SLOVENSKI STANDARD
SIST EN ISO 5755:2012

01-november-2012

Sintrane kovine - Specifikacije (ISO 5755:2012)

Sintered metal materials - Specifications (ISO 5755:2012)

Sintermetalle - Anforderungen (ISO 5755:2012)

Matériaux métalliques frittés - Spécifications (ISO 5755:2012)

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English Version

Sintered metal materials - Specifications (ISO 5755:2012)

Matériaux métalliques frittés - Spécifications (ISO 5755:2012)

Sintermetalle - Anforderungen (ISO 5755:2012)

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN ISO 5755:2012) has been prepared by Technical Committee ISO/TC 119 "Powder metallurgy".

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of an identical text or by endorsement, at the latest by March 2013, and conflicting national standards shall be withdrawn at the latest by March 2013.

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Endorsement notice

The text of ISO 5755:2012 has been approved by CEN as a EN ISO 5755:2012 without any modification.

INTERNATIONAL STANDARD

ISO 5755

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Sintered metal materials — Specifications

Matériaux métalliques frittés — Spécifications

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 5755 was prepared by Technical Committee ISO/TC 119, *Powder metallurgy*, Subcommittee SC 5, *Specifications for powder metallurgical materials (excluding hardmetals)*.

This third edition cancels and replaces the second edition (ISO 5755:2001), which has been technically revised.

Sintered metal materials — Specifications

1 Scope

This International Standard specifies the requirements for the chemical composition and the mechanical and physical properties of sintered metal materials used for bearings and structural parts.

When selecting powder metallurgical (PM) materials, it should be taken into account that the properties depend not only on the chemical composition and density, but also on the production methods. The properties of sintered materials giving satisfactory service in particular applications may not necessarily be the same as those of wrought or cast materials that might otherwise be used. Therefore, liaison with prospective suppliers is recommended.

2 Normative references

The following referenced documents are indispensable for the application 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 437, *Steel and cast iron — Determination of total carbon content — Combustion gravimetric method*

ISO 1099, *Metallic materials — Fatigue testing — Axial force-controlled method*

ISO 1143, *Metallic materials — Rotating bar bending fatigue testing*

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

ISO 2739, *Sintered metal bushings — Determination of radial crushing strength*

ISO 2740, *Sintered metal materials, excluding hardmetals — Tensile test pieces*

ISO 2795, *Plain bearings — Sintered bushes — Dimensions and tolerances*

ISO 3325, *Sintered metal materials, excluding hardmetals — Determination of transverse rupture strength*

ISO 3928, *Sintered metal materials, excluding hardmetals — Fatigue test pieces*

ISO 3954, *Powders for powder metallurgical purposes — Sampling*

ISO 4498, *Sintered metal materials, excluding hardmetals — Determination of apparent hardness and micro-hardness*

ISO 5754, *Sintered metal materials, excluding hardmetals — Unnotched impact test piece*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 7625, *Sintered metal materials, excluding hardmetals — Preparation of samples for chemical analysis for determination of carbon content*

ISO 14317, *Sintered metal materials, excluding hardmetals — Determination of compressive yield strength*

ASTM E228, *Standard Test Method for Linear Thermal Expansion of Solid Materials with a Push-Rod Dilatometer*

ASTM E1875, *Standard Test Method for Dynamic Young's Modulus, Shear Modulus, and Poisson's Ratio by Sonic Resonance*

3 Terms and definitions

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

3.1
tensile strength
R_m
ability of a test specimen to resist fracture when a pulling force is applied in a direction parallel to its longitudinal axis – expressed in MPa

NOTE It is equal to the maximum load divided by the original cross-sectional area.

3.2
tensile yield strength
$R_{p0,2}$
load at which the material exhibits a 0,2 % offset from proportionality on a stress-strain curve in tension, divided by the original cross-sectional area – expressed in MPa

3.3
Young's modulus
E
ratio of normal stress to corresponding strain for tensile or compressive stresses below the proportional limit of the material – expressed in GPa

3.4
Poisson's ratio
v
absolute value of the ratio of transverse strain to the corresponding axial strain, resulting from uniformally distributed axial stress below the proportional limit of the material

3.5
impact energy
measurement of the energy absorbed when fracturing a specimen with a single blow – measured in Joules (J)

3.6
compressive yield strength
stress at which a material exhibits a specified permanent set – expressed in MPa

3.7
transverse rupture strength
stress, calculated from the bending strength formula, required to break a specimen of a given dimension – expressed in MPa

3.8
fatigue strength
maximum alternating stress that can be sustained for a specific number of cycles without failure, the stress being reversed with each cycle unless otherwise stated – expressed in MPa

3.9
radial crushing strength
radial stress required to fracture a hollow cylindrical part of specified dimensions – expressed in MPa

3.10
density
mass per unit volume of the material – expressed in g/cm^3

3.11
apparent hardness
resistance of a powder metallurgical (PM) material to indentation, tested under specified conditions; for PM materials, it is a function of the density of the material

3.12
open porosity
oil content after full impregnation, divided by the volume of the test piece, and multiplied by 100 – expressed as a volume percentage

3.13
coefficient of linear expansion
change in length per unit length per degree change in temperature – expressed in $10^{-6}\ K^{-1}$

4 Sampling

Sampling of powders to produce standard test pieces shall be carried out in accordance with ISO 3954.

5 Test methods for normative properties

5.1 General

The following test methods shall be used to determine the normative properties given in Tables 1 to 18.

5.2 Chemical analysis

The chemical composition table for each material lists the principal elements by minimum and maximum mass percentage before any additional process, such as oil impregnation, resin impregnation or steam treatment, has taken place. “Other elements” may include minor amounts of elements added for specific purposes and is reported as a maximum percentage.

Whenever possible, and always in cases of dispute, the methods of chemical analysis shall be those specified in the relevant International Standards. If no International Standard is available, the method may be agreed upon and specified at the time of enquiry and order.

Samples for the determination of total carbon content shall be prepared in accordance with ISO 7625. Determination of the total carbon content shall be in accordance with ISO 437.

5.3 Open porosity

The open porosity shall be determined in accordance with ISO 2738.