BS EN 10223-2:2012

BSI Standards Publication

Steel wire and wire products for fencing and netting

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

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National foreword

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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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Fils et produits tréfilés en acier pour clôtures et grillages - Partie 2: Grillage à mailles hexagonales en acier utilisé dans l'agriculture pour l'isolation et les clôtures

Stahldraht und Drahterzeugnisse für Zäune und Drahtgeflechte - Teil 2: Stahldrahtgeflecht mit sechseckigen Maschen für landwirtschaftliche Zwecke, Isolierungen und Zäune

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Foreword

This document (EN 10223-2:2012) 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of an identical text or by endorsement, at the latest by May 2013, and conflicting national standards shall be withdrawn at the latest by May 2013.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 10223-2:1997.

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 requirements for the dimensions and coating of steel wire netting having meshes of hexagonal shape specified for agricultural, insulation and fencing purposes.

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 requirements for steel products*

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

EN 10244-1, *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 or zinc alloy coatings*

EN 10245-1, *Steel wire and wire products — Organic coatings on steel wire — Part 1: General rules*

EN ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods (ISO 1461)*

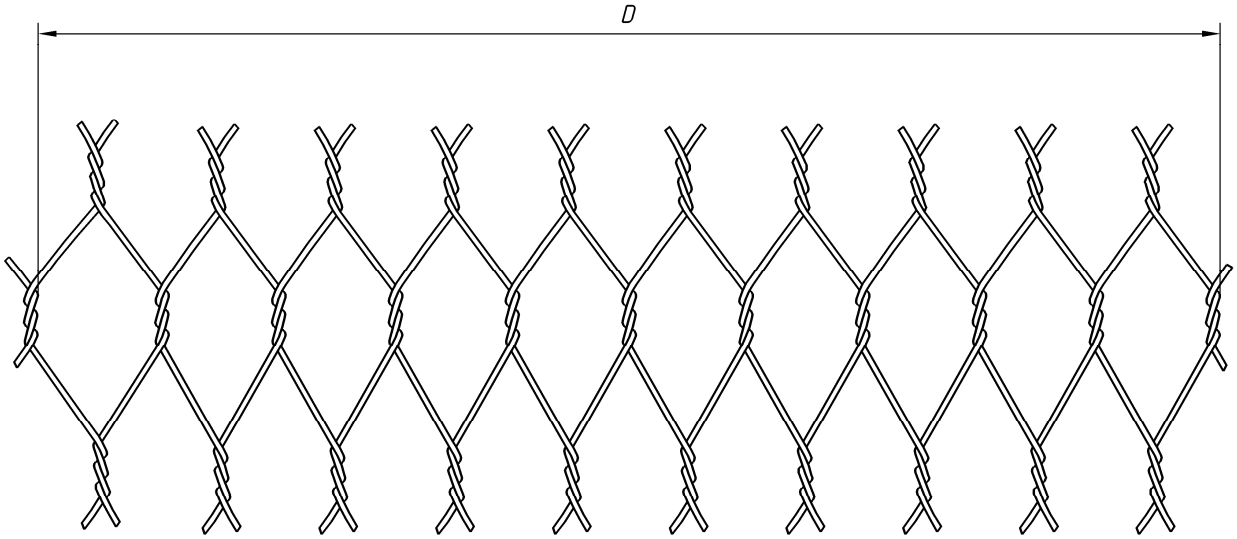
EN ISO 16120-1, *Non-alloy steel wire rod for conversion to wire — Part 1: General requirements (ISO 16120-1)*

EN ISO 16120-2, *Non-alloy steel wire rod for conversion to wire — Part 2: Specific requirements for general-purpose wire rod (ISO 16120-2)*

3 Terms and definitions

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

3.1
mesh size of hexagonal mesh
distance measured at right angles between two twisted sides. An average distance, *D* (see Figure 1) is measured over 10 meshes



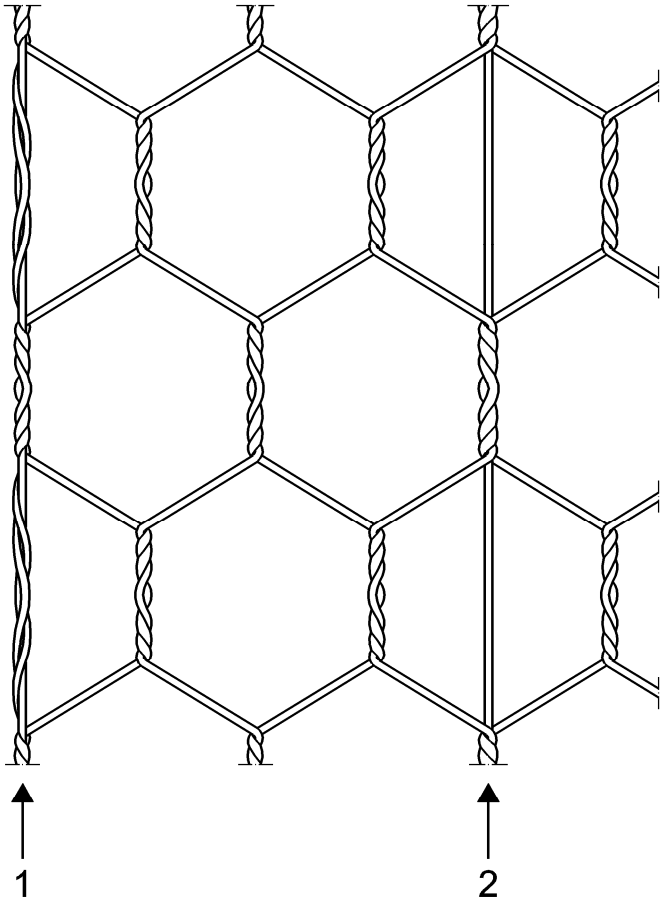
Key

D average mesh size

Figure 1 — Mesh size

3.2
hexagonal mesh
hexagonal-netting consists of hexagonal shaped meshes, formed by twisting adjacent wires two by two, alternatively forming a twist to the right and to the left

Note 1 to entry: The netting may have a border composed of one, two or more selvedge wires with a greater diameter than that used for the net. For widths above 50 cm or more stretching wires may be woven in the netting at equal distances (see Figure 2 and Table 1).



Key

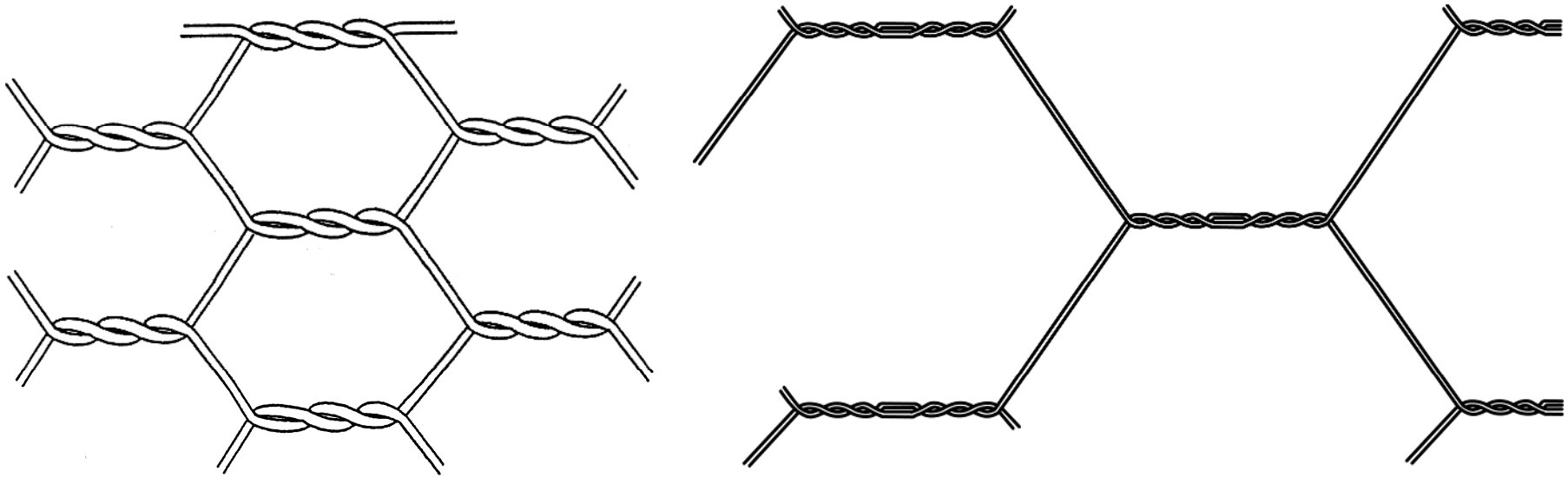
1 selvedge
2 stretching wire

Figure 2 — Selvedge and stretching wires

3.3
twist
tight helically winding of two wires around each other measured as each revolution of the two wires over 180°

3.3.1
regular twist
in the case of regular twist, the wires rotate only in one direction; the minimum number of twists is three (see Figure 3 a)

3.3.2
reverse twist
in the case of reverse twist the two wires are first twisted in one direction and then in the other direction. In the short transition zone the two wires are straightened parallel. The minimum number of twists is 1,5 in each direction (see Figure 3 b)



a) Regular twist

b) Reverse twist

Figure 3 — Twist

Table 1 — Recommended minimum number of stretching wires [a]

Roll width r_b mm	Number of stretching wires
$r_b \leq 500$	0
$500 < r_b \leq 1\,000$	1
$1\,000 < r_b \leq 1\,500$	2
$1\,500 < r_b \leq 2\,000$	3

[a] These values apply to mesh sizes 25 mm and above.

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) length of rolls;

d) mesh size;

e) wire size;

f) width;

g) type - if no type is specified then either regular twist or reverse twist may be supplied;

h) coating type;

i) whether uniformity of coating is to be measured;

j) inspection documentation requirements;

k) agreed quality characteristics for testing (see Clause 7).

5 Manufacture

5.1 Base metal

The base metal of the hexagonal netting shall be of good commercial quality steel selected from EN ISO 16120-1 and EN ISO 16120-2 and in a condition suitable for manufacture into netting.

5.2 Fabrication

The netting may be coated after fabrication with either zinc or zinc alloy coating. In the case of zinc coating the purity of zinc shall be 98,5 % minimum (according to EN ISO 1461). Where an organic coating is specified it may be applied either on the uncoated netting or on the zinc or zinc alloy coated netting.

The netting may also be fabricated from zinc or zinc alloy coated wire with or without organic coating or with an extruded or sintered organic coating. Usual coating weight is according to EN 10244-2:2009, class A for Zn coating. Different coating weights may be agreed at time of order between purchaser and supplier.

6 Requirements

6.1 General

The netting shall be manufactured in the wire sizes, mesh sizes and widths as given in Table 2.

The diameter of the wire characterizing the finished netting shall be the finished diameter in each case, either uncoated, zinc or zinc alloy coated or organic coated. Table 3 gives the relationship of the organic coated wire diameters to the core diameter.

6.2 Netting, zinc or zinc alloy coated after fabrication

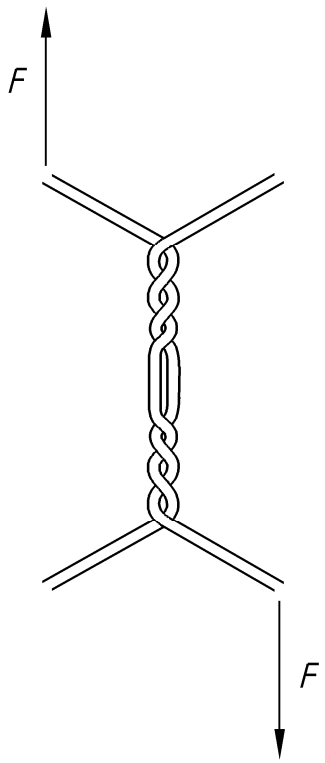
The netting shall meet the minimum values of coating mass and uniformity as stated in Table 2 and Table 4 of this European Standard.

6.3 Netting made from zinc or zinc alloy coated wire

Before fabricating into netting, the zinc or zinc alloy coated wire shall meet the minimum requirements of EN 10244-2:2009, class A for coating mass, adherence and where specified, the uniformity of the coating. Where samples are taken from the fabricated netting then the specified minimum coating mass requirement is reduced by 5 % and the specified dips by one half minute dip.

For wire zinc or zinc alloy coated before fabrication, the twisted wire shall not break nor unwind in loading the netting up to 80 % of the breaking load of the wire (see Figure 4).

NOTE Breaking load is the maximum force during the tensile test before breaking.



Key

F 80 % of the braking load

Figure 4 — Loading of netting to test unwinding resistance

Table 2 — Mesh sizes, preferred wire sizes, zinc and zinc alloy coating masses and widths of netting

Mesh details		Preferred Wire diameter			Minimum zinc or zinc alloy coating mass per m^2 mesh[f]	Typical roll widths[a d]
Size	Tolerances	Annealed	Zinc coated[b]	Tolerances[c]		
mm	mm	mm	mm	mm	g/m^2	mm
10	± 1,0	0,60	0,70	± 0,08	145	
13	± 1,5	0,60	0,70	± 0,08	95	
13	± 1,5	0,50	0,60	± 0,08	80	
16	± 2,0	0,60	0,70	± 0,08	70	
20	± 2,0	0,60	0,70	± 0.,08	55	
20	± 2,0	0,80	0,90	± 0,08	65	
25	± 3,0	0,50	0,60	± 0,08	40	300
25	± 3,0	0,70	0,80	± 0,08	45	450
25	± 3,0	0,80	0,90	± 0,08	55	500
25	± 3,0	0,90	1,0	± 0,10	60	600
30	± 4,0	0,80	0,90	± 0,08	40	750
30	± 4,0 [e]	0,90	1,0	± 0,10	40	900
30	± 4,0 [e]	1,10	1,2	± 0,10	60	
40	± 5,0	0,80	0,90	± 0,08	35	
40	± 5,0	0,90	1,0	± 0,10	45	1 000
40	± 5,0	1,1	1,2	± 0,10	55	1 200
50	± 6,0	0,80	0,90	± 0,08	25	1 500
50	± 6,0	0,90	1,0	± 0,10	30	1 800
50	± 6,0	1,1	1,2	± 0,10	40	2 000
65	± 7,0	0,90	1,0	± 0,10	30	
75	± 8,0	0,90	1,0	± 0,10	20	
75	± 8,0	1,1	1,2	± 0,10	25	
75	± 8,0	1,3	1,4	± 0,10	30	
100	± 8,0	1,5	1,6	± 0,10	30	

[a] Other roll widths – by agreement.

[b] Zinc coated diameter in this table is the coated wire diameter in finished netting.

[c] These tolerances apply to the diameter of the zinc coated wire in finished netting.

[d] The tolerance on width shall be ± 1 mesh size measurement.

[e] Tolerances on mesh size shall be ± 2,0 mm for rabbit netting when specified.

[f] Coating mass as netting coated after fabrication (see 9.1).

For mesh width 75 mm and over, centre strands and selvedges should be by agreement.

Table 3 — Relationship between the core diameter and the diameter of the organic coated wire [a]

Core diameter Bright/Zinc coated wire mm	Organic coated wire diameter mm	Tolerance on organic coated wire mm
0,60	1,00	± 0,10
0,80	1,20	± 0,10
0,90	1,30	± 0,10
1,00	1,50	± 0,10
1,20	1,70	± 0,15

[a] The organic coated wire shall be free from burns, lumps and pinholes etc.

6.4 Selvedges

If a single selvedge (see Figure 2) is used, the diameter of the selvedge wire shall be at least equal to or one size greater than that of the netting wire, e.g. netting wire of size 0,9 mm with a selvedge wire of size 1,0 mm.

For netting having 2 ply or 3 ply selvedges and/or a centre stretching wire (see Figure 2), the wire for these shall be at least equal to the netting wire diameter.

Table 4 — Wire size and number of dips to be withstood by zinc coated wires carried out in accordance with EN 10244-2:2009

Zinc coated diameter mm	Number of dips	
	Minute	Half minute
0,7	-	2
0,8	-	2
0,9	1	0
1,0	1	0
1,2	1	1
1,4	1	1
1,6	1	1

7 Sampling and testing

The manufacturer is 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 in fifty.

8 Inspection documentation

Non-specific testing and inspection documentation shall be provided according to EN 10021 and EN 10204.

9 Methods of test

9.1 Netting, zinc or zinc alloy coated after fabrication

Zinc or zinc alloy coatings shall be tested in accordance with EN 10244-1 and EN 10244-2:2009 for coating mass and uniformity of coating , except that the coating mass shall be expressed per square metre of netting. The test piece for the uniformity of coating shall be a square of netting having a length of side at least three times the mesh size.

9.2 Netting made from zinc or zinc alloy coated wire

Zinc or zinc alloy coatings shall be tested in accordance with EN 10244-1 and EN 10244-2:2009.

9.3 Netting, organic coated after fabrication

Organic coating shall be assessed in accordance with EN 10245-1.

10 Packaging

Hexagonal netting shall be supplied in ($25\,^{+1}_{0}$) m or ($50\,^{+1}_{0}$) m rolls.

Other roll lengths may be agreed between purchaser and manufacturer.

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