BS EN 10223-1:2012

BSI Standards Publication

Steel wire and wire products for fencing and netting

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

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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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Steel wire and wire products for fencing and netting - Part 1: Zinc and zinc-alloy coated steel barbed wire

Fils et produits tréfilés en acier pour clôtures et grillages - Partie 1: Ronces en acier revêtu de zinc ou d'alliage de zinc

Stahldraht und Drahterzeugnisse für Zäune und Drahtgeflechte - Teil 1: Stacheldraht aus Stahl, mit Zink oder Zinklegierung überzogen

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 10223-1:2012) 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of an identical text or by endorsement, at the latest by May 2013, and conflicting national standards shall be withdrawn at the latest by May 2013.

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This document supersedes EN 10223-1:1997.

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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Introduction

There are many types of barbed wire. This standard specifies three types of barbed wire, conventional (C), reverse twist (RT) and barbed wire entanglement (BWE).

Drawings of typical conventional and reverse twist barbed wire are given for information in Annex A, Figures A.1 and A.2.

1 Scope

This European Standard specifies zinc coated and zinc alloy coated steel barbed wire, conventional and reverse twist consisting of two stranded line wires, around which the barbs are tightly wound, a twist being imparted between the barbs to restrict their movement. The barbed wire entanglement has a single line wire, around which the barbs are wound.

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, *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 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 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) type of barbed wire;

d) coating type;

e) barb spacing (mm);

f) length on reels (m);

g) in the case of barbed wire entanglement (BWE) the type of finish;

h) whether uniformity of coating is to be measured;

i) inspection documentation requirements;

j) agreed quality characteristics for testing (see Clause 6).

EXAMPLE Barbed wire in accordance with EN 10223-1 / 10 reels / Reverse twist / class A zinc coating / 100 mm / 250 m / not applicable / no / inspection documents (non specific testing) in accordance with EN 10204 / min. strand breaking load, coat weight.

4 Manufacture

4.1 Base metal

The base metal of the barbed wire shall be of a good commercial quality steel wire, selected from EN ISO 16120-1 and EN ISO 16120-2 and in a condition suitable for manufacture into barbed wire and base wire having the properties specified in the following Table 1.

4.2 Fabrication

4.2.1 General

The wire shall be zinc coated or zinc alloy coated to EN 10244-2, before fabrication into barbed wire, except for barbed wire entanglement, which may be made from bright wire and suitably finish coated (other than zinc) as the final product.

4.2.2 Conventional barbed wire (C)

4.2.2.1 The conventional barbed wire shall be formed from two line wires complying with 4.1 and Table 1, twisted together with an approximate lay of 50 mm. Typical barb spacing is 75 mm ± 7 mm, or 100 mm ± 10 mm (or other spacing by agreement). Barb spacing shall be measured in accordance with 8.4.

4.2.2.2 The barbs shall be tightly wrapped round the two stranded line wires by a method that prevents slipping, to expose the four barbs at an angle of approximately 90 ° apart in a plane at right angles to the axis of the line wire (see Figure 1). The barbs shall project a distance of 12,5 mm ± 3,5 mm from the centreline of the wire and the barb ends shall be cut at an angle not greater than 35 ° to the axis of the barb.

4.2.3 Reverse twist type (RT)

4.2.3.1 The barbed wire shall be formed from two line wires complying with 4.1 and Table 1, twisted together alternately with an approximate lay of 25 mm, typical barb spacing is 75 mm ± 7 mm, or 100 mm ± 10 mm (or other spacing by agreement). Barb spacing shall be measured in accordance with 8.4.

4.2.3.2 The barbs shall be formed by tightly wrapping round the two stranded line wires to expose the four barbs in a fixed position at an angle of approximately 90 ° apart in a plane at right angles to the axis of the line wires. The barbs shall project a distance of 12,5 mm ± 3,5 mm from the centreline of the wire and the barb ends shall be cut at an angle not greater than 35 ° to the axis of the barb.

4.2.3.3 The barbed wire shall not start to unwind until 75 % of the total nominal breaking load is applied. The unwinding of the barbed wire occurs when the stranded wires no longer extend under the influence of the applied load. The wires start to unravel in such a way that the number of twists of the wire around each other diminishes. This is noticeable in the stress-strain curve of the tensile test, where the first major drop in stress occurs. The tensile test shall be performed on a sample of two barb spacing.

4.2.4 Barbed wire entanglement (BWE)

4.2.4.1 The entanglement shall be formed from wire complying with 4.1 and Table 1. The single line wire shall be crimped to an approximate pitch of 16 mm and approximate amplitude of 1 mm excluding the wire diameter.

4.2.4.2 The barbed wire shall be formed from one crimped line wire with four point barbs spaced at intervals between centres of 60 mm ± 15 mm. The barbs shall be formed by wrapping round the line wire approximately four turns to expose the barbs in a fixed position at an angle of approximately 90 ° apart in a plane at right angles to the axis of the line. The barbs shall project a distance of 15 mm to 20 mm from the centreline of the wire and the barb ends shall be cut at an angle not greater than 35° to the axis of the barb.

4.2.4.3 The barbed wire entanglement shall be supplied as a uniform cylindrical coil complying with (a) or (b) as follows:

a) 68 turns 1 m ± 0,15 m in diameter, with adjacent turns clipped together in a diamond pattern, the coil being capable of being extended to a length of 15 m;

b) 32 turns 0,50 m ± 0,1 m diameter, clipped together in a diamond pattern, the coil being capable of being extended to a length of 6 m.

4.2.4.4 Along the length of the coil, adjacent turns in the coil shall be fastened together with five rows of clips made from austenitic stainless steel in the softened condition or galvanized steel. The rows of clips shall be spaced around the circumference of the coils at 72 ° ± 10 ° intervals. The start and end of the coil shall also be fitted with two additional clips 50 mm apart to secure the ends of the coil.

The clips shall be completely closed round the two wires, but allowing sufficient movement to permit the formation of the concertina when the coil is extended, without the line wire being permanently deformed at the clips.

If the entanglement is manufactured from bright wire a finish should be applied, such as bitumastic (by spraying or by dipping) to provide durability during weather.

4.3 Welding

Joining of individual wires by means of an electric butt weld is permitted provided such joints are 10 m apart and are made in a workmanlike manner. The weld area shall be suitably protected against corrosion.

5 Requirements

Before fabricating into barbed wire, the zinc or zinc alloy coated wire shall be tested for coating mass 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 the fabricated barbed wire then the specified minimum coating mass shall be reduced by 5 % and if specified the minimum number of dips by one half minute.

The nominal diameters, minimum tensile strengths and breaking loads of barbed wire shall be as in Table 1. Tolerances on dimensions shall comply with EN 10218-2:2012, T1, for galvanized wire and EN 10218-2:2012, T3, for bright wire.

Table 1 — Nominal diameters, minimum tensile strengths and breaking loads for barbed wire

Wire type	Type of barbed wire	Nominal wire diameter	Minimum tensile strength of wire	Minimum strand breaking load [a]
		mm	N/mm^2	N
Line	Conventional	2,20	350	2 660
		2,40	350	3 166
		2,50	350	3 434
		2,70	350	4 008
	Reverse twist	1,70	950	4 230
	BWE	3,00	1 250	8 836
Barbs	Conventional and BWE	2,00	350	Non applicable
	Reverse twist	1,50	350	Non applicable

[a] The minimum strand breaking load shall be the overriding criterion. Strand breaking load is the maximum force during the tensile test before breaking.

6 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 reel in fifty.

7 Inspection documentation

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

8 Methods of test

8.1 Mechanical

Mechanical tests shall be carried out in accordance with EN 10218-1.

8.2 Dimensions

Dimensions shall be measured in accordance with EN 10218-2.

8.3 Zinc and zinc-alloy coatings

Zinc and zinc-alloy coatings shall be assessed in accordance with EN 10244-1 and EN 10244-2.

8.4 Barb spacing

Barb spacing shall be measured and averaged over a 10 m sample.

9 Packaging

9.1 Conventional and reverse twist barbed wire shall be supplied on reels in typical minimum lengths of 100 m, 200 m, 250 m or 500 m.

NOTE Other lengths may be supplied by agreement.

9.2 BWE shall be supplied in coil in bundles of fifteen.

Annex A
(informative)

Typical barbed wire formation (other types of barbed wire may be available)

a)

b)

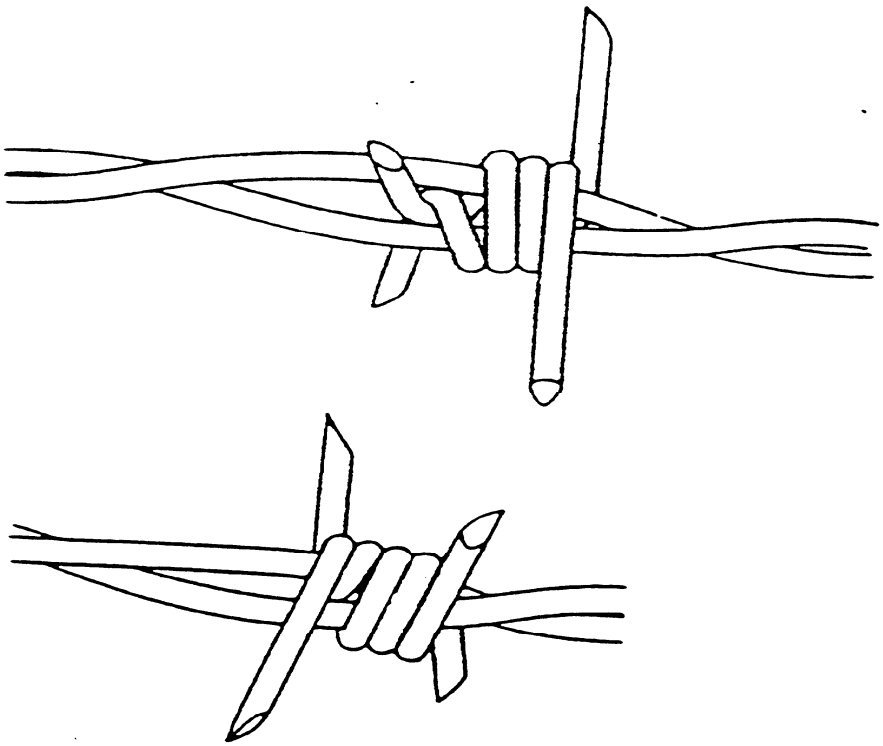

Figure A.1 — Conventional barbed wire

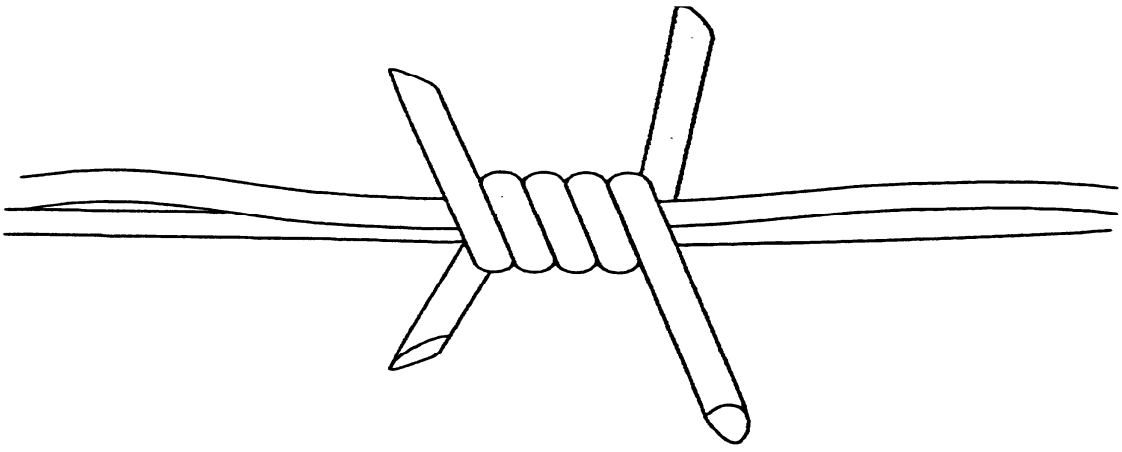

Figure A.2 — Reverse twist

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