INTERNATIONAL STANDARD

ISO 14317

First edition
2006-11-01

Sintered metal materials excluding hardmetals — Determination of compressive yield strength

Matériaux métalliques frittés, à l'exclusion des métaux-durs — Détermination de la limite d'élasticité en compression

Reference number
ISO 14317:2006(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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.

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.

ISO 14317 was prepared by Technical Committee ISO/TC 119, *Powder metallurgy*, Subcommittee SC 3, *Sampling and testing methods for sintered metal materials (excluding hardmetals)*.

Sintered metal materials excluding hardmetals — Determination of compressive yield strength

1 Scope

This International Standard specifies a method for the determination of the compressive yield strength of sintered metal materials, excluding hardmetals.

This method is applicable to sintered materials, excluding hardmetals, that may or may not have been subjected to heat treatment after sintering, and also to materials that have been sized or coined after sintering.

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 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

3 Test method

Test pieces shall be tested in compression, with a machine which has been calibrated to class 1, in accordance with ISO 7500-1. In this test, machined or compacted test cylinders are compressed axially to their yield points while measuring strain with an extensometer with an error of strain not exceeding the greater of: fixed error (0,000 2 m/m), relative error (± 0,5 % of strain).

The top and bottom anvil contact faces shall be parallel, within 0,002 mm/cm. Faces shall be polished to achieve a good finish, less than 0,4 *Ra*. To avoid imprinting, care shall be taken to ensure that contact faces are always harder than test pieces. To improve parallelism, it is acceptable practice to use an adjustable bearing block (ball and cone self-aligning device) in the test machine.

No lubrication is required between sample and anvil faces.

4 Test piece

The test piece shall be nominally 9,0 mm in diameter (D) and 27,0 mm in length (L); L/D ratio of 3:1. It may be produced either in round dies, or by machining from larger sections. If machined, it is imperative that the sample axis be compared to the pressing direction; any angularity between the two must be reported.

Cylindrical end faces shall be machined to be perpendicular to the sample center axis, within 0,005 mm/cm.

The test piece shall be cleaned prior to testing. Measure the diameter to the nearest 0,005 mm.

5 Procedure

5.1 Place the test piece on end on the center of the anvil. Close the top anvil so as to make light contact with the test piece. Engage the extensometer: gauge lengths of 12,7 mm are typical. Gauge-length points shall be at least 1/2 test-sample diameter away from end faces.

5.2 Loading rates shall not exceed 0,05 mm/min.

5.3 Apply load until the stress-strain curve has safely passed the 0,1 % strain mark. Stop loading and then unload.

6 Expression of results

Assuming an initial straight-line increment on the stress-strain curve, draw a parallel line anchored at the bottom strain axis through the 0,1 % mark (0m offset in Figure 1). The drawn line intersects the curve at the yield point, and the yield load may be determined, see Figure 1.

In the event that the curve is not initially straight, extend the initial unload line to the strain axis. Move that line to the 0,1 % strain mark and its upper intercept (r) will denote yield load, see Figure 2.

Calculate the compressive yield strength (cys) by dividing the load, in newtons, by area, in square millimetres, to report the result in megapascals at the 0,1 % strain level.

7 Test report

The test report shall include the following information:

a) a reference to this International Standard;

b) all details necessary for identification of the test-sample process condition at the time of testing: machined or compacted; angularity between sample axis and original pressing direction;

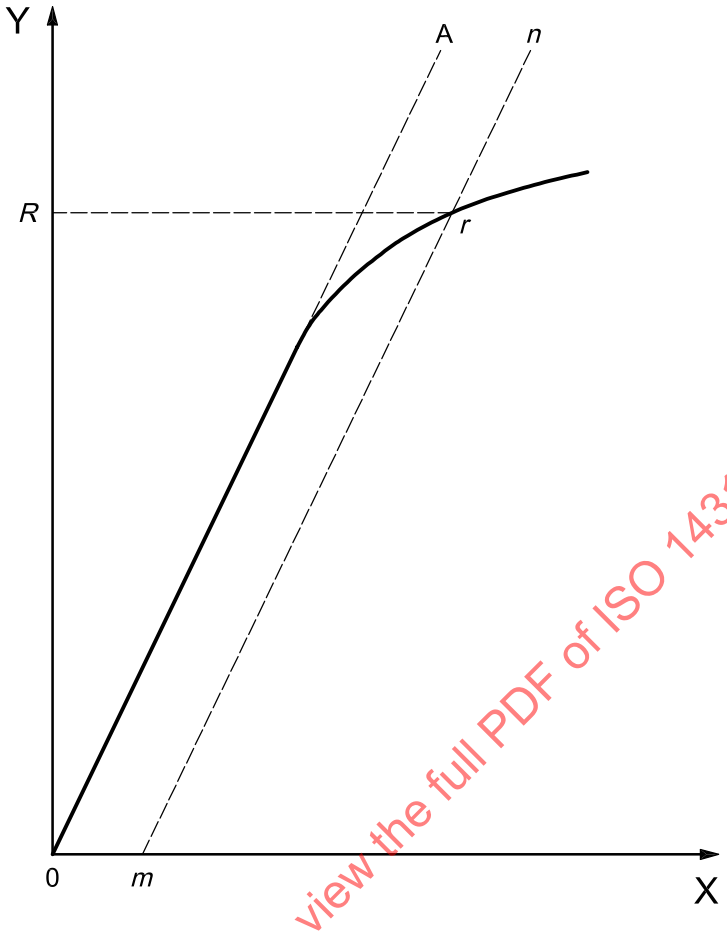
c) the result obtained;

d) all operations not specified in this International Standard, or regarded as optional;

e) details of any occurrence which may have affected the result.

8 Precision statement

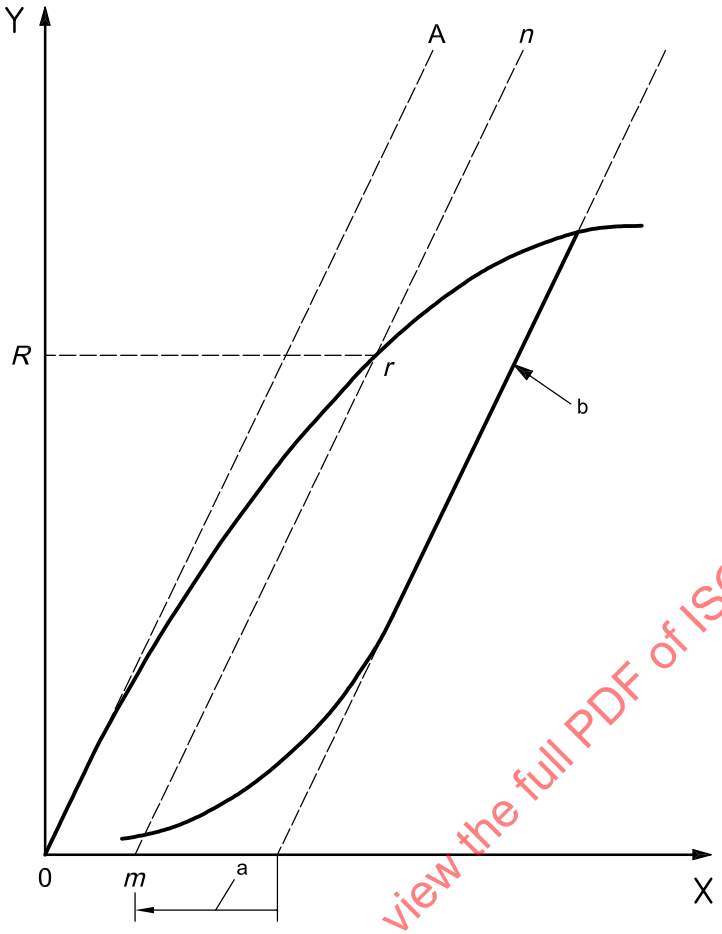
Data is under development.



Key

X Strain
Y Stress
0m Specified offset
r Upper intercept

Figure 1 — Stress-strain diagram for determination of compressive yield strength by the offset method



Key

X Strain
Y Stress
0m Specified offset
r Upper intercept
a Move parallel line to m, typically 0,1 %
b Unload line

Figure 2 — Stress-strain diagram for determination of compressive yield strength by the offset method; load line non-linear