
INTERNATIONAL STANDARD



3312

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Sintered metal materials and hardmetals – Determination of Young's modulus

Matériaux métalliques frittés et métaux durs – Détermination du module de Young

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STANDARD PREVIEW
(standards.iteh.ai)

[ISO 3312:1975](#)

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Sintered metal materials and hardmetals – Determination of Young's modulus

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method of determination of dynamic (adiabatic) Young's modulus by longitudinal oscillations of sintered metal materials and hardmetals.

2 REFERENCES

ISO 2738, *Permeable sintered metal materials – Determination of density and open porosity.*

ISO 3369, *Impermeable sintered metal materials and hardmetals – Determination of density.*¹⁾

ISO ..., *Powder metallurgical materials excluding hardmetals – Sampling.*²⁾

ISO ..., *Hardmetals – Sampling and preparation of test pieces.*²⁾

3 PRINCIPLE

Excitation of ultrasonic longitudinal oscillations in a test piece and determination of the resonance frequency of its natural oscillations.

4 SYMBOLS AND UNITS

Symbol	Designation	Unit
L	Length of test piece	mm
ρ	Density	g/cm ³
f	Frequency of natural oscillations	Hz
E	Young's modulus	N/mm ²

5 APPARATUS

5.1 **Fixture** for mounting test piece.

5.2 **Ultrasonic oscillator** having a continuous control of frequencies in the range from 20 to 100 kHz.

5.3 **Device** for determining resonance frequency.

6 SAMPLING AND PREPARATION OF TEST PIECES

6.1 Sampling shall be carried out in accordance with ISO ... and ISO

6.2 The test pieces shall be at least 60 mm long and may have either a round or a rectangular cross-section. The test piece with round cross-section shall be $6 \pm 0,2$ mm in diameter. The cross-section of the rectangular test piece shall be $6 \pm 0,2$ mm \times $8 \pm 0,2$ mm.

6.3 The surface layer shall be removed to a depth of at least 0,1 mm. The surface roughness shall be $R_a \leq 1,5 \mu\text{m}$.

6.4 The ends of the test piece shall be ground and shall be parallel to within 0,02 mm.

6.5 The test piece shall be free of surface cracks or other structural defects and shall be cleaned immediately before being tested.

7 PROCEDURE

7.1 Determine the density of the test piece to the nearest 0,01 g/cm³ according to ISO 2738 or ISO 3369.

7.2 Measure the length of the test piece to the nearest 0,1 mm.

7.3 Mount the test piece in the apparatus. Smoothly increase the frequency of the oscillator until the lowest frequency of the natural longitudinal oscillations of the test piece is obtained. Determine the resonance frequency to the nearest 50 Hz.

1) At present at the stage of draft.

2) In preparation.