



**SLOVENSKI STANDARD**  
**SIST EN ISO 8041:2005/prA1:2015**  
**01-julij-2015**

---

**Odzivanje človeka na vibracije - Merilni instrumentarij - Dopolnilo A1 (ISO 8041:2005/DAM 1:2015)**

Human response to vibration - Measuring instrumentation - Amendment 1 (ISO 8041:2005/DAM 1:2015)

Schwingungseinwirkung auf den Menschen - Messeinrichtung - Änderung 1 (ISO 8041:2005/DAM 1:2015)

Réponse des individus aux vibrations - Appareillage de mesure - Amendement 1 (ISO 8041:2005/DAM 1:2015)

**Ta slovenski standard je istoveten z: EN ISO 8041:2005/prA1:2015**

---

**ICS:**

13.160	Vpliv vibracij in udarcev na ljudi	Vibration and shock with respect to human beings
--------	------------------------------------	--

**SIST EN ISO 8041:2005/prA1:2015**      **en,fr,de**



# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 8041

ISO/TC 108/SC 3

Secretariat: DS

Voting begins on:  
2015-04-02Voting terminates on:  
2015-07-02

## Human response to vibration — Measuring instrumentation

### AMENDMENT 1

*Réponse des individus aux vibrations — Appareillage de mesure*

*AMENDEMENT 1*

ICS: 13.160

#### ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

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.

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.



Reference number  
ISO/DIS 8041:2015(E)

© ISO 2015



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2015

All rights reserved. Unless otherwise specified, 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  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

## 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](http://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](http://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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 108, *Mechanical vibration, shock and condition monitoring*, Subcommittee SC 3, *Use and calibration of vibration and shock measuring instruments*.

*Page v, fifth indent*

Add after pattern evaluation "or validation".

*Page vi*

Add the following Introduction:



# Human response to vibration — Measuring instrumentation

## AMENDMENT 1

### Introduction

Up to 2005, when this International Standard was published, measuring instrumentation for human response to vibration (vibration meters) normally consisted of a signal processing unit and a detachable vibration transducer. According to recent developments, however, part of the signal processing steps can be integrated in the transducer unit, so that the signal coming out of the transducer's sensing element and going into the signal conditioning unit is not accessible any more. These transducer units include e.g. IEPE and MEMS transducers.

Some of the test procedures specified in this International Standard, however, presume that this point in the signal path is accessible (electrical input). Since such an input is not mandatory these tests can only be performed on a vibration meter having an electrical input or after some technical modifications to the instrumentation, e.g. internal access to signals. Or those tests can only be performed mechanically, which in certain cases requires modifications to some test procedures. Such modifications to test procedures, however, are beyond the present scope of this International Standard.

Some of the test procedures specified in this International Standard can only be performed if an electrical output is available, e.g. 5.13. Since such an output is not mandatory these tests can only be performed on a vibration meter having an electrical output or after some technical modifications to the instrumentation, e.g. internal access to signals.

The verification test specified in this Amendment is practicable and has the objective of identifying an instrument which is adequately calibrated for the intended applications and is suitable for the purpose, at a cost reasonable for the calibration laboratory and affordable for the end user. Therefore the verification test is strongly reduced in its extend compared to the full pattern evaluation or validation and does only test the most relevant characteristics of a vibration meter.

*Page 1, Clause 1, first paragraph*

Add after *pattern evaluation* "or validation".

Renumber a) to be a1) and add the following:

a2) validation of one-off instruments, i.e. a limited set of tests of an individual vibration measuring system against the relevant specifications defined in this International Standard;

*Page 4, 3.1.5.7*

Replace Formula (7) by the following:

$$a_v = \sqrt{k_x^2 a_{wx}^2 + k_y^2 a_{wy}^2 + k_z^2 a_{wz}^2} \quad (7)$$

*Page 6, Figure 1*

Replace in the figure capture "Overview" by "Example".

## ISO/DIS 8041:2015(E)

Page 7 and 8, 5.1

Add after the first and the third indent, respectively, the following symbols:

$a_w$

$T$

Page 17, 5.10, fifth paragraph, fifth line

Replace “a further” by “at least”.

Page 17, 5.10

Add at the end of the subclause the following Note:

**NOTE — It is useful that the vibration meter is capable of indicating how long (in relation to the measurement duration) in each channel an overload took place.**

Page 19, 5.16

Add at the end of the subclause the following Note:

**NOTE — This electrical cross-talk between measurement channels should be distinguished from transducer transverse sensitivity which typically is greater than 0,5 %, see Clause E.2. The transverse sensitivity can become relevant especially with multi-axial transducers.**

Page 23, Clause 11

Replace a) by the following:

- a1) Pattern evaluation (targeted at manufacturers) is a full set of tests to be performed on samples of an instrument type. This test is used for product type testing or pattern approval of a production series of vibration measuring instruments. The objective of this test is to demonstrate an instrument design can meet the specifications defined in this International Standard;
- a2) Validation of one-off instruments (targeted at laboratory users or research users) is a limited set of tests to demonstrate that an individual vibration measuring system complies with the relevant specifications defined in this International Standard;

Replace in b), first indent, “every 1 or” by “at least every”.

Delete in b) the second indent.

Add in b) in the last indent after *modification* “(e.g. use of another transducer)”.

Page 24, Table 13

Replace the table by the following:



Table 13 — Summary of performance characteristics and test requirements

Clause	Specification Characteristic	Test type		Test clause			
		Electrical	Mechanical	Pattern evaluation (production series)	Validation (one-off instruments)	Periodic verification	In-situ check
5.1	General characteristics			12.5, 12.6	13.6, 13.7	14.5	15.2
5.2	Display of signal magnitude			12.5	13.6		
5.3	Electrical output	•		12.17			
5.4	Vibration sensitivity		•	12.7	13.9, 13.11	14.9	15.3
5.5	Accuracy of indication at reference frequency under reference conditions	•		12.7	13.9		
5.6	Frequency weightings and frequency responses	•	•	12.11 Annex H	13.11	14.9	
5.7	Amplitude linearity	•	•	12.10	13.11	14.9	
5.8	Instrument noise		•	12.12	13.12		
5.9	Signal-burst response	•		12.13			
5.10	Overload indication	•		12.14	13.14		
5.11	Under-range indication	•	•	12.10			
5.12	Time averaging	•		12.13			
5.13	Running r.m.s. acceleration	•		12.13			
5.14	Reset			12.15			
5.15	Timing facilities			12.18	13.15		
5.16	Electrical cross-talk	•		12.8	13.13		
5.2	Combined axis outputs	•		12.16			
5.17 (Annex E)	Vibration transducer characteristics		•	12.9			
5.18	Power supply			12.19			
6	Mounting			Annex F			
7	Environmental and electromagnetic criteria			12.20			
8	Provision for use with auxiliary devices	•		12.5, 12.17			
9	Instrument marking			12.4	13.5	14.6	
10	Instrument documentation			12.4	13.5	14.6	

Page 25, 12.3

Add the following second and third paragraphs:

The instrument shall be submitted for testing with equipment (e.g. adaptors) suitable for enabling the input and output of electrical signals.

A vibration calibrator should be supplied with the vibration instrument.

**ISO/DIS 8041:2015(E)**

*Page 26, 12.6, first paragraph*

Replace the second sentence by “The instrument, transducer and the vibration calibrator (if supplied) shall be visually inspected and all controls operated to ensure they are in working order.”

*Page 26, 12.7*

Replace the third paragraph by the following:

The reference vibration transducer shall be used to measure the value of the mechanical vibration input generated at the reference vibration value and at the reference frequency, before measuring the vibration magnitude with the vibration meter. For these measurements, the vibration meter shall be set to the reference measurement range, band-limiting frequency-weighting and linear time averaging and with a measurement duration sufficient for the indicated values to stabilize (for low-frequency testing, this duration can be as much as 30 s for hand-arm vibration, 1 min for whole-body, and 5 min for low-frequency whole-body applications). The value of the input signal plus background noise shall be at least 10 times the value of the background noise as measured by the vibration meter.

*Page 28, 12.10.1, third paragraph from top of page*

Add in the first sentence after *specified lower boundary* “[see G.2 j)]”.

*Page 28, 12.10.2, first paragraph*

Replace the last sentence by “The vibration transducers shall be mounted in accordance with the calibration procedure specified in ISO 16063-21.”

*Page 29, 12.10.2, paragraph in between the six indents*

Replace “from the signal value that caused the first indication of overload” by “from that maximum signal value”.

*Page 29, 12.10.2, last but two paragraph*

Replace “until the first indication of overload” by “until the maximum signal value specified above”.

*Page 29, 12.10.2, last paragraph*

Delete “and until the first indications of overload”.

*Page 30, 12.11.2, first paragraph*

Replace the last sentence by “The vibration transducers shall be mounted in accordance with the calibration procedure specified in ISO 16063-21.”

*Page 30, 12.11.2*

Replace the second paragraph by the following:

At the reference frequency, the input mechanical vibration shall be adjusted such that the indication of band-limited vibration on the instrument under test is 20 dB above the lower limit of the specified linearity range. The band-limited acceleration value of this input signal,  $a_{in}$ , shall be used as a reference input value for subsequent tests.

*Page 31, 12.11.3*

Replace the second paragraph by the following:

At the reference frequency  $f_{ref}$ , the input electrical signal shall be adjusted such that the indication of band-limited vibration on the instrument under test is 20 dB above the lower limit of the specified linearity range. The indicated frequency-weighted value,  $a_{ind}$ , of this input signal shall be used as a reference value for subsequent tests.