INTERNATIONAL STANDARD

ISO 2739

Second edition
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Sintered metal bushes — Determination of radial crushing strength

Bagues en métal fritté — Détermination de la résistance à l'écrasement radial

Reference number
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Foreword

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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 2739 was prepared by Technical Committee ISO/TC 119, *Powder metallurgy*, Subcommittee SC 3, *Sampling and testing methods for sintered metal materials (excluding hardmetals)*.

This second edition cancels and replaces the first edition (ISO 2739:1973), which has been technically revised by adding Clause 8, Precision statement (Statement of accuracy). Editorial changes have also been made.

Sintered metal bushes — Determination of radial crushing strength

1 Scope

This International Standard specifies a method of measuring the radial crushing strength of sintered metal parts in the form of hollow cylinders, commonly known as bushes.

This method is applicable to sintered bushes composed of pure or alloyed metal powders.

2 Principle

A hollow cylinder is submitted to a continuously increasing radial load until breakage occurs, provided that the deformation does not exceed 10 % of the diameter. The maximum load observed is used to calculate a value in relation to the dimensions of the hollow cylinder known as “radial crushing strength”.

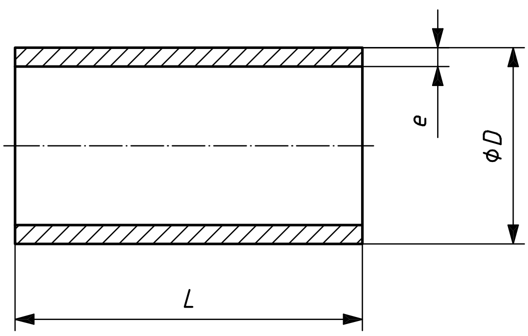
3 Apparatus

3.1 Pressing apparatus, which enables a radial load to be applied to a hollow cylinder.

3.2 Load-measuring device, capable of giving the reading of the maximum value attained.

4 Test piece

The test piece (see Figure 1) shall be in the form of a sintered hollow cylinder (which may or may not be oil-impregnated), without flanges, notches, grooves, pronounced chamfers, drilled holes, oilways or keyways. If necessary, the cylinder may be machined but, in this case, the results obtained may differ from those obtained with a cylinder which has not been machined.



Key

L length of the hollow cylinder

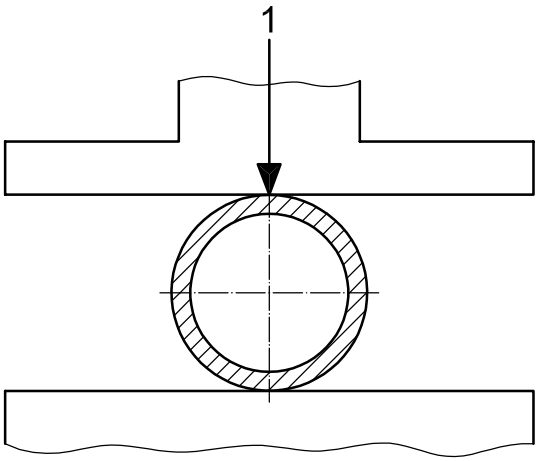
D external diameter of the hollow cylinder

e thickness of the cylinder wall

Figure 1 — Test piece

5 Procedure

Place the test piece between the plates of the pressing apparatus, the axis of the test piece being parallel to the planes of the plates (see Figure 2).



Key

1 applied load

Figure 2 — Test arrangement

Apply the load progressively, without shock, so that coefficient K (see Clause 6) increases at a rate between 2 N/mm^2 and 20 N/mm^2 per second, and that the test time is greater than 10 s.

6 Expression of results

The radial crushing strength of the bush, K, in newtons per square millimetre, is given by the following formula:

$$K = \frac{F\,(D - e)}{L\,e^2}$$

where

F is the maximum load, in newtons, incurring fracture;

L is the length, in millimetres, of the hollow cylinder;

D is the external diameter, in millimetres, of the hollow cylinder;

e is the thickness, in millimetres, of the cylinder wall.

This formula is valid only if the ratio e/D is less than 1/3 [1)].

1) In this case, the tensile strength is approximately equal to 0,5 K.

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 specimen;

c) whether the specimen is as sintered or sized;

d) whether the specimen has been machined or not, and, if so, a drawing showing how the specimen has been taken from the part;

e) whether the specimen has been oil impregnated or not;

f) the result obtained;

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

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

If necessary, the data required for the identification of the test piece shall be agreed between the manufacturer and user.

8 Precision statement (Statement of accuracy)

On the basis of the test error alone, the difference in the absolute value of two test results obtained in the same laboratory will be expected to exceed the repeatability (r) only 5 % of the time. If such a difference is found to be larger than (r), there is reason to question one or both results.

Similary, the difference in two test results obtained in different laboratories will be expected to exceed the reproducibility (R) only 5 % of time. If the difference is found to be larger than (R), there is reason to question one or both measurements.

Table 1 — Precision data

Material	K MPa	r MPa	R MPa
CTG — 1001 — K23	214	15	23
FC — 1000 — K 20	400	34	45
FC — 0208 — 50	785	48	48
1MPa = 1N/m^2			

NOTE With permission, this clause was taken from MPIF (Metal Powder Industries Federation, USA) Standard 55, 1998: *Determination of radial crush strength (K) of powder metallurgy test specimens*.

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