

# Steel strip sheaths for prestressing tendons — Terminology, requirements, quality control

The European Standard EN 523:2003 has the status of a  
British Standard

ICS 01.040.77; 77.140.75; 91.080.40

## National foreword

This British Standard is the official English language version of EN 523:2003. It supersedes BS EN 523:1997 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee B/517, Concrete, to Subcommittee B/517/1, Concrete production and testing, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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## Steel strip sheaths for prestressing tendons - Terminology, requirements, quality control

Gaines en feuillard d'acier pour câbles de précontrainte -  
Terminologie, prescriptions, contrôle de qualité

Hüllrohre aus Bandstahl für Spannglieder - Begriffe,  
Anforderungen, Güteüberwachung

This European Standard was approved by CEN on 11 March 2003.

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 Management Centre 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 Management Centre has the same status as the official versions.

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

**Management Centre: rue de Stassart, 36 B-1050 Brussels**

## Contents

	page
<b>1</b> <b>Scope</b> .....	<b>3</b>
<b>2</b> <b>Normative references</b> .....	<b>3</b>
<b>3</b> <b>Terms and definitions</b> .....	<b>4</b>
<b>4</b> <b>Classification</b> .....	<b>4</b>
<b>5</b> <b>Requirements</b> .....	<b>4</b>
<b>6</b> <b>Technical documents, delivery ticket, marking and labelling</b> .....	<b>9</b>
<b>7</b> <b>Storage</b> .....	<b>10</b>
<b>8</b> <b>Procedures for the evaluation of conformity</b> .....	<b>10</b>
<b>Annex A</b> (informative) <b>Explanatory notes</b> .....	<b>13</b>
<b>Annex ZA</b> (informative) <b>Clauses of this European standard addressing the provisions of the EU Construction Products Directive</b> .....	<b>15</b>

## Foreword

This document EN 523:2003 has been prepared by Technical Committee CEN/TC 104 "Concrete and related products", the secretariat of which is held by DIN.

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 February 2004, and conflicting national standards shall be withdrawn at the latest by February 2004.

This document supersedes EN 523:1997.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

This European Standard applies together with the standards of the EN 524 series which comprises test methods for sheaths.

Annex A is informative.

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

## 1 Scope

This European Standard is applicable to uncoated cylindrical steel sheaths with a corrugated profile and with a nominal internal diameter of up to 130 mm and their connectors (couplers) which are assembled to form ducts for prestressing tendons in post-tensioned prestressed concrete structures. It is only applicable to sheaths and connectors made of interlocked or welded steel strip<sup>1</sup>). It does not cover plastic sheaths<sup>2</sup>).

The seals required between sheaths and couplers are not covered by this standard.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 524-1, *Steel strip sheaths for prestressing tendons — Test methods — Part 1: Determination of shape and dimensions*.

EN 524-2, *Steel strip sheaths for prestressing tendons — Test methods — Part 2: Determination of flexural behaviour*.

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1) In case of coated or galvanised steel additional requirements should be considered, which are not covered by this standard. Additional requirements may conform to the relevant provisions in the place of use of the product.

2) For plastic sheaths, see annex A.

## EN 523:2003 (E)

EN 524-3, *Steel strip sheaths for prestressing tendons — Test methods — Part 3: To-and-fro bending test.*

EN 524-4, *Steel strip sheaths for prestressing tendons — Test methods — Part 4: Determination of lateral load resistance.*

EN 524-5, *Steel strip sheaths for prestressing tendons — Test methods — Part 5: Determination of tensile load resistance.*

EN 524-6, *Steel strip sheaths for prestressing tendons — Test methods — Part 6: Determination of leaktightness (Determination of water loss).*

EN 10139, *Cold rolled uncoated mild steel narrow strip for cold forming - Technical delivery conditions.*

ENV 13670-1, *Execution of concrete structures - Part 1: Common.*

ISO 6932, *Cold-reduced carbon steel strip with a maximum carbon content of 0,25 %.*

### 3 Terms and definitions

For the purpose of this European Standard the following terms and definition apply.

#### 3.1

##### **type of sheath**

sheaths are designated by the manufacturer according to specific delivery form having certain features, e.g. production procedure (welded or interlocked), shape of profile, etc.

#### 3.2

##### **connectors (couplers)**

connectors are specific devices to join sheath sections. They are usually made from cut ends of sheaths with the same profile type but with larger diameter (see 5.2)

#### 3.3

##### **stiffener**

is an additional components whose purpose is to increase the lateral load strength of the sheaths at supporting points, e.g. semi-circular sheathing sections placed between supports and tendons

### 4 Classification

Sheaths are classified by the requirements as given in Table 1.

Category 1 (normal sheaths)

Category 2 (rigid sheaths)

### 5 Requirements

#### 5.1 Sheaths

##### 5.1.1 General requirements

Sheaths shall have sufficient resistance against the mechanical actions and environmental exposure during storage, transport and construction period. Sheaths are deemed to be resistant against:

- mechanical actions, if they fulfil the requirements of clause 5.1.5 to 5.1.8;

- environmental exposure, if the requirements of 5.1.2 and clause 7 are fulfilled and the measurements recommended for handling the sheaths on site in accordance with ENV 13670-1 are taken into account.

Sheaths shall have a corrugated profile (see Figure 1) to provide a sufficient mechanical bond with the concrete externally and the grout internally.

Sheaths shall be leaktight (see 5.1.9). The sheaths and their connectors shall be designed in such a way as to allow this proper sealing of the joints.

### 5.1.2 Steel strip

Sheaths shall be made from rolled steel strip conforming to EN 10139, ISO 6932 or specified steel with similar properties. The nominal thickness of the steel strip shall be not less than the values given in Table 1, lines 1a and 1b.

### 5.1.3 Tolerances (ovality)

Deviations from the mean values of the internal diameter of any cross-section of the sheaths determined according to EN 524-1 shall not exceed  $\pm 1\%$  or  $\pm 0,5$  mm, whichever is the greater.

### 5.1.4 Relative volume of the profile

The relative volume of the profile  $V_{rel}$  determined in accordance with EN 524-1 shall be not less than  $0,08 \text{ cm}^3/\text{cm}^2$ . For nominal internal diameters greater than 25 mm, the height of the profile shall be not less than 2,5 mm (see EN 524-1).

### 5.1.5 Flexural behaviour

The relative load  $F_{rel} = F_{pl}/d_1$  in N/mm and the load  $F_{pl}$  at the beginning of plastic deformation shall be determined in accordance with EN 524-2.

The relative load  $F_{rel}$  for category 2 shall not be less than the given values in Table 1, line 2.

For category 1 there are no requirements but test results shall be given for information to the user in the relevant documents (see 6.2).

### 5.1.6 Flexibility

When tested by means of the to-and-fro bending test described in EN 524-3, flexibility is sufficient if, after the bending test, no significant deformations of the corrugation appear so that the plunger can push in the specimen over its whole length. A straightening of the specimen by means of the tensile load test (see EN 524-5) is permitted.

### 5.1.7 Lateral load resistance

The irreversible reduction of the internal diameter shall not exceed 10 % or 5 mm whichever is the smaller when the loads given in Table 1, lines 4a to 4c are applied according to EN 524-4. If any type of sheaths of class 1 withstands the load  $F_1 = 1500$  N without a stiffener a test with lower forces in accordance with Table 1, line 4a is not required.

### 5.1.8 Tensile load resistance

When loaded in accordance with EN 524-5, the tensile load strength is sufficient if the sleeve coupling (comprising sheaths and the corresponding coupler) does not fail by complete separation under the test loads specified in Table 1, line 5.

### 5.1.9 Leaktightness

When tested in accordance with EN 524-6, using a specimen tested earlier for flexibility, lateral load resistance and tensile load resistance, the water loss shall not exceed the values given in Table 1, line 6.

## 5.2 Connectors (couplers)

### 5.2.1 General requirements

Couplers made from corrugated metal strip sheaths shall fulfil the requirements given in 5.1.1.

### 5.2.2 Minimum length

The length of the couplers shall be at least three times the nominal internal diameter of the sheaths, but not less than 150 mm.

### 5.2.3 Nominal internal diameter and wall thickness of the couplers

When measured in accordance with EN 524-1, the nominal internal diameter of the couplers  $d_{1,c}$  shall not exceed a value of

$$d_{1,c} = d_{1,s} + 8 t_s + c \quad (\text{for interlocked sheaths})$$

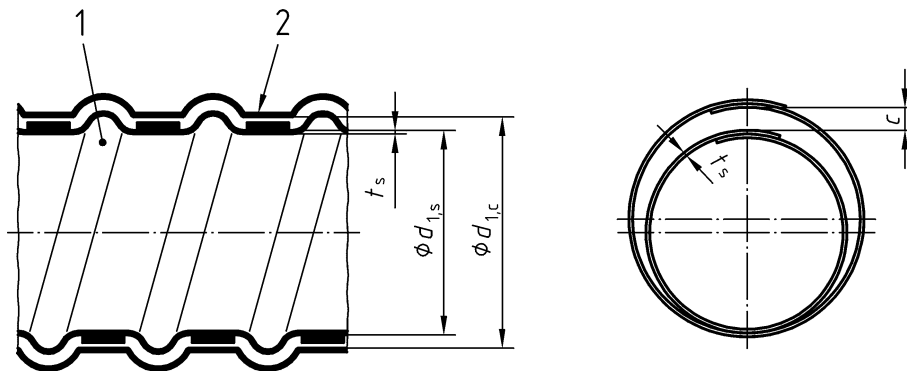
$$d_{1,c} = d_{1,s} + 3 t_s + c \quad (\text{for welded sheaths})$$

where (see also Figure 1)

$d_{1,s}$  is the nominal internal diameter of the sheath (in mm)

$t_s$  is the nominal wall thickness of the sheath (in mm)

$c$  is the clearance between the outer surface of the sheath and the inner surface of the coupler, taking into account the increase due to folds or seams (in mm)



#### Key

- 1 Sheath
- 2 Coupler

Figure 1 — Dimensions of couplers

The clearance,  $c$ , shall not exceed 2,0 mm for sheaths with an internal diameter of up to 55 mm or 3,0 mm for larger diameters.

The steel strips from which couplers are made shall at least fulfil the minimum requirements concerning the wall thickness as the sheaths which are to be connected (see Table 1, lines 1a to 1b).

## 5.3 Stiffeners

It shall be possible to strengthen locally those sheaths which do not possess the increased lateral load resistance specified in Table 1, line 4b. The size of the stiffeners shall not exceed half the circumference of the sheath and shall be designed such that, after concreting, no cavities remain between the sheath and the stiffener which could have



detrimental effects. This requirement can be met for instance by using the same profile and at least the same wall thickness for stiffener and sheath.

The length of the stiffeners shall not exceed 1,5 times the nominal internal diameter of the sheaths or 10 cm, whichever is the greater.

Table 1 — Minimum requirements

	1	2	3	4	5	6	7	8	9	10	11	
Characteristic	Category	Nominal internal diameter $d_1$ in mm										
		≤ 25	over 25 to 35	over 35 to 45	over 45 to 55	over 55 to 65	over 65 to 75	over 75 to 85	over 85 to 100	over 100 to 130		
1a	Nominal thickness of steel strip in mm	1	0,20	0,25	0,25	0,30	0,30	0,30	0,35	0,35	0,40	≥ 0,40
1b		2	—	—	0,40	0,45	0,45	0,50	0,50	0,50	0,60	≥ 0,60
2	Relative load $F_{pl}/d_1$ in N/mm	2	3,0	3,5	4,0	4,0	4,5	5,0	5,5	6,0	6,5	
3a	Radius $r$ for the flexibility test, in mm (maximum values)	1	750	750	750	750	750	750	750	900	1 000	
3b		2	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 800	1 800
4a	Lateral load $F_1$ in N	1	500	600	750	750	950	950	950	1 050	1 050	
4b		1	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	
4c		2	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500
5	Tensile load $F_2$ in N	1 and 2	250	400	600	900	1 100	1 400	1 600	1 900	2 200	
6	Tightness	1 and 2	Water loss ≤ 1,5 % by volume									

## 6 Technical documents, delivery ticket, marking and labelling

### 6.1 Technical documents

Technical documents shall be prepared by the producer in which the following information shall be given for both sheaths and the corresponding couplers:

- mark or trademark;
- dimensions and tolerances;
- nominal thickness of the steel strip;
- sketch of the shape of the profile;
- relative volume of the profile;
- Flexural behaviour  $F_{p2}$ ;
- nominal weight;
- chosen radius for the bending test;
- lateral load (with and without stiffeners);
- type, shape and dimensions of stiffeners required for the sheaths to fulfil the requirements given in Table 1, line 4 (if relevant).

### 6.2 Delivery ticket

The following information shall be given on the delivery ticket and shall correspond to that given in the technical documents:

- name of producer;
- producer's mark;
- number of this European Standard, EN 523;
- nominal internal diameter, classification, type;
- type of sheath (see 3.1);
- classification of sheath (see clause 4);
- nominal internal diameter.

In the case of couplers and stiffeners, reference shall be made to the sheaths with which they are to be used.

### 6.3 Marking and labelling

#### 6.3.1 General

When sheaths are supplied a clear marking with the relevant information shall be affixed on each packing unit, transport bundle or on the sheaths themselves.

The marking shall include the producers mark or trademark, the reference to EN 523, the classification in accordance with clause 4, the nominal internal diameter and, where necessary, the type of the sheaths.

## EN 523:2003 (E)

NOTE For CE-marking and labelling see clause ZA.3.

### 6.3.2 Designation of sheaths

Steel strip sheaths for prestressing tendons shall be designated by:

- a) number of this standard: EN 523;
- b) title of this standard in the language understandable by the country of destination;
- c) classification of the sheath in accordance to clause 4;
- d) steel conforming to: Number of standard or specification (see clause 5.1.2).

EXAMPLE EN 523; Steel strip sheath for prestressing tendons; (Class 2); Steel ISO 6932

## 7 Storage

Sheaths shall be stored in such a way that any damage or corrosion is avoided and no water or other substances harmful to the prestressing steel are able to penetrate into them.

## 8 Procedures for the evaluation of conformity

### 8.1 General

The production of steel strip sheaths shall be subject to the following procedures for the evaluation of conformity.

### 8.2 Initial type testing

Initial type testing shall be carried out by the producer of the sheath to prove conformity of the sheath to the requirements of this standard, in the following circumstances:

- a) for each type and nominal diameter, claiming conformity with this standard;
- b) where there is a change of basic material (strip steel) or of production equipment which may have a significant effect on the performance of the sheath.

Initial type testing shall include all tests and checks in accordance with 5.1.2 to 5.1.9 and for couplers 5.2 to 5.3.

All relevant data from initial type testing shall be recorded.

### 8.3 Factory production control

#### 8.3.1 General

Factory production control comprises all measures necessary to obtain the quality of steel strip sheaths in conformity with the specified requirements. It includes checking and testing of production equipment, basic materials (steel) and the finished sheaths.

Factory production control shall be carried out by the manufacturer.

All relevant data from factory production control shall be recorded.

#### 8.3.2 Checking production equipment and manufacturing process

The production equipment and manufacturing process shall be checked before starting production in order to ensure correct manufacturing of the sheaths.

### 8.3.3 Checking the basic materials (steel strip)

The delivery ticket of the incoming steel strip shall be checked to ensure that it is in compliance with the properties which are required for the intended production of sheaths. Checks and tests in accordance with Table 2, lines 1 and 2, shall be carried out by the manufacturer of the sheaths in order to verify that the incoming steel strip complies with the properties declared on the delivery ticket and which are relevant to the manufacturing process.

### 8.3.4 Routine checks of running production

Table 2, lines 3 to 7 specifies the kind and frequency of tests which have to be carried out by the for routine checks of the running production. A record shall be kept of the checks and, where required, of the test results. Compliance with the requirements shall be confirmed in each case.

Table 2 specifies the minimum number of checks to be carried out.

For the determination of leaktightness other simplified tests may be carried out after the specimen has passed the flexibility test as described in EN 543-3. Where applying a simpler method this has to be described in the technical documents.

### 8.3.5 Quality control of finished sheaths

Fulfilment of the requirements given in clause 5 and compliance with the specifications given in clause 6 shall be checked by the manufacturer using random samples taken separately. These checks shall be performed independently of the routine production checks.

The number of samples shall be related to types and nominal internal diameters of sheaths as follows:

- initial test for each type and nominal internal diameter;
- from a production of up to 4 different nominal internal diameters: 2 nominal internal diameters per type and year;
- from a production of more than 4 different nominal internal diameters: every 4th nominal internal diameter, however at least 3 nominal internal diameters per year.

The number of random samples tested shall be not less than 1 per month and machine.

Sheaths which are manufactured separately for use in the production of couplers shall be treated as having separate nominal internal widths.

Table 2 — Routine checks for factory production control

	Check	Product to be tested	Inspection/tests		Requirements	Frequency			
	1		2	Properties			Procedure	3	4
1	Inspection of incoming material	Strip steel	Tensile strength, Elongation at rupture	Check works' certificate	In accordance with order documents.	On delivery			
2			Dimensions (thickness)	Measuring		In accordance with order documents.	On delivery, however at least once per delivery lot		
3	Production		Strip steel	Dimensions (and, where appropriate, the material)	Measuring (check marking)	In accordance with information given in the technical operating instructions	After each coil change and, where necessary, after each change of type of sheath or of nominal internal diameter		
4		Sheaths		Dimensions (internal diameter, height, shape and thread of profile)	EN 524-1			In accordance with information given in the technical documents	After each change in the machine setting <sup>a</sup> and, where appropriate, after each coil change
5				Flexibility and leaktightness	EN 524-3 EN 524-6				
6		Final inspection before delivery	Sheaths	Flexural behaviour (for category 2 only)	EN 524-2	In accordance with 5.1.5	After each change in the machine setting <sup>a</sup> and, where appropriate, after each coil change		
7				Marking	Visual inspection			Clause 6	Each delivery
8	Protection during transport, suitability of vehicles used for transport.			Clause 7					

<sup>a</sup> At least once per shift and machine.

## Annex A (informative)

### Explanatory notes

#### A.1 Use with tendons in post-tensioning

Metal sheaths made of steel strips have been in use for many years and experience has shown that they have an important contribution to make to the long-term fitness for use of post-tensioned prestressed concrete structures. Knowledge regarding the required properties of such sheaths has been accumulated during this time and comprehensive and simple test methods for quality control at the factory as well as on the construction site have been developed. Thus it was possible to draft a European Standard for sheaths based on existing national specifications for inclusion in the package of European Standards.

Sheaths for post-tensioning should permit elongation of the tendons during stressing with as little friction as possible. For this reason, sheaths cannot display any unacceptable deflections, local bends or damage.

They should have ample load-bearing capacity during manufacture, transport, installation and concreting.

In particular, they should remain leaktight under these conditions in order to prevent moisture and cement slurry entering the sheaths during concreting as moisture in the sheaths can lead not only to corrosion of the prestressing steel but also to a very considerable increase in friction losses if there is a relatively long interval between concreting and post-tensioning.

#### A.2 Shape of sheaths

Furthermore, the sheaths should be designed in such a way that their shape permits the complete filling of the cavities between tendon and sheath with grout in order to ensure lasting protection of the prestressing steel against corrosion and the necessary bond for the load transfer from tendon to sheath and from sheath to the surrounding concrete structure.

The following effects can be obtained by special shaping of the profile:

- an adequate profile height ensures the necessary bond.
- a sufficiently large profile volume ensures that any air bubbles can collect and be kept away from the surface of the prestressing steel.
- an appropriate area supporting the prestressing steel along a curved sheath has a positive influence on the lateral pressure, thus reducing friction losses.

#### A.3 Application of categories

The criterion of distinction of the categories is marked by the thickness of the steel strip, forming the sheath.

Most of the post-tensioning systems recommend the use of sheath with normal thickness of strip. This category of sheaths (category-1-sheath) is widely used all over the world.

In addition to this type of sheath a more robust sheath is applied in cases where a stiffer sheath is required. This category-2-sheath has been successfully used when empty sheaths have to be placed in the formwork, to reduce the influence of the unintentional angles of deviation (reduce the wobble effect). When no stiffening element is present before pouring the concrete, large deflections of the sheath on the occasion of placing the concrete are to be expected and therefore in such cases the use of category-1-sheath is not recommended.

Category-2-sheaths, also called “rigid”, in general do not require high flexibility because they are not placed from rolls or drums. Rigid sheaths have in particular been used successfully in cases when stepping on the sheath during installation cannot be avoided.

#### **A.4 Filling ratio**

One general point should be mentioned here which has not been included in the specifications of this standard but which should nevertheless be borne in mind when selecting sheaths or during the manufacture of sheath sections: In the case of prestressing tendons made of groups of strands, the filling ratio — i.e. the ratio of the cross-sectional areas of the prestressing reinforcement to the cross-sectional area of the sheath should not exceed 0,5. This prevents an increased friction loss and allows the grout to be injected correctly.

#### **A.5 Couplers**

Sheath sections are generally connected by means of screwed couplers when they are joined to make sheaths of the required lengths. However, unless provided with additional protection, joints with screwed couplers are not watertight. They should therefore always be sealed very carefully, e. g. by wrapping strips of a suitable waterproofing material around them.

#### **A.6 Plastic sheaths**

Sheaths for tendons are, however, not only made of steel strips. The recent development of plastic sheaths should be noted. While their shapes, dimensions, possible applications and conditions for use correspond to those of the traditional metal sheathing; several technical differences (e. g. protection against corrosion, risk of fretting corrosion of the prestressing steel) should be mentioned. As neither adequate nor long-term experience is available at present, the standardization of plastic sheaths should be planned for the future.



## Annex ZA (informative)

### Clauses of this European standard addressing the provisions of the EU Construction Products Directive

#### ZA.1 Scope and relevant characteristics

This European standard and this annex ZA have been prepared under mandate M 115 “Reinforcing and prestressing steel (for concrete)” given to CEN by the European Commission and the European Free Trade Association.

The clauses of this European standard shown in Table ZA.1 meet the requirements of this mandate given under the EU Construction Products Directive (89/106/EEC).

Compliance with these clauses confers a presumption of fitness of the products covered by this annex for the intended uses indicated herein; reference shall be made to the information accompanying the CE-marking.

**WARNING — Other requirements and other EU Directives, not affecting the fitness for intended uses, can be applicable to the construction products falling within the scope of this European Standard.**

NOTE 1 In addition to any specific clauses relating to dangerous substances contained in this standard, there may be other requirements applicable to the products falling within its scope (e. g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

NOTE 2 An informative database of European and national provision on dangerous substances is available at the construction web site on EUROPA (CREATE, accessed through <http://europa.eu.int>).

This annex establishes the conditions for the CE-marking of steel strip sheaths for prestressing tendons intended for the uses indicated in Table ZA.1 and the relevant clauses applicable:

The scope of this annex is defined by Table ZA.1.

**Table ZA.1 — Scope and relevant clauses**

<b>Product:</b> Steel strip sheaths			
<b>Intended use(s):</b> for prestressing tendons			
Essential characteristics	Requirement clauses in this standard	Mandated level(s) or class(es):	Notes
Watertightness (Leaktightness)	5.1.9 and Table 1	None	Requirements are for upper limits.
Flexural behaviour	5.1.5 and Table 1	None	Requirements are for upper limits,
Lateral load resistance	5.1.7 and Table 1	None	Requirements are for lower limits.
Tensile load resistance	5.1.8 and Table 1	None	Requirements are for lower limits.

The requirement on a certain characteristic is not applicable in those Member States (MSs) where there are no regulatory requirements on that characteristic for the intended use of the product. In this case, manufacturers placing their products on the market of these MSs are not obliged to determine nor declare the performance of their products with regard to this characteristic and the option “No performance determined” (NPD) in the information accompanying the CE marking (see Clause ZA.3) may be used. The NPD option may not be used, however, where the characteristic is subject to a threshold level.

## ZA.2 Procedure for attestation of conformity of steel strip sheaths for prestressing tendons

### ZA.2.1 System of attestation of conformity

The system of attestation of conformity for the steel strip sheaths for prestressing tendons indicated in Table ZA.1, in accordance with the decision of the Commission of 1997-07-14 as given in Annex III of the mandate M115 "Reinforcing and prestressing steel (for concrete)", is shown in Table ZA.2 for the indicated intended use:

**Table ZA.2 — System of attestation of conformity**

Product(s)	Intended use	Level(s) or class(es)	Attestation of conformity system(s)
Steel strip sheaths	for prestressing tendons	—	4
System 4: See Directive 89/106/EEC (CPD) Annex III.2 (ii), Third possibility.			

The attestation of conformity of steel strip sheaths for prestressing tendons in Table ZA.1 shall be based on the evaluation of conformity procedures shown in Table ZA.3 resulting from application of the clauses of this or other European Standard indicated therein.

**Table ZA.3 — Assignment of evaluation of conformity tasks for steel strip sheaths for prestressing tendons**

Tasks		Content of the task	Clauses to apply
Tasks for the manufacturer	Factory production control (F.P.C)	Parameters related to all relevant characteristics of Table ZA.1	8.3
	Initial type testing	All relevant characteristics of Table ZA.1	8.2

### ZA.2.2 EC declaration of conformity

When compliance with the conditions of this annex is achieved, the manufacturer or his agent established in the EEA shall prepare and retain a declaration of conformity, which entitles the manufacturer to affix the CE-marking. This declaration shall include:

- name and address of the manufacturer, or his authorised representative established in the EEA, and place of production;
- description of the product (trade name, type, identification, use,...), and a copy of the information accompanying the CE-marking;
- provisions to which the product conforms (e. g. annex ZA of this EN);
- particular conditions applicable to the use of the product (e. g. provisions for the use of the product under certain conditions, etc.);
- name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or his authorised representative.

The above mentioned declaration shall be presented in the official language or languages of the Member State in which the product is to be used.

### ZA.3 CE marking and labelling

The manufacturer or his authorised representative established within the EU or EFTA is responsible for the affixing of the CE marking. The affixing shall be done either on the packaging unit or the transport bundle or the sheaths themselves, (when not possible it shall be done on an accompanying label or on the accompanying documents e.g. delivery ticket). The following information about the products and on its relevant essential characteristics shall accompany the CE-marking symbol:

- name or identifying mark and registered address of the producer;
- the last two digits of the year in which the marking is affixed;
- reference to the European Standard;
- description of the product: generic name, material, dimensions, ... and intended use;
- information on the relevant essential characteristics in Table ZA.1:
  - values and, where relevant, level or class to declare for each essential characteristic as indicated in “Notes” in Table ZA.1;
  - as an alternative, values presented as standard designations;
  - “No performance determined” (NPD) option when relevant.

The “No performance determined” (NPD) option may not be used where the characteristic is subject to a threshold level. Otherwise, the NPD option may be used when and where the characteristic, for a given intended user is not subject to regulatory requirements.


In addition to any specific information relating to dangerous substances shown above, the product should also be accompanied, when and where required and in the appropriate form, by documentation listing any other legislation on dangerous substances for which is claimed, together with and information required by that legislation.

NOTE European legislation without national derogations need not be mentioned.

Format of the CE marking and accompanying information:

For steel strip sheath for prestressing tendons the following information shall accompany the CE marking symbol:

As example:

	
<b>AnyCo Ltd, PO Box 21, B-1050</b>	
<b>00</b>	
<b>EN 523</b>	
Steel strip sheath for prestressing tendons	
Category: .....	
Nominal internal diameter: ..... mm	
Steel: ISO 6932	

*CE conformity marking, consisting of the “CE”-symbol given in directive 93/68/EEC*

*Name or identifying mark and registered address of the producer*

*Last two digits of the year in which the marking was affixed*

*No. of European Standard*

*Description*

*and*

*information on product and on regulated characteristics (see the N.B. below)*

Figure ZA.1 — Example CE-marking information

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