
Powder metallurgy — Vocabulary

Métallurgie des poudres — Vocabulaire

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 3252:2019

<https://standards.iteh.ai/catalog/standards/sist/5ab2db1d-ed12-4d46-ab17-f92e680a8a12/iso-3252-2019>



Reference number
ISO 3252:2019(E)

© ISO 2019

iTeh STANDARD PREVIEW (standards.iteh.ai)

ISO 3252:2019

<https://standards.iteh.ai/catalog/standards/sist/5ab2db1d-ed12-4d46-ab17-f92e680a8a12/iso-3252-2019>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
3.1 Terms relating to powders.....	1
3.2 Terms relating to forming.....	14
3.3 Terms relating to sintering and characteristics of sintered materials.....	24
3.4 Terms relating to post-sintering treatments.....	30
3.5 Terms relating to powder metallurgy materials.....	31
Bibliography	34

iTeh STANDARD PREVIEW (standards.iteh.ai)

ISO 3252:2019

<https://standards.iteh.ai/catalog/standards/sist/5ab2db1d-ed12-4d46-ab17-f92e680a8a12/iso-3252-2019>

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 on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 119, *Powder metallurgy*.

This fifth edition cancels and replaces the fourth edition (ISO 3252:1999), which has been technically revised.

The main changes compared to the previous edition are as follows:

- addition of the mandatory [Clause 2](#) (Normative references);
- addition of terms in current use.

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.

Introduction

The terms are classified alphabetically under the following main headings:

- powders;
- forming;
- sintering and characteristics of sintered materials;
- post-sintering treatments;
- powder metallurgy materials.

NOTE Additional information on certain terms defined can be found in the standards given in Notes to entry. These are listed in the Bibliography.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 3252:2019

<https://standards.iteh.ai/catalog/standards/sist/5ab2db1d-ed12-4d46-ab17-f92e680a8a12/iso-3252-2019>

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

ISO 3252:2019

<https://standards.iteh.ai/catalog/standards/sist/5ab2db1d-ed12-4d46-ab17-f92e680a8a12/iso-3252-2019>

Powder metallurgy — Vocabulary

1 Scope

This document defines terms relating to powder metallurgy. Powder metallurgy is the branch of metallurgy which relates to the manufacture of metallic powders, or of articles made from such powders with or without the addition of non-metallic powders, by the application of forming and sintering processes.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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 relating to powders

3.1.1

acicular
needle-shaped

ISO 3252:2019
<https://standards.iteh.ai/catalog/standards/sist/5ab2db1d-ed12-4d46-ab17-f92e680a8a12/iso-3252-2019>

Note 1 to entry: See [Figure 1](#).

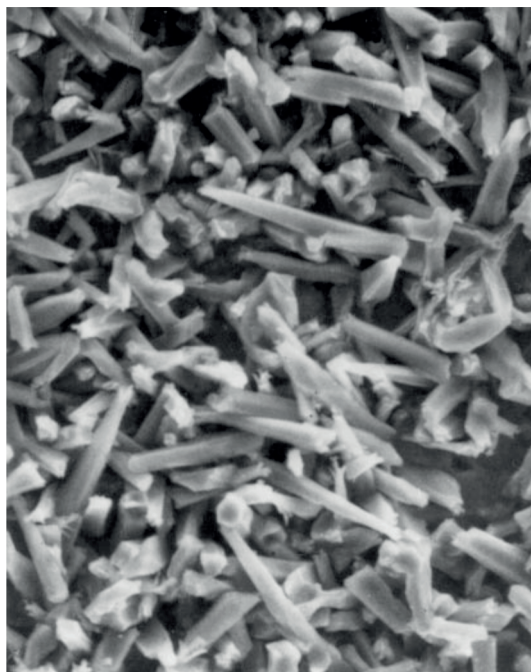


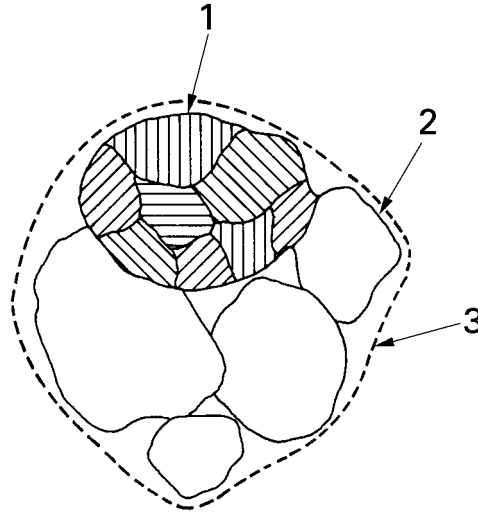
Figure 1 — Acicular

3.1.2

agglomerate

several particles adhering together

Note 1 to entry: See [Figure 2](#).



Key

- 1 grain
- 2 particle
- 3 agglomerate

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Figure 2 — Diagrammatic representation of grain, particle and agglomerate

<https://standards.iteh.ai/catalog/standards/sist/5ab2db1d-ed12-4d46-ab17-f92e680a8a12/iso-3252-2019>

3.1.3

alloyed powder

metal powder consisting of at least two constituents that are partially or completely alloyed with each other

3.1.4

angle of repose

basal angle of a pile formed by a powder when freely poured under specified conditions on to a horizontal surface

3.1.5

angular

sharp-edged or roughly polyhedral

Note 1 to entry: See [Figure 3](#).

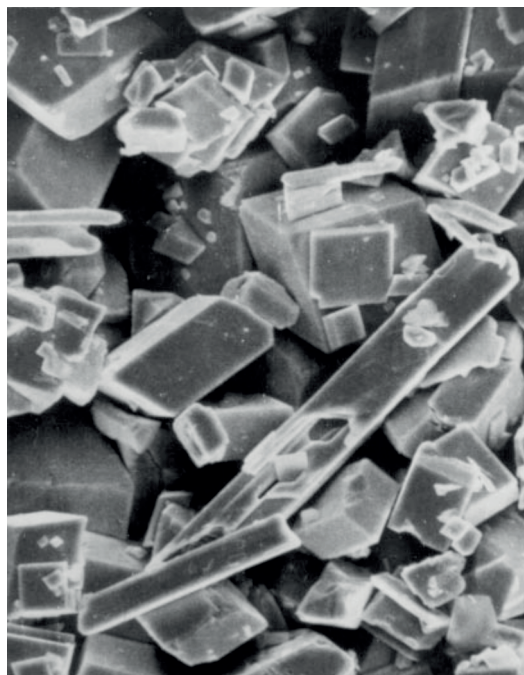


Figure 3 — Angular

iTeh STANDARD PREVIEW (standards.iteh.ai)

3.1.6

apparent density

mass per unit volume of a powder obtained following specific methods

Note 1 to entry: For example, ISO 3923-1 related to free-flowing powders and ISO 3923-2 related to non-free-flowing powders. <https://standards.iteh.ai/catalog/standards/sist/5ab2db1d-ed12-4d46-ab17-f92e680a8a12/iso-3252-2019>

3.1.7

atomization

dispersion of a molten metal into particles by a rapidly moving gas or liquid stream or by mechanical means

[SOURCE: ASTM B243-17]

3.1.8

atomized metal powder

metal powder produced by *atomization* ([3.1.7](#))

3.1.9

binder

material added to the powder mix to increase the *green strength* ([3.2.47](#)) of the compact or to counteract dusting and *segregation* ([3.1.75](#)) of fine particulate mix constituents, and which is expelled during sintering

Note 1 to entry: In hard metals, it is also used for material (binder metal, usually of lower melting point) added to a powder mixture for the specific purpose of cementing together powder particles which alone would not sinter into a strong body.

Note 2 to entry: Cementing medium is also used in the field of hard metals.

3.1.10

blended powder

powder made by *blending* ([3.1.11](#)) powders

3.1.11

blending

thorough intermingling of powders of the same nominal composition

Note 1 to entry: Not to be confused with *mixing* (3.1.53).

3.1.12

bridging

formation of arched cavities in a powder mass

3.1.13

bulk density

mass per unit volume of a powder under nonstandard conditions

3.1.14

cake

bonded mass of unpressed metal powder

EXAMPLE The condition of a powder mass as it exits an annealing furnace.

3.1.15

carbonyl powder

powder produced by the thermal decomposition of a metal carbonyl

3.1.16

chill-block cooling

process for producing rapidly solidified powders by cooling a thin layer of molten material on a solid substrate

3.1.17

chopped powder

powder produced by chopping material such as sheet, ribbon, fibre or filament

3.1.18

classification

separation of powder into fractions according to particle size

3.1.19

coated powder

powder consisting of particles having a surface layer of different composition

3.1.20

comminuted powder

powder produced by mechanical disintegration of solid metal

3.1.21

compactability

conceptual term, encompassing the powder characteristics of *compressibility* (3.1.24), *green strength* (3.2.47), edge retention, and lamination tendency, that relates to the ability of a powder to be consolidated into a usable *green compact* (3.2.13)

Note 1 to entry: Compactability may be a function of flowability, compressibility and green strength.

3.1.22

completely alloyed powder

alloyed powder (3.1.3) in which each powder particle has a homogeneous chemical composition being that of the entire powder

3.1.23

composite powder

powder in which each particle consists of two or more different constituents

3.1.24**compressibility**

capacity of a powder to be densified under an uniaxially applied pressure

Note 1 to entry: The pressure applied is usually a uniaxial pressure in a closed die. Compressibility may be expressed as the pressure needed to reach a required density or as the density obtained at a given pressure.

Note 2 to entry: See ISO 3927.

3.1.25**compression ratio**

ratio of the volume of the loose powder to the volume of the compact made from it

3.1.26**cut**

fraction of a powder nominally within stated particle size limits

3.1.27**dehydrided powder**

powder made by removal of hydrogen from metal hydride

3.1.28**demixing**

loss of homogeneity of a powder mix due to excessive mixing time

3.1.29**dendritic**

of branched shape

Note 1 to entry: See [Figure 4](#).

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 3252:2019
<https://standards.iteh.ai/catalog/standards-vist/5ab2db1d-ed12-4d46-ab17-026c80a8a12/no-3252-2019>

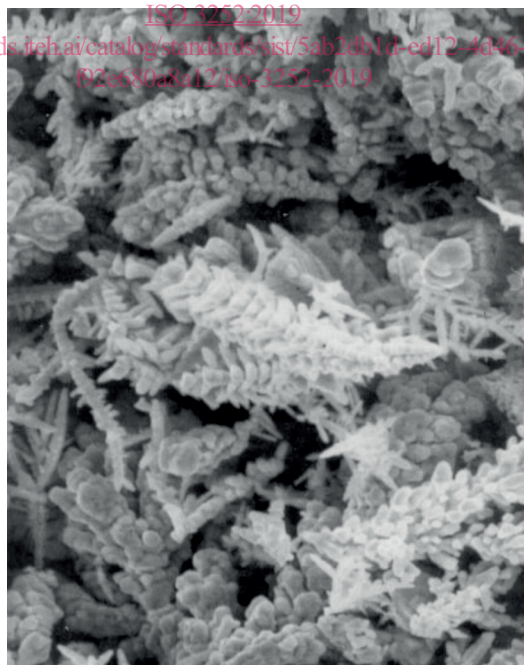


Figure 4 — Dendritic

3.1.30**diffusion-alloyed powder**

partially *alloyed powder* ([3.1.3](#)) produced by means of a thermal process

3.1.31

dopant

substance added in small quantity to a metallic powder to prevent or control recrystallization or grain growth either during *sintering* (3.3.60) or during use of the resultant sintered object

Note 1 to entry: This term is especially used in the powder metallurgy of tungsten.

3.1.32

electrolytic powder

powder produced by an electrolytic process

3.1.33

elutriation

classification (3.1.18) of a powder through movement of the particles through a fluid medium

EXAMPLE Air classification and liquid classification.

3.1.34

feedstock

moldable mixture of metal powder and *binder* (3.1.9) used for injection moulding or powder extrusion

3.1.35

fibrous

having the appearance of regularly or irregularly shaped threads

Note 1 to entry: See [Figure 5](#).

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 3252:2019
<https://standards.iteh.ai/catalog/standards/sist/5ab2db1d-ed12-4d46-ab17-f92c680a8a12/iso-3252-2019>



Figure 5 — Fibrous

3.1.36

fill factor

<uniaxial pressing> ratio of the height to which a powder fills a die to the height of the compact, measured after ejection from the die

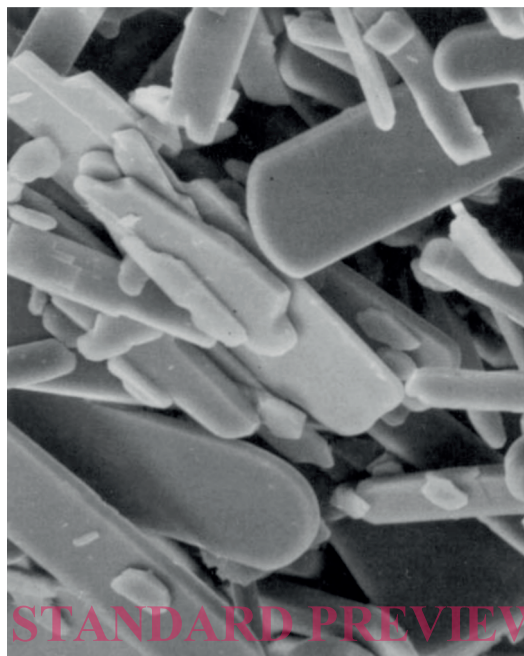
3.1.37

finer

fraction of a powder that passes through the smallest sieve size used in the *sieve analysis* (3.1.76)

3.1.38
flaky
 platelike shape

Note 1 to entry: See [Figure 6](#).



iTeh STANDARD PREVIEW
 (standards.iteh.ai)

Figure 6 — Flaky

[ISO 3252:2019](#)

3.1.39
flowability

<https://standards.iteh.ai/catalog/standards/sist/5ab2db1d-ed12-4d46-ab17-f92e680a8a12/iso-3252-2019>

qualitative term describing the behaviour of a powder when flowing through a funnel of defined dimension

Note 1 to entry: See ISO 4490 and ISO 13517.

3.1.40
flowmeter

standardized funnel and cylindrical cup used for the determination of *apparent density* ([3.1.6](#)) and *flow rate* ([3.1.41](#))

Note 1 to entry: For apparent density see ISO 3923-1 and ISO 3923-2.

Note 2 to entry: For flow rate see ISO 4490 and ISO 13517.

3.1.41
flow rate

time required for a powder sample of standard weight to flow through an orifice in a standard instrument according to a specified procedure

[SOURCE: ASTM B243-17]

3.1.42
granular

approximately equidimensional nonspherical shape

Note 1 to entry: See [Figure 7](#).