INTERNATIONAL STANDARD

ISO 10070

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Metallic powders — Determination of envelope-specific surface area from measurements of the permeability to air of a powder bed under steady-state flow conditions

Poudres métalliques — Détermination de la surface spécifique d'enveloppe à partir de mesures de la perméabilité à l'air d'un lit de poudre dans des conditions d'écoulement permanent



Reference number ISO 10070:1991(E)

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 Unternational Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Dislication as an International Standard requires approval by at least % of the member bodies casting a vote.

International Standard ISO 10070 was prepared by Technical Committee ISO/TC 119, *Powder metallurgy*.

Annexes A and B of this International Standard are for information only.

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International Organization for Standardization

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Introduction

The measurement of the permeability of a packed powder bed to a laminar gas flow is the basis of this International Standard. The determination can be made either at constant pressure drop (steady-state flow) or at variable pressure drop (constant volume).

This docum. The permeability measured is influenced by the porosity of the bed. For a given particle shape, the values of permeability and percent, included used to calculate a specific surface area of the powder by means of autotions of different types.

The surface area so calculated includes only those walls of the pores in the bed which are swept by the gas flow. It does not take into account closed or blind pores. It is defined as the envelope-specific surface area. It may be very different from the total surface area of particles as measured for instance, by gas adsorption methods.

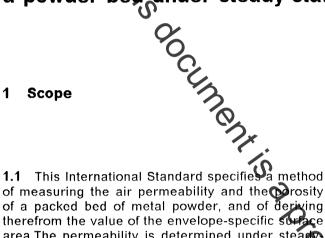
A single equation is used in the standard methods described and this entails certain limitations with respect to the type of powder (particle shape) and the porosity of the powder bed for which the method is ap-plicable. Consequently this is not an absolute method, and the value obtained depends poor the procedure used and the assumptions made.

The specific surface area determined can be converted into a mean equivalent spherical dameter (see definitions, clause 3).

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therefrom the value of the envelope-specific surface area. The permeability is determined under stear state flow conditions, using a laminar flow of air a a pressure near atmospheric. This International, Standard does not include the measurement of permeability by a constant volume method.

Several different methods have been proposed for this determination, and several instruments are available commercially. They give similar, reproducible results, provided the general instructions given in this International Standard are respected and the test parameters are identical.

This International Standard does not specify a particular commercial apparatus and corresponding test procedure. However, for the convenience of the user, an informative annex has been included (annex A) which is intended to give some practical information on three specific methods:

- the Lea and Nurse method, involving an apparatus which can be built in a laboratory (see A.1);
- the Zhang Ruifu method, using similar equipment (see A.2);
- the Gooden and Smith method, involving an apparatus which can be built in a laboratory but for which a commercial apparatus also exists (see A.3).

These methods are given as examples only. Other equipment available in various countries is acceptable within the scope of this International Standard.

1.2 This method is applicable to all metallic powders, including powders for hardmetals, up to 1 000 µm in diameter, but it is generally used for particles having diameters between 0.2 µm and 50 µm. It should not be used for powders composed of particles whose shape is far from equiaxial, i.e. flakes or fibres, unless specifically agreed upon between the parties concerned.

This method is not applicable to mixtures of different metallic powders or powders containing binders or lubricant.

If the powder contains agglomerates, the measured surface area may be affected by the degree of agglomeration. If the powder is subjected to a deagglomeration treatment (see annex B), the method used shall be agreed upon between the parties concerned.

Normative references 2

The following standards contain provisions which, through reference in the text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All stan-dards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3252:1982, Powder metallurgy – Vocabulary.

ISO 3954:1977, Powders for powder metallurgical purposes --- Sampling.

ISO 4022:1987, Permeable sintered metal materials - Determination of fluid permeability.