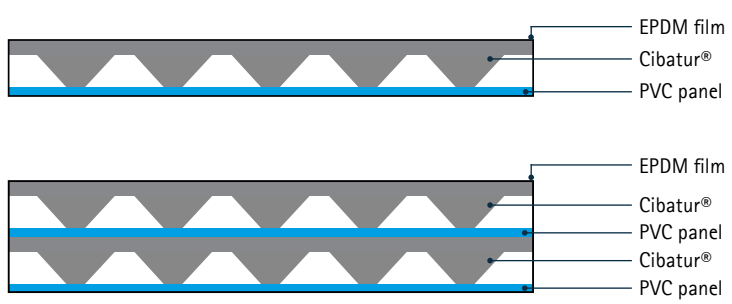


## Cimax®

Vibration protection for buildings in groundwater

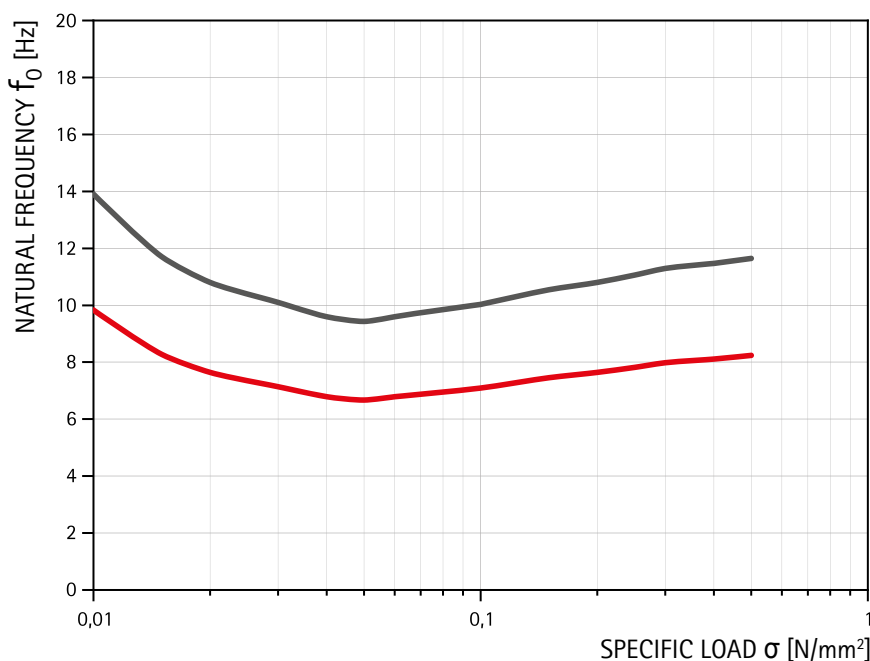
### Product information

DIMENSIONS	
Element size	1550 mm x 980 mm 1040 mm x 980 mm Special sizes on request
Thickness	Cimax one-layer: 35 mm Cimax two-layer: 70 mm



PROPERTIES	
Materials	NR, CR, EPDM, PVC
Bearing keeping	Outdoors
Technical approval	Nr. Z-16.32-495
Permanent load	$\leq 0,5 \text{ N/mm}^2$
Permanent load + dynamic load	$0,7 \text{ N/mm}^2$
Load peaks (occasional and short-term)	$\leq 1,2 \text{ N/mm}^2$
Thermal stability	$-40^\circ\text{C} + 70^\circ\text{C}$
Flammability	B2 acc. to DIN 4102 (normally combustible)
Use in groundwater	Assured effectiveness in groundwater. Documented in: VDI report no. 1941, 2006: Elastic building bearing in groundwater, N. Breitsamter, H. Schmitz, H. Molzberger, F. Müller-Boruttau

### Natural frequency



#### NATURAL FREQUENCY CURVE

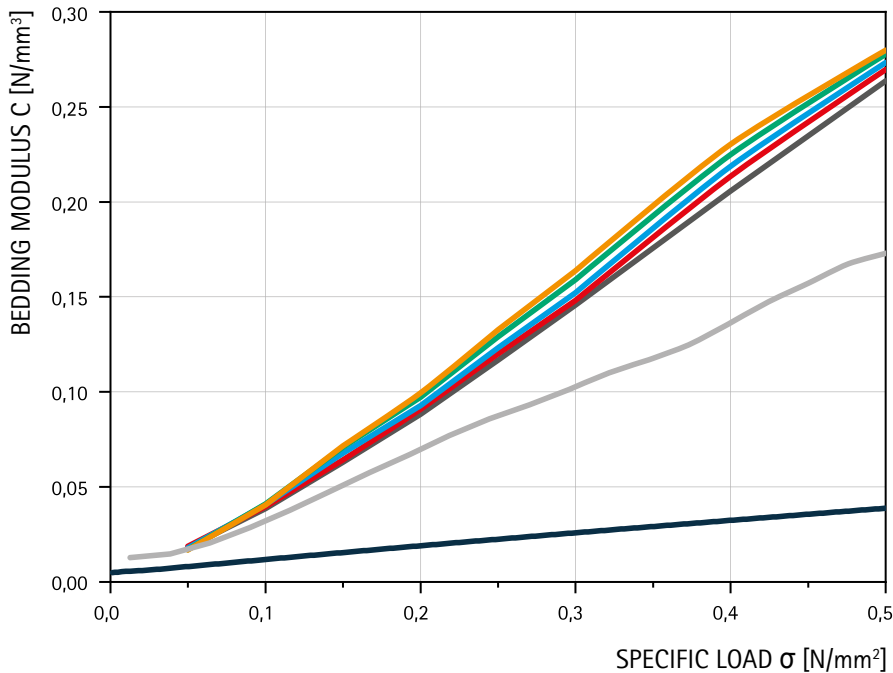
The diagram shows the natural frequency of a single-mass oscillator with Cimax® as spring element. If Cimax® is used in two-layers, the stiffness of the bearing is approximately halved and the natural frequency decreases significantly.

— One-layer  
— Two-layer

## Cimax®

Vibration protection for buildings in groundwater

### Bedding modulus depending on specific load, Cimax® one-layer

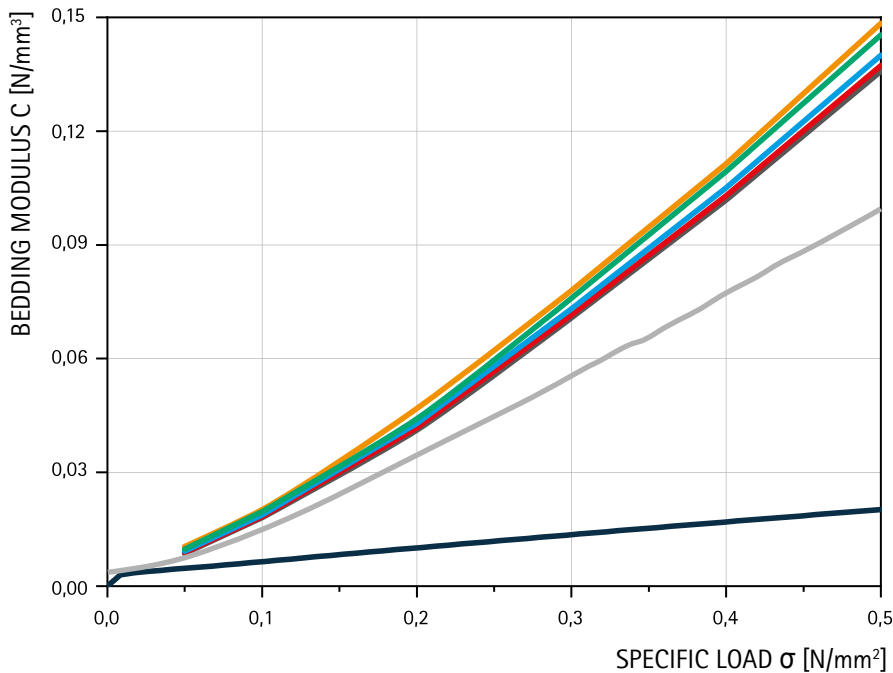


#### DIAGRAM

The diagrams show the static tangent module and secant module for one and two-layer Cimax® in addition to the dynamic bedding modules.

- $C_{dyn}$ ,  $f = 2,5$  Hz
- $C_{dyn}$ ,  $f = 5$  Hz
- $C_{dyn}$ ,  $f = 10$  Hz
- $C_{dyn}$ ,  $f = 20$  Hz
- $C_{dyn}$ ,  $f = 40$  Hz
- Stat. tangent module
- Stat. secant module

### Bedding modulus depending on specific load, Cimax® two-layer



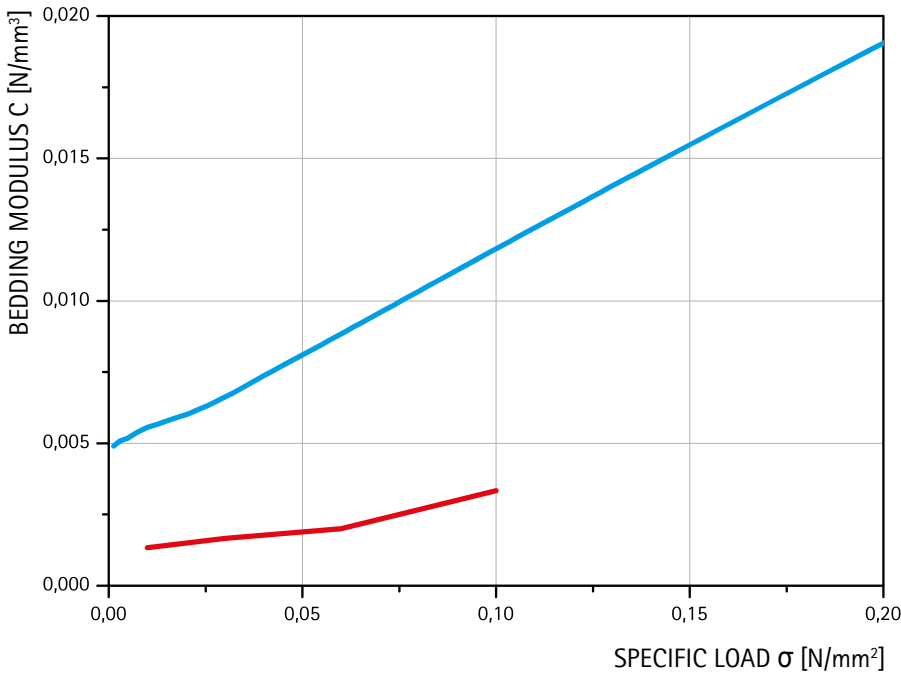
#### DIAGRAM

- $C_{dyn}$ ,  $f = 2,5$  Hz, one-layer
- $C_{dyn}$ ,  $f = 5$  Hz
- $C_{dyn}$ ,  $f = 10$  Hz
- $C_{dyn}$ ,  $f = 20$  Hz
- $C_{dyn}$ ,  $f = 40$  Hz
- Stat. tangent module
- Stat. secant module

**Cimax®**

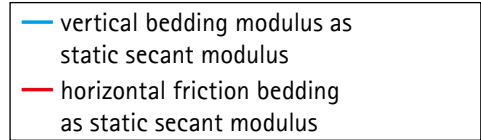
Vibration protection for buildings in groundwater

**Vertical and horizontal stiffness**

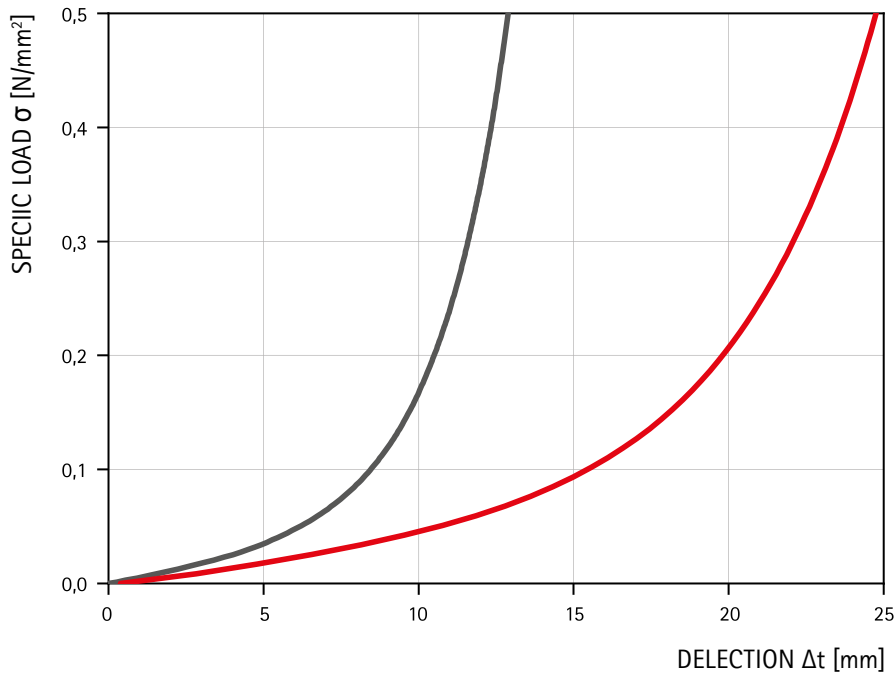


**STIFFNESS CURVE**

The diagram shows vertical and horizontal secant modulus of a layer of Cimax® are plotted against the pressure. As a result, the shear modulus is significantly lower than the bedding modulus.



**Compression**



**LOAD DEFLECTION CURVE**

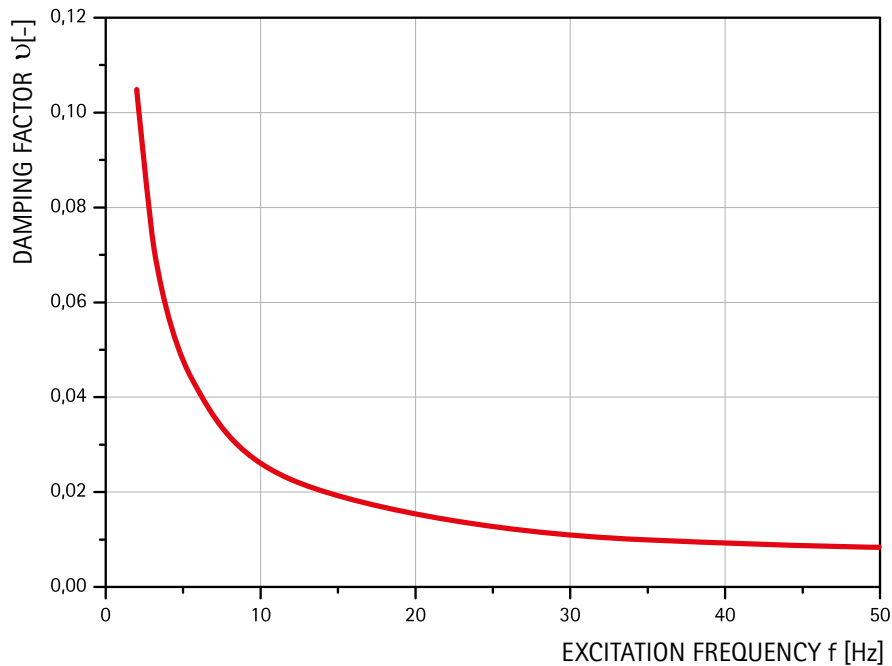
Uniaxial pressure against vertical deformation for one and two-layer Cimax®.



## Cimax®

Vibration protection for buildings in groundwater

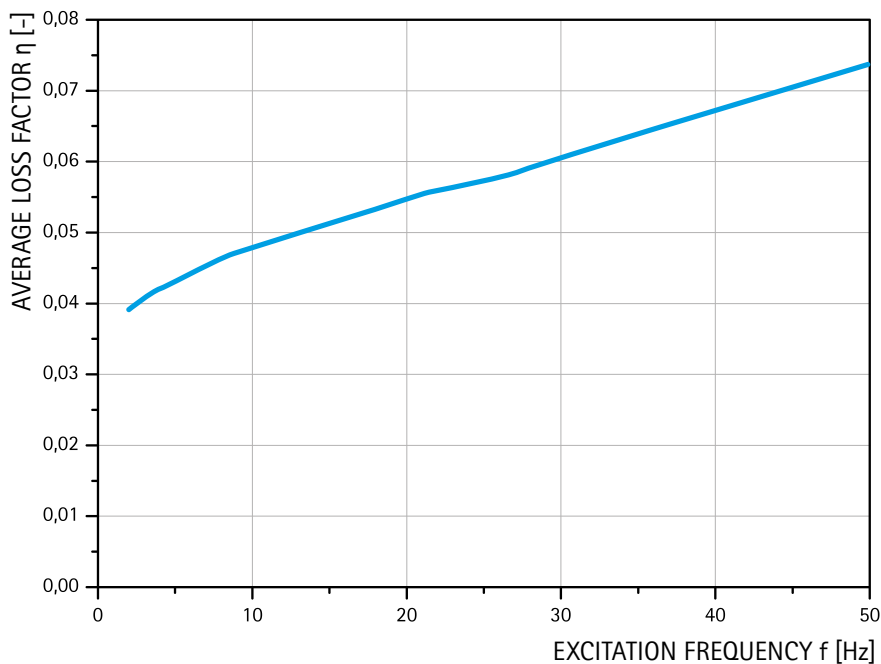
### Damping factor



#### DAMPING FACTOR CURVE

The damping factor  $\vartheta$  (frequently given as a percentage, previously referred to as Lehr damping factor  $D = \vartheta$ ) is a measurement of the decrease in amplitude of a free decay process.

### Loss factor



#### LOSS FACTOR CURVE

Loss factor depending on specific load.

For a free oscillation, the two are related as follows:  
Loss factor  $\eta = 2 D = 2 \vartheta$

In general, the higher  $\vartheta$ , the smaller are both the maximum increase of the amplitude in the case of resonance and the insulation effect for excitation frequencies higher than 1.4 times the natural frequency.

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