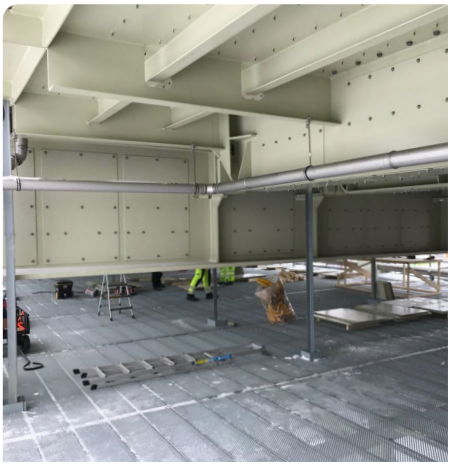
VIBRATEC
Quietly Improving Your Environment

# Constrained Layer Damping – Solutions

## CLD-solutions for the Old Steel Bridge

Vibratec reduces noise on the Årsta bridge in central Stockholm. Using our Constrained Layer Dampening (CLD) tiles, noise from the passing trains was lowered with 6 dB.



- **Railway & Road Steel Bridges**
- **Marine & Offshore**
- **Industry**
- **Wind Turbine Applications**
- **Defence Applications**

**CLD Damping Tile VT7044**
Temperature range 5° to 30°C

**CLD Damping Tile VT7055**
Temperature range -10° to +5°C

**CLD Damping Tile VT7044-55 Hybrid**
Temperature range -10° to +30°C


## CLD-solutions for Powerstation in Kansas

At the new Rubart power station in Kansas electricity is generated by 12 Caterpillar engines. The air intake filters to the engines where originally designed for another slightly smaller engine type, so after start-up it turned out the larger air flow caused resonances in the steel plates of the filters. The vibration levels where considered to high, not only causing noise but also risk of fatigue and cracks in the steel plates. Instaling our CLD-Tiles Vibratec reduced the vibrations and met the new requirements of 6 dB IL.

# Description

Constrained Layer Damping Tiles consist of a constraining sheet and a viscoelastic polymer that consists of a high performance acrylic system. The polymer is primarily characterized by its joining strength, load-dissipating properties as well as temperature and weather resistance, and has a high loss factor in the temperature range -10 -30°C, depending on the viscoelastic core type.

Due to the products unique composition, the doubleadhesive acrylic viscoelastic polymer combines very high adhesion levels with the ability to absorb and dissipate vibrational energy.

The products viscoelastic core can compensate for thermal elongation of bonded parts.

CLD tile performs well on materials that are difficult to join, such as powder coatings or plastic materials. Even in connection with combinations of such materials, this product provides advanced security due to its innovative design.

CLD tiles are available in customized sizes and thicknesses.

# Applications

- Reduction of structure borne noise radiation from steel bridges
- Reduction of structure borne noise radiation in marine & offshore applications
- Reduction of structure borne noise radiation in industrial applications, gensets, generators, wind turbine towers etc.
- Reduction of structure borne noise radiation in steel balcony applications

# Engineering

Vibratec can offer a full-service incl. detailed engineering and calculation of required damping for any specific application. Note that damping requirement and needed damping by a CLD system is depending on application, required corrosion protection, fixation method and environment such as temperature, rain etc.

Laboratory measurements with test specimens and onsite Noise & vibration measurements incl. measurement of damping in the “basic structure” is often needed, prior to the design of the best possible CLD solution.

Hybrid solutions may be required for a larger temperature range, e.g combining with viscoelastic acrylic polymer type 7055.

Along with acrylic polymer VT-7044 and 7055, Vibratec holds a database of many other viscoelastic materials, that enable us to design and manufacture a CLD solution, that meet customer requirement.

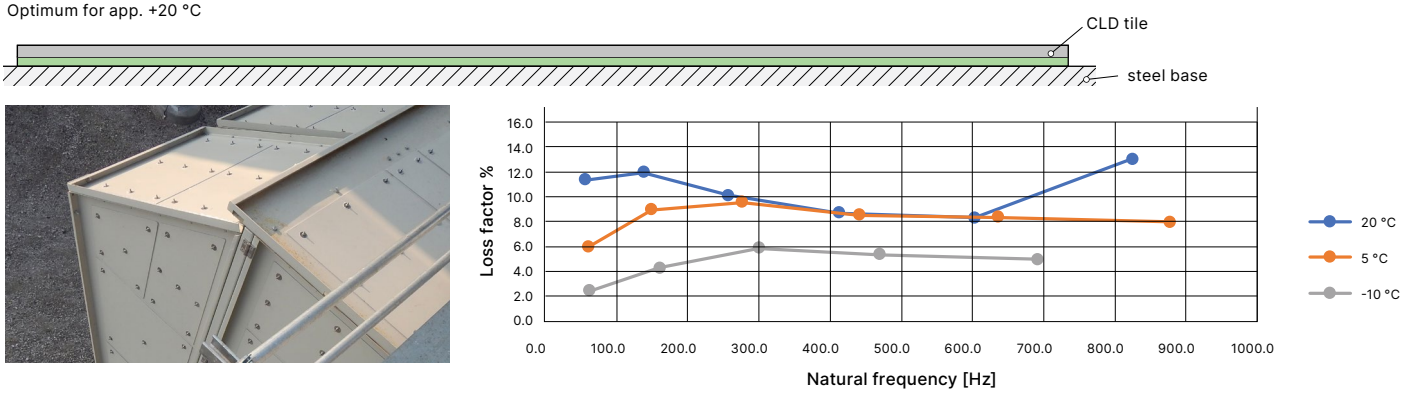
### Installation

Vibratec can offer turnkey projects including installation. Contact us for more information about the options and how to start a co-operation.

## CLD Tile VT7044 - Composite loss factor meassurements

Optimum for app. +20 °C

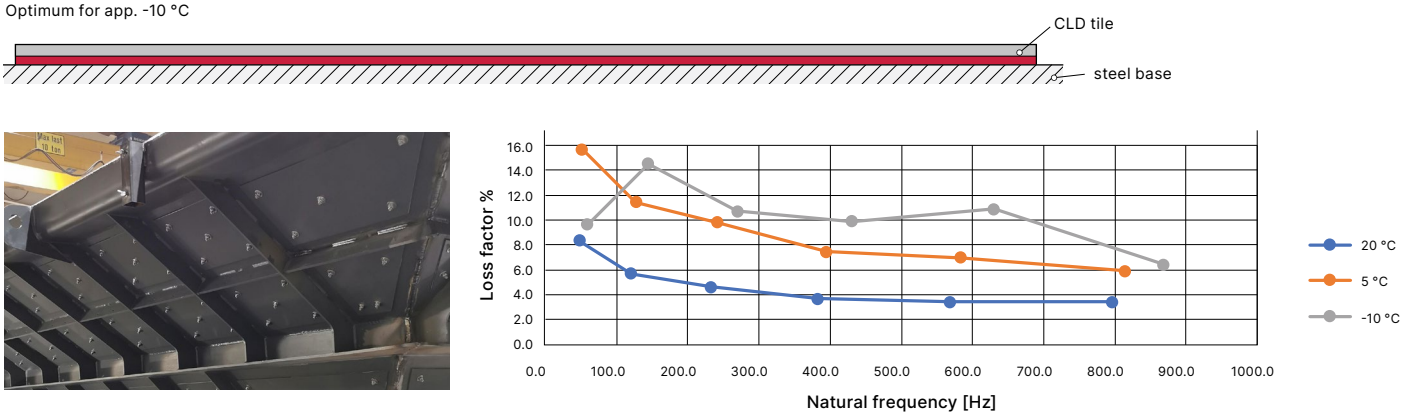





## CLD Tile VT7055 - Composite loss factor meassurements

Optimum for app. -10 °C

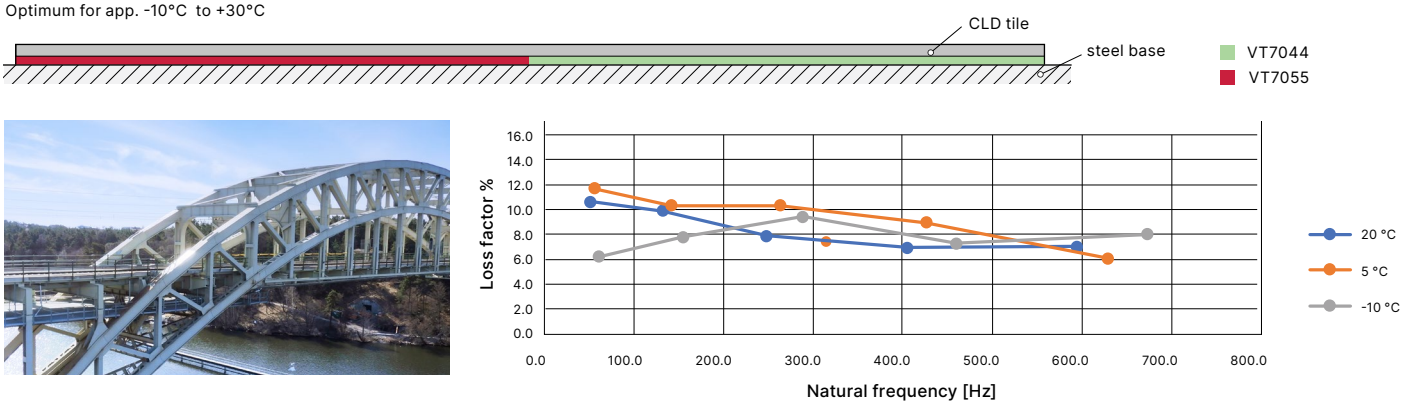





## CLD Tile VT7044- 55 Hybrid - Composite loss factor meassurements

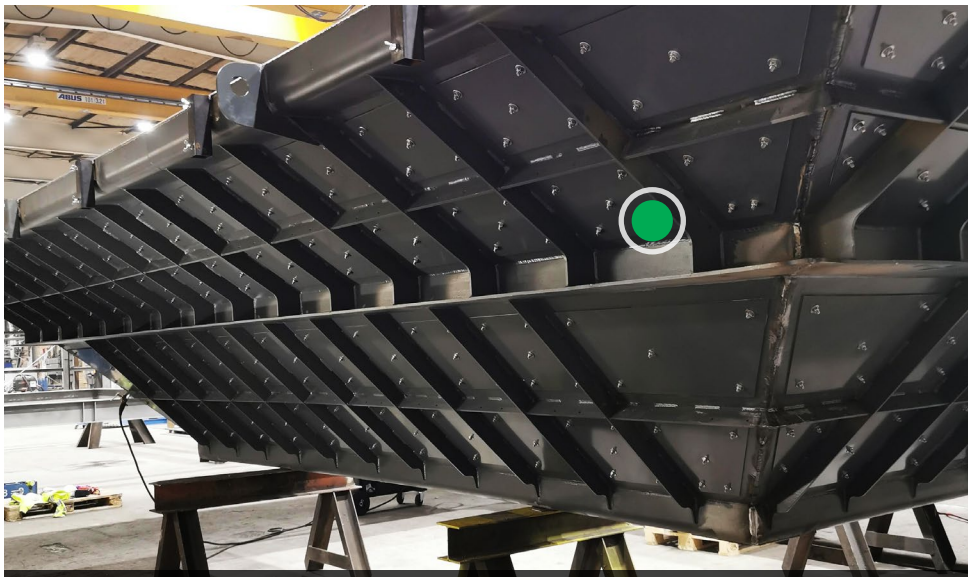
Optimum for app. -10°C to +30°C

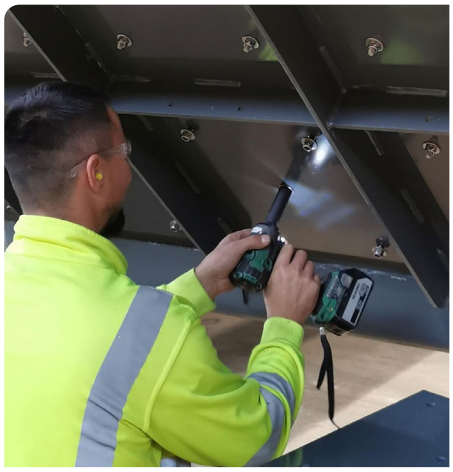





| Vibratec CLD Tiles | Max. Theroretical Insertion Loss Ilp, dB Measured on test specimens in a lab | | | Comments |
|---|---|---|---|---|
| | +20 °C | +5 °C | -10 °C | |
| CLD VT7055 | 11 | 14 | 14 | Good for lower temperatures |
| CLD VT7044 | 14 | 13 | 11 | Good for higher temperatures |
| CLD VT7044-55-Hybrid | 13 | 14 | 13 | Wide range of temperature and frequency |

Note: realistic insertion loss are expected to be lower due to different in-situ conditions. Expect 6-10 dB for most applications





## Installation: CLD-Tiles on a Shute for SSAB

When workers at SSAB dump scrap metals into the shute, high levels of radiated noise occurs. Vibratec was assigned to apply constrained layer damping on the entire chute. In this case the temperature is in a wide range from -10 C $^{0}$- +25 C.

| Characteristics | VT7044 | VT7055 | VT7044-55-Hybrid |
|---|---|---|---|
| Core material | Viscoelastic Acrylic Polymer | Viscoelastic Acrylic Polymer | 2 Viscoelastic Acrylic Polymers |
| Adhesive | Acrylic | Acrylic | Acrylic |
| Color | Grey | Transparent | Transparent / Grey |
| Thickness of acrylic polymer: | app. 1 mm | app. 1 mm | app. 1 mm |
| Adhesive strength on steel (After 72 hours): | 36 N/cm | 24 N/cm | 24 N/cm |
| Release liner: | Yes | Yes | Yes |
| Multiple layers: | Yes (special option for increase damping further, and widen the temperature range) | Yes (special option for increase damping further, and widen the temperature range) | Yes (special option for increase damping further, and widen the temperature range) |
| Constraining sheets comes in: | Galvanized steel / AISI 304 or AISI 316<br>Aluminum & Seawater resistant aluminum<br>Carbon fiber & FRP panels | Galvanized steel / AISI 304 or AISI 316<br>Aluminum & Seawater resistant aluminum<br>Carbon fiber & FRP panels | Galvanized steel / AISI 304 or AISI 316<br>Aluminum & Seawater resistant aluminum<br>Carbon fiber & FRP panels |
| Size & Shape: | Customized/ Project specific | Customized/ Project specific | Customized/ Project specific |
| Thickness: | 2-20 mm, customized | 2-20 mm, customized | 2-20 mm, customized |

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