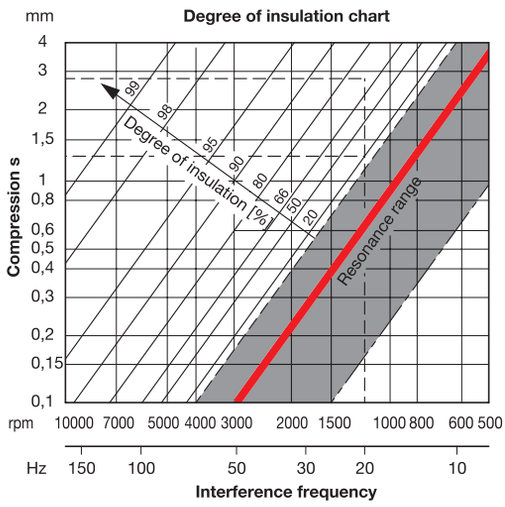

Definitions

Interference frequency [Hz]:
Is the frequency emanating from a machine, e.g. from the machine main shaft speed [rpm].

Static load F [lbf or N]:
Is the load acting on each vibration damping pad (leveling foot)

Degree of insulation [%]:
Is the measure for absorbing the interference frequency (damping)

Compression s [in or mm]:
Is the change in the height of the damping pad (spring rate)

Stiffness R [lbf/in or N/mm]:
Is the load that causes the damping pad to be compressed by 1 in / 1 mm (spring rate)

Determining the suitable leveling foot and the achievable degree of insulation

The first step is to determine the static load F per leveling foot. With appropriately arranged leveling feet and thus an evenly distributed load F, this value is calculated using the following equation:

$$\frac{\text{Force due to weight of the machine [lbf or N]}}{\text{Number of leveling feet}} = \text{Static load F [lbf or N] per leveling foot}$$

Use the calculated static load F to select a leveling foot from the table, making sure that the static load F lies as close as possible to the static load capacity without exceeding it. The associated stiffness R of the selected leveling foot is also taken from the table.

The actual compression is then calculated using the equation below:

$$\frac{\text{Static load F [lbf or N] per leveling foot}}{\text{Stiffness R [lbf/in or N/mm]}} = \text{Actual compression s [in or mm]}$$

Starting from the calculated actual compression s, the achievable degree of insulation as factor of the interference frequency can now be taken from the chart shown above.

To optimize the achievable degree of insulation, the number of leveling feet may be changed such that the static load F for each leveling foot is as close as possible below a load capacity value given in the table. This will increase the compression s which, in turn, results in a higher degree of insulation.

In general, medium to high frequencies can be very well insulated with sufficient compression.

Example

Static load F (machine weight) = 48,000 N, number of feet = 4, ergo: static load per foot = 12,000 N

Selected foot: d_1 = 160 mm, static load capacity 20,000 N, R = 9,000 N/mm

This results in an actual compression s of: $\frac{\text{12,000 N (static load per foot)}}{\text{9,000 N/mm (stiffness R)}} = 1.3 \text{ mm}$

With an interference frequency of 20 Hz (1,200 rpm), the above chart shows a degree of insulation of only about 20 %.

To optimize, the number of feet may be increased to 5, resulting in a static load per foot of 9,600 N. A leveling foot whose static load capacity is closer to the new result may now be selected.

Newly selected foot: d_1 = 120 mm, static load capacity 10,000 N, R = 4,000 N/mm

This results in an actual compression s of: $\frac{\text{9,600 N (static load per foot)}}{\text{4,000 N/mm (stiffness R)}} = 2.4 \text{ mm}$

With the same interference frequency of 20 Hz (1,200 rpm), the above chart now shows a degree of insulation of approximately 75 %.