

# Measurement report: Elastic bearing for air handling and refrigeration systems

Effective vibration isolation of the entire unit



Complete unit with measuring points on the floor

## Construction

In order to compare the insulation behaviour of different elastic bearings, vibration measurements were carried out on a compact unit. The main excitation came from both a refrigerant compressor and a fan.

For the purpose of the measurement, the coolant compressor was operated at the frequencies 30 Hz, 50 Hz and 70 Hz. The fan ran at a high intensity level and served to balance the temperature of the refrigerant system.

The vibrations transmitted from the unit to the floor were recorded at four measuring points next to the unit. This also allows a conclusion to be drawn regarding how the different types of bearing affect the secondary airborne noise.

## Benefits

- Measurable reduction in vibrations and secondary airborne noise
- Units can be installed even in difficult locations (e.g. roofs and mezzanine floors)
- Easy and convenient installation
- Long service life and maintenance-free

### Investigated bearing types

Different types of bearings were installed, in order to obtain a meaningful comparison. A standard Mafund rubber bearing was used as a reference product.

In addition, measurements were carried out with Sylomer® strips and metal-polyurethane combinations.



Mafund



Sylomer® strip bearing



Machine mounting with Sylomer®



Isotop® SE-2



Isotop® DSD with FP/K footplate



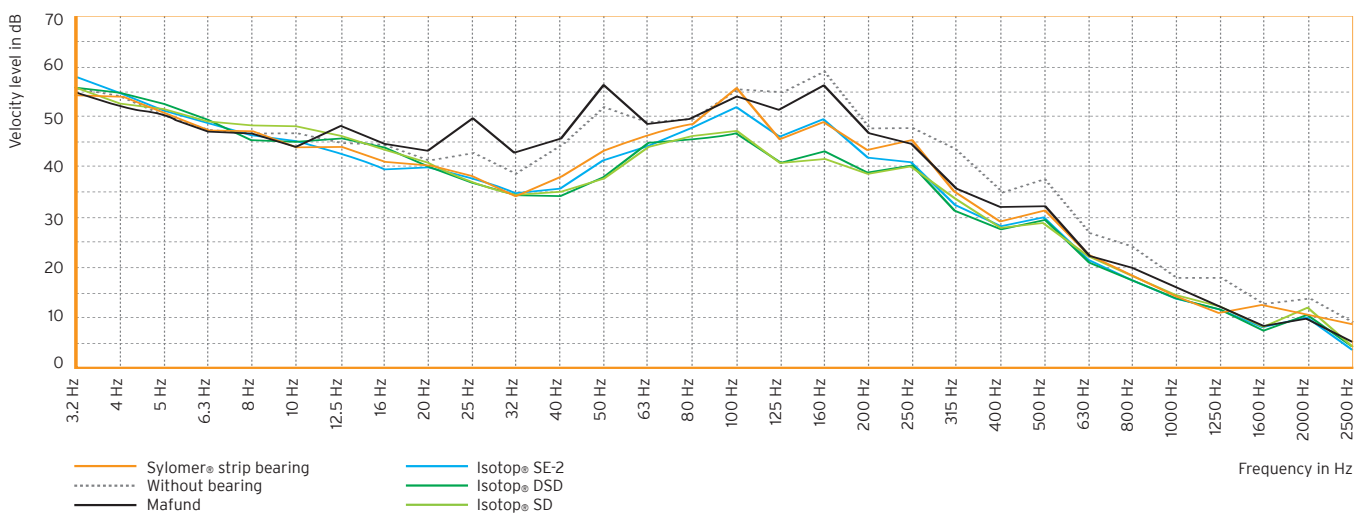
Isotop® SD with FP/K footplate

### Measurement results

With the excitation frequency of the compressor set at 50 Hz, there are clear improvements over a wide frequency range compared to a standard Mafund rubber bearing. The improvements in the critical range from 20 Hz to 100 Hz are particularly striking.

Only elastic solutions that can be best matched to the operating point exhibit a sustained effect, in particular in this frequency range. Rubber products, such as those from Mafund, whose stiffness can only be selected with limited optimisation, show no effectiveness or even an amplification effect here compared to a fixed bearing.

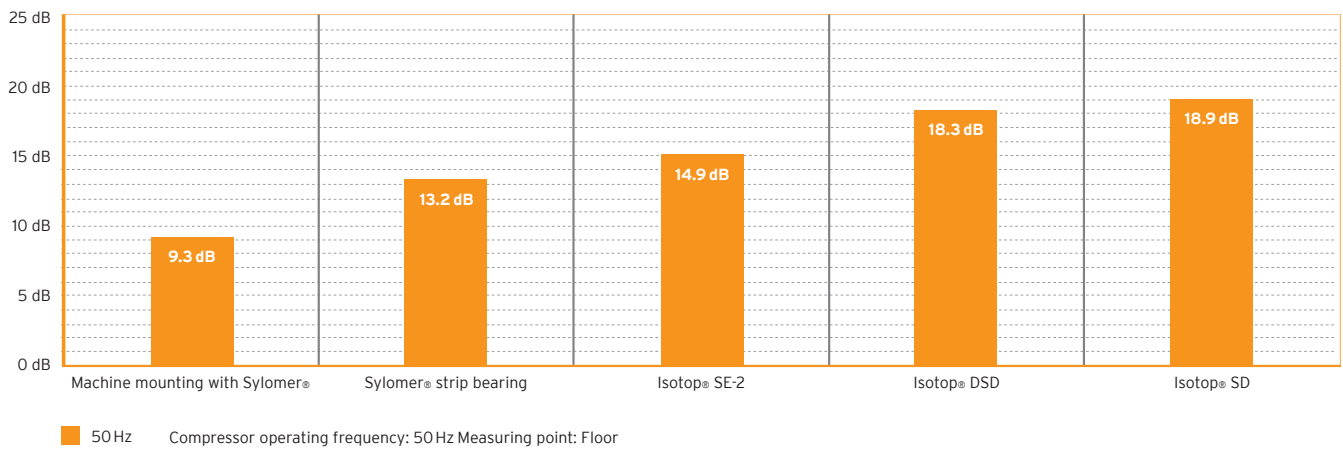
### Velocity level in dB at a compressor operating frequency of 50 Hz



Both pure steel spring isolators (Isotop® SD) and steel springs with a damper core (Isotop® DSD) show significant improvements of over 18 dB. Metal-polyurethane combinations from the Isotop® series, but also pure Sylomer® solutions, likewise demonstrate the effectiveness of Getzner's materials.

The tests have also shown that attention must be paid to stability and sturdiness, in particular for systems with a high centre of gravity. Here, steel spring solutions with Sylodamp® damper core (Isotop® DSD) or sandwich elements (Isotop® SE) are preferred to pure steel springs.

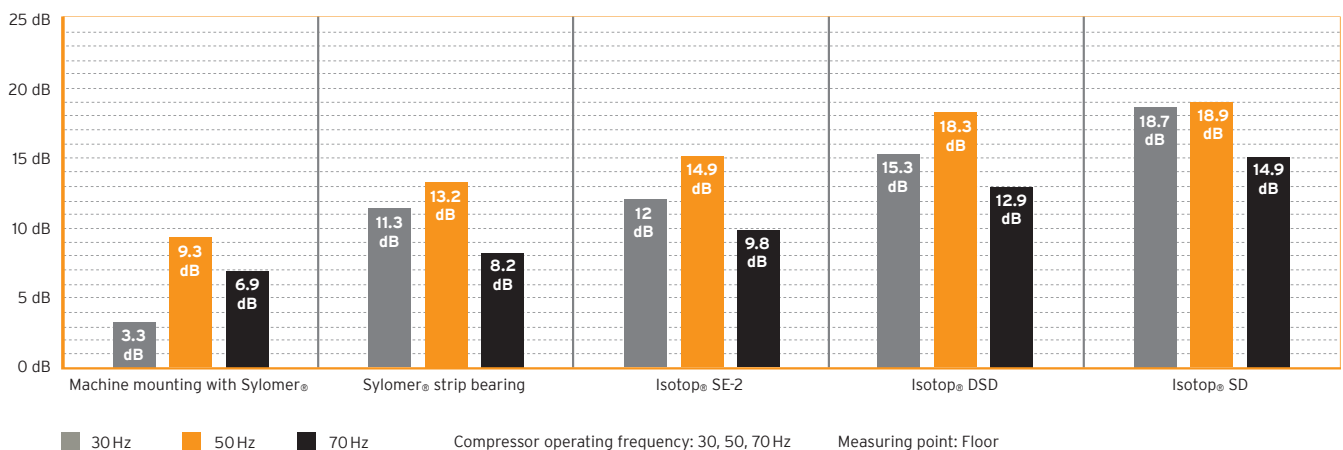
### Improvement of the insulating effect compared to the Mafund rubber bearing



If the bearing comparison is extended to cover the compressor operating frequencies of 30 Hz and 70 Hz, a significant improvement in the insulating effect compared to the standard rubber bearing is also demonstrated here.

Impact excitations show that the floor has a natural frequency at about 70 Hz. Nevertheless, a significant reduction was also achieved in this range.

### Improvement of the insulating effect compared to the Mafund rubber bearing





### **Put us to the test!**

Every unit is different. And the structure and foundation also differ. We would be delighted to support you in selecting the right bearing for your unit or in conducting measurements!