



ISO 10816 and ISO 20816: from the standard to continuous protection

How the standard for evaluating industrial machine vibration becomes the starting point — and not the finishing line — of a continuous monitoring system.

This document is written for technical managers, R&D staff and plant managers who want to understand why starting from the ISO standard makes sense, and what happens when you go beyond it.

01 What the standard says, and why it matters

For decades ISO 10816 was the international reference standard for measuring and evaluating vibration on industrial machinery. It defines how to measure — RMS vibration velocity, in mm/s, on non-rotating parts — and how to interpret the result through four machine health zones.

It is the common language between machine builders, maintenance teams and certifiers. When the standard is quoted, everyone starts from the same reference.

ZONE	MEANING	OPERATIONAL GUIDANCE
Zone A	New machine or in excellent condition	No action required
Zone B	Acceptable normal operation	Continue monitoring
Zone C	Anomaly, degradation under way	Plan an intervention
Zone D	Imminent danger, risk of failure	Stop immediately

The standard has changed, and it is worth knowing. The ISO 10816 series has been progressively replaced by the ISO 20816 series. The general part, ISO 20816-1, dates from 2016. The part covering industrial machinery — ISO 20816-3, published in October 2022 — replaces both ISO 10816-3:2009 and ISO 7919-3:2009, unifying the evaluation of non-rotating parts and rotating shafts in a single document.

Compared with the previous standard the scope has widened: the power rating still starts above 15 kW, but the upper speed limit moves from 15,000 to 30,000 rpm, and machine classification is simplified. Zone-based evaluation remains the conceptual framework.



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02 The limits of the standard used on its own

The standard is a solid tool. But applied alone, as a single value compared against a fixed threshold, it has specific limits that anyone working in production knows well.

It detects late

Zone C is reached when degradation is already advanced. Many faults build up earlier, through changes in behaviour that a broadband overall value does not separate.

It does not give the cause

The standard says how much a machine vibrates, not why. Unbalance, a worn bearing and mechanical looseness can produce similar values and require completely different interventions.

It does not know the machine

Thresholds are set by category, not by installation. A machine running steadily in zone B may be in perfect health; another, at the same value, may already have changed behaviour compared with a month earlier.

It was designed for periodic readings

In traditional practice the standard is applied through manual readings at intervals. Between one reading and the next, the machine is not observed.

03 The VBOX4AI view: the standard as a floor, not a ceiling

In VBOX4AI, zone-based evaluation is the starting point. It is the first layer of protection, active from the moment of installation and with no prior learning: the sensor continuously computes RMS vibration velocity and places the machine in its zone. Immediate protection, universal language, no configuration.

On top of that base, the system progressively builds a reference specific to that machine, under its real operating conditions.

From a single value to the structure of the signal



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Zone evaluation compresses all vibration energy into one number. VBOX4AI adds the distribution of that energy alongside the number: by frequency band, by axis, over time. This makes it possible to say not only that the level has changed, but **where** in the spectrum and on which axis it changed, and since when.

What the system does not do, and why we say so. VBOX4AI does not identify the component responsible. Component-level diagnosis requires the kinematics of the machine and the geometric data of its parts — the number and diameter of a bearing's rolling elements, the tooth count of a gear — as well as a known and stable rotational speed. On a real machine fleet that information often no longer exists. Our system narrows the field for whoever goes to look; it does not replace them.

From periodic readings to continuous monitoring

The standard was designed for spot readings. VBOX4AI applies it continuously, removing the windows in which a change can develop unnoticed. It is the difference between knowing the machine is in zone B today, and knowing it has been in zone B for three weeks with a slowly rising level.

From category thresholds to one machine's own normal

The zones of the standard apply to a class of machines. The learned reference applies to that machine, in that operating condition. The two are not alternatives: the first protects from minute zero, the second sharpens over time.

04 When this is not worth doing

There is one case where continuous monitoring has no value, and we prefer to say it up front: when the machine is redundant.

If a stoppage is absorbed by redistributing production across other machines with no significant loss, advance warning changes no decision. Condition monitoring has economic value where a machine stopping stops something downstream: a synchronous line, a continuous process, a



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bottleneck. That is the first question to ask, before any technical assessment.

The technical constraints that make a vibration measurement reliable or unreliable — variable speed, product changeover, sensor mounting, spectral resolution — are covered in the technical note **Vibration analysis: what it can and cannot tell you about a machine**, at box4ai.com/risorse.



In short

Zone-based evaluation under ISO 10816 and ISO 20816 is the common language of the sector and remains the right starting point: it protects from day one and needs no configuration. But it is a category threshold applied to an overall value, and on its own it arrives late.

VBOX4AI uses it as a base and adds two things: continuity of measurement, and a reference built on that specific machine. We flag when behaviour changes, where in the spectrum, and since when. Whoever intervenes decides what to do, with a much narrower field of investigation.

To find out whether your machine meets the prerequisites: info@bludocknet.com