



SIS - Standardiseringskommissionen i Sverige

Handläggande organ

MATERIALNORMCENTRALEN

SVENSK STANDARD SS-EN 24 506

Fastställt	Utgåva	Sida	Ikraftsätter
1993-10-29	1	1 (1+6+6)	ISO 4506:1979

SIS FASTSTÄLLER OCH UTGER SVENSK STANDARD SAMT SÄLJER NATIONELLA OCH INTERNATIONELLA STANDARDPUBLIKATIONER ©

Hårdmetall — Bestämning av tryckhållfasthet (ISO 4506:1979)

Denna standard utgörs av både den svenska och engelska versionen av europastandarden EN 24 506:1993.

EN 24 506:1993 ikraftsätter ISO 4506:1979.

Vid tryckningen har de två versionerna lagts sida mot sida, men numrerats löpande, så att varje uppslag numrerats som en sida.

Denna standard ersätter SS 11 22 47 som dras in.

De officiella franska och tyska versionerna kan också köpas genom SIS.

Hardmetals — Compression test (ISO 4506:1979)

This standard consists of the Swedish and English versions of the European Standard EN 24 506:1993.

EN 24 506:1993 endorses ISO 4506:1979.

The two versions are printed with the pages side by side, but are numbered in consecutive order, so that each set of pages has only one page number.

This standard supersedes SS 11 22 47 which is withdrawn.

The official French and German versions can also be bought through SIS.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 24506

April 1993

UDC 669.018.25 : 620.173

Descriptors: Powder metallurgy, hard metals, mechanical tests, compression tests, elastic limit, designation

English version

Hardmetals — Compression test

(ISO 4506 : 1979)

Métaux-durs — Essai de compression
(ISO 4506 : 1979)

Hartmetalle — Druckversuch
(ISO 4506 : 1979)

This European Standard was approved by CEN on 1993-04-02. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

EUROPASTANDARD
EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 24 506

April 1993

UDC 669.018.25:620.173

Nyckelord: Pulvermetallurgi, hårdmetall, mekanisk provning, tryckhållfasthet, elasticitetsgräns, beteckning

Svensk version

**Hårdmetall — Bestämning av tryckhållfasthet
(ISO 4506:1979)**

Métaux-durs — Essai de
compression (ISO 4506:1979)

Hardmetals — Compression test
(ISO 4506:1979)

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Denna europastandard antogs av CEN 1993-04-02. CEN-medlemmarna är förpliktade att följa fordringarna i CEN/CENELECs interna bestämmelser som anger på vilka villkor denna europastandard i oförändrat skick skall ges status som nationell standard.

Aktuella förteckningar och bibliografiska referenser rörande sådana nationella standarder kan på begäran erhållas från CENs centralsekretariat eller från någon av CENs medlemmar.

Denna europastandard finns i tre officiella versioner (engelsk, fransk, tysk). En version på något annat språk, översatt under ansvar av en CEN-medlem till sitt eget språk och anmäld till CENs centralsekretariat har samma status som de officiella versionerna.

CENs medlemmar är de nationella standardiseringsorganen i Belgien, Danmark, Finland, Frankrike, Grekland, Irland, Island, Italien, Luxemburg, Nederländerna, Norge, Portugal, Schweiz, Spanien, Storbritannien, Sverige, Tyskland och Österrike.

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Foreword

In 1992, ISO 4506 : 1979 *Hardmetals — Compression test* was submitted to the CEN Primary Questionnaire procedure.

Following the positive result of the CEN/CS Proposal ISO 4506 : 1979 was submitted to the Formal Vote. The result of the Formal Vote was positive.

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 October 1993, and conflicting national standards shall be withdrawn at the latest by October 1993.

According to the Internal Regulations of CEN/CENELEC, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EN 24 506:1993

Förord

1992 var ISO 4506:1979, Hardmetals – Compression test, föremål för en första omröstning inom CEN.

Som en följd av det positiva utfallet lades ISO 4506:1979 fram för formell slutomröstning, vilken gav positivt resultat.

Denna europeiska standard skall ges status som nationell standard, antingen genom publicering av en identisk text eller genom ikraftsättning, senast i oktober 1993 och motstridande nationella standarder skall dras in senast i oktober 1993.

Enligt CEN/CENELECs interna regler är följande länder skyldiga att ikraftsätta denna europastandard: Belgien, Danmark, Finland, Frankrike, Grekland, Irland, Island, Italien, Luxemburg, Nederländerna, Norge, Portugal, Schweiz, Spanien, Storbritannien, Sverige, Tyskland och Österrike.

1 Scope and field of application

This International Standard specifies a method of determining the ultimate strength and proof stress of hardmetals under uniaxial compressive loads.

2 Principle

Axial loading of a test piece, placed between two hardmetal bearing blocks, until the intended deformation occurs or until the test piece fractures.

3 Symbols and designations

Symbol	Designation	Unit
S_0	Minimum original cross-sectional area	mm ²
F_c	(with index) Load at proof stress, for example :	
$F_{c 0,2}$	Load at 0,2 % proof stress	N
F_{cu}	Ultimate load, i.e. load at instant of fracture	N
R	Stress	N/mm ²
ϵ_c	Strain	%
E	Young's modulus	N/mm ²
R_c	(with index) Proof stress, for example :	
$R_{c 0,2}$	0,2 % proof stress	N/mm ²
R_{cm}	Ultimate compressive strength	N/mm ²

4 Apparatus

The test machine shall be designed and constructed so that loads can be applied at a uniform rate and so that, within the measuring range in question, the maximum loading error will be $\pm 1\%$.

The test piece shall be affixed between two well-centred and rigidly secured hardmetal anvils with a hardness not less than 1 600 HV. These contact surfaces shall be perpendicular to the loading axis and parallel to each other within 0,5 $\mu\text{m}/\text{mm}$. An example of a suitable anvil is given in figure 1.

5 Test piece

5.1 The dimensions of the test piece shall conform to figure 2. The end faces and the cylindrical surfaces of the enlarged ends shall be ground. Other surfaces should not be ground. (Grinding or polishing may affect the result of the test.)¹⁾

5.2 The minimum diameter of the test piece shall be measured with an accuracy of $\pm 0,02$ mm.

6 Procedure

6.1 Rate of stress increase

The rate at which the load is applied shall be as uniform as possible, and any changes in this rate shall be made gradually and without shock. The rate shall not exceed 8 000 N/s, corresponding approximately to 100 N/(mm².s).

1) Cylindrical test pieces such as those specified in ASTM E9-1977 or USSR TU-48-19 280 78 may be used to obtain results with potentially less accuracy.

1 Omfattning och tillämpning

Denna internationella standard specificerar en metod för bestämning av brottgräns och stukgräns hos hårdmetall vid enaxlig tryckbelastning.

2 Princip

Axiell belastning av en provstav, placerad mellan två provstavsstöd av hårdmetall, tills den avsedda deformationen uppnås eller brott inträffar.

3 Beteckningar och benämningar

Beteckning	Benämning	Enhet
S_0	Minsta ursprungliga tvärsnittsytta	mm ²
F_c	(med index) Belastning vid stukgräns t ex:	N
$F_{c0,2}$	Belastning vid 0,2-stukgräns	N
F_{cu}	Slutlig belastning, dvs belastning i brottögonblicket	N
R	Spänning	N/mm ²
ϵ_c	Stukning	%
E	Elasticitetsmodul	N/mm ²
R_c	(med index) Stukgräns, t ex	N/mm ²
$R_{c0,2}$	0,2-stukgräns	N/mm ²
R_{cm}	Tryckbrottgräns	N/mm ²

4 Utrustning

Tryckprovningssmaskin som medger belastning med jämn hastighet och vars belastningsfel inom det ifrågavarande mätområdet ligger inom $\pm 1\%$.

Provstaven skall fixeras mellan två väl centrerade och styvt infästa stöd av hårdmetall med en hårdhet av minst 1600 HV. Kontaktytorna mot provstaven skall vara vinkelräta mot belastningsaxeln och parallella med varandra inom 0,5 $\mu\text{m}/\text{mm}$. Ett exempel på ett lämpligt stöd visas i figur 1.

5 Provstav

5.1 Provstavens dimensioner skall överensstämma med figur 2. Dess ändytor och skallarnas mantelytor skall slipas. Övriga ytor slipas inte. (Slipning eller polering kan påverka provningsresultaten.)¹⁾

5.2 Provstavens minsta diameter skall bestämmas med en noggrannhet inom $\pm 0,02$ mm.

6 Utförande

6.1 Belastningshastighet

Belastningshastigheten skall vara så jämn som möjligt och eventuella ändringar därav skall ske jämnt och utan stötar. Hastigheten skall inte överstiga 8000 N/s, motsvarande ca 100 N/(mm².s).

1) Cylindriska provstavar, av det slag som specificeras i ASTM E9 1977 eller USSR TU-48-19-280-78, kan användas, dock med eventuellt mindre noggrannhet.

6.2 Determination of proof stress

6.2.1 The proof stress, for example the 0,2 % proof stress, is determined according to figure 3. This method is based on the fact, valid for almost all metals, that if a load is removed after the elastic limit, D, has been exceeded, the load-compression curve will follow a linear path that is roughly parallel to the loading curve below the elastic limit.

6.2.2 Determination of proof stress using the graphic intersection method is carried out as follows.

6.2.2.1 Apply a pre-load not greater than that required to keep the test piece positioned properly in the machine.

6.2.2.2 Determine the stress-strain curve.

NOTE — Because of the shortness of the test zone and the hardness of the material, practical difficulties are involved in measuring changes in length using displacement gauges of the clamp-on type (extensometers). It is therefore recommended that changes in length be measured using a resistive strain gauge. Two or four gauges should be applied symmetrically at the centre of the test zone. The active length of the gauges should not exceed 8 mm. The results obtained represent an average of the change in length of the test zone.

6.2.2.3 On the graph thus plotted (figure 3), make OB equal to the specified residual strain (offset), and draw a line BA from B parallel to OC. Ordinate F_c of intersection point Q has the value F_{cq} and represents the load that corresponds to the proof stress.

It is sometimes difficult to ascertain the direction of line OC from a graph; in such a case, this line can be drawn on the basis of an agreed value of the Young's modulus.

6.2.3 The proof stress R_{cq} , in newtons per square millimetre, is given by the formula

$$R_{cq} = \frac{F_{cq}}{S_0}$$

6.3 Determination of ultimate compressive strength

6.3.1 Load the test piece to fracture.

6.3.2 The ultimate compressive strength R_{cm} , in newtons per square millimetre, is given by the formula

$$R_{cm} = \frac{F_{cu}}{S_0}$$

7 Expression of results

Report the arithmetical mean of at least five determinations, rounded to the nearest 10 N/mm².

8 Test report

The test report shall include the following informations :

- a) reference to this International Standard;
- b) all details necessary for identification of the test piece;
- c) the result obtained;
- d) all operations not specified by this International Standard, or regarded as optional;
- e) details of any occurrence which may have affected the result.