

APPLICATION NOTE

# What you need to know about vibration tools

Vibration analysis is critical to a condition-based maintenance program, and a welcome alternative to run-to-fail strategies used by many plants. Vibration analysis allows you to measure machine health and find faults without taking machines offline, and to schedule repairs only when needed. This way, repairs are not performed prematurely or behind schedule. A new wave of vibration technology includes rules (automated vibration fault patterns) and algorithms programmed into analyzers to diagnose problems.



The award-winning Fluke 810 Vibration Meter uses an auto-diagnostic program that helps workers stay efficient.

These software programs analyze patterns and amplitudes of vibration peaks at specific frequencies. This is automatically accomplished by securely attaching a sensor (typically an accelerometer) to the bearings of the machine, and measuring the vibration frequencies that transmit from the rotating shaft through the bearings into the outside metal surface of the machine and then into the sensor.

An engineer at a public port warehouse and cold storage facility in Seattle, Washington, for example, deploys a handheld vibration tester to find problems before they become unplanned downtime. The facility has approximately 7 million cubic feet of cold storage space with three engine rooms that power refrigeration. Using this vibration tool, the engineer performed three separate tests on a 600-horse power motor, each producing identical results. The tests revealed slightly worn bearings on each end of the motor.

“We can get some of these problems taken care of before things like that become out of warranty, and become our problem financially,” he said. “It has positively impacted our business because you don’t need to know a lot about the data or how to decipher it.” In addition, the engineer is able to manage when he used the vibration tester at different times of the year, which can lead to financial savings due to minimizing unplanned downtime. Summer is the most critical season for refrigeration equipment as compressors kick on, whereas the winter allows the engineer to idle down these same machines for repairs.





### How vibration tools have evolved

For the past 30 years, the high-end vibration analyzer and the simplified vibration pen have been the only two options available to maintenance teams. The vibration analyzer produces detailed waveforms, but understanding them depended on the interpretations of experienced analysts. While useful in some situations, vibration pens come with a catch-22. They provide a simpler, easy-to-understand number that is burdened by high variation based on measurement conditions, and lack context for mechanics to know if the measured value is good or poor.

Nowadays, there are two newer categories of vibration test tools to help mainstream technicians fill the void between complex vibration analysis and one-dimensional pens. When screening equipment, vibration meters identify which machines are healthy and which have potential problems. Vibration testers automatically diagnose the most common machine faults, severity, and provide recommended maintenance actions. All remaining complex faults (often less than 10 % of faults) can then be referred to an expert consultant who uses a vibration analyzer.

**Vibration meters**, such as the Fluke 805 FC Vibration Meter, let technicians quickly and confidently track bearing impacting and health, overall vibration level and machine health, and bearing surface temperature. This tool is designed to be used by any level technician and take readings during route-based maintenance, which can be screened for changes and potential problems over time.

**Vibration testers**, such as the Fluke 810 Vibration Tester, have an auto-diagnostic program—based on 30 years of real machine baselines analyzed by vibration experts—that helps teams return to work even faster. Extensive setup, trending, analysis and onsite experts are not needed. It is ideal for in-house vibration programs, as it diagnoses the problem without special expertise or years of training, potentially saving money by finding faults before failure and lost production. Technicians use vibration testers to troubleshoot the root cause to fix the problem (e.g. misalignment) instead of fixing the symptom (e.g. bearings) again and again.

Some vibration meters come with functionality that connects them to a mobile app, like Fluke Connect® (available for iOS or Android operating systems), developed for sharing inspection results and authorizing next maintenance steps from the field. Productivity apps like these let you organize measurements by asset in one location and securely collaborate with your team.

In today's competitive business environment, you don't have the time and resources to analyze every machine from the ground up. There is no time for analyzing endless graphs or meaningless data. You need to quickly and efficiently diagnose the fault that will return the machine to full capacity before production is lost.



**Preventive maintenance simplified. Rework eliminated.**

Save time and improve the reliability of your maintenance data by wirelessly syncing measurements using the Fluke Connect® system.

- Eliminate data-entry errors by saving measurements directly from the tool and associating them with the work order, report or asset record.
- Maximize uptime and make confident maintenance decisions with data you can trust and trace.
- Access baseline, historical and current measurements by asset.
- Move away from clipboards, notebooks and multiple spreadsheets with a wireless one-step measurement transfer.
- Share your measurement data using ShareLive™ video calls and emails.
- The Fluke 805 FC Vibration Meter is part of a growing system of connected test tools and equipment maintenance software. Visit the website to learn more about the Fluke Connect® system.

Find out more at [flukeconnect.com](http://flukeconnect.com)



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**Smart phone wireless service and data plan not included with purchase. Fluke Connect is not available in all countries.**

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