



SLOVENSKI STANDARD
SIST EN 24003:2000

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Permeable sintered metal materials - Determination of bubble test pore size (ISO 4003:1977)

Permeable sintered metal materials - Determination of bubble test pore size (ISO 4003:1977)

Durchlässige Sintermetalle - Ermittlung der Porengröße mittels Gasblasentest (ISO 4003:1977)

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Matériaux en métal fritté perméable - Détermination de la dimension des pores - Méthode bulloscopique (ISO 4003:1977)

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Ta slovenski standard je istoveten z: EN 24003:1993

ICS:

77.160

Metalurgija prahov

Powder metallurgy

SIST EN 24003:2000

en

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EUROPEAN STANDARD

EN 24003:1993

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 1993

UDC 6621.762.5:669-492.2:620.1:539.217

Descriptors: Powder metallurgy, sintered products, porous metal, porosity, physical tests, bubble tests, pores, dimensional measurements

English version

**Permeable sintered metal materials -
Determination of bubble test pore size
(ISO 4003:1977)**

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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.

The European Standards exist 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

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Foreword

In 1992 ISO 4003:1977 "Permeable sintered metal materials - Determination of bubble test pore size" was submitted to the CEN Primary Questionnaire procedure.

Following the positive result of the CEN/CS Proposal ISO 4003:1977 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.

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Endorsement notice

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The text of the International Standard ISO 4003:1977 was approved by CEN as a European Standard without any modification.

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

Annex ZA (normative)
Normative references to international publications
with their relevant European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO 2738		Permeable sintered metal materials - Determination of density, oil content and open porosity		----

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4003 was developed by Technical Committee ISO/TC 119, *Powder metallurgical materials and products*, and was circulated to the member bodies in December 1975.

It has been approved by the member bodies of the following countries :

Australia	Japan	Spain
Austria	Mexico	Sweden
Canada	Poland	United Kingdom
France	Portugal	U.S.A.
Germany	Romania	U.S.S.R.
Italy	South Africa, Rep. of	Yugoslavia

No member body expressed disapproval of the document.

Permeable sintered metal materials – Determination of bubble test pore size

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method, known as the bubble test method, for the determination of the pore size of permeable sintered powder metallurgical materials, i.e. filters, porous bearings, porous electrodes and other parts with interconnected porosity.

NOTE – The bubble test shall be considered as a quality control test and not as a test for defining filter grades or determining exact pore size and pore size distribution.

2 REFERENCE

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

3 PRINCIPLE

Impregnation of a test piece with a test liquid. Immersion of the test piece in the test liquid and introduction of a gas (usually air) into the test piece at gradually increasing pressure. Determination of the pressure at which bubbles are emitted from the surface of the test piece. Evaluation of the equivalent bubble test pore size by means of a mathematical formula.

4 DEFINITION

bubble test pore size : The maximum equivalent capillary diameter in the test piece which is calculated from the measured minimum pressure required to force the first bubble of gas through the test piece (under standardized conditions) impregnated with a liquid.

The first bubble of gas will form at the pore having the greatest throat, the throat being the narrowest section of this pore.

For calculation purposes, it is assumed that this bubble forms at the end of a capillary tube of circular cross-section which is initially filled with the same liquid of known surface tension.

For a circular capillary, the diameter is related to the bubble pressure by the equation :

$$d = \frac{4 \gamma}{\Delta p} \quad \dots (1)$$

where

d is the capillary diameter corresponding to the bubble test pore size, in metres;

γ is the surface tension of the test liquid, in newtons per metre;

Δp is the differential pressure, in pascals, across the test piece under static conditions, i.e.

$$\Delta p = p_g - p_l \quad \dots (2)$$

p_g being the gas pressure, in pascals;

p_l being the pressure in the liquid at the level of bubble formation, in pascals :

$$p_l = 9,81 \times \rho_l \times h \quad \dots (3)$$

where ρ_l is the density of the test liquid, in kilograms per cubic metre;

h is the height of the surface of the test liquid, in metres, above the highest throat in the test piece.