



Air Components, Inc.

*M & P Air Components, Inc. provides
Components, Technologies, Guidelines,
Sales and Technical Services for
Industrial Air and Dry Solids Processes.*

*Our Goal is to provide Clients with the
correct components selection and
system design to achieve the best
Utilization, Reliability, Safety and
Economy for their plant processes.*

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Technical Bulletin

Fan Balance & Vibration Control – Guidelines, Terms & Locations

TB.60.0.04

This Bulletin is intended for fans installed in Industrial Processes, excluding extreme temperature applications. The reference basis is AMCA 204-96.

However, it should be noted that uneven temperature distribution into the fan can cause imbalance due to material distortion, and extreme temperatures can cause imbalance due to uneven materials growth.

It is expected that the fan foundation or mounting structure is suitable to meet the requirements of the fan manufacturer.

Overall vibration velocity is the best operating parameter for evaluating structural and dynamic (rotational) conditions such as balance, bearing condition and components stress.

These conditions include mechanical looseness, resonance, imbalance, soft foundation, aerodynamic effects, misalignment, shafting, bearing wear, and wheel deterioration.

Regularly measuring the overall vibration of the fan or its structure and comparing the measured value to the normal value is a recommended means of maintaining machinery reliability and predicting condition changes.

All vibration measurements should be taken when the fan is operating under its normal condition (volume, pressure, and temperature).

When the fan is operated using a VFD Controller, measurements should be taken at max/min/average conditions.

Balance: Adding or removing mass in order to move the center of gravity toward the axis of rotation.

Trim Balance: Making minor corrections in unbalance which may be necessary due to either fan assembly, handling, reassembly or installation.

Fan Vibration Level: The vibration amplitude at the fan bearings using velocity (in/sec) or displacement (mils).

Filter In: Vibration measured at a target frequency.

Filter Out: Vibration measured over a wide frequency range (overall vibration).

Fan Application Categories (BV): Categories for the purpose of grouping fans by application with respect to acceptable balance and vibration limits. This Bulletin addresses BV-3 and BV-4 with corresponding Balance Quality Grades G6.3 and G2.5.

Balance Quality Grade: Limit of residual rotor imbalance based on the fan application category (BV).

The fan manufacturer is responsible for balancing the rotor to the appropriate Balance Quality Grade.

Vibration Pick-up Locations:

Horizontal measurements should always be taken in a radial direction and at right angles to the shaft.

Vertical measurements should always be taken at right angles from the fan shaft and the horizontal measurements.

Axial measurements should always be taken parallel to the rotor axis.

Normally, horizontal measurements indicate shaft imbalance, while vertical measurements indicate looseness or imbalance, and axial measurements indicate misalignment or uneven structural strength.

Fan installations are also classified for vibration severity based on their support flexibility.

Normally, fans installed on a well-designed concrete foundation are considered rigid, while fans installed on vibration isolators are considered flexible.

Fans installed on a steel structure can be either, depending on the structural design.

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