



SLOVENSKI STANDARD
oSIST prEN ISO 3995:2022
01-september-2022

Kovinski praški - Določanje zelene trdnosti s prečnim prelomom pravokotnih kompakto (ISO/DIS 3995:2022)

Metallic powders - Determination of green strength by transverse rupture of rectangular compacts (ISO/DIS 3995:2022)

Metallpulver - Bestimmung der Presskörperfestigkeit von Probekörpern mit rechteckigem Querschnitt unter Biegebeanspruchung (ISO/DIS 3995:2022)

Poudres métalliques - Détermination de la résistance à la rupture transversale de comprimés rectangulaires à cru (ISO/DIS 3995:2022)

Ta slovenski standard je istoveten z: prEN ISO 3995

ICS:

77.040.10	Mehansko preskušanje kovin	Mechanical testing of metals
77.160	Metalurgija prahov	Powder metallurgy

oSIST prEN ISO 3995:2022

en,fr,de

DRAFT INTERNATIONAL STANDARD

ISO/DIS 3995

ISO/TC 119/SC 2

Secretariat: SIS

Voting begins on:
2022-07-27Voting terminates on:
2022-10-19

Metallic powders — Determination of green strength by transverse rupture of rectangular compacts

Poudres métalliques — Détermination de la résistance de comprimés rectangulaires à cru

ICS: 77.160; 77.040.10

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 3995:2022](https://standards.iteh.ai/catalog/standards/sist/14219f36-c8cf-4f6d-83c3-9fe2bf1072dd/osist-pren-iso-3995-2022)<https://standards.iteh.ai/catalog/standards/sist/14219f36-c8cf-4f6d-83c3-9fe2bf1072dd/osist-pren-iso-3995-2022>

This document is circulated as received from the committee secretariat.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

ISO/CEN PARALLEL PROCESSING



Reference number
ISO/DIS 3995:2022(E)

© ISO 2022

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN ISO 3995:2022](https://standards.iteh.ai/catalog/standards/sist/14219f36-c8cf-4f6d-83c3-9fe2bf1072dd/osist-pren-iso-3995-2022)

<https://standards.iteh.ai/catalog/standards/sist/14219f36-c8cf-4f6d-83c3-9fe2bf1072dd/osist-pren-iso-3995-2022>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2022

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
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword.....	iv
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
4 Principle.....	1
5 Apparatus.....	1
5.1 Die.....	1
5.2 Press.....	2
5.3 Balance.....	2
5.4 Micrometer or other measuring device.....	2
5.5 Fixture for testing.....	3
5.6 Loading device.....	3
6 Sampling.....	4
7 Procedure.....	4
7.1 Cleaning of the die and punches.....	4
7.2 Powder testing conditions.....	4
7.3 Lubrication.....	5
7.3.1 General.....	5
7.3.2 Die wall lubrication.....	5
7.3.3 Lubrication of powder.....	5
7.4 Compacting and ejection.....	5
7.5 Compacting pressure.....	6
7.6 Determination of density.....	7
7.7 Determination of breaking force.....	7
7.7.1 Method 1 — Using a compression testing machine.....	7
7.7.2 Method 2 — Using a loading beam device (see Figure 3).....	7
8 Expression of results.....	7
9 Test report.....	7

ISO/DIS 3995:2022(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 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 2, *Sampling and testing methods for powders (including powders for hardmetals)*.

This third edition cancels and replaces the second edition (ISO 3995:1985) which has been technically revised.

The main changes are as follows:

- allowing automated compacting sequence in [clause 7.4](#)
- adding second compacting pressure option and tighter tolerance in [clause 7.5](#)
- mandatory reporting of lubrication technique and lubrication details in [clause 9](#)
- stearic acid is replaced by synthetic wax
- use of solvent is removed

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.

Metallic powders — Determination of green strength by transverse rupture of rectangular compacts

1 Scope

This International Standard specifies a method for the determination of green strength by measuring the transverse rupture strength of compacts of rectangular cross-section.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

4 Principle

Subjection of a compact pressed from metallic powder to a uniformly increasing transverse force under controlled conditions until fracture occurs. Determination of the transverse rupture strength, or green strength as used herein, as the stress, calculated from the flexure formula, required to break the compact as a simple beam supported near the ends and applying the force midway between the fixed centre of supports.

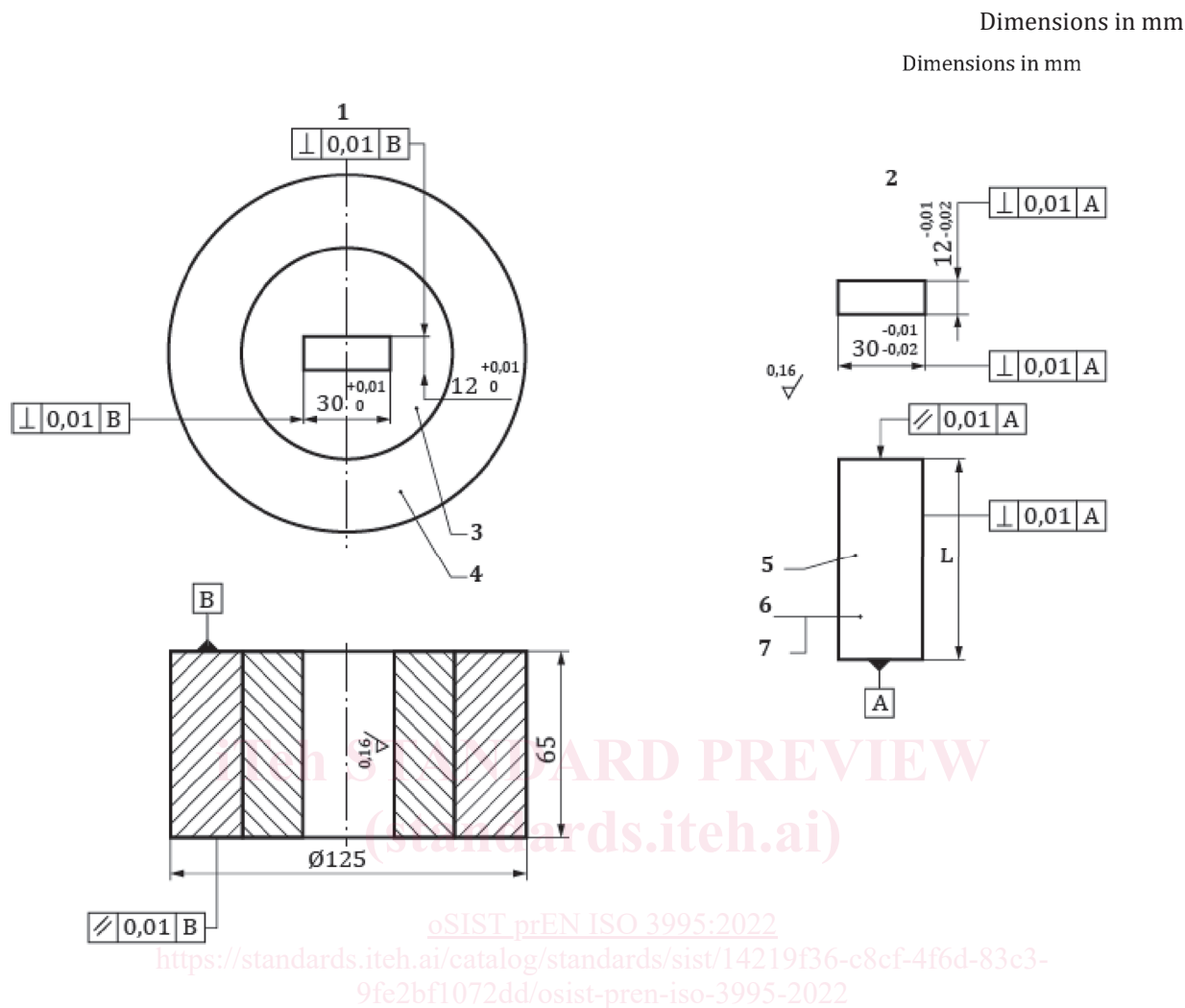
The green strength is determined on compacts either having a particular density or after compaction at a specific compacting pressure.

5 Apparatus

5.1 Die

Preferably of cemented carbide or alternatively of tool steel, and two punches for producing rectangular test pieces with dimensions according to [Clause 6](#). All mating parts shall be fitted and lapped. An example of a design for tooling is shown in [Figure 1](#).

ISO/DIS 3995:2022(E)

**Key**

1	Die	5	Steel HRC 60 to 62
2	Punches	6	Upper punch; L = 25
3	Cemented carbide	7	Lower punch; L = 70
4	Shrink ring		

Figure 1 — Example of tooling to produce a rectangular test piece

5.2 Press

Capable of applying forces up to about 300 kN with a minimum accuracy of $\pm 2\%$ and adjustable to permit an even increase of the force at a rate no higher than 50 kN/s.

5.3 Balance

Capable of weighing the compacts to an accuracy of $\pm 0,01$ g.

5.4 Micrometer or other measuring device

Suitable for measuring the dimensions of the compacts to an accuracy of $\pm 0,01$ mm.

5.5 Fixture for testing

Having two support cylinders (rollers) with a fixed distance between them and a load cylinder (roller). All three cylinders shall be $3,0 \text{ mm} \pm 0,1 \text{ mm}$ in diameter and shall be made of hardened steel with a hardness of at least 700 HV, or of hardmetal.

The cylinders shall be mounted parallel and the distance between the centres of the support cylinders shall be $25 \text{ mm} \pm 0,2 \text{ mm}$, measured with an accuracy of $\pm 0,1 \text{ mm}$. The load cylinders shall be mounted midway between the support cylinders.

The mounting of the cylinders shall be such as to account for the permitted deviation from parallelism of the top and bottom faces of the test piece.

A diagrammatic arrangement of a typical test fixture is shown in [Figure 2](#).

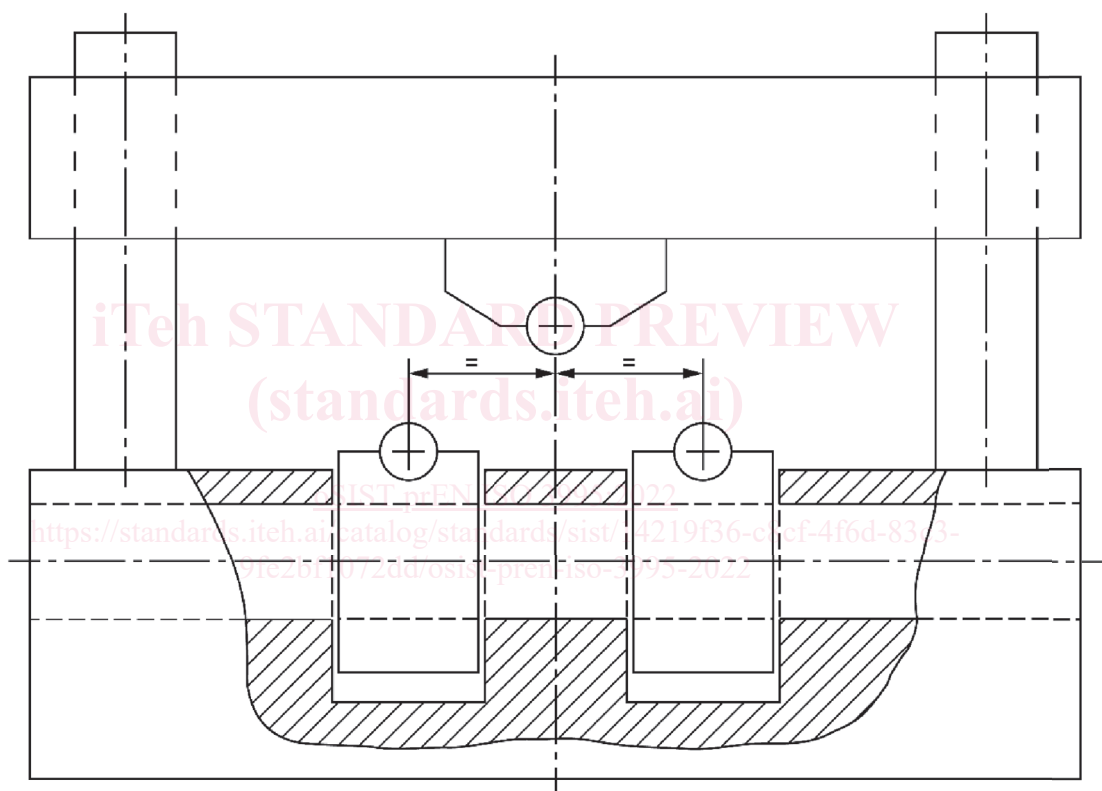


Figure 2 — Diagram of test fixture

5.6 Loading device

5.6.1 General

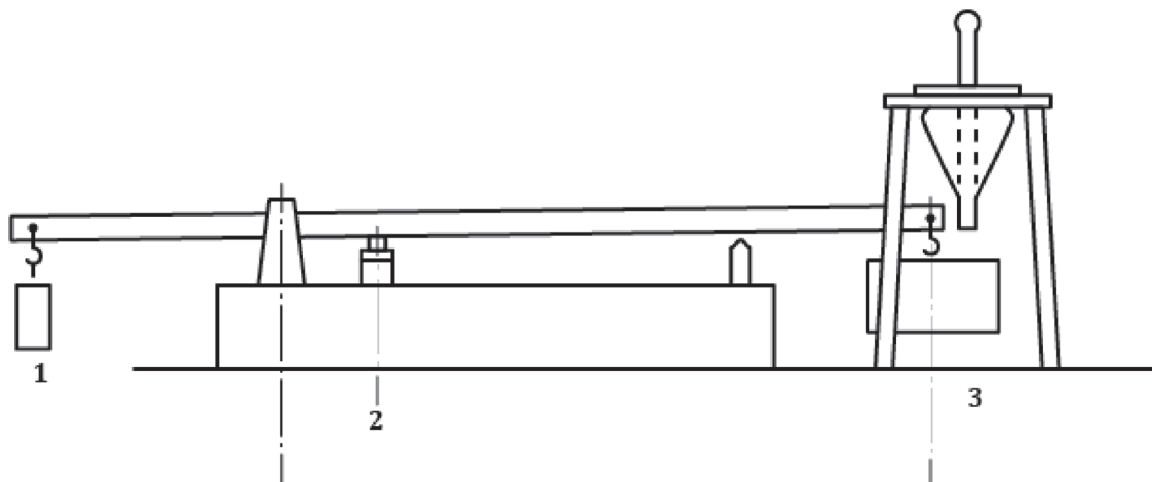
Loading devices may be either of the devices in 5.6.2 or 5.6.3.

5.6.2 A compression testing machine capable of determining the breaking force with a minimum accuracy of $\pm 2 \text{ N}$.

5.6.3 A loading beam apparatus to properly locate the test piece and which is capable of applying a breaking force through a lever arrangement. The applied force can be exerted by various systems,

ISO/DIS 3995:2022(E)

an example of which is given in Figure 3. The applied force on the test piece shall be calculated to an accuracy of ± 2 N.

**Key**

- 1 Counterbalance
- 2 Test fixture
- 3 Load

iTech STANDARD PREVIEW
 Figure 3 — Example of loading beam apparatus
 (standards.iteh.ai)

6 Sampling

oSIST prEN ISO 3995:2022

The quantity of the test sample shall be chosen to give three test pieces with the dimensions 10 mm to 13 mm wide, at least 30 mm long and 5,5 mm to 6,5 mm thick. The thickness of the test piece shall be uniform within 0,1 mm over the distance between supports. If necessary, preliminary tests should be made in order to establish the quantity of powder which is needed to fulfil this requirement.

7 Procedure

7.1 Cleaning of the die and punches

Wipe the die cavity and the punches with soft and clean paper.

7.2 Powder testing conditions

7.2.1 Powders which do not contain a lubricant can be compacted in the following ways:

- a) in a dry die (**Warning:** seizure and excessive die wear may occur, particularly at high compacting pressures);
- b) in a die with lubricated walls (see [7.3.2](#));
- c) after admixing a lubricant (see [7.3.3](#)) and in a dry die.

7.2.2 Powders which contain a lubricant can be compacted the following ways:

- a) in a dry die;
- b) after admixing additional lubricant (see [7.3.3](#)) and in a dry die.