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Hårdmetall – Bestämning av böjhållfasthet (ISO 3327:2009)

Hardmetals – Determination of transverse rupture strength (ISO 3327:2009)

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Denna standard ersätter SS-EN 23327, utgåva 1.

The European Standard EN ISO 3327:2009 has the status of a Swedish Standard. This document contains the official English version of EN ISO 3327:2009.

This standard supersedes the Swedish Standard SS-EN 23327, edition 1.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 3327

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Supersedes EN 23327:1993

English Version

Hardmetals - Determination of transverse rupture strength (ISO 3327:2009)

Métaux-durs - Détermination de la résistance à la flexion (ISO 3327:2009)

Hartmetalle - Bestimmung der Biegebruchfestigkeit (ISO 3327:2009)

This European Standard was approved by CEN on 16 April 2009.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN ISO 3327:2009) has been prepared by Technical Committee ISO/TC 119 "Powder metallurgy" in collaboration withTechnical Committee CEN/SS M11 “Powder metallurgy” the secretariat of which is held by CMC.

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of an identical text or by endorsement, at the latest by November 2009, and conflicting national standards shall be withdrawn at the latest by November 2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 23327:1993.

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Endorsement notice

The text of ISO 3327:2009 has been approved by CEN as a EN ISO 3327:2009 without any modification.

Hardmetals — Determination of transverse rupture strength

1 Scope

This International Standard specifies a method for the determination of the transverse rupture strength of hardmetals.

This method is applicable to hardmetals of negligible ductility. If it is used for hardmetals showing significant plastic deformation before breaking, incorrect results may be obtained. In such cases, the method may be used for comparison purposes only.

2 Symbols and designations

For the purposes of this document, the symbols, designations and units given in Table 1 apply.

Table 1 — Symbols and designations

Symbol	Designation	Unit
F	Force required to fracture the test piece	N
l	Distance between supports	mm
b	Width of test piece perpendicular to its height	mm
h	Height of test piece parallel to the direction of application of the test force	mm
k	Correction factor to compensate for the chamfer	—
R_a	Surface roughness	µm
R_{bm}	Transverse rupture strength	N/mm^2
d	Diameter of test piece (if a cylindrical test piece is used)	mm

3 Principle

Breaking a test piece lying freely on two supports by application of a force at the midpoint of the span, under conditions of short-term static application of the force.

4 Apparatus

4.1 Device for applying a force, capable of applying a uniformly increasing force with an accuracy of 1 % or better.

4.2 Three cylinders (rollers), of which two are freely lying support cylinders with a fixed distance between them and one is a freely lying force cylinder. The three cylinders shall be of equal diameter between 3,2 mm and 6 mm.

Alternatively, the force may be applied by a ball having a diameter of 10 mm. Loading of the test piece can only be made via three cylinders if a cylindrical test piece is used. Consequently, a ball is only applicable for test pieces having plane surfaces.

The support cylinders and the force cylinder or ball shall be made of tungsten carbide hardmetal which will not be visibly deformed by the applied force. The surface roughness R_a of the cylinders and the ball shall not be greater than 0,63 µm.

The support cylinders shall be mounted parallel, with a span between them of 30 mm ± 0,5 mm for Type A test pieces and 14,5 mm ± 0,5 mm for Type B or Type C test pieces. The measurement of the span used for the calculation shall be made to an accuracy of 0,1 mm for Type B or Type C test pieces and to an accuracy of 0,2 mm for Type A test pieces.

The mounting of the cylinders shall be such as to minimize deviations from parallelism of the support cylinders.

4.3 **A suitable protective guard**, surrounding the fixture for safety.

5 Test pieces

5.1 The test pieces shall be of rectangular (Type A or B) or cylindrical (Type C) cross-section and shall have the dimensions shown in Table 2.

Table 2 — Dimensions of test pieces

Dimensions in millimetres

Type	Length	Width/Diameter	Height
A	35 ± 1	5 ± 0,25	5 ± 0,25
B	20 ± 1	6,5 ± 0,25	5,25 ± 0,25
C	25 ± 5	3,3 ± 0,5	—

NOTE In general, Type B test pieces give strength values which are about 10 % to 20 % higher than those obtained using Type A test pieces, depending on the material tested and provided that they have the same surface conditions. The repeatability is similar for all types of test piece. Type C test pieces give strength values which are about 5 % – 10 % higher than Type B specimens whereas the increase of the strength values are material related.

5.2 The test pieces shall be ground on the four faces which are parallel to the length with a free-cutting diamond wheel, preferably resin bonded, using copious quantities of coolant. No pass shall exceed 0,01 mm and all grinding marks shall be parallel to the length. The amount taken off each face shall be not less than 0,1 mm and the surface roughness shall be $R_a \leqslant 0{,}4$ µm. The four long edges shall be chamfered to 0,15 mm to 0,2 mm at an angle of 45° and all grinding marks shall be parallel to the length. Type C test pieces shall be centreless ground to a surface roughness $R_a \leqslant 0{,}4$ µm.

5.3 It is also permitted to use test pieces in the as-sintered condition. Such test pieces shall have a chamfer of 0,4 mm to 0,5 mm at an angle of 45°, made before sintering to avoid flash. Bend strength results from as-sintered test pieces are generally significantly lower than those for ground test pieces.

Surface preparation is an important variable and should be standardized to ensure that consistent results are obtained.

5.4 The deviation from parallelism of opposite longitudinal sides, in both the longitudinal and transverse directions, shall not exceed 0,05 mm for each 10 mm length for as-sintered test pieces and 0,01 mm for each 10 mm length for ground test pieces. For round test pieces, opposite sides shall be parallel within 0,015 mm.