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Acoustics and vibration - Laboratory measurement of vibroacoustic transfer properties of resilient elements - Part 5: Driving point method for determination of the low-frequency transfer stiffness of resilient supports for translatory motion (ISO 10846- 5:2008)

## I.S. EN ISO 10846-5:2009

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<b>NSAI</b> 1 Swift Square, Northwood, Santry Dublin 9	T +353 1 807 3800 F +353 1 807 3838 E standards@nsai.ie W NSAI.ie	<b>Sales:</b> T +353 1 857 6730 F +353 1 857 6729 W standards.ie	<b>Price Code:</b> K
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Acoustique et vibrations - Mesurage en laboratoire des propriétés de transfert vibro-acoustique des éléments élastiques - Partie 5: Méthode du point d'application pour la détermination de la raideur dynamique de transfert basse fréquence en translation des supports élastiques (ISO 10846-5:2008)

Akustik und Schwingungstechnik - Laborverfahren zur Messung der vibro-akustischen Transfereigenschaften elastischer Elemente - Teil 5: Ermittlung der Transfersteifigkeit elastischer Stützelemente aus der Eingangssteifigkeit bei Anregung in translatorischer Richtung und tiefen Frequenzen (ISO 10846-5:2008)

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**Contents**

Page

**Foreword.....3**

## **Foreword**

The text of ISO 10846-5:2008 has been prepared by Technical Committee ISO/TC 43 "Acoustics" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 10846-5:2009 by Technical Committee CEN/TC 211 "Acoustics" the secretariat of which is held by DS.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2009, and conflicting national standards shall be withdrawn at the latest by August 2009.

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# INTERNATIONAL STANDARD

# ISO 10846-5

First edition  
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## Acoustics and vibration — Laboratory measurement of vibro-acoustic transfer properties of resilient elements —

Part 5:

### Driving point method for determination of the low-frequency transfer stiffness of resilient supports for translatory motion

*Acoustique et vibrations — Mesurage en laboratoire des propriétés de  
transfert vibro-acoustique des éléments élastiques —*

*Partie 5: Méthode du point d'application pour la détermination de la  
raideur dynamique de transfert basse fréquence en translation des  
supports élastiques*



Reference number  
ISO 10846-5:2008(E)

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## ISO 10846-5:2008(E)

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# Contents

Page

Foreword.....	iv
Introduction .....	v
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>2</b>
<b>3 Terms and definitions.....</b>	<b>3</b>
<b>4 Principle.....</b>	<b>5</b>
<b>5 Test arrangements.....</b>	<b>6</b>
<b>5.1 Normal translations .....</b>	<b>6</b>
<b>5.2 Transverse translations .....</b>	<b>7</b>
<b>5.3 Suppression of unwanted vibrations.....</b>	<b>8</b>
<b>6 Criteria for adequacy of the test arrangement.....</b>	<b>11</b>
<b>6.1 General requirements.....</b>	<b>11</b>
<b>6.2 Determination of upper limiting frequency .....</b>	<b>12</b>
<b>6.3 Force transducers.....</b>	<b>12</b>
<b>6.4 Accelerometers .....</b>	<b>12</b>
<b>6.5 Summation of signals.....</b>	<b>13</b>
<b>6.6 Analysers.....</b>	<b>13</b>
<b>7 Test procedures .....</b>	<b>13</b>
<b>7.1 Selection of force measurement system and force distribution plates .....</b>	<b>13</b>
<b>7.2 Installation of the test element .....</b>	<b>13</b>
<b>7.3 Mounting and connection of accelerometers .....</b>	<b>14</b>
<b>7.4 Mounting and connections of the vibration exciter .....</b>	<b>14</b>
<b>7.5 Source signal .....</b>	<b>14</b>
<b>7.6 Measurements.....</b>	<b>14</b>
<b>7.7 Test for linearity.....</b>	<b>15</b>
<b>8 Evaluation of test results .....</b>	<b>16</b>
<b>8.1 Calculation of dynamic driving-point stiffness .....</b>	<b>16</b>
<b>8.2 One-third-octave-band values of the frequency-averaged dynamic driving-point stiffness .....</b>	<b>17</b>
<b>8.3 One-third-octave-band values of the frequency-averaged transfer stiffness .....</b>	<b>17</b>
<b>8.4 Presentation of one-third-octave-band results.....</b>	<b>17</b>
<b>8.5 Presentation of narrow-band data .....</b>	<b>18</b>
<b>9 Information to be recorded .....</b>	<b>19</b>
<b>10 Test report .....</b>	<b>20</b>
<b>Annex A (informative) Static load-deflection curve .....</b>	<b>21</b>
<b>Annex B (informative) Measurement uncertainty .....</b>	<b>22</b>
<b>Bibliography .....</b>	<b>26</b>

## ISO 10846-5:2008(E)

### 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 10846-5 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*, and ISO/TC 108, *Mechanical vibration, shock and condition monitoring*.

ISO 10846 consists of the following parts, under the general title *Acoustics and vibration — Laboratory measurement of vibro-acoustic transfer properties of resilient elements*:

- *Part 1: Principles and guidelines*
- *Part 2: Direct method for determination of the dynamic stiffness of resilient supports for translatory motion*
- *Part 3: Indirect method for determination of the dynamic stiffness of resilient supports for translatory motion*
- *Part 4: Dynamic stiffness of elements other than resilient supports for translatory motion*
- *Part 5: Driving point method for determination of the low-frequency transfer stiffness of resilient supports for translatory motion*

## **Introduction**

Passive vibration isolators of various kinds are used to reduce the transmission of vibration. Examples are automobile engine mounts, resilient supports for buildings, resilient mounts and flexible shaft couplings for shipboard machinery and small isolators in household appliances.

This part of ISO 10846 specifies a driving point method for measuring the low-frequency dynamic transfer stiffness function of linear resilient supports. This includes resilient supports with non-linear static load-deflection characteristics provided that the elements show an approximate linearity for vibration behaviour for a given static preload. This part of ISO 10846 belongs to a series of International Standards on methods for the laboratory measurement of vibro-acoustic properties of resilient elements, which also includes documents on measurement principles, on a direct method and on an indirect method. ISO 10846-1 provides global guidance for the selection of the appropriate International Standard.

The laboratory conditions described in this part of ISO 10846 include the application of static preload, where appropriate.

The results of the method described in this part of ISO 10846 are useful for resilient supports that are used to prevent low-frequency vibration problems and to attenuate structure-borne sound in the lower part of the audible frequency range. However, for complete characterization of resilient elements that are used to attenuate low-frequency vibration or shock excursions, additional information is needed, which is not provided by this method.



# Acoustics and vibration — Laboratory measurement of vibro-acoustic transfer properties of resilient elements —

## Part 5: Driving point method for determination of the low-frequency transfer stiffness of resilient supports for translatory motion

### 1 Scope

This part of ISO 10846 specifies a driving point method for determining the low-frequency transfer stiffness for translations of resilient supports, under a specified preload. The method concerns the laboratory measurement of vibrations and forces on the input side with the output side blocked, and is called the “driving point method”.

The stiffness resulting from measuring the input displacement (velocity, acceleration) and input force is the dynamic driving point stiffness. Only at low frequencies, where the driving point stiffness and the transfer stiffness are equal, can this method be used for determination of the dynamic transfer stiffness.

NOTE 1 In ISO 10846-2, the direct method for measuring the dynamic transfer stiffness is covered. The direct method covers the determination of the low-frequency dynamic transfer stiffness and it covers, in principle, a wider frequency range than the driving point method. Nevertheless, the driving point method is covered in the ISO 10846 series of international standards as well. It is considered as a valuable option for owners of (often expensive) test rigs for driving point stiffness measurements, to extend the use of these rigs with the determination of low-frequency dynamic transfer stiffness.

The method is applicable to test elements with parallel flanges (see Figure 1).

Resilient elements, which are the subject of this part of ISO 10846, are those which are used to reduce

- a) the transmission of vibration in the lower part of the audible frequency range (typically 20 Hz to 200 Hz) to a structure which may, for example, radiate unwanted fluid-borne sound (airborne, waterborne or others), and
- b) the transmission of low-frequency vibrations (typically 1 Hz to 80 Hz) which may, for example, act upon human subjects or cause damage to structures of any size when vibration is too severe.

NOTE 2 In practice, the size of available test rig(s) determines restrictions for very small and for very large resilient supports.

NOTE 3 Samples of continuous supports of strips and mats are included in the method. Whether or not the sample describes the behaviour of the complex system sufficiently is the responsibility of the user of this part of ISO 10846.

Measurements for translations normal and transverse to the flanges are covered in this part of ISO 10846. The method covers the frequency range from  $f_1 = 1$  Hz to the upper limiting frequency  $f_{UL}$ . Typically  $50 \text{ Hz} \leq f_{UL} \leq 200 \text{ Hz}$ .

The data obtained according to the method specified in this part of ISO 10846 can be used for the following:

- product information provided by manufacturers and suppliers;

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