QUESTION: How do you determine housing vibrations at the installation location and how are they evaluated?

ANSWER / REMEDY / INFORMATION:

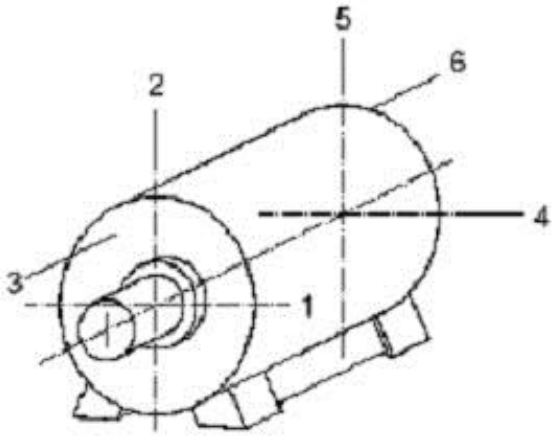
The measurement and evaluation should be made in accordance with DIN ISO 10816-3.

DIN ISO 10816-3: Mechanical vibrations measured on non-rotating parts; vibration test in machines; coupled with rated power.

Field of application / description:

- Machines with rated power above 15 kW
- Motors / electrical machines with shaft height 160 mm or higher
- Rated speed between 120 ... 15,000 rpm
- Bearing housing vibrations
- Only for stationary operating points (no evaluation for transient operating states)
- Normally broadband measurement between 10 … 1000 Hz; (if speed ≤ 600 rpm: broadband measurement between 2 … 1000 Hz)
- It is standard or adequate to measure only the eff. vibration speed (only if significant low-frequency signals are expected: also measure and evaluate the vibration displacement)
- Definition of 'rigid substructure': The lowest natural frequency of the complete system from the motor and the substructure lies in the measurement direction at least 25% above the significant excitation frequency

Measuring points 1 – 6 at the two bearing shields in the three levels (horizontal, vertical, axial for horizontal machines or two displaced radially by 90° and axially for vertical machines)



The limit values of the measured vibration severity values are classified according to the following parameters:

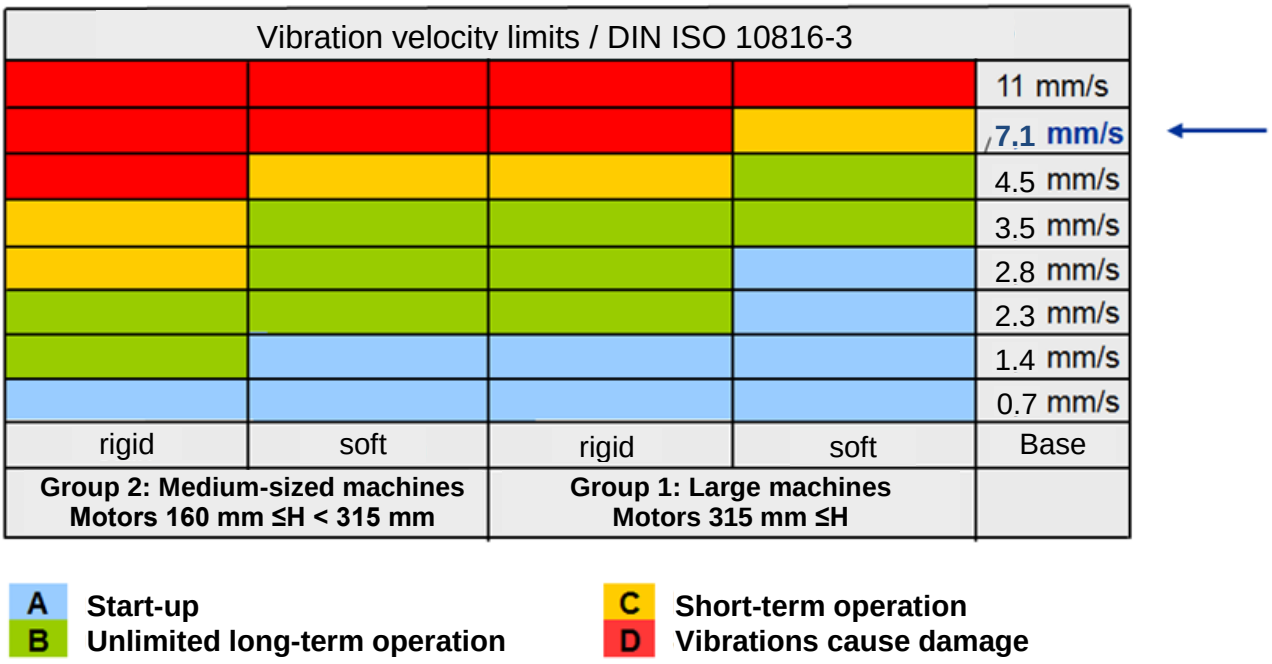
- Machine type:
  Group 1: Large machines > 300 kW, motors with shaft height H >= 315 mm
  Group 2: Medium-sized machines > 15 kW to 300 kW, motors with H >= 160 mm to 315 mm

- Elasticity of the machine substructure: rigid or elastic

- Evaluation zones A, B, C and D

  Motors must lie in the range B (definition of zone B: "normally considered as suitable to run continuously without restrictions")

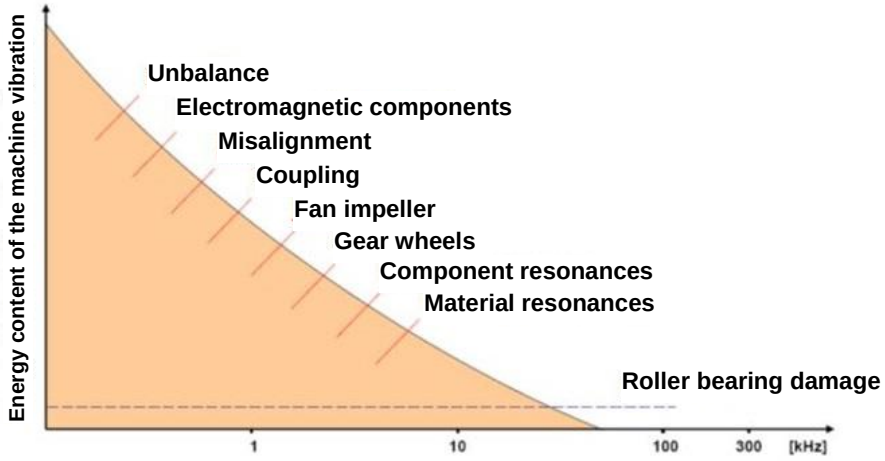
  Because no operation-relevant vibration changes (e.g. change of the residual unbalance) are to be expected for motors, it is not necessary for the motors to be kept in range A after the commissioning. This reduction from four to three evaluation zones (omission of zone A or extension of zone B) for electrical machines is similar to Standard VDI 3834 part 1 (standard for mechanical vibrations for onshore wind energy plants)



Once the housing vibrations on electrical machines attain values of zone C or D (> 7.1 mm/s eff. for motors with shaft height >315 for elastic installation), the associated causes must be eliminated briefly (zone C) or immediately (zone D).

Supplementary notes:

- Broadband-measured total vibrations consist of several higher-level vibration frequencies
- The broadband machine vibration provides, in particular, information about the balance, the orientation and the electronic shares



*Source: **SKF***

The effective vibration velocity is not suitable for roller contact bearings diagnostics