

Measurement report: Elastic bearing for compressors

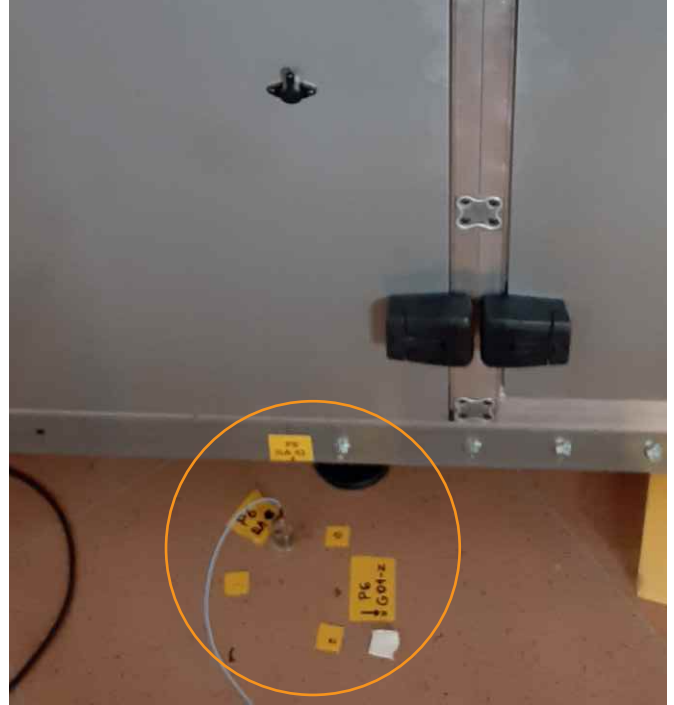
Effective vibration isolation with Getzner Isotop®



Complete unit



Decoupled reciprocating compressor



Measuring point on the floor next to the unit

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 a GEA Bock refrigerant compressor, whose mass, including the attachments and oil, was around 80 kg (see fact box).

For the purpose of the measurement, the compressor was operated at the frequencies 30 Hz, 50 Hz and 70 Hz. The fan runs at an intensity of 30% and serves to balance the temperature of the refrigerant system, although this component does not emit any measurable vibrations at this low level of utilisation.

For the comparison of the different elastic bearings, a measuring point was selected on the floor directly next to the unit. This also allows conclusions to be drawn about secondary airborne noise.

Benefits

- Measurable reduction of vibrations in a wide frequency range and thus reduction of secondary airborne noise
- Unit installation also possible in critical locations
- Easy and convenient installation
- Long service life and maintenance-free

Fact box

Type:	GEA Bock Reciprocating piston compressor Semi-hermetic HGX22P/160-4S
Pmax:	18/28 bar
Vth:	13.7 m ³ /h
Weight:	80 kg

Investigated bearing types

Different types of bearings were fitted, in order to obtain a meaningful comparison. The reference product is a conventional metal-rubber bearing, which is normally installed in the test unit as standard. In addition, measurements were carried out with steel springs and metal-polyurethane combinations.

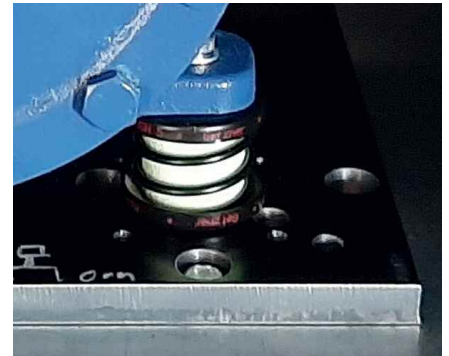
Also investigated was the influence of an additional intermediate plate weighing 22 kg - i.e. roughly 27 % of the compressor weight - on the insulating effect. This measurement was performed with Isotop® MSN-DAMP and Isotop® Compact.



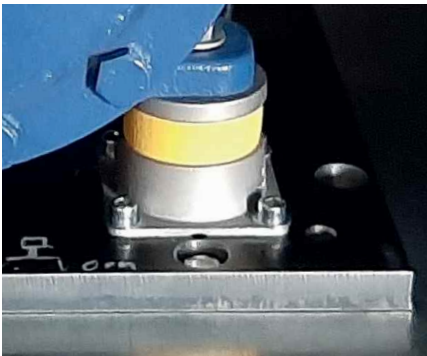
Conventional rubber-metal bearing



Isotop® MSN



Isotop® DMSN



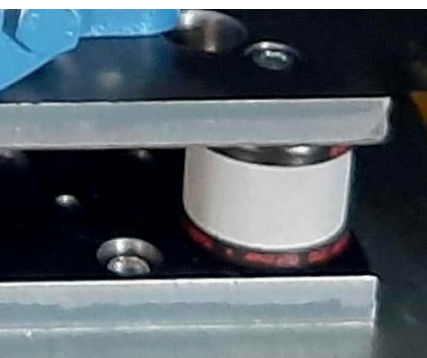
Isotop® DZE Mini



Isotop® MSN-DAMP



Isotop® Compact



Isotop® MSN-DAMP with additional mass



Isotop® Compact with additional mass

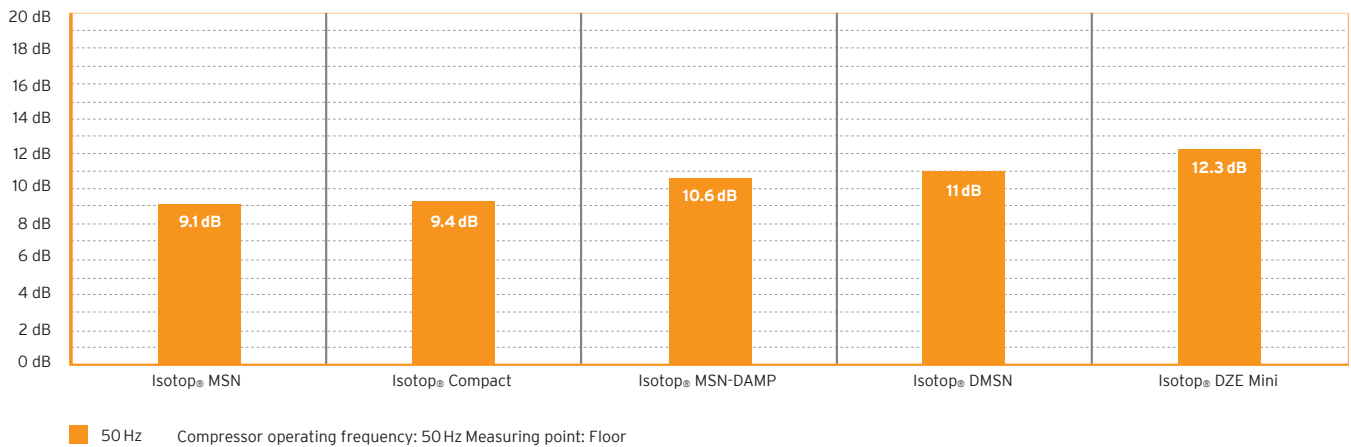
Measurement results

Direct bearing comparison

For the comparison of the different bearing types, an operating frequency of 50 Hz was selected on the frequency converter of the compressor. At this operating point, the direct bearings demonstrate a significant improvement in the insulating effect of up to

12.3 dB compared to the conventional rubber-metal element. Attention must also be paid to stability and sturdiness of compressors. Here, steel spring solutions with Sylodamp® damper cores (Isotop® DMSN) or elements with a polyurethane core (Sylomer®/Sylodyn®) are preferable to pure steel springs.

Improved insulating effect in comparison to conventional rubber-metal bearings

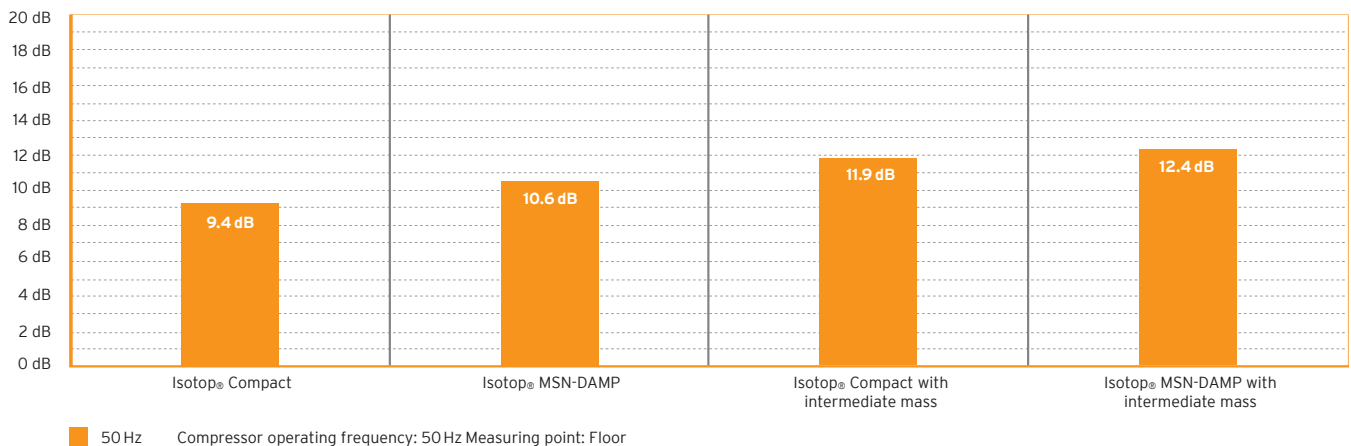


Influence of additional intermediate plate

When designing an elastic bearing arrangement, it is important to focus on the selection of the correct bearing elements. The capacity of the elastic Isotop® elements should be at least 70%. The dynamically effective mass is increased by fitting additional metal

plates beneath a refrigerant compressor. This reduces the natural frequency of the elastic bearing, because its capacity is optimally utilised. For example, the capacity of the Isotop® Compact was increased from 74% to 95% by the additional mass and a further 2.5 dB improvement in the insulating effect was achieved.

Additional improvement of the insulating effect with an intermediate plate compared to conventional rubber-metal bearings

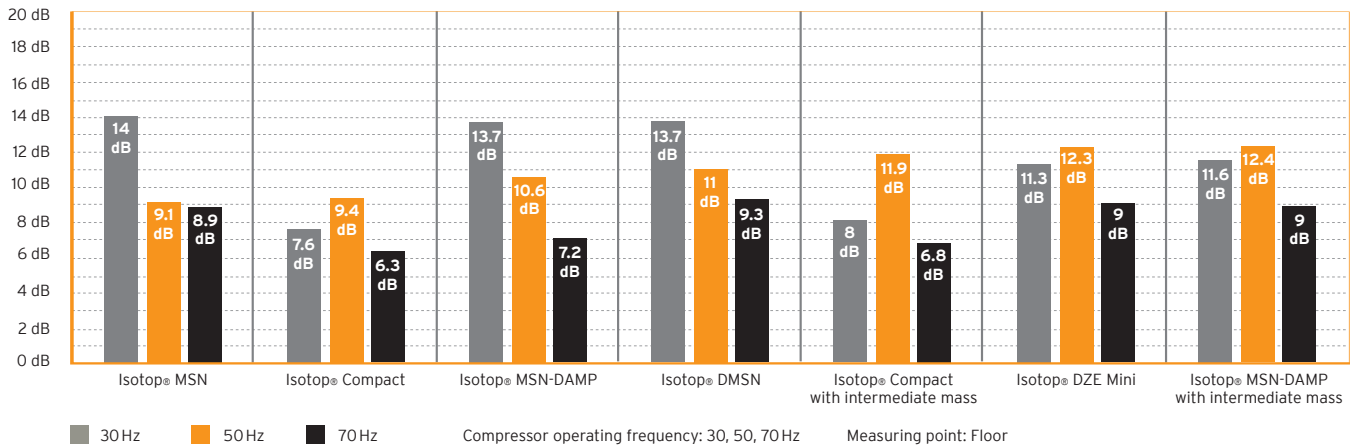


Results over all three operating frequencies of the compressor

If the previous bearing comparison is extended to include the further operating frequencies of the compressor of 30 Hz and 70 Hz, a significant improvement in the insulating effect compared to the conventional rubber-metal bearing is also demonstrated here.

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

Improved insulating effect when compared to conventional rubber-metal bearings



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!

