International Standard

ISO 16063-31

Methods for the calibration of vibration and shock transducers —

Part 31: Testing of transverse vibration sensitivity

AMENDMENT 1

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

Partie 31: Essai de sensibilité aux vibrations transversales

AMENDEMENT 1

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Methods for the calibration of vibration and shock transducers —

Part 31:
Testing of transverse vibration sensitivity

AMENDMENT 1

7.3

Add the following subclause at the end of Clause 7:

"7.3 Determination of the transverse sensitivity using elliptical orbits

Annex B shall be used for testing of transverse sensitivity using elliptical orbits."

Annex B

Add the following annex after Annex A, before the Bibliography.

Annex B
(normative)

Testing of transverse sensitivity using elliptical orbits

This annex gives a brief insight into a method that can be used to test the transverse sensitivity of vibration and shock transducers in the bi-axial transverse directions by actuating the test set up exciters in the X- and Y- directions at any phase and amplitude as described in Formulae (B.1) and (B.2). A full description of a method that can be used is included in Reference [13].

$$a_X(t) = \hat{a}_X \cos(2\pi f t + \phi_X) \tag{B.1}$$

$$a_Y(t) = \hat{a}_Y \cos(2\pi f t + \phi_Y) \tag{B.2}$$

where

$a_X(t)$ is the time-varying value of the X-axis acceleration;

$\hat{a}_X$ is the amplitude of the acceleration component along the X-axis;

ϕ_X is the initial phase of the acceleration component along the X-axis;

$a_Y(t)$ is the time-varying value of the Y-axis acceleration;

$\hat{a}_Y$ is the amplitude of the acceleration component along the Y-axis;

ϕ_Y is the initial phase of the acceleration component along the Y-axis;

f is the frequency of oscillation; and

t is the time.

In general case, Formulae (B.1) and (B.2) describe an elliptical orbit motion in the X-Y plane and in those cases the transducer under test output is given by Formula (B.3).

$$V_T(t) = S_X \hat{a}_X \cos(2\pi f t + \phi_X) + S_Y \hat{a}_Y \cos(2\pi f t + \phi_Y) \tag{B.3}$$

where

S_X is the transverse sensitivity in the X-direction;

S_Y is the transverse sensitivity in the Y-direction.

In addition, the expressions that describe the relationships between the magnitude $\hat{V}_T$ and the initial phase ϕ of the output $V_T(t)$ and the amplitudes and initial phases of the X- and Y-axis accelerations are given by Formulae (B.4) and (B.5).

$$\hat{V}_T^2(t) = \left(S_X \hat{a}_X \cos\phi_X + S_Y \hat{a}_Y \cos\phi_Y\right)^2 + \left(S_X \hat{a}_X \sin\phi_X + S_Y \hat{a}_Y \sin\phi_Y\right)^2 \tag{B.4}$$