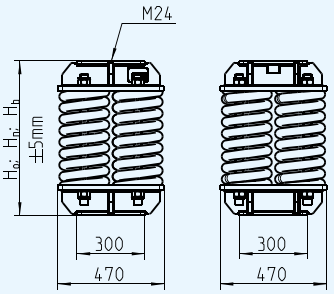
S-WLP-4030-2.0/150
S-WLP-5030-2.0/150



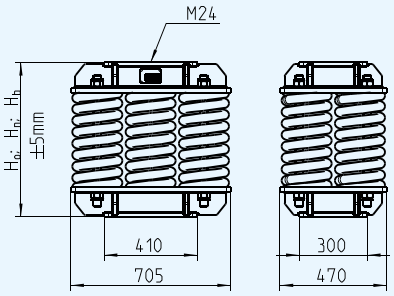
S-WLP

Type	Max. load [kN]	Vert. stiffness[1)] [kN/mm]	Hor. stiffness[1)] [kN/mm]	Height [mm]		
				H_0*	H_n*	H_b*
S-WLP-4030-1.0/150	98	0.66	0.13	524	374	374
S-WLP-4030-2.0/150	197	1.31	0.27			
S-WLP-4030-4.0/150	394	2.63	0.53	765	615	598
S-WLP-4030-6.0/150	591	3.94	0.80			
S-WLP-4030-8.0/150	788	5.25	1.06			
max. weight approx.: 685 kg						
S-WLP-5030-1.0/150	160	1.07	0.32	599	449	415
S-WLP-5030-2.0/150	320	2.13	0.63			
S-WLP-5030-4.0/150	640	4.26	1.26	840	690	656
S-WLP-5030-6.0/150	960	6.40	1.89			
S-WLP-5030-8.0/150	1279	8.53	2.52			
max. weight approx.: 1191 kg						

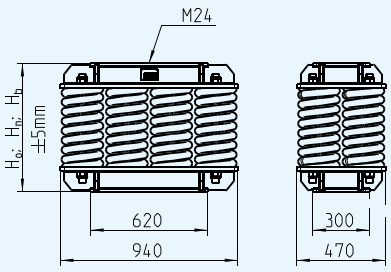
S-WLP-4030-4.0/150



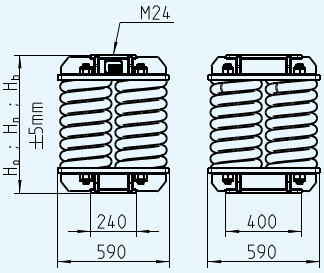
S-WLP-4030-6.0/150



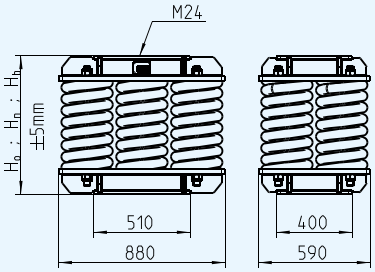
S-WLP-4030-8.0/150



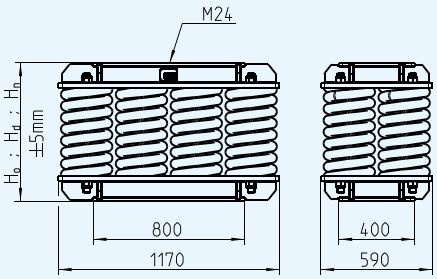
S-WLP-5030-4.0/150



S-WLP-5030-6.0/150



S-WLP-5030-8.0/150



(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:

1) calculated according to DIN EN 13906-1

2) 2x4 mm adhesive pads and shims on request

3) spring elements are prestressable

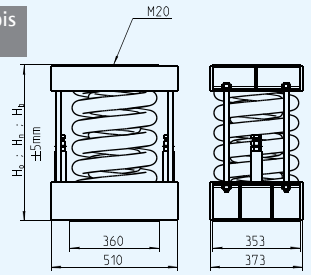
Spring element type: S-WLP-50.../160
S-WLPV-50.../160

LEGEND

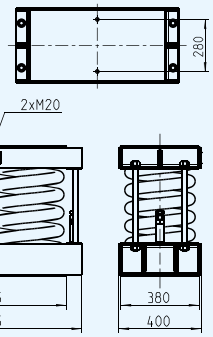
H_0: unloaded height H_n: height at nominal load H_d: delivery height (according to customer specifications)
H_b: height at blockload

DIMENSIONS

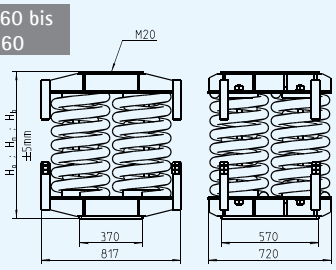
S-WLP-5010-1../160 bis
S-WLP-5020-1../160



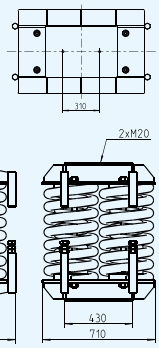
S-WLP-5010-2.0/160 bis
S-WLP-5020-2.2/160



S-WLP-5010-4../160 bis
S-WLP-5020-4../160



S-WLP-5010-6../160 bis
S-WLP-5020-6../160



S-WLP

Type	Nom. load [kN]	Vert. stiffness[1)] [kN/mm]	Hor. stiffness[1)] [kN/mm]	Height [mm]			
				H_0^*	H_n^*	H_b^*	H_1^*
S-WLP-5020-1.0/160	96	0.60	0.31	629	469	427	-
S-WLP-5010-1.0/160	110	0.69	0.38				
S-WLP-5020-1.1/160	129	0.80	0.33				
S-WLP-5010-1.1/160	142	0.89	0.41				
S-WLP-5020-2.0/160	192	1.20	0.62				
S-WLP-5010-2.0/160	220	1.38	0.77				
S-WLP-5020-2.1/160	225	1.40	0.65				
S-WLP-5010-2.1/160	252	1.58	0.79				
S-WLP-5020-2.2/160	257	1.61	0.67				
S-WLP-5010-2.2/160	285	1.78	0.81				
S-WLP-5020-4.0/160	384	2.40	1.24	869	709	667	
S-WLP-5010-4.0/160	440	2.75	1.53				
S-WLP-5020-4.1/160	417	2.61	1.27				
S-WLP-5010-4.1/160	472	2.95	1.55				
S-WLP-5020-4.2/160	44	2.81	1.29				
S-WLP-5010-4.2/160	505	3.16	1.58				
S-WLP-5020-4.3/160	482	3.01	1.31				
S-WLP-5010-4.3/160	537	3.36	1.60				
S-WLP-5020-4.4/160	514	3.21	1.33				
S-WLP-5010-4.4/160	570	3.56	1.62				
S-WLP-5020-6.0/160	577	3.60	1.86				
S-WLP-5010-6.0/160	660	4.13	2.30				
S-WLP-5020-6.1/160	609	3.81	1.89				
S-WLP-5010-6.1/160	692	4.33	2.32				
S-WLP-5020-6.2/160	641	4.01	1.91				
S-WLP-5010-6.2/160	725	4.53	2.34				
S-WLP-5020-6.3/160	674	4.21	1.93				
S-WLP-5010-6.3/160	757	4.73	2.36				
S-WLP-5020-6.4/160	706	4.41	1.95				
S-WLP-5010-6.4/160	790	4.94	2.39				
S-WLP-5020-6.5/160	739	4.62	1.98				
S-WLP-5010-6.5/160	822	5.14	2.41				
S-WLP-5020-6.6/160	771	4.82	2.00				
S-WLP-5010-6.6/160	855	5.34	2.43				
max. weight approx.: 1445kg							

(*) heights and weights exclude allowances for adhesive pads and shims

REMARKS:
1) calculated according to DIN EN 13906-1
2) 2 x 4 mm adhesive pads and shims on request

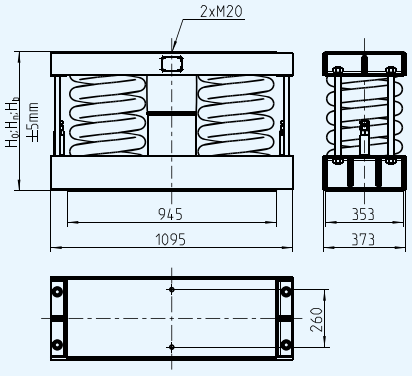
Spring element type: S-WLPV-50.../160

LEGEND

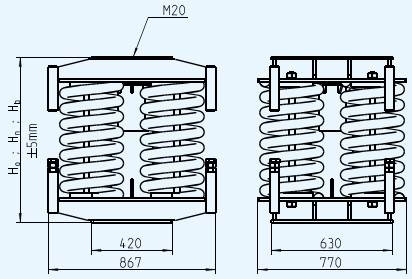
H_0: unloaded height H_n: height at nominal load H_d: delivery height 620 mm or according to customer specifications
H_b: height at blockload

DIMENSIONS

S-WLPV-5010-2.0/160 bis
S-WLPV-5020-2.2/160



S-WLPV-5010-4.0/160 bis
S-WLPV-5020-4.4/160

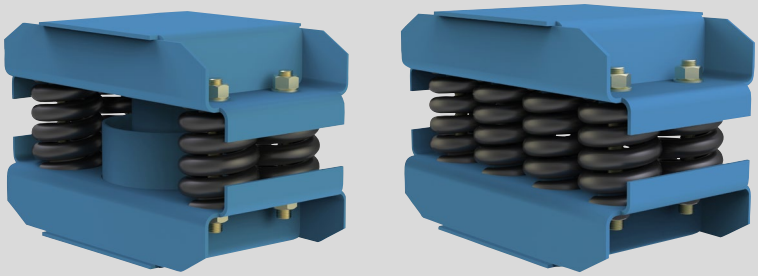


S-WLPV

Type	Nom. load [kN]	Vert. stiffness[1)] [kN/mm]	Hor. stiffness[1)] [kN/mm]	Height [mm]				Damping parameter [kNs/m]	
				H_0*	H_n*	H_b*	H_1*	d_v [4)]	d_h [4)]
S-WLPV-5020-2.0/160	192	1.20	0.62	629	469	427	-	150	215
S-WLPV-5010-2.0/160	220	1.38	0.77						
S-WLPV-5020-2.1/160	225	1.40	0.64						
S-WLPV-5010-2.1/160	252	1.58	0.79						
S-WLPV-5020-2.2/160	257	1.61	0.67						
S-WLPV-5010-2.2/160	285	1.78	0.81						
S-WLPV-5020-4.0/160	384	2.40	1.24	869	709	667			
S-WLPV-5010-4.0/160	440	2.75	1.53						
S-WLPV-5020-4.1/160	417	2.61	1.27						
S-WLPV-5010-4.1/160	472	2.95	1.55						
S-WLPV-5020-4.2/160	449	2.81	1.29						
S-WLPV-5010-4.2/160	505	3.16	1.58						
S-WLPV-5020-4.3/160	482	3.01	1.31						
S-WLPV-5010-4.3/160	537	3.36	1.60						
S-WLPV-5020-4.4/160	514	3.21	1.33						
S-WLPV-5010-4.4/160	570	3.56	1.62						
max. weight approx.: 985kg									

(*) heights and weights exclude allowances for adhesive pads and shims

ANMERKUNG:
1) calculated according to DIN EN 13906-1
2) 2x4 mm adhesive pads and shims on request
3) d_v, d_h: min. values, measured at test frequency 1Hz, amplitude ± 1 mm, ambient temperature 20°C

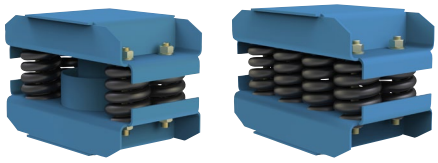


INSTALLATION AND OPERATION MANUAL

Spring Element (with viscoelastic Damper) S-WP(V)

Installation and Operation Manual

CONTENT



Safety Instructions

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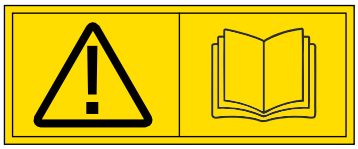
Safety instructions

Safety instructions are used for personal safety and protection from serious injury that can lead to death.
The following instructions are intended to protect the product from damage.



General Safety Information

Before installation, operation or service, read and understand this installation and operational manual.
Failure to follow installation and operating instructions could result in death or serious injury.

Special Safety Warnings

CAUTION

CAUTION CONTUSION / CRUSHING

CAUTION UPRIGHT TRANSPORT AND STORAGE

Safety Instructions

Qualified Personnel

The product described in this document may be operated only by qualified personnel. Compliance with the required safety regulations according to the country of use is required. Qualified personnel must be based on their training and experience to recognize risks associated with this product and to avoid possible hazards.

Intended Use

The product described here may only be used for the intended application. If products and third-party components are used, they must be recommended or approved by LISEGA. The successful and safe operation of the product presupposes proper transportation, proper storage, installation, assembly, installation, commissioning, operation and maintenance.

All additional works that are not described in this document must be performed by authorized LISEGA personnel only. Any system changes that are not authorized by LISEGA or any kind of additional works might cause damage to the spring element and the warranty will be void.

Disclaimer

We have checked that the contents of this document are applicable to the described products. However, since deviations cannot be entirely precluded, we cannot guarantee full agreement. The information contained in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Spring Elements

VICODA® spring elements are used for vibration isolation in technical applications. They are mounted between the vibration source and the sub-structure to reduce vibrations. The system consisting of vibration source and VICODA® spring elements is characterized by its natural frequency. The usage of adequate spring elements leads to optimal vibration isolation.

The spring element consists of springs with an additional viscoelastic damper. Its main field of application is in plant engineering, being used to isolate machines and reduce resonant vibrations. The spring elements system is composed of the following major parts: A casing and helical coil steel compression springs and an additional viscoelastic damper.

General Arrangement Drawing

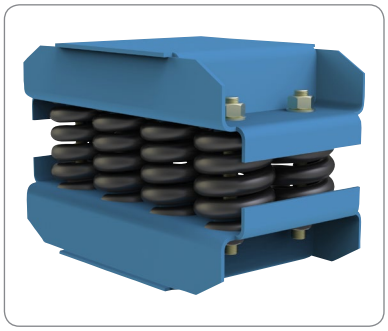


Fig. 1: Spring element S-WP type

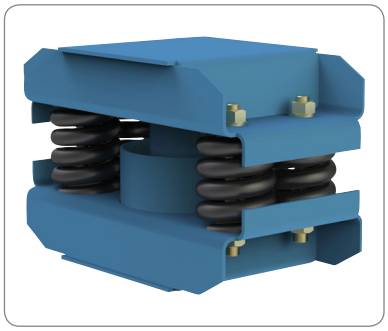


Fig. 2: Spring element S-WPV type

The main parts of the spring element are:
1) Lower casing (with viscoelastic damper for S-WPV type spring element)
2) Upper casing (with piston for S-WPV type spring element)
3) Helical coil steel compression springs
4) 4 bolts, 8 washers and 8 nuts to lock spring element during transport, installation and commissioning
5) Bitumen adhesive pads for top and bottom
6) Steel shims according to data sheet

Standard Corrosion Protection

The components receive the following standard surface treatment. Alternative corrosion protection may be agreed separately.

Casing:
- Surface treatment C3 medium according to ISO 12944
- Steel grit blasting according to EN ISO 12944-4 grade SA 2 1/2
- Undercoat zinc-rich primer, dry film thickness 60 µm
- Final coating with dry film thickness of 60 µm, color shade RAL 5012, light blue. The total dry film thickness of the system amounts to approx. 120 µm

Springs:
- Surface treatment C4 high according to ISO 12944
- Cathodic electrophoretic dip coating, thickness 20µm

Handling and Pre-Commissioning

Handling and Shipping Procedure

The standard marking and transportation procedure is specified in:
QP002-Standard LISEGA packaging, marking and transportation procedure.

These spring elements must be upright at all times! This also applies during transport, storage and operation.

Unpacking Procedure / Delivery Conditions

Prevent from shocks during unpacking. Be careful with sharp tools during unpacking so that the surface of the element will not be damaged.

They are usually delivered with shim plates for compensation of floor irregularities and settlements of concrete. Furthermore, VICODA® spring elements are usually protected from dust and water, ingress at the construction site by means of a PE cover.

The spring element is delivered pre-stressed according to customer specification. It is recommended to deliver spring elements with low pre-stress for transportation to reduce transportation risks. Then prestressing to the installation height is carried out on site with hydraulic jacks and a frame.

The default data are stamped on a name plate .

Lifting Arrangement

For transport by crane use the eye bolt or suitable sling lifting magnet. Consider the total mass of the product to choose the correct load size. Make sure that the sling is correctly mounted to the casing and not cause damage. The bolts must not be removed at this stage.

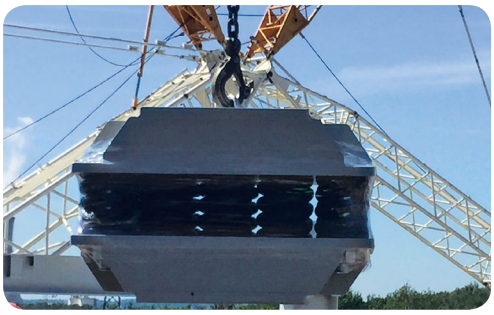


Fig. 3 Lifting of spring element with eye bolt

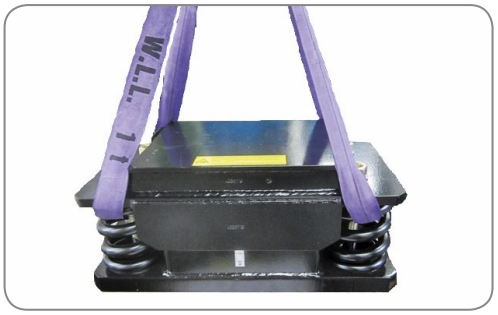


Fig. 4: Lifting of spring element with sling

Erection and Installation Procedure

Depending on the machine to be installed, the erection and installation procedure will vary. The aim to achieve vibration isolation, though, is the same. The final arrangement of the installed spring element between foundation or column and the machine or turbine table is shown in Figure 5 below.

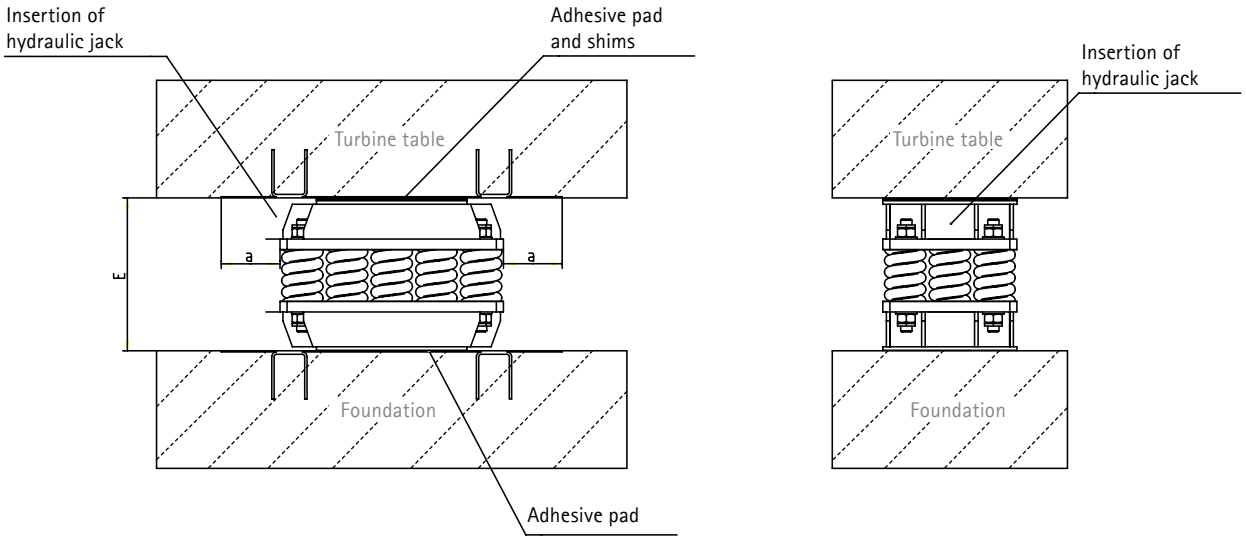


Fig. 5: Sketch of installed spring element

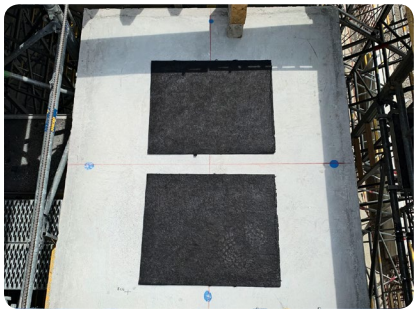
The spring elements are usually prestressed to height (E) and will be compressed by at least two hydraulic jacks during installation, see Fig. 5. The space (a) next to the spring element should be available to grant access for the hydraulic jacks on both sides. The length (a) is communicated separately and may be shared by two adjacent spring elements.

The following sections describe the installation of spring elements. The steps are recommendations, based on LISEGA experience in the installation of spring elements. If the installation will be carried out in a different way, the alternative installation method has to be agreed with LISEGA beforehand.

Installation with Formwork Construction

The situation is, that the column heads or foundation below the spring elements are ready but the turbine table still has to be built in a concrete formwork construction. In this case, the spring elements are inserted when the formwork is done and the turbine table is still to be built.

01. Make sure, the spring elements are prestressed to installation height (E), usually 10% more than under static load.



02. Make sure the foundation or column heads are clean, oil-free and levelled horizontally.

03. If the positions of the spring elements have not been marked on the column heads, the positions must be marked according to the spring element distribution plan. Afterwards position the bottom adhesive pad on the foundation through the recess in the formwork.

04. Place the spring element through the recess in the formwork and align its bottom part centered on top of the adhesive pad.

05. Measure the difference in height between the top edge of the formwork bottom and the top edge of the spring element. The difference in height, minus the required air gap (normally 3-5 mm, or consult with the contractor) and the thickness of the upper adhesive pad gives the required total thickness of the shims to be laid. The number of shims determined in this way is placed and aligned on the upper part of the spring element. In order to enable the later alignment of the foundation, at least 8 mm shims should be laid on top. If possible, use all material thicknesses of the available plates.

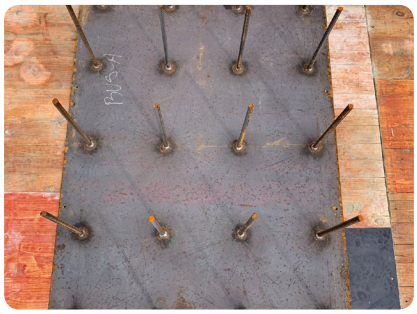
06. Place the adhesive pad on the top of the spring element and align it accordingly. Check the air gap again. Then each spring element is individually covered by a PE cover and thus protected from soiling during of the concrete.
(For the entire time from insertion, during concrete work until alignment when the turbine table is finished, the spring elements have to be protected from dust, dirt etc.)

Installation with Formwork Construction

Releasing of spring elements

07. The recess in the formwork is closed with an anchor plate that will form part of the turbinetable. The anchor plate has to be fixed on the formwork to prevent it from shifting during concrete work.

08. After the concrete work is finished and all relevant masses like turbine, generator etc. are mounted, releasing and aligning of the spring elements can be started. The first step is to measure and record the height between column head and foundation in the immediate vivinity of all spring elements (at least one per column head). The measuring positions must be marked accordingly (initial state). Then the spring elements are compressed with at least two hydraulic jacks. The jacks are inserted between the turbinen table (foundation) and the upper part of the spring element casing.



9. Loosen the lower nuts of the prestressing bolts. The prestressing bolts should never be used for alignment of the machine. The nuts should be secured by wire, cable ties or similar.

10. After all elements are released, the height level is measured again and compared with the values of the initial state. The final height level of the turbine table must be agreed and adjusted at the individual measuring points in consultation with the responsible turbine engineer. The turbine table can be lowered or raised by removing or inserting shims at the individual spring elements. For this purpose the spring elements are compressed again one by one by means of a hydraulic system. After all necessary heights have been set, the measurement has to be taken again. If the initial state of the foundation has not yet been restored, the previously described operation must be repeated until the required heights are reached.

Operating

Travel Scale (optional)

The actual position can be seen on the optional travel scale, it shows the actual travel length of the springs. This scale is approximate and not suitable for levelling of spring elements.

Maintenance

Under specified conditions and normal operation, it is recommended during the normal plant maintenance to perform (visual) check of the element and the actual position. If any deviation or damage is noted, please contact LISEGA.

LISEGA SE | GERMANY
Gerhard-Liesegang-Straße 1
27404 Zeven
P. O. Box 1357
27393 Zeven

T. | +49 (0) 42 81 – 713-0
M. | info@de.lisega.com
www.lisega.com

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