



Fan Balance and Vibration

Phelps Fan uses ANSI/AMCA 204-96 standards for determining balance and vibration tolerances. This standard categorizes fans according to the application, and horsepower. Fans normally supplied by Phelps Fan fall into grade BV-3 or BV-4 of ANSI/AMCA 204-96, or Balance Quality Grade G 6.3 or G 2.5 of ANSI S2.19-1975.

Unbalance: Unbalance refers to the mass of an impeller not being in equilibrium about its center of rotation. This results in additional forces being applied to the impeller, and its supporting bearings during rotation.

Vibration: Vibration is the result of having unbalanced forces applied to an elastic system. There are three methods for measuring vibration:

Displacement: Displacement refers to the resulting displacement of the rotor's geometric center caused by unbalance forces. Displacement is normally measured in English units as mils (thousandths of an inch) – peak to peak displacement.

Velocity: Velocity refers the time rate of change of the motion of the displacement, measured in Inches per second – peak.

Acceleration: Acceleration is the time rate of change of velocity, measured in g's.

ANSI/AMCA 204-96 sets vibration limits, whether at the factory, or in situ (start-up, alarm, and shutdown), dependant upon the flexibility of the support system. Vibration limits classified by this standard are more relaxed for flexibly mounted units than rigidly mounted fan units.

Installation and environmental factors beyond the control of any fan manufacturer will influence the in-situ vibration level. Therefore, the fan vibration at site conditions cannot be guaranteed. Due to this, and the potential disruption of alignments during shipment and installation, it is recommended that prior to commissioning a fan unit into service the vibration levels be checked. This can also provide a baseline measurement for determining maintenance requirements once the fan has been commissioned.

Phelps Fan offers field service technician capabilities for installation start-up.

It is strongly recommended that bearings be equipped with seismic vibration detectors mounted on the bearing housings, or bearing pedestal. Monitoring vibration is important in order to avoid potential catastrophic failure as a result of excessive vibration. Cost for these monitors can range from a few hundred dollars to thousands of dollars, but could pay off in reduced down time.

Contact **Phelps Fan** Sales or Field Service department for your fan balance/vibration problems, or start-up assistance of new installations.
(501) 568-5550 (www.phelpsfan.com).

More information concerning fan balance and vibration is available from AMCA by purchasing a copy of AMCA Publication Number 204-96.