

This document is a preview generated by EVS

Permeable sintered metal materials - Determination of fluid permeability (ISO 4022:2018)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 4022:2018 sisaldab Euroopa standardi EN ISO 4022:2018 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 4022:2018 consists of the English text of the European standard EN ISO 4022:2018.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 31.10.2018.	Date of Availability of the European standard is 31.10.2018.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 77.160

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

EUROPEAN STANDARD

EN ISO 4022

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2018

ICS 77.160

Supersedes EN ISO 4022:2006

English Version

Permeable sintered metal materials - Determination of fluid permeability (ISO 4022:2018)

Matériaux métalliques frittés perméables -
Détermination de la perméabilité aux fluides (ISO
4022:2018)

Durchlässige Sintermetallwerkstoffe - Bestimmung der
Flüssigkeitsdurchlässigkeit (ISO 4022:2018)

This European Standard was approved by CEN on 26 August 2018.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

This document (EN ISO 4022:2018) has been prepared by Technical Committee ISO/TC 119 "Powder metallurgy" in collaboration with Technical Committee CEN/SS M11 "Powder metallurgy" the secretariat of which is held by CCMC.

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 April 2019, and conflicting national standards shall be withdrawn at the latest by April 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 4022:2006.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 4022:2018 has been approved by CEN as EN ISO 4022:2018 without any modification.

Contents

	Page
Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms, definitions, symbols and units	1
3.1 Terms and definitions.....	1
3.2 Symbols and units.....	3
4 Principle	3
5 Test piece	3
6 Apparatus	3
6.1 Equipment.....	3
6.2 Test fluids.....	7
7 Procedure	7
7.1 Measurement of thickness and area of the test piece.....	7
7.1.1 Flat test pieces.....	7
7.1.2 Hollow cylindrical test pieces.....	8
7.2 Measurement of pressure drop.....	8
7.3 Measurement of flow rate.....	8
7.4 Measurement of pressures and temperatures.....	8
8 Expression of results	9
8.1 Mean flow rate.....	9
8.2 Mean density and viscosity.....	9
8.3 Calculation of results.....	9
8.4 Final result.....	10
9 Test report	10
Annex A (informative) The flow of fluid through porous materials	11
Annex B (informative) Test fluids	13

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 119, *Powder metallurgy*, Subcommittee SC 3 *Sampling and testing methods for sintered metal materials (excluding hardmetals)*.

This third edition cancels and replaces the second edition (ISO 4022:1987), of which it constitutes a minor revision with the following changes:

- [Clause 3](#) and [Clause 4](#) order reversed, and [Clause 3](#) split into [3.1](#) and [3.2](#);
- [3.1.3](#), [3.1.4](#), [3.1.5](#), [3.1.13](#) and [3.1.14](#) editorially revised;
- [Clause 3](#): Terminological entries 'length' and 'dynamic viscosity' removed;
- [6.1.1](#) and [6.1.2](#), [Figures 1](#) and [2](#) and keys editorially revised;
- [7.1.2](#), first Formula removed and [Formula \(2\)](#) corrected, "l" changed to "1";
- [8.3](#), [Formula \(12\)](#) corrected, "ρ" changed to "q".

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Permeable sintered metal materials — Determination of fluid permeability

1 Scope

This document specifies a method for the determination of the fluid permeability of permeable sintered metal materials in which the porosity is deliberately continuous or interconnecting, testing being carried out under such conditions that the fluid permeability can be expressed in terms of viscous and inertia permeability coefficients (see [Annex A](#)).

This document does not apply to very long hollow cylindrical test pieces of small diameter, in which the pressure drop of the fluid in passing along the bore of the cylinder might not be negligible compared with the pressure drop of the fluid passing through the wall thickness (see [A.5](#)).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 2738, *Sintered metal materials, excluding hardmetals — Permeable sintered metal materials — Determination of density, oil content and open porosity*

3 Terms, definitions, symbols and units

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1 Terms and definitions

3.1.1

permeability

ability of a porous metal to pass a fluid under the action of a pressure gradient

3.1.2

test area

area of a porous metal normal to the direction of the fluid flow

3.1.3

thickness

dimension of the test piece in the direction of fluid flow

Note 1 to entry: For flat test pieces it is equal to the thickness.

Note 2 to entry: For hollow cylinders it is given by [Formulae \(2\)](#) to [\(6\)](#).