



SIS - Standardiseringskommissionen i Sverige

Handläggande organ

**MATERIALNORMCENTRALEN**

## **SVENSK STANDARD SS-EN 23 312**

Fastställd

Utgåva

Sida

Ikraftsätter

1993-08-31

1

1 (1 + 4 + 4)

**ISO 3312:1987**

SIS FASTSTÄLLER OCH UTGER SVENSK STANDARD SAMT SÄLJER NATIONELLA OCH INTERNATIONELLA STANDARDPUBLIKATIONER ©

### **Pulvermetallurgi — Sintermetall — Bestämning av dynamisk elasticitetsmodul (ISO 3312:1987)**

Denna standard utgörs av både den svenska och engelska versionen av europastandarden EN 23 312:1993.

EN 23 312:1993 ikraftsätter ISO 3312:1987.

Vid tryckningen har de två versionerna lagts sida mot sida, men numrerats löpande, så att varje uppslag numrerats som en sida.

De officiella franska och tyska versionerna kan också köpas genom SIS.

### **Sintered metal materials and hardmetals — Determination of Young modulus (ISO 3312:1987)**

This standard consists of the Swedish and English versions of the European Standard EN 23 312:1993.

EN 23 312:1993 endorses ISO 3312:1987.

The two versions are printed with the pages side by side, but are numbered in consecutive order, so that each set of pages has only one page number.

The official French and German versions can also be bought through SIS.

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 23 312**

April 1993

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UDC 621.762.5:669-492.2:669.018.25:620.1:539.382

Descriptors: Powder metallurgy, sintered products, hard metals, modulus of elasticity, vibration tests

English version

**Sintered metal materials and hardmetals —  
Determination of Young modulus (ISO 3312:1987)**

Matériaux métalliques frittés et  
métaux-durs — Détermination  
du module de Young  
(ISO 3312:1987)

Sintermetall und Hartmetalle —  
Ermittlung des Elastizitäts-  
moduls (ISO 3312:1987)

This European Standard was approved by CEN on 1993-04-02. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**CEN**

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

EUROPASTANDARD  
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Nyckelord: Pulvermetallurgi, sintrade produkter, hårdmetall, elasticitetsmodul, vibrationsprovning

Svensk version

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Denna europastandard antogs av CEN 1993-04-02. CEN-medlemmarna är förpliktade att följa fordringarna i CEN/CENELECs interna bestämmelser som anger på vilka villkor denna europastandard i oförändrat skick skall ges status som nationell standard.

Aktuella förteckningar och bibliografiska referenser rörande sådana nationella standarder kan på begäran erhållas från CENs centralsekretariat eller från någon av CENs medlemmar.

Denna europastandard finns i tre officiella versioner (engelsk, fransk, tysk). En version på något annat språk, översatt under ansvar av en CEN-medlem till sitt eget språk och anmäld till CENs centralsekretariat har samma status som de officiella versionerna.

CENs medlemmar är de nationella standardiseringsorganen i Belgien, Danmark, Finland, Frankrike, Grekland, Irland, Island, Italien, Luxemburg, Nederländerna, Norge, Portugal, Schweiz, Spanien, Storbritannien, Sverige, Tyskland och Österrike.

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**Foreword**

In 1992 ISO 3312:1987 "Sintered metal materials and hardmetals – Determination of Young modulus" was submitted to the CEN Primary Questionnaire procedure.

Following the positive result of the CEN/CS Proposal ISO 3312:1987 was submitted to the CEN Formal Vote. The result of the Formal Vote was positive.

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 October 1993, and conflicting national standards shall be withdrawn at the latest by October 1993.

According to the Internal Regulations of CEN/CENELEC, the following countries are bound to implement this European Standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**Endorsement notice**

The text of the International Standard ISO 3312:1987 was approved by CEN as a European Standard without any modification.

NOTE: The European references to international publications are given in annex ZA (normative).

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EN 23 312:1993

### Förord

1992 var ISO 3312:1987, Sintered metal materials and hardmetals – Determination of Young modulus, föremål för en första omröstning inom CEN.

Som en följd av det positiva utfallet lades ISO 3312:1987 fram för formell slutomröstning, vilken gav positivt resultat.

Denna europeiska standard skall ges status som nationell standard, antingen genom publicering av en identisk text eller genom ikraftsättning, senast i oktober 1993 och motstridande nationella standarder skall dras in senast i oktober 1993.

Enligt CEN/CENELECs interna regler är följande länder skyldiga att ikraftsätta denna europastandard:

Belgien, Danmark, Finland, Frankrike, Grekland, Irland, Island, Italien, Luxemburg, Nederländerna, Norge, Portugal, Schweiz, Spanien, Storbritannien, Sverige, Tyskland och Österrike.

### Meddelande om ikraftsättning

Texten i den internationella standarden ISO 3312:1987 antogs av CEN utan ändring som europastandard.

ANM: De europeiska referenserna till internationella dokument ges i bilaga ZA (bindande).

## 1 Scope and field of application

This International Standard specifies a method for the determination of the dynamic (adiabatic) Young modulus by longitudinal oscillations of sintered metal materials and hard-metals.

## 2 Reference

ISO 2738, *Permeable sintered metal materials — Determination of density, oil content and open porosity.*

## 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
$\rho$	Density	g/cm <sup>3</sup>
$f$	Frequency of natural oscillations	Hz
$E$	Young modulus	N/mm <sup>2</sup>

## 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 Preparation of test pieces

**6.1** 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.

**6.2** The surface layer shall be removed to a depth of at least 0,1 mm. The surface roughness shall be  $R_a < 1,25$   $\mu$ m.

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

**6.4** 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/cm<sup>3</sup> according to ISO 2738.

**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.

## 8 Expression of results

**8.1** Young modulus is given by the following equation:

$$E = 4 \times 10^{-9} \times L^2 \times \rho \times f^2$$

**8.2** Report the result rounded to the nearest  $5 \times 10^3$  N/mm<sup>2</sup>.

## 9 Test report

The test report shall include the following information:

- reference to this International Standard;
- all details necessary for identification of the test sample;
- the result obtained;
- all operations not specified by this International Standard, or regarded as optional;
- details of any occurrence which may have affected the results.