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Condition monitoring and diagnostics of machine systems — Data interpretation and diagnostics techniques

Part 1: General guidelines

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This British Standard is the UK implementation of ISO 13379-1:2025. It supersedes BS ISO 13379-1:2012, which is withdrawn.

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A list of organizations represented on this committee can be obtained on request to its committee manager.

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Part 1: General guidelines

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Partie 1: Lignes directrices générales

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This document was prepared by Technical Committee ISO/TC 108, *Mechanical vibration, shock and condition monitoring,* Subcommittee SC 5, *Condition monitoring and diagnostics of machine systems*.

This second edition of ISO 13379-1 cancels and replaces the first edition (ISO 13379-1:2012), which has been technically revised. The main changes are as follows:

— the Scope of the document has been extended by the addition of Clause 1 c);

— Clause 4 has been added to outline recommended steps to perform diagnostics;

— new methods for assessing the failure mode symptoms analysis have been added, see 5.3.4 and 5.3.5;

— new examples and descriptions of elements used for diagnostics have been added in Clause 6;

— information provided in 7.1, 7.3 and Annexes E and F has been updated to reflect the state of the art;

— descriptions of data-driven methods have been moved to (informative) Annex E;

A list of all parts in the ISO 13379 series can be found on the ISO website.

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Effective management of machine systems throughout their life cycles requires maintaining their performance, reliability and availability. One of the key strategies to support this objective is condition monitoring, which provides information on the state of the machine system.

Condition monitoring serves two principal roles:

a) to identify trends that indicate the remaining useful life of the machine system, deterioration of its performance or increased risk of failures; and

b) to detect nonconformities, referred to as anomalies in the context of condition monitoring, by identifying deviations from baseline values or expected operating conditions. Such deviations, when compared against predefined criteria, can result in alarms.

Once an anomaly has been detected, it is often needed to identify its cause(s). Identifying the cause(s) of the anomaly is referred to as diagnostics and supports the determination of appropriate corrective actions. Stakeholders typically expect a certain level of accuracy in diagnostics, as its output — a diagnosis — can directly influence machine system operation, maintenance planning and resource allocation. This document supports users in developing diagnostic procedures and models, and in evaluating their confidence level, applicability and limitations.

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Condition monitoring and diagnostics of machine systems — Data interpretation and diagnostics techniques —

Part 1: General guidelines

1 Scope

This document

a) establishes common concepts for condition monitoring and diagnostics of machine systems, simplifying communication between the users and manufacturers of condition monitoring and diagnostics systems;

b) establishes technical characteristics and describes principles for condition monitoring and diagnostics of machine systems;

c) gives guidance on developing condition monitoring and diagnostics systems; and

d) gives guidance on selecting an appropriate diagnostic approach in the particular application.

This document is applicable to any machine system whose state can be described by measuring or observing its operational parameters (or inputs) and responses (or outputs).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13372, *Condition monitoring and diagnostics of machines — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13372 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org

3.1
confidence level
figure of merit, e.g. percentage, that indicates the degree of certainty that the diagnosis or prognosis is correct.

Note 1 to entry: This figure essentially represents the cumulative effect of error sources on the final certainty or confidence in the accuracy of the outcome. Such a figure can be determined algorithmically or via a weighted assessment system.

[SOURCE: ISO 13381-1:2025, 3.3, modified by adding ‘or’ and removing parentheses]

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