

**Methods of test for refractory products -  
Part 1: Determination of dynamic  
Young's modulus (MOE) by impulse  
excitation of vibration**

Methods of test for refractory products - Part 1:  
Determination of dynamic Young's modulus (MOE)  
by impulse excitation of vibration

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 12680-1:2007 sisaldab Euroopa standardi EN ISO 12680-1:2007 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 30.03.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 12680-1:2007 consists of the English text of the European standard EN ISO 12680-1:2007.</p> <p>This document is endorsed on 30.03.2007 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p><b>Käsitlusala:</b></p> <p>This part of ISO 12680 specifies a method for determining the dynamic Young's modulus of rectangular cross-section bars and circular cross-section specimens of refractories by impulse excitation of vibration. The dynamic Young's modulus is determined using the resonant frequency of the specimen in its flexural mode of vibration.</p>	<p><b>Scope:</b></p> <p>This part of ISO 12680 specifies a method for determining the dynamic Young's modulus of rectangular cross-section bars and circular cross-section specimens of refractories by impulse excitation of vibration. The dynamic Young's modulus is determined using the resonant frequency of the specimen in its flexural mode of vibration.</p>
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ICS 81.080

Võtmesõnad:

English Version

**Methods of test for refractory products - Part 1: Determination of  
dynamic Young's modulus (MOE) by impulse excitation of  
vibration (ISO 12680-1:2005)**

Méthodes d'essai pour produits réfractaires - Partie 1:  
Détermination du module de Young dynamique (MOE) par  
excitation de vibration par impulsion (ISO 12680-1:2005)

Verfahren zur Prüfung von feuerfesten Erzeugnissen - Teil  
1: Bestimmung des dynamischen E-Moduls durch  
Schwingungs-Impulsanregung (ISO 12680-1:2005)

This European Standard was approved by CEN on 4 February 2007.

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**Management Centre: rue de Stassart, 36 B-1050 Brussels**

## Foreword

The text of ISO 12680-1:2005 has been prepared by Technical Committee ISO/TC 33 "Refractories" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 12680-1:2007 by Technical Committee CEN/TC 187 "Refractory products and materials", the secretariat of which is held by BSI.

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 2007, and conflicting national standards shall be withdrawn at the latest by August 2007.

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### Endorsement notice

The text of ISO 12680-1:2005 has been approved by CEN as EN ISO 12680-1:2007 without any modifications.

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**Methods of test for refractory products —**

**Part 1:**

**Determination of dynamic Young's  
modulus (MOE) by impulse excitation of  
vibration**

*Méthodes d'essai pour produits réfractaires —*

*Partie 1: Détermination du module de Young dynamique (MOE) par  
excitation de vibration par impulsion*



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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.

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 12680-1 was prepared by Technical Committee ISO/TC 33, *Refractories*.

ISO 12680 consists of the following parts, under the general title *Methods of test for refractory products*:

— *Part 1: Determination of dynamic Young's modulus (MOE) by impulse excitation of vibration*

The following part is under preparation:

— *Part 2: Determination of static modulus of elasticity*



# Methods of test for refractory products —

## Part 1:

# Determination of dynamic Young's modulus (MOE) by impulse excitation of vibration

## 1 Scope

This part of ISO 12680 specifies a method for determining the dynamic Young's modulus of rectangular cross-section bars and circular cross-section specimens of refractories by impulse excitation of vibration. The dynamic Young's modulus is determined using the resonant frequency of the specimen in its flexural mode of vibration.

**NOTE** Although not specifically described in this part of ISO 12680, this method can also be used at high temperatures with suitable equipment modification.

This part of ISO 12680 does not address the safety issues associated with its use. It is the responsibility of the users of this standard to establish appropriate safety and health practices.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 5022:1979, *Shaped refractory products — Sampling and acceptance testing*

ISO 8656-1:1988, *Refractory products — Sampling of raw materials and unshaped products — Part 1: Sampling scheme*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

**modulus of elasticity**

**MOE**

ratio of stress to strain below the proportional limit

### 3.2

**proportional limit**

greatest stress which a material is capable of sustaining without deviation from proportionality of stress to strain (Hooke's Law)

### 3.3

**anti-nodes**

locations, generally two or more, of local maximum displacement in an unconstrained slender bar or rod in resonance

**NOTE** For the fundamental flexural resonance, the anti-nodes are located at the two ends and the centre of the specimen.