INTERNATIONAL STANDARD

# ISO 5347-18

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# Methods for the calibration of vibration and shock pick-ups —

# Part 18: Testing of transient temperature sensitivity



*Méthodes pour l'étalonnage de capteurs de vibrations et de chocs —*

*Partie 18: Essai de sensibilité de température transitoire*



Reference number
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## 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.



International Standard ISO 5347-18 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock*, Sub-Committee SC 3, *Use and calibration of vibration and shock measuring instruments*.



ISO 5347 consists of the following parts, under the general title *Methods for the calibration of vibration and shock pick-ups*:

— *Part 0: Basic concepts*

— *Part 1: Primary vibration calibration by laser interferometry*

— *Part 2: Primary shock calibration by light cutting*

— *Part 3: Secondary vibration calibration*

— *Part 4: Secondary shock calibration*

— *Part 5: Calibration by Earth's gravitation*

— *Part 6: Primary vibration calibration at low frequencies*

— *Part 7: Primary calibration by centrifuge*

— *Part 8: Primary calibration by dual centrifuge*



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— *Part 9: Secondary vibration calibration by comparison of phase angles*

— *Part 10: Primary calibration by high-impact shocks*

— *Part 11: Testing of transverse vibration sensitivity*

— *Part 12: Testing of transverse shock sensitivity*

— *Part 13: Testing of base strain sensitivity*

— *Part 14: Resonance frequency testing of undamped accelerometers on a steel block*

— *Part 15: Testing of acoustic sensitivity*

— *Part 16: Testing of mounting torque sensitivity*

— *Part 17: Testing of fixed temperature sensitivity*

— *Part 18: Testing of transient temperature sensitivity*

— *Part 19: Testing of magnetic field sensitivity*

— *Part 20: Primary vibration calibration by the reciprocity method*

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# Methods for the calibration of vibration and shock pick-ups —

# Part 18:
Testing of transient temperature sensitivity



## 1 Scope

ISO 5347 comprises a series of documents dealing with methods for the calibration of vibration and shock pick-ups.

This part of ISO 5347 lays down detailed specifications for the instrumentation and procedure to be used for transient temperature sensitivity testing. It applies to piezoelectric pick-ups, whereby pick-up output due to sudden temperature change is measured.



## 2 Apparatus

**2.1 Equipment capable of maintaining room temperature** at 23 °C ± 3 °C.

**2.2 Water** or **alcohol bath**, kept at a temperature 20 °C ± 1 °C lower than actual temperature of the pick-up and with a volume such that the temperature rise during immersion of pick-up and its mounting block is limited to 1 °C.

**2.3 Aluminium block**, with a mass ten times the mass of the pick-up. It shall be possible to attach the pick-up to the block by the usual means of attachment.

**2.4 D.c. oscilloscope** or **d.c. recorder**, with gigaohm input impedance.

**2.5 Recommended preamplifier**, if any.

**2.6 Other apparatus requirements.**

Precautions shall be made to ensure that the bath liquid does not leak into the pick-up, that the electrical leakage resistance is not lowered by the bath liquid at the connector, etc., or that the action of immersion itself does not affect the output of the pick-up.

## 3 Method

### 3.1 Test procedure

Connect the pick-up directly to the oscilloscope or recorder without the amplifier, if possible. Quickly immerse the pick-up mounted on the aluminium block into the bath. Measure the maximum output and the time from the start of the transient to the maximum. If the output reverses within the first two seconds and reaches a peak of opposite polarity, the magnitude of this peak shall also be recorded.

If the pick-up is always used together with a specified amplifier, repeat the test with this amplifier in use. Set the amplifier to its lowest frequency range and note this low-frequency cut-off.

### 3.2 Expression of results

Calculate the transient temperature sensitivity, $S_{tr}$, expressed (as acceleration) in metres per (second squared per degree Celsius) [m/(s$^2$/°C)], using the following formula:

$$S_{tr} = \frac{a_{tr}}{\Delta t}$$

where

$a_{tr}$ is the change in pick-up output expressed (as acceleration) in metres per second squared;

$\Delta t$ is the difference between the pick-up temperatures, in degrees Celsius, before and after immersion in the bath.

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**Descriptors:** vibration, mechanical shock, transducers, sensors, tests, calibration.

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