BS EN 10223-5:2012

BSI Standards Publication

Steel wire and wire products for fencing and netting

Part 5: Steel wire woven hinged joint and knotted mesh fencing

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National foreword

This British Standard is the UK implementation of EN 10223-5:2012. It supersedes BS EN 10223-5:1998, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ISE/106, Wire Rod and Wire.

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

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Foreword

This document (EN 10223-5:2012) has been prepared by Technical Committee ECISS/TC 106 “Wire rod and wires”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by May 2013, and conflicting national standards shall be withdrawn at the latest by May 2013.

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 10223-5:1998.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

EN 10223 "*Steel wire and wire products for fencing and netting*" consists of the following parts:

— *Part 1: Zinc and zinc-alloy coated steel barbed wire*

— *Part 2: Hexagonal steel wire netting for agricultural, insulation and fencing purposes*

— *Part 3: Hexagonal steel wire mesh products for engineering purposes*

— *Part 4: Steel wire welded mesh fencing*

— *Part 5: Steel wire woven hinged joint and knotted mesh fencing*

— *Part 6: Steel wire chain link fencing*

— *Part 7: Steel wire welded panels for fencing*

— *Part 8: Welded mesh gabion products*

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1 Scope

This European Standard specifies preferred dimensions, properties and coatings of zinc and zinc alloy coated steel wire woven hinged joint and knotted mesh fencing.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 10021, *General technical delivery conditions for steel products*

EN 10204, *Metallic products — Types of inspection documents*

EN 10218-1, *Steel wire and wire products — General — Part 1: Test methods*

EN 10218-2:2012, *Steel wire and wire products — General — Part 2: Wire dimensions and tolerances*

EN 10244-1:2009, *Steel wire and wire products — Non-ferrous metallic coatings on steel wire — Part 1: General principles*

EN 10244-2:2009, *Steel wire and wire products — Non-ferrous metallic coatings on steel wire — Part 2: Zinc and zinc alloy coatings*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
knotted mesh fencing
fencing with rectangular meshes made of line and stay wires zinc or zinc alloy coated to EN 10244-1:2009 and EN 10244-2:2009, class A

The line and stay wires are connected by a hinged joint spiral knot in the case of hinge joint stock fence (see Figure 1) and by a knot in the case of knotted stock fence (see Figure 2) (except for the selvedge wire which is spiral knotted):

— The top and bottom wires of the fence may consist of a larger diameter selvedge wire.

— The rectangular mesh openings may decrease in size from the top downwards.

— The line and selvedge wire are regularly and evenly crimped between the stay wires (to aid erection of the fence)

3.2
woven joint fencing
classification relating to:

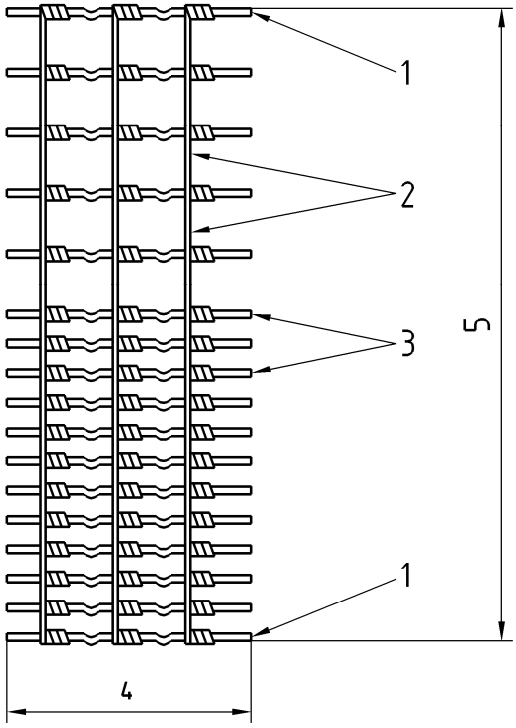
a) strength of wire:

   1. strength 1 applies to fencing manufactured from low tensile wire;

   2. strength 2 applies to fencing manufactured from high tensile wire;

b) nominal diameter of wires incorporated in the fence using:

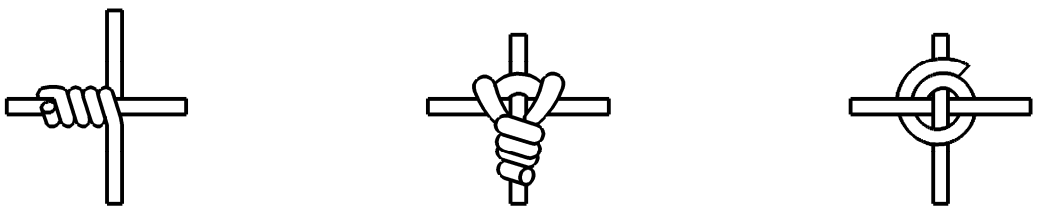
1. *L* for light (small diameter wire);
2. *M* for medium (medium diameter wire);
3. *H* for heavy (large diameter wire)



Key

1 selvedge wire
2 stay wire
3 line wire
4 length
5 height

Figure 1 — Example of woven hinged joint design



a) b) c)

Figure 2 — Examples of knotted joint design

4 Information to be supplied by the purchaser

The following information shall be supplied by the purchaser at the time of enquiry and order:

a) number of this European Standard;
b) quantity;
c) hinged joint or knotted joint;
d) classification (i.e. L, M or H and 1 or 2 according to Table 1);
e) designation (see Clause 5, Table A.1 and Table A.2);
f) length of rolls;
g) height of roll;
h) number of line wires and stay wire spacing;
i) for 2*M* and 2*H* (according to Table 1) the size of selvedge wire required;
j) coating type, zinc or zinc alloy;
k) if uniformity of coating is to be measured;
l) inspection documentation requirements;
m) agreed quality characteristics for testing (see Clause 7).

5 Designation of hinged joint and knotted mesh fencing

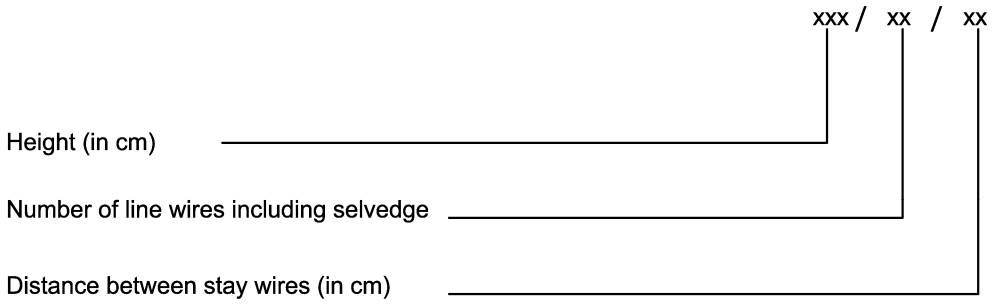


Figure 3

EXAMPLE 80/8/15

Typical designations of hinged joint and knotted mesh fencing are given in Table A.1 and Table A.2.

6 Manufacture

6.1 Base metal

Wires shall be manufactured from steel rod capable of achieving the tensile properties given in Tables 1 and 2.

6.2 Fabrication

The hinge joint or knotted fence shall be made from zinc or zinc-alloy coated wires which conform to EN 10244-1 and EN 10244-2.

The line and selvedge wires shall be regularly and evenly crimped between the stay wires (to aid erection of the fence).

In the case of hinge joint fencing the wires shall be twisted at least one and a half times to ensure that the hinge joints are tightly fixed. In the case of knotted joint fencing the knots shall be manufactured so that they are tightly fixed.

7 Requirements

7.1 Tensile strength

7.1.1 Woven hinged joint fencing

The tensile strength of wires shall not be less than that given in Table 1 for the classification and tensile strength required. The tensile strength range for any one batch within a type of wire shall be not more than 200 N/mm^2.

7.1.2 Knotted mesh fencing

The tensile strength of the wires shall be not less than that given in Table 2. The tensile strength range in any one batch within a wire type shall be not more than 200 N/mm^2.

7.2 Wire diameters

7.2.1 Woven hinged joint fencing

The nominal diameters of wires shall be as given in Table 1 and shall be subject to tolerance EN 10218-2:2012 (T1 – Table 1).

7.2.2 Knotted mesh fencing

The nominal diameters of wires shall be as given in Table 2 and shall be subject to tolerance EN 10218-2:2012 (T1 - Table 1).

7.3 Tolerances

The tolerance on roll width is ± 25 mm.

The maximum variation in any individual vertical or horizontal spacing shall be no more than ± 5 mm from the nominal stated by the manufacturer.

NOTE Rolls are usually supplied with either 150 or 300 mm spacing between verticals, but other spacing may be arranged by agreement.

7.4 Coating

The zinc or zinc alloy coating of wire shall be tested in accordance with EN 10244-2:2009 complying with class A for Zn coatings and class B for Zn95/Al5 alloys (for similar service life), adherence and where specified, the uniformity of the coating

Where samples are taken from a fabricated fence the minimum coating mass requirement shall be reduced by 5 % and where specified the number of dips shall be reduced by one half minute dip.

The assessment of adherence (wrap quality) on 1 × diameter for all wires prior to fabrication of the fence shall comply with EN 10244-2:2009 (Figure 1) classes 1 or 2. The assessment of adherence (wrap quality) on 1 × diameter of the wire in the fabricated fence shall comply with EN 10244-2:2009 (Figure 1) classes 1, 2 or 3.

Table 1 — Preferred nominal diameters and minimum tensile strengths for woven hinged joint fencing

Wire type	Low tensile steel woven wire hinged joint						High tensile woven wire hinged joint					
	Light 1*L*		Medium 1*M*		Heavy 1*H*		Light 2*L*		Medium 2*M*		Heavy 2*H*	
	Nominal diameter	Minimum tensile strength	Nominal diameter	Minimum tensile strength	Nominal diameter	Minimum tensile strength	Nominal diameter	Minimum tensile strength	Nominal diameter	Minimum tensile strength	Nominal diameter	Minimum tensile strength
	mm	N/mm^2	mm	N/mm^2	mm	N/mm^2	mm	N/mm^2	mm	N/mm^2	mm	N/mm^2
Top and bottom line (horizontal) selvedge wires	2,50	600	3,00	600	3,70	550	1,60 or 2,00	1 050	2,00 or 2,50	1 050	2,50 or 3,00 [a]	1 050
Intermediate line (horizontal) wires	1,90	600	2,50	600	3,00	600	1,60	1 050	2,00	1 050	2,50	1 050
Stay (vertical) wires	1,90	400	2,50	350	3,00	350	1,60	600	2,00	600	2,50	600

Tensile strength range for any one batch within a type of wire shall be not more than 200 N/mm^2.

[a] Where the duty of the fence requires them, larger diameter selvedge wires may be agreed.

Table 2 — Preferred nominal wire diameters and minimum tensile strengths of wire for woven knotted mesh fencing

Wire type	Nominal wire diameter mm	Minimum tensile strength N/mm^2
Top and bottom line/selvedge (horizontal) wires	3,70	550
Intermediate line (horizontal) wires	3,00	600
Stay (vertical) wires	3,00	600
Knot wire	3,00	350
Tensile strength range in any one batch within a wire type shall be not more than 200 N/mm^2.		

8 Sampling and testing

The manufacturer shall be responsible for the control of product quality by the application of statistical methods of sampling and analysis of results or, alternatively, by sampling and testing for the agreed quality characteristics at a rate of one roll/reel in 50.

9 Inspection documentation

Unless otherwise agreed at the time of enquiry and order, non specific testing and inspection documentation shall be provided according to the requirements of EN 10021 and EN 10204.

10 Test methods

10.1 Tensile tests

Tensile tests shall be in accordance with EN 10218-1.

10.2 Coating tests

The zinc or zinc alloy coated wire before fabrication into the fence shall be tested for the weight, adherence of coating and, where required, the uniformity of coating in accordance with EN 10244-1 and EN 10244-2.

11 Packaging

Woven hinged or knotted joint fencing shall usually be supplied in 50 m or 100 m rolls with a tolerance of $^{+1}_{0}$ m.

Other lengths may be supplied by agreement.

Annex A
(informative)

Typical designations for hinged joint and knotted joint fencing

Table A.1 — Typical woven hinged joint fencing designations

No. of line wires	Approximate woven roll width in centimeters																			
	53	60	65	80	90	95	100	115	120	125	130	140	145	150	155	160	180	190	200	220
4		60/4/15																		
5	53/5/15	60/5/15																		
6		60/6/15	65/6/15	80/6/15	90/6/30															
7				80/7/15			100/7/15													
8				80/8/15	90/8/15		100/8/15	115/8/30					145/8/15							
9							100/9/15		120/9/15	125/9/15										
10						95/10/15			120/10/15			140/10/15								
11											130/11/15	140/11/15		150/11/15		160/11/15				
12																	180/12/15			
13														150/13/15				190/13/15	200/13/15	
14							100/14/15									160/14/15			200/14/30	
15									120/15/15	125/15/15						160/15/15				
16							100/16/15								155/16/15				200/16/30	
17							100/17/15												200/17/15	
18											130/18/15			150/18/15						
19													145/19/15				180/19/15			
20																160/20/15			200/20/15	
21																		190/21/15		
22																			200/22/15	
23																160/23/15				
25																			200/25/15	220/25/15

NOTE 1 Type of fence is denoted by prefixing the designation with either 1L, 1M, 1H, 2L, 2M or 2H. See Table 1.

NOTE 2 The width of the roll and the spacing of the horizontal wires are dimensions inherent in the individual machines.

Table A.2 — Typical woven knotted joint fencing designations

	Approximate woven roll width (height) in centimeters																
	53	**60**	**65**	**80**	**90**	**95**	**100**	**115**	**120**	**130**	**140**	**145**	**150**	**160**	**180**	**190**	**200**
4																	
5																	
6							100/6/15										
7					90/7/15				120/7/15								
8				80/8/15	90/8/15												
9																	
10							100/10/15										
11									120/11/15								
12											140/12/15						
13																190/13/15	
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NOTE The width of the roll and the spacing of the horizontal wires are dimensions inherent in the individual machines.

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