



# VICODA®

INSTALLATION AND OPERATION MANUAL Spring Element (with viscoelastic Damper) S-WP(V)

### Installation and Operation Manual

CONTENT



### Safety Instructions

Pages 23 - 24

### Spring Elements

Page 25

### Handling and Pre-Commissioning

Page 26

#### Erection and Installation Procedure

Pages 27 - 29



Page 29



General Safety Information	Page	23
Special Safety Warnings	Page	23
Qualified Personnel	Page	24
ntended Use	Page	24
Disclaimer	Page	24





General Arrangement Drawing Standard Corrosion Protection

Page 25 Page 25



Handling and Shipping Procedure Page 26 Unpacking Procedure / Delivery Conditions Page 26 Lifting Arrangement Page 26



Erection and Installation Procedure Installation with Formwork Construction Releasing of Spring Elements

Page 27 Page 28 Page 29



Travel Scale (optional) Maintenance

Page 29 Page 29

# 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





Senkrecht transportieren und lagern! Gefahr durch Flüssigkeitsaustritt!

Upright transport and store only! Risk of fluid leakage!





# 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<sup>®</sup> 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<sup>®</sup> 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



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



Fig. 2: Spring element S-WPV type



# 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<sup>®</sup> 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.



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.

- 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