

Correct installation for a longer service life

Avoidance of vibration-induced damage

Fans used in ventilation, refrigeration and air conditioning systems or other industrial applications are generally subjected to rigorous testing and have to withstand endurance tests under harsh conditions at the factory. Vibration can however lead to damage and failure if the fans are not properly installed.

Correct installation is crucial

Incorporation of a fan into a system always produces a new oscillatory arrangement with a specific structural resonant frequency. Other factors affecting vibration severity in operation are transportation and handling. Dirt on the impeller during operation can also lead to imbalance, or turbulence arises on account of unfavorable intake conditions.

Determination of speed range

To avoid vibration-induced damage, vibration measurements should therefore always be taken and points of resonance identified throughout the entire speed control range following installation of the fan in the application. A distinction is made between three ranges: sub-critical (1), critical (2) and above critical (3). Continuous operation only takes place in the above-critical range (3) and at ≤ 3.5 mm/s (picture 1). Operation in the lower speed ranges (1 and 2) is not directly harmful, but sustained operation will shorten the service life of the fans.

Use of vibration-absorbing elements

Vibration-absorbing elements (picture 2), i.e. appropriately designed springs or rubber elements, help to isolate the fan from vibration in the surrounding area. Certain aspects do however have to be taken into consideration when selecting these. Alongside the natural frequency of the fan set-up itself, the attachment of vibration-absorbing elements produces a further spring-mass system with its own resonant frequency. The minimum speeds must be observed when using spring or rubber elements. The correct size of vibration-absorbing element and the associated minimum speed can be found in the technical documentation for each fan. The above-mentioned factors must be heeded if using different elements.

Vibration measurements guard against damage

It is always well worth observing vibration-related aspects when fitting fans. Customers can call on ebm-papst experts for any advice they may require. The identification of points of resonance (start-up) and the regular performance of vibration checks during operation ensure that fans operate reliably and efficiently.

The ebm-papst installation guide can be ordered free of charge from Mr. Ralf Mühleck (Ralf.Muehleck@de.ebmpapst.com).

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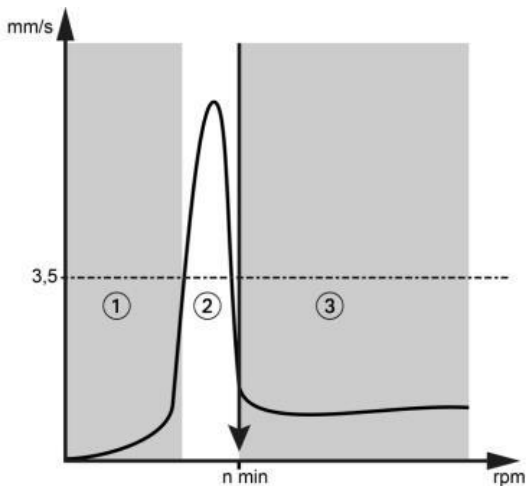
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Picture 1: Vibration velocity curve over the speed range of a fan with vibration-absorbing elements: Range below resonant frequency (1), range close to resonant frequency (2) and range above resonant frequency (3).



Picture 2: Vibration-absorbing elements, i.e. appropriately designed springs or rubber elements, help to isolate the fan from vibration in the surrounding area.

Pictures ebm-papst
Characters approx. 2,600, including headings and sub-headings
Tags EC fans, Vibration measurement, Fan set-up, Vibration-absorbing elements, Vibration sensor, Service life
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About ebm-papst

The ebm-papst Group is the world's leading manufacturer of fans and motors. Since it was founded, the technology company has continuously set global industry standards: from the digital interconnection of electronically controlled EC fans to aerodynamic improvements for fan blades to the use of eco-friendly materials.

In fiscal year 2017/18, the company achieved sales of over € 2 billion. ebm-papst employs over 15,000 people at 27 production sites (e.g. in Germany, China and the US) and in 48 sales offices worldwide. Fans and motors from the world market leader are used in many industries, including ventilation, air conditioning and refrigeration, household appliances, heating, automotive and drive engineering.

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