

ISO/TC 4

Secretariat: SIS

Voting begins on:
2020-03-30

Voting terminates on:
2020-05-25

Rolling bearings — Noise testing of rolling bearing greases —

Part 2: Test and evaluation method BQ+

*Roulements — Essais de bruit de graisse pour roulement —
Partie 2: Méthode d'essai et interprétation BQ*

ITeH STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sis/81b76897-fd0-4eba-a60a-503708d102f6/iso-fdis-21250-2>

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.



Reference number
ISO/FDIS 21250-2:2020(E)

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/f8b76680-fd0-4eba-a60a-503708d102f6/iso-fdis-21250-2>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2020

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
Fax: +41 22 749 09 47
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 Symbols, abbreviated terms and subscripts.....	1
5 Calculation method.....	2
5.1 Signal processing.....	2
5.2 Calculation of damping.....	3
5.3 Calculation of peak values.....	3
6 Test method BQ+.....	4
6.1 Measuring principle.....	4
6.2 Testing procedure.....	4
7 Evaluation of results.....	5
7.1 Rating scale.....	5
7.2 Damping ability.....	6
Annex A (informative) Test machine, test setup, electronic system and test reports: examples.....	7
Annex B (informative) Recommendation for inserting the amount of grease.....	12
Annex C (informative) Practical hints for calibration.....	15
Bibliography.....	17

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 documents 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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 4, *Rolling bearings*.

This document is intended to be used in conjunction with ISO 21250-1.

A list of all parts in the ISO 21250 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

The rolling bearing life theory emphasizes the use of pure and homogeneous lubricants as essential for a long bearing service life. The lubrication of rolling bearings is described in several national standards. The GfT worksheet 3^[12] contains theoretical and practical knowledge of rolling bearing lubrication.

Grease lubrication is the most common type of rolling bearing lubrication. The purity grade of rolling bearing grease is influenced by thickeners, base oils, additives and solid lubricant additives as well as the manufacturing process and is reflected in the running noise. Therefore, noise testing of rolling bearing greases is recommended.

In addition, grease noise testing in accordance with this document allows the grease manufacturers to develop low-noise lubricants with better damping properties. This document can also support the rolling bearing manufacturers and end-users in the selection of low noise grease with better damping properties.

This document covers requirements for the testing assembly and the test machine of method BQ+ to determine and assess the noise characteristics of rolling bearing grease jointly with ISO 21250-1, ISO 21250-3 and ISO 21250-4.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/f8b76680-fd0-4eba-a60a-503708d102f6/iso-fdis-21250-2>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/f8b76680-fd0-4eba-a60a-503708d102f6/iso-fdis-21250-2>

Rolling bearings — Noise testing of rolling bearing greases —

Part 2: Test and evaluation method BQ+

1 Scope

This document specifies the testing and evaluation method of rolling bearing grease noise in accordance with the method BQ+.

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 5593, *Rolling bearings — Vocabulary*

ISO 15242-1, *Rolling bearings — Measuring methods for vibration — Part 1: Fundamentals*

ISO 21250-1:—, *Rolling bearings — Noise testing of rolling bearing greases — Part 1: Basic principles, testing assembly and test machine*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5593, ISO 15242-1, ISO 21250-1 and the following apply.

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

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

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1

sampling rate

sample rate

<signal processing> frequency with which a continuous signal is sampled and converted into a time-discrete signal

Note 1 to entry: The unit is hertz (Hz) or samples (readings) per second [samples per second (samples/s)].

3.2

peak reset

manual or automatic zeroizing of the peak detector

4 Symbols, abbreviated terms and subscripts

For the application of this document, the symbols, abbreviated terms and subscripts according to ISO 21250-1:—, Table 1 and Table 2, the symbols and abbreviated terms contained in [Table 1](#) and the subscripts contained in [Table 2](#) apply.

Table 1 — Symbols and abbreviated terms

Symbol/abbreviated term	Unit	Description
f	Hz	frequency
FFT	—	fast Fourier transform
GD	—	grease damping
H ^a	—	high-band, H-band (1 800 Hz to 10 000 Hz)
L ^b	—	low-band, L-band (50 Hz to 300 Hz)
M ^a	—	medium-band, M-band (300 Hz to 1 800 Hz)
v	$\mu\text{m}\cdot\text{s}^{-1}$	vibration velocity

^a Can be also used as subscript to indicate the related band.

^b The L-band is used in noise and vibration analysis in the ISO 15242 series. However, this document does not consider this frequency range for grease noise testing and its analysis.

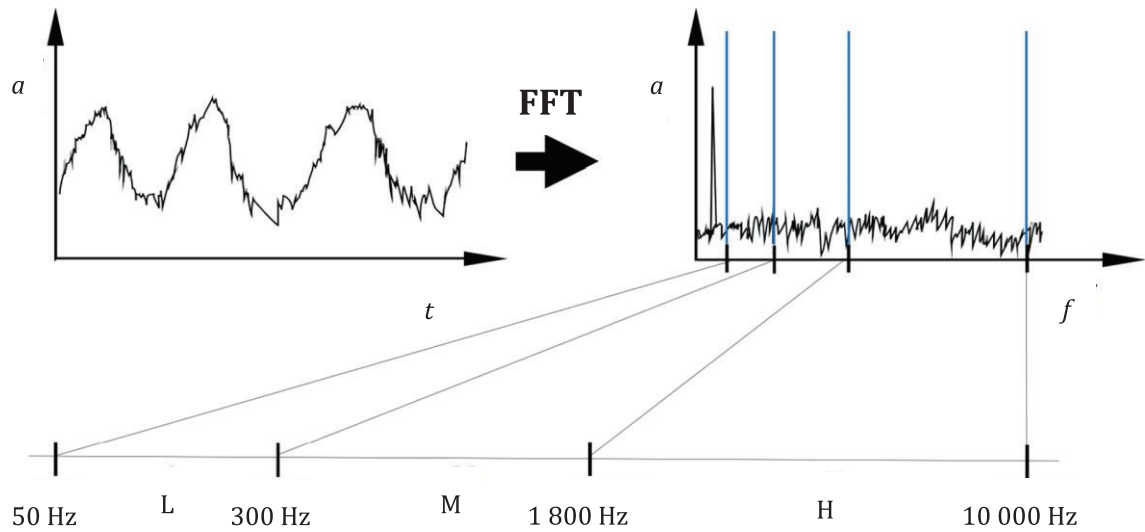
Table 2 — Subscripts

Subscript	Description
BQ+	method BQ+ according to this document
NL	noise level, average value (of vibration velocity)
ref	reference, ungreased bearing
rms	root mean square

5 Calculation method

5.1 Signal processing

The recorded time signal is transformed into a frequency signal via fast Fourier transform (FFT) and is subjected to an analysis of the bands (L-, M- and H-band; effective value/rms-value), as shown in [Figure 1](#).



Key

- a amplitude
- f frequency
- t time
- FFT fast Fourier transform
- H H-band
- L L-band
- M M-band

iTeh STANDARD PREVIEW
 (standards.iteh.ai)
 Full standard:
<https://standards.iteh.ai/catalog/standards/sist/18b76680-f1d0-4eba-a605-503708d1102f6/iso-fdis-21250-2>

Figure 1 — Signal transformation

5.2 Calculation of damping

The damping ability is to be calculated according to [Formulae \(1\)](#) and [\(2\)](#).

M-band:

$$GD_{M\ BQ+} = \frac{V_{NL, M\ ref} - V_{NL, M}}{V_{NL, M\ ref}} \tag{1}$$

H-band:

$$GD_{H\ BQ+} = \frac{V_{NL, H\ ref} - V_{NL, H}}{V_{NL, H\ ref}} \tag{2}$$

5.3 Calculation of peak values

The peak detection algorithm for processing of the input signal is shown in ISO 21250-1:—, Figure 1 a).

The flow chart for determining the peak values is shown in [Figure 2](#).

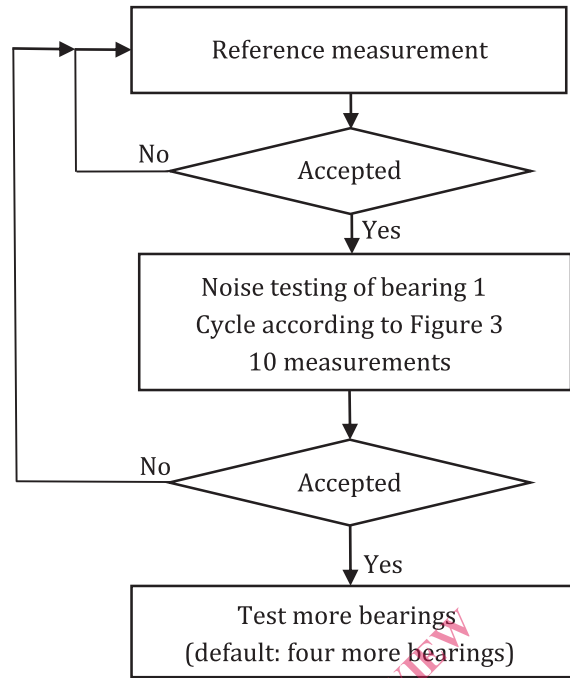


Figure 2 — Flow chart of grease noise assessing BQ+

The sampling rate of 25,6 kHz over a measurement period of 3,2 s shall be applied.

6 Test method BQ+

6.1 Measuring principle

For the application of this document, the measuring principle, test bearings and amount of grease, test load, spindle speed, signal recording and display of measuring results according to ISO 21250-1:—, Clause 7, shall apply.

An example of a test machine, the test setup, electronic system and test reports is given in [Annex A](#). A recommendation for inserting the amount of grease is given in [Annex B](#) and practical hints for calibration are given in [Annex C](#).

6.2 Testing procedure

The testing procedure is illustrated in [Figure 3](#) and is defined in the key to [Figure 3](#).