



FINAL DRAFT

International Standard

ISO/FDIS 13379-1

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

Part 1: General guidelines

ISO/TC 108/SC 5

Secretariat: **SA**

Voting begins on:
2025-07-07

Voting terminates on:
2025-09-01

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO/FDIS 13379-1](https://standards.iteh.ai/catalog/standards/iso/d9c086bc-af50-41d5-98d1-76d0c775e2f2/iso-fdis-13379-1)

<https://standards.iteh.ai/catalog/standards/iso/d9c086bc-af50-41d5-98d1-76d0c775e2f2/iso-fdis-13379-1>

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

iTeh Standards
(<https://standards.itih.ai>)
Document Preview

ISO/FDIS 13379-1

<https://standards.itih.ai/catalog/standards/iso/d9c086bc-af50-41d5-98d1-76d0c775c2f2/iso-fdis-13379-1>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2025

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Diagnostics and its relation to condition monitoring	2
5 Requirements to set-up condition monitoring and diagnostics	3
5.1 General	3
5.2 Establishing diagnostics needs	3
5.3 Failure mode symptoms analysis (FMSA)	4
5.3.1 General	4
5.3.2 Usage guidance	4
5.3.3 Rating guidance	5
5.3.4 Assessing FMSA results using a monitoring priority number (MPN)	6
5.3.5 Assessing FMSA results using a diagram	7
5.4 Diagnostics requirements report	8
6 Elements used for diagnostics	8
6.1 Condition monitoring data	8
6.1.1 Parameters and measurements	8
6.1.2 Descriptors	9
6.1.3 Symptoms	9
6.1.4 Fault	10
6.2 Machine system data	11
6.3 Maintenance data and events related to the machine system	11
7 Diagnostic approaches and models	11
7.1 Definition of diagnostic approaches	11
7.2 General guidelines for developing a diagnostic model	12
7.3 Data-driven approach	13
7.3.1 General	13
7.3.2 Building the model	14
7.3.3 Strengths and weaknesses	14
7.4 Knowledge-based approach	15
7.4.1 Fault-symptom diagnostics	15
7.4.2 Causal trees	16
7.4.3 First-principle models	18
7.5 Confidence factor determination	19
Annex A (informative) Example of diagnostic report	20
Annex B (informative) Failure mode symptoms analysis (FMSA) worksheet	23
Annex C (informative) Examples of ratings used for failure mode symptoms analysis (FMSA)	25
Annex D (informative) Effectiveness of the diagnostics system	26
Annex E (informative) Description of selected methods used to build diagnostic models	28
Annex F (informative) Overview of diagnostic model applicability by monitoring technique	35
Annex G (informative) Example of bearing spalling modelled with a causal tree	36
Annex H (informative) Example of diagnosis confidence level determination	38
Bibliography	39

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

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.

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO/FDIS 13379-1](https://standards.iteh.ai/catalog/standards/iso/d9c086bc-af50-41d5-98d1-76d0c775e2f2/iso-fdis-13379-1)

<https://standards.iteh.ai/catalog/standards/iso/d9c086bc-af50-41d5-98d1-76d0c775e2f2/iso-fdis-13379-1>

