

**अग्निसह सामग्रियों के नमूने लेने और भौतिक परीक्षण की
पद्धतियाँ
भाग 29 कम्पन के आवेगी उत्तेजन द्वारा
उच्चतापमान पर गत्यात्मक यंग मापांक (एमओई) ज्ञात करना**

**Methods of Sampling and Physical
Tests for Refractory Materials
Part 29 Determination of dynamic Young's modulus (MOE)
at elevated temperatures by impulse excitation of vibration**

ICS 81.080

© BIS 2024
© ISO 2020

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9बहादुर शाह ज़फर मार्ग, नई दिल्ली 110002 -
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG,
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

NATIONAL FOREWORD

This Indian Standard (Part 29) which is identical to ISO 22605:2020 “Refractories — Determination of dynamic Young’s modulus (MOE) at elevated temperatures by impulse excitation of vibration” issued by the International Organization for Standardization (ISO), was adopted by the Bureau of Indian Standards on the recommendation of the Refractories Sectional Committee and approval of the Metallurgical Engineering Division Council.

This Indian Standard has been issued in several parts. Other parts of this Indian Standard are:

Part 1 Determination of pyrometric cone equivalent (PCE) or softening point

Part 2 Determination of refractoriness under load

Part 3 Determination of spalling resistance

Part 4 Determination of cold crushing strength of dense shaped refractories products

Part 5 Method for determination of modulus of rupture at ambient temperature of dense and insulating shaped refractory products

Part 6 Determination of permanent linear change after reheating for shaped insulating and dense refractories

Part 7 Methods of sampling and criteria for conformity

Part 9 Determination of true density

Part 12 Method for determination of bulk density and true porosity of shaped insulating refractory products

Part 13 Determination of resistance to carbon monoxide

Part 14 Determination of sieve analysis

Part 15 Method for determination of bulk density, apparent porosity and true porosity of dense shaped refractory products

Part 16 Determination of thermal conductivity according to hot-wire method (parallel)

Part 17 Shaped insulating refractory products — Determination of cold crushing strength

Part 18 Determination of creep in compression.

Part 19 Determination of thermal expansion

Part 20 Determination of modulus of rupture at elevated temperature

Part 21 Determination of thermal conductivity according to hot-wire method (cross-array and resistance thermometer)

Part 22 Method for determination of permeability to gases of dense shaped refractory products.

Part 23 Methods of test for dense shaped refractory products — Determination of resistance to abrasion at ambient temperature.

Part 24 Monolithic refractory products — Determination of resistance to explosive spalling

Part 25 Determination of abrasion resistance at elevated temperature.

Part 26 Method for determination of resistance to sulfuric acid of dense shaped refractory products

Part 27 Method for determination of compressive strength at elevated temperature of refractory products

Part 28 Determination of dynamic Young's modulus (MOE) by impulse excitation of vibration

The text of ISO standard has been approved as suitable for publication as in Indian Standard without deviations. Certain terminologies and conventions are, however, not identical with those used in Indian Standard. Attention is especially drawn to the following:

- a) Wherever the words 'International Standard' appear referring to this standard, it should be read as 'Indian Standard'.
- b) Comma (,) has been used as a decimal marker while in Indian Standards the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the edition indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 5022 Shaped refractory products — Sampling and acceptance testing.	IS 1528 (Part 7): 2010 Methods of sampling and physical tests for refractory materials: Part 7 methods of sampling and criteria for conformity (<i>Second Revision</i>).	Technically Equivalent
ISO 8656-1 Refractory products — Sampling of raw materials	IS 1528 (Part 7): 2010 Methods of sampling and physical tests for refractory materials: Part 7 methods of sampling	Technically Equivalent

and unshaped products — Part 1: Sampling scheme.	and criteria for conformity (<i>Second Revision</i>).	
ISO 12680-1 Methods of test for refractory products — Part 1: Determination of dynamic Young's modulus (MOE) by impulse excitation of vibration	IS 1528 (Part 28): 2024/ISO 12680-1: 2005 Methods of Sampling and Physical Tests for Refractory Materials: Part 28 Determination of dynamic Young's modulus (MOE) by impulse excitation of vibration.	Identical
ISO 16835 Refractory products — Determination of thermal expansion	IS 1528 (Part 19) : 2020 / ISO 16835 : 2014 Methods of Sampling and Physical Tests for Refractory Materials: Part 19 Determination of Thermal Expansion (<i>First Revision</i>).	Identical
IEC 60584-1 Thermocouples — Part 1: EMF specifications and tolerances	IS 16923 (Part 1) : 2018 / IEC 60584-1 : 2013 Thermocouples: Part 1 EMF Specifications and Tolerances (<i>First Revision</i>).	Identical
IEC 60584-2 Thermocouples ¹⁾ — Part 2: Tolerances	IS 16923 (Part 1) : 2018 / IEC 60584-1 : 2013 Thermocouples: Part 1 EMF Specifications and Tolerances (<i>First Revision</i>).	Identical

- 1) The International Standard IEC 60584-2 : 1982 “Thermocouples — Part 2: Tolerances” has been replaced by IEC 60584-1: 2013 “Thermocouples — Part 1: EMF specifications and tolerances” which is adopted as a Indian Standard IS 16923 (Part 1) : 2018 “Thermocouples Part 1 EMF Specifications and Tolerances (*First Revision*)” under dual numbering system.

In reporting the result of a test or analysis made in accordance with this standard, is to be rounded off, it shall be done in accordance with IS 2: 2022 ‘Rules for rounding off numerical- values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.