FINAL DRAFT
Amendment

# ISO 16063-21:2003/ FDAM 2

# Methods for the calibration of vibration and shock transducers —

## Part 21: Vibration calibration by comparison to a reference transducer

## AMENDMENT 2

*Méthodes pour l'étalonnage des transducteurs de vibrations et de chocs —*

*Partie 21: Étalonnage de vibrations par comparaison à un transducteur de référence*

*AMENDEMENT 2*

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This document was prepared by Technical Committee ISO/TC 108, *Mechanical vibration, shock and condition monitoring*.

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# Methods for the calibration of vibration and shock transducers —

# Part 21:
# Vibration calibration by comparison to a reference transducer

# AMENDMENT 2

Introduction

*Add the following paragraph at the end of the Introduction:*

ISO 16063-21:2003/Amd 2 aims to explain better the use of reference transducers, different calibration set-ups and opens up the frequency limits for the applicable calibration range.



1 Scope

*Add the following sentence at the end of the scope before the NOTE:*

"This document is applicable to calibrations outside the frequency range from 0,4 Hz to 10 kHz, considering the additional facts described in 4.3. Systems have been demonstrated to cover the range from 0,01 Hz to 30 kHz."



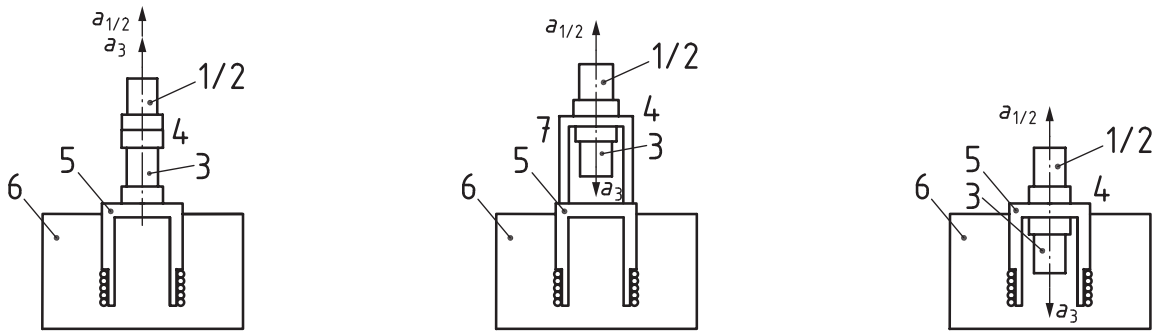
4.3

*Replace the last but one paragraph by the following:*

"The reference transducer may be of the back-to-back type meant for direct mounting of the transducer to be calibrated on top of it, in a back-to-back configuration, see Figure 1 a). It may also be a transducer used in a fixture, see Figure 1 b), or underneath the exciter mounting platform (built-in reference transducer), see Figure 1 c), always in line with the transducer to be calibrated. In the setup shown in Figure 1 c) the reference might even be an integral part of the exciter (which means it cannot be detached). To reduce the influence of rocking motions, the centres of the seismic elements of both transducers should be superimposed on one axis coinciding with the axis of vibration. It is not recommended to mount the two transducers side by side as rocking motions will often be present, causing large errors in many circumstances.

For low frequency calibrations requiring measurements below a few Hz, long stroke exciters are used giving displacements of 100 mm or more. The setups are normally like the one shown schematically in Figure 2. The principle is the same as Figure 1 b) but the armature is a sledge driven by an electromagnetic system or otherwise. The sledge configuration permits heavy transducers to be calibrated. Some transducers (e.g. seismometers) are sensitive in the transverse direction with respect to their mounting surface. They can then be mounted directly on the sledge without the fixture 7 in Figure 2.

For these low frequency setups, the influence of rocking motion typically is very low, so side by side measurements can be performed with low uncertainty.




**a) Calibration set-up with back-to-back reference transducer**

**b) Calibration set-up with mounting fixture (contains single ended transfer reference transducer)**

**c) Calibration set-up with vibration exciter internal reference transducer**

**Key**

1 transducer to be calibrated (see Note 1)

2 transfer standard, used for transfer calibration of transducer 3 (see Note 1 and ISO 16063-21:2003/Amd 1:2016, Annex E)

3 reference transducer (see Note 1)

4 top surface of back-to-back transducer (subfigure a)), mounting surface of mounting fixture (subfigure b)) or mounting surface of vibration exciter (subfigure c))

5 vibration exciter armature

6 vibration exciter body

7 mounting fixture (providing back-to-back configuration)

*a* vibration direction

$a_{1/2}$ nominal sensitivity axis of transducer 2/1 (standard set-up: transducer to be calibrated)

$a_3$ nominal sensitivity axis of transducer 3 (standard set-up: reference transducer)



**Figure 1 — Permitted calibration set-ups for a standard calibration and transfer calibration**