BS EN 10264-2:2012

BSI Standards Publication

# Steel wire and wire products — Steel wire for ropes

## Part 2: Cold drawn non alloy steel wire for ropes for general applications

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**National foreword**

This British Standard is the UK implementation of EN 10264-2:2012. It supersedes BS EN 10264-2:2002, which is withdrawn.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.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.



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**Compliance with a British Standard cannot confer immunity from legal obligations.**

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EUROPEAN STANDARD

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# EN 10264-2

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Supersedes EN 10264-2:2002

English Version

# Steel wire and wire products - Steel wire for ropes - Part 2: Cold drawn non alloy steel wire for ropes for general applications

Fils et produits tréfilés en acier - Fils pour câbles - Partie 2: Fils écrouis à froid par tréfilage en acier non allié pour câbles d'usages courants

Stahldraht und Drahterzeugnisse - Stahldraht für Seile - Teil 2: Kaltgezogener Draht aus unlegiertem Stahl für Seile für allgemeine Verwendungszwecke

This European Standard was approved by CEN on 19 November 2011.

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# Contents

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# Foreword

This document (EN 10264-2:2012) 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of an identical text or by endorsement, at the latest by July 2012, and conflicting national standards shall be withdrawn at the latest by July 2012.

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 10264-2:2002.

This European Standard for wire for ropes is made up of the following parts:

— *Part 1: General requirements*

— *Part 2: Cold drawn non alloy steel wire for ropes for general applications*

— *Part 3: Round and shaped non alloyed steel wire for high duty applications*

— *Part 4: Stainless steel wire*

This European Standard has been technically revised to incorporate the following changes:

a) additional standards have been referenced for manufacturing the drawn wires (see Clause 4);

b) the purity of the zinc coating of the drawn wire has been specified according the relevant EN 1179 (see Clause 4);

c) other tensile strength grades than those given in Table 1, have been allowed subject to an agreement between supplier and user at the time of order (see 5.1);

d) other wires than those given in Table 1, have been allowed subject to an agreement between the customer and the supplier at the time of order (see 5.2);

e) new values have been given in Table 2 "Requirements for mechanical characteristics of wire".

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

## 1 Scope

This part of this European Standard defines cold drawn non alloy steel wire used for the manufacture of:

— ropes for general applications and lifts;

— ropes for applications for which there is no specific EN standard.

This part of this European Standard does not apply to steel wire taken from manufactured ropes.

This part of this European Standard specifies the following for cold drawn non alloy steel wire for ropes for general applications:

— dimensional tolerances;

— mechanical characteristics;

— requirements relating to the chemical composition of the steel wire;

— conditions to be satisfied by any coating.

In addition to the requirements of this part of this European Standard, the requirements of EN 10264-1 also apply.

## 2 Normative references

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

EN 1179, *Zinc and zinc alloys — Primary zinc*

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

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

EN 10264-1, *Steel wire and wire products — Steel wire for ropes — Part 1: General requirements*

EN ISO 16120-1:2011, *Non-alloy steel wire rod for conversion to wire - Part 1: General requirements (ISO 16120-1:2011)*

EN ISO 16120-2:2011, *Non-alloy steel wire rod for conversion to wire - Part 2: Specific requirements for general-purpose wire rod (ISO 16120-2:2011)*

EN ISO 16120-4:2011, *Non-alloy steel wire rod for conversion to wire - Part 4: Specific requirements for wire rod for special applications (ISO 16120-4:2011)*

# 3 Product designation

The designation of round wire for ropes, covered by this part of EN 10264, shall be based on the nominal diameter ($d$), surface appearance and tensile strength classification. The abbreviation for the surface finish condition is:

— U (uncoated) for bright wire;

— A or B for zinc or zinc alloy coating depending on coating class.

A distinction is made between a zinc and a zinc alloy coating by the addition in brackets of “Zn/Al” for the zinc alloy.

EXAMPLE 1 Wire for rope for general applications with nominal diameter $d$ = 1,5 mm, surface appearance bright (U), tensile strength grade 1 770 MPa.

**Designation rope wire EN 10264-2 — 1,5 — U — 1 770**

EXAMPLE 2 Wire for rope for general applications with a nominal diameter $d$ = 2,5 mm, zinc coated class A, tensile strength grade 1 370 MPa.

**Designation rope wire EN 10264-2 — 2,5 — A — 1 370**

EXAMPLE 3 Wire for rope for general applications with a nominal diameter $d$ = 1,8 mm, coated with zinc alloy, class B, tensile strength grade 1 770 MPa.

**Designation rope wire EN 10264-2 — 1,8 — B(Zn/Al) — 1 770**

# 4 General conditions of manufacture

The drawn wire shall be manufactured using wire rod in accordance with either EN ISO 16120-1 and EN ISO 16120-2 or EN ISO 16120-1 and EN ISO 16120-4.

The finished wire shall show no surface defects or internal defects prejudicial to its use.

When specified, drawn wire shall be supplied with zinc coating or Zn95/Al5 coating. Unless otherwise specified, the zinc used for the zinc coating shall have a purity of 99,95 % according to EN 1179, Z3, other zinc alloys are subject to agreement.

NOTE If required by the purchaser, the quality of the zinc or zinc alloy used for the coating material should be certified by the manufacturer. Because of the reaction between the base material and coating material, which is inherent to the process, the composition of the coating on the wire is different to that of the coating bath.

# 5 Characteristics of wire

## 5.1 Tensile strength grades

The values for tensile strength grades shall be as specified in Table 1.

Additional grades are possible by agreement between supplier and user at the time of order. Corresponding properties will be agreed between the parties.

**Table 1 — Tensile strength grades and ranges of nominal diameters**

| Tensile strength grade MPa [a] | Range of nominal diameters mm | |
|---|---|---|
| | Bright and coated [b] – Class B | Coated [b] – Class A |
| | Class B | Zinc or Zn95/Al5 Class A |
| 1 180 | 0,20 to 1,80 | — |
| 1 370 | 0,20 to 7,00 | 0,70 to 7,00 |
| 1 570 | 0,20 to 7,00 | 0,70 to 7,00 |
| 1 770 | 0,20 to 6,00 | 0,70 to 6,20 |
| 1 960 | 0,20 to 5,00 | 0,70 to 4,20 |
| 2 160 | 0,20 to 4,00 | — |

[a] 1 MPa = 1 N/mm$^2$.

[b] Coated means zinc or Zn95/Al5 alloy.

## 5.2 Requirements for wire characteristics

The requirements for wire are specified in Table 2.

If required and agreed at the time of order between the customer and the supplier, wires not mentioned in the Table 1 can be introduced. Corresponding characteristics will be agreed upon by the customer and the supplier.

## Table 2 — Requirements for mechanical characteristics of wire [c]

| Nominal diameter $d$ of wire | Diameter tolerances | | $R$ | Minimum number of reverse bends | | | | | | | | | Minimum number of torsions | | | | | | | | | Minimum mass of coating | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bright and coated [a] – Class B | Coated [a] – Class A | | Bright and coated [a] – Class B | | | | | Coated [a] – Class A | | | | Bright and coated [a] – Class B | | | | | Coated [a] – Class A | | | | | |
| | | | | Tensile strength grade – MPa [b] | | | | | | | | | Tensile strength grade – MPa [b] | | | | | | | | | g/m$^2$ | |
| mm | mm | | mm | 1 180 & 1 370 | 1 570 | 1 770 | 1 960 | 2 160 | 1 370 | 1 570 | 1 770 | 1 960 | 1 180 & 1 370 | 1 570 | 1 770 | 1 960 | 2 160 | 1 370 | 1 570 | 1 770 | 1 960 | Class B | Class A |
| $0{,}20 \le d < 0{,}25$ | ± 0,008 | — | | | | | | | | | | | | | | | | | | | | 20 | |
| $0{,}25 \le d < 0{,}30$ | ± 0,008 | — | | | | | | | | | | | | | | | | | | | | 30 | |
| $0{,}30 \le d < 0{,}40$ | ± 0,01 | ± 0,025 | | | | | | | | | | | | | | | | | | | | 30 | |
| $0{,}40 \le d < 0{,}50$ | ± 0,01 | ± 0,025 | | | | | | | | | | | | | | | | | | | | 40 | 85 |
| $0{,}50 \le d < 0{,}55$ | ± 0,015 | ± 0,03 | 1,75 | 16 | 15 | 14 | 13 | 12 | | | | | 34 | 30 | 28 | 25 | 23 | | | | | 50 | 100 |
| $0{,}55 \le d < 0{,}60$ | ± 0,015 | ± 0,03 | 1,75 | 14 | 14 | 13 | 12 | 11 | | | | | 34 | 30 | 28 | 25 | 23 | | | | | 50 | 100 |
| $0{,}60 \le d < 0{,}65$ | ± 0,015 | ± 0,03 | 1,75 | 13 | 12 | 11 | 10 | 9 | | | | | 34 | 30 | 28 | 25 | 23 | | | | | 60 | 115 |
| $0{,}65 \le d < 0{,}70$ | ± 0,015 | ± 0,03 | 1,75 | 12 | 11 | 10 | 9 | 8 | | | | | 34 | 30 | 28 | 25 | 23 | | | | | 60 | 115 |
| $0{,}70 \le d < 0{,}75$ | ± 0,015 | ± 0,03 | 2,5 | 19 | 17 | 16 | 15 | 14 | | 13 | 12 | 11 | 34 | 30 | 28 | 25 | 23 | | 21 | 19 | 17 | 60 | 130 |
| $0{,}75 \le d < 0{,}80$ | ± 0,015 | ± 0,03 | 2,5 | 18 | 16 | 15 | 14 | 13 | | 12 | 11 | 10 | 34 | 30 | 28 | 25 | 22 | | 21 | 19 | 17 | 60 | 130 |
| $0{,}80 \le d < 0{,}85$ | ± 0,015 | ± 0,03 | 2,5 | 16 | 14 | 13 | 12 | 11 | | 11 | 10 | 9 | 34 | 30 | 28 | 25 | 22 | | 21 | 19 | 17 | 70 | 145 |
| $0{,}85 \le d < 0{,}90$ | ± 0,015 | ± 0,03 | 2,5 | 15 | 13 | 12 | 11 | 10 | | 10 | 9 | 8 | 34 | 30 | 28 | 25 | 22 | | 21 | 19 | 17 | 70 | 145 |
| $0{,}90 \le d < 0{,}95$ | ± 0,015 | ± 0,03 | 2,5 | 14 | 12 | 11 | 10 | 9 | | 9 | 8 | 7 | 34 | 30 | 28 | 25 | 22 | | 21 | 19 | 17 | 70 | 155 |
| $0{,}95 \le d < 1{,}00$ | ± 0,015 | ± 0,03 | 2,5 | 13 | 11 | 10 | 9 | 8 | | 8 | 7 | 6 | 34 | 30 | 28 | 25 | 22 | | 21 | 19 | 17 | 70 | 155 |
| $1{,}00 \le d < 1{,}10$ | ± 0,02 | ± 0,04 | 3,75 | 20 | 18 | 17 | 16 | 14 | | 15 | 14 | 12 | 33 | 29 | 26 | 23 | 21 | | 20 | 18 | 13 | 80 | 165 |
| $1{,}10 \le d < 1{,}20$ | ± 0,02 | ± 0,04 | 3,75 | 19 | 17 | 16 | 15 | 13 | | 14 | 13 | 11 | 33 | 29 | 26 | 23 | 21 | | 20 | 18 | 13 | 80 | 165 |
| $1{,}20 \le d < 1{,}30$ | ± 0,02 | ± 0,04 | 3,75 | 18 | 16 | 15 | 14 | 12 | | 12 | 11 | 9 | 33 | 28 | 25 | 22 | 20 | | 18 | 15 | 10 | 90 | 180 |
| $1{,}30 \le d < 1{,}40$ | ± 0,02 | ± 0,04 | 3,75 | 16 | 14 | 13 | 12 | 10 | | 10 | 8 | 7 | 33 | 28 | 25 | 22 | 19 | | 18 | 15 | 10 | 90 | 180 |
| $1{,}40 \le d < 1{,}50$ | ± 0,02 | ± 0,04 | 3,75 | 14 | 12 | 11 | 10 | 9 | | 8 | 7 | 6 | 33 | 28 | 25 | 22 | 19 | | 18 | 15 | 10 | 100 | 195 |
| $1{,}50 \le d < 1{,}60$ | ± 0,02 | ± 0,04 | 5 | 16 | 15 | 14 | 13 | 12 | | 11 | 10 | 9 | 33 | 28 | 25 | 22 | 19 | | 18 | 15 | 10 | 100 | 195 |

*(to be continued)*

**Table 2 — Requirements for mechanical characteristics of wire [C] *(continued)***

| Nominal diameter $d$ of wire | Diameter tolerances | | $R$ | Minimum number of reverse bends | | | | | | | | | Minimum number of torsions | | | | | | | | | Minimum mass of coating | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bright and coated [a] – Class B | Coated [a] – Class A | | Bright and coated [a] – Class B | | | | | Coated [a] – Class A | | | | Bright and coated [a] – Class B | | | | | Coated [a] – Class A | | | | | |
| | | | | Tensile strength grade – MPa [b] | | | | | | | | | Tensile strength grade – MPa [b] | | | | | | | | | g/m$^2$ | |
| mm | mm | | mm | 1 180 & 1 370 | 1 570 | 1 770 | 1 960 | 2 160 | 1 370 | 1 570 | 1 770 | 1 960 | 1 180 & 1 370 | 1 570 | 1 770 | 1 960 | 2 160 | 1 370 | 1 570 | 1 770 | 1 960 | Class B | Class A |
| 1,60 ≤ $d$ < 1,65 | ± 0,02 | ± 0,04 | 5 | 15 | 14 | 13 | 12 | 11 | | 10 | 9 | 8 | 33 | 28 | 25 | 22 | 19 | | 18 | 15 | 10 | 100 | 195 |
| 1,65 ≤ $d$ < 1,70 | ± 0,02 | ± 0,04 | 5 | 15 | 14 | 13 | 12 | 11 | | 10 | 9 | 8 | 33 | 28 | 25 | 22 | 19 | | 18 | 15 | 10 | 100 | 205 |
| 1,70 ≤ $d$ < 1,80 | ± 0,02 | ± 0,05 | 5 | 14 | 12 | 11 | 11 | 10 | | 9 | 8 | 7 | 33 | 28 | 25 | 22 | 19 | | 18 | 15 | 10 | 100 | 205 |
| 1,80 ≤ $d$ < 1,85 | ± 0,025 | ± 0,05 | 5 | 13 | 11 | 10 | 10 | 8 | | 8 | 7 | 6 | 32 | 27 | 24 | 21 | 18 | | 17 | 14 | 9 | 100 | 205 |
| 1,85 ≤ $d$ < 1,90 | ± 0,025 | ± 0,05 | 5 | 13 | 11 | 10 | 10 | 8 | | 8 | 7 | 6 | 32 | 27 | 24 | 21 | 18 | | 17 | 14 | 9 | 115 | 215 |
| 1,90 ≤ $d$ < 2,00 | ± 0,025 | ± 0,05 | 5 | 12 | 10 | 9 | 9 | 7 | | 7 | 6 | 5 | 32 | 27 | 24 | 21 | 18 | | 17 | 14 | 9 | 115 | 215 |
| 2,00 ≤ $d$ < 2,10 | ± 0,025 | ± 0,05 | 7,5 | 17 | 16 | 15 | 14 | 12 | | 13 | 12 | 11 | 32 | 27 | 24 | 21 | 18 | | 17 | 14 | 9 | 115 | 215 |
| 2,10 ≤ $d$ < 2,15 | ± 0,025 | ± 0,06 | 7,5 | 16 | 15 | 14 | 13 | 11 | | 12 | 11 | 10 | 32 | 27 | 24 | 21 | 18 | | 17 | 14 | 9 | 115 | 215 |
| 2,15 ≤ $d$ < 2,20 | ± 0,025 | ± 0,06 | 7,5 | 16 | 15 | 14 | 13 | 11 | | 12 | 11 | 10 | 32 | 27 | 24 | 21 | 18 | | 17 | 14 | 9 | 125 | 230 |
| 2,20 ≤ $d$ < 2,30 | ± 0,025 | ± 0,06 | 7,5 | 15 | 14 | 13 | 12 | 10 | 12 | 11 | 10 | 9 | 31 | 27 | 24 | 21 | 18 | 20 | 17 | 14 | 9 | 125 | 230 |
| 2,30 ≤ $d$ < 2,40 | ± 0,025 | ± 0,06 | 7,5 | 15 | 14 | 13 | 12 | 10 | 12 | 11 | 10 | 9 | 30 | 27 | 24 | 21 | 18 | 20 | 17 | 14 | 9 | 125 | 230 |
| 2,40 ≤ $d$ < 2,50 | ± 0,025 | ± 0,06 | 7,5 | 15 | 13 | 12 | 11 | 9 | 11 | 10 | 9 | 8 | 29 | 26 | 23 | 20 | 18 | 19 | 15 | 12 | 7 | 125 | 230 |
| 2,50 ≤ $d$ < 2,60 | ± 0,025 | ± 0,06 | 7,5 | 14 | 12 | 11 | 10 | 8 | 10 | 9 | 8 | 7 | 29 | 26 | 23 | 20 | 18 | 19 | 15 | 12 | 7 | 125 | 245 |
| 2,60 ≤ $d$ < 2,70 | ± 0,025 | ± 0,06 | 7,5 | 12 | 11 | 10 | 9 | 7 | 9 | 8 | 7 | 6 | 29 | 26 | 23 | 20 | 18 | 19 | 15 | 12 | 7 | 125 | 245 |
| 2,70 ≤ $d$ < 2,80 | ± 0,025 | ± 0,06 | 7,5 | 11 | 10 | 9 | 8 | 6 | 8 | 7 | 6 | 5 | 29 | 26 | 23 | 20 | 18 | 19 | 15 | 12 | 7 | 125 | 245 |
| 2,80 ≤ $d$ < 2,90 | ± 0,03 | ± 0,07 | 7,5 | 11 | 10 | 9 | 8 | 6 | 8 | 7 | 6 | 5 | 28 | 26 | 23 | 20 | 18 | 18 | 15 | 12 | 7 | 135 | 255 |
| 2,90 ≤ $d$ < 3,00 | ± 0,03 | ± 0,07 | 7,5 | 10 | 9 | 8 | 7 | 6 | 7 | 6 | 5 | 4 | 28 | 26 | 23 | 20 | 18 | 18 | 15 | 12 | 7 | 135 | 255 |
| 3,00 ≤ $d$ < 3,10 | ± 0,03 | ± 0,07 | 10 | 15 | 14 | 13 | 12 | 10 | 11 | 10 | 9 | 8 | 27 | 25 | 21 | 18 | 16 | 18 | 12 | 8 | 5 | 135 | 255 |
| 3,10 ≤ $d$ < 3,20 | ± 0,03 | ± 0,07 | 10 | 14 | 13 | 12 | 11 | 9 | 10 | 9 | 8 | 7 | 27 | 25 | 21 | 18 | 16 | 13 | 12 | 8 | 5 | 135 | 255 |
| 3,20 ≤ $d$ < 3,30 | ± 0,03 | ± 0,07 | 10 | 13 | 12 | 11 | 10 | 8 | 9 | 8 | 7 | 6 | 27 | 25 | 21 | 18 | 16 | 13 | 12 | 8 | 5 | 135 | 265 |
| 3,30 ≤ $d$ < 3,40 | ± 0,03 | ± 0,07 | 10 | 12 | 11 | 10 | 9 | 7 | 9 | 8 | 7 | 6 | 27 | 25 | 21 | 18 | 16 | 13 | 12 | 8 | 5 | 135 | 265 |
| 3,40 ≤ $d$ < 3,50 | ± 0,03 | ± 0,07 | 10 | 11 | 10 | 9 | 8 | 6 | 8 | 7 | 6 | 5 | 27 | 25 | 21 | 18 | 16 | 13 | 12 | 8 | 5 | 135 | 265 |
| 3,50 ≤ $d$ < 3,60 | ± 0,03 | ± 0,07 | 10 | 10 | 9 | 8 | 7 | 5 | 7 | 6 | 5 | 4 | 26 | 24 | 20 | 16 | 14 | 11 | 10 | 6 | 5 | 135 | 265 |

*(to be continued)*

**Tableau 2 — Requirements for mechanical characteristics of wire [C] *(continued)***

| Nominal diameter $d$ of wire | Diameter tolerances | | $R$ | Minimum number of reverse bends | | | | | | | | | Minimum number of torsions | | | | | | | | Minimum mass of coating | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bright and coated [a] – Class B | Coated [a] – Class A | | Bright and coated [a] – Class B | | | | | Coated [a] – Class A | | | | Bright and coated [a] – Class B | | | | | Coated [a] – Class A | | | | |
| | | | | Tensile strength grade – MPa [b] | | | | | | | | | Tensile strength grade – MPa [b] | | | | | | | | g/m$^2$ | |
| mm | mm | | mm | 1 180 & 1 370 | 1 570 | 1 770 | 1 960 | 2 160 | 1 370 | 1 570 | 1 770 | 1 960 | 1 180 & 1 370 | 1 570 | 1 770 | 1 960 | 2 160 | 1 370 | 1 570 | 1 770 | 1 960 | Class B | Class A |
| 3,60 ≤ $d$ < 3,70 | ± 0,03 | ± 0,07 | 10 | 9 | 8 | 7 | 6 | 5 | 6 | 5 | 4 | 3 | 26 | 24 | 20 | 16 | 14 | 11 | 10 | 6 | 5 | 135 | 265 |
| 3,70 ≤ $d$ < 3,80 | ± 0,03 | ± 0,07 | 10 | 8 | 7 | 6 | 5 | 4 | 5 | 4 | 3 | 3 | 25 | 23 | 19 | 15 | 13 | 11 | 8 | 6 | 5 | 135 | 265 |
| 3,80 ≤ $d$ < 3,90 | ± 0,03 | ± 0,07 | 10 | 8 | 7 | 6 | 5 | 4 | 5 | 4 | 3 | 3 | 24 | 22 | 18 | 14 | 12 | 11 | 7 | 6 | 4 | 135 | 275 |
| 3,90 ≤ $d$ < 4,00 | ± 0,03 | ± 0,07 | 10 | 7 | 6 | 5 | 4 | 3 | 5 | 4 | 3 | 3 | 24 | 22 | 18 | 14 | 12 | 10 | 7 | 6 | 4 | 135 | 275 |
| 4,00 ≤ $d$ < 4,20 | ± 0,03 | ± 0,08 | 15 | 12 | 11 | 10 | 9 | 8 | 8 | 7 | 6 | 5 | 23 | 21 | 17 | 13 | 11 | 9 | 6 | 6 | 4 | 135 | 275 |
| 4,20 ≤ $d$ < 4,40 | ± 0,03 | ± 0,08 | 15 | 11 | 10 | 9 | 8 | | 7 | 6 | 5 | 4 | 21 | 19 | 15 | 11 | | 8 | 6 | 5 | 4 | 135 | 275 |
| 4,40 ≤ $d$ < 4,60 | ± 0,03 | ± 0,08 | 15 | 10 | 9 | 8 | 7 | | 6 | 5 | 5 | | 20 | 18 | 14 | 10 | | 7 | 6 | 5 | | 150 | 280 |
| 4,60 ≤ $d$ < 4,80 | ± 0,03 | ± 0,08 | 15 | 9 | 8 | 8 | 6 | | 6 | 5 | 4 | | 18 | 16 | 12 | 8 | | 6 | 5 | 4 | | 150 | 280 |
| 4,80 ≤ $d$ < 5,00 | ± 0,03 | ± 0,08 | 15 | 8 | 7 | 7 | 5 | | 5 | 4 | 4 | | 17 | 14 | 11 | 7 | | 5 | 4 | 3 | | 150 | 280 |
| 5,00 ≤ $d$ < 5,20 | ± 0,03 | ± 0,08 | 15 | 7 | 6 | 6 | 4 | | 4 | 3 | 3 | | 17 | 14 | 11 | 7 | | 5 | 4 | 3 | | 150 | 280 |
| 5,20 ≤ $d$ < 5,40 | ± 0,03 | ± 0,08 | 15 | 6 | 5 | 5 | | | 4 | 3 | 3 | | 14 | 12 | 10 | | | 5 | 4 | 3 | | 160 | 290 |
| 5,40 ≤ $d$ < 5,60 | ± 0,04 | ± 0,09 | 15 | 5 | 4 | 4 | | | 3 | 2 | 2 | | 12 | 10 | 8 | | | 4 | 3 | 2 | | 160 | 290 |
| 5,60 ≤ $d$ < 5,80 | ± 0,04 | ± 0,09 | 15 | 5 | 4 | 4 | | | 3 | 2 | 2 | | 10 | 8 | 6 | | | 3 | 2 | 2 | | 160 | 290 |
| 5,80 ≤ $d$ < 6,00 | ± 0,04 | ± 0,09 | 15 | 4 | 3 | 3 | | | 3 | 2 | 2 | | 8 | 6 | 6 | | | 3 | 2 | 2 | | 160 | 290 |
| 6,00 ≤ $d$ < 6,25 | ± 0,04 | ± 0,09 | 20 | 9 | 8 | 6 | | | 5 | 4 | 3 | | 8 | 6 | 6 | | | 3 | 2 | 2 | | 160 | 290 |
| 6,25 ≤ $d$ < 6,50 | ± 0,04 | ± 0,09 | 20 | 7 | 6 | | | | 4 | 3 | | | 7 | 6 | 5 | | | 2 | 2 | | | 160 | 290 |
| 6,50 ≤ $d$ < 6,75 | ± 0,04 | ± 0,09 | 20 | 6 | 5 | | | | 3 | 2 | | | 6 | 5 | 4 | | | 2 | 2 | | | 160 | 290 |
| 6,75 ≤ $d$ ≤ 7,00 | ± 0,04 | ± 0,10 | 20 | 4 | 3 | | | | 3 | 2 | | | 6 | 5 | 4 | | | 2 | 2 | | | 160 | 290 |

[a] Coated means zinc or Zn95/Al5 alloy.

[b] MPa = 1 N/mm$^2$.

[c] If necessary, values to be agreed between supplier and user at the time of order for blank positions in this table.

# 6 Test methods

## 6.1 General

The characteristics specified in Table 2 shall be determined in accordance with EN 10218-1 with the following observations.

## 6.2 Measurement of diameter

The diameter shall be measured using a micrometer with an accuracy of minimum 0,01 mm for all diameters above 0,50 mm. However up to and including this diameter, an accuracy of minimum 0,001 mm is required.

## 6.3 Tensile test

The tensile test shall be carried out in accordance with EN 10264-1.

## 6.4 Reverse bend test

The reverse bend test shall be carried out in accordance with EN 10218-1 by bending the wire around a mandrel with a radius of curvature $R$ as specified in Table 2.

## 6.5 Torsion test

The torsion test shall be carried out in accordance with EN 10218-1 with the number of twists specified in Table 2.

A length of $100d$, with a maximum of 500 mm between anchorage heads is recommended for the test sample.

If this length cannot be used, another length shall be chosen at the discretion of the wire manufacturer. In this case, the minimum number of twists that the wire shall withstand shall be proportional to the number specified in Table 2 for a test length of $100d$ or 500 mm for diameters above 5 mm.

## 6.6 Inspection of zinc or Zn95/Al5 alloy coating

The mass of coating shall be determined in accordance with EN 10244-2. For class A zinc and Zn95/Al5 alloy coatings, a coiling test shall be carried out in accordance with EN 10218-1.

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