



**NSAI**  
Standards

Irish Standard  
I.S. EN 12165:2016

# Copper and copper alloys - Wrought and unwrought forging stock

**I.S. EN 12165:2016**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

*This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):*

*NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.*

*This document is based on:*

EN 12165:2016

*Published:*

2016-07-20

*This document was published under the authority of the NSAI and comes into effect on:*

2016-08-07

ICS number:

77.150.30

NOTE: If blank see CEN/CENELEC cover page

NSAI  
1 Swift Square,  
Northwood, Santry  
Dublin 9

T +353 1 807 3800  
F +353 1 807 3838  
E standards@nsai.ie  
W NSAI.ie

Sales:  
T +353 1 857 6730  
F +353 1 857 6729  
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

## National Foreword

I.S. EN 12165:2016 is the adopted Irish version of the European Document EN 12165:2016, Copper and copper alloys - Wrought and unwrought forging stock

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

**Compliance with this document does not of itself confer immunity from legal obligations.**

*In line with international standards practice the decimal point is shown as a comma (,) throughout this document.*

This page is intentionally left blank

EUROPEAN STANDARD

EN 12165

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2016

ICS 77.150.30

Supersedes EN 12165:2011

English Version

## Copper and copper alloys - Wrought and unwrought forging stock

Cuivre et alliages de cuivre - Barres corroyées et brutes  
pour matriçage

Kupfer und Kupferlegierungen - Vormaterial für  
Schmiedestücke

This European Standard was approved by CEN on 9 April 2016.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

<b>Contents</b>	<b>Page</b>
European foreword.....	4
Introduction .....	6
1 Scope .....	7
2 Normative references.....	7
3 Terms and definitions .....	7
4 Designations.....	8
4.1 Material.....	8
4.1.1 General.....	8
4.1.2 Symbol.....	8
4.1.3 Number .....	8
4.2 Material condition .....	8
4.3 Product.....	8
5 Ordering information .....	10
6 Requirements .....	12
6.1 Composition .....	12
6.2 Mechanical properties.....	12
6.3 Resistance to dezincification .....	12
6.4 Dimensions and tolerances .....	13
6.4.1 Diameter.....	13
6.4.2 Deviation from circular form .....	13
6.4.3 Length.....	13
6.4.4 Straightness.....	13
6.5 Surface quality.....	13
7 Sampling.....	13
7.1 General.....	13
7.2 Analysis.....	13
7.3 Hardness and dezincification resistance tests .....	14
8 Test methods .....	14
8.1 Analysis.....	14
8.2 Hardness test.....	14
8.2.1 General.....	14
8.2.2 Preparation of samples.....	14
8.2.3 Procedure for testing.....	14
8.3 Dezincification resistance test .....	14
8.4 Retests for analysis, hardness and dezincification resistance .....	14
8.5 Rounding of results .....	15
9 Declaration of conformity and inspection documentation.....	15
9.1 Declaration of conformity .....	15
9.2 Inspection documentation.....	15
10 Marking, packaging, labelling.....	15
Bibliography.....	30

**Tables**

<b>Table 1 — Composition of copper .....</b>	<b>16</b>
<b>Table 2 — Composition of low alloyed copper alloys .....</b>	<b>17</b>
<b>Table 3 — Composition of copper-aluminium alloys.....</b>	<b>18</b>
<b>Table 4 — Composition of copper-nickel alloys .....</b>	<b>19</b>
<b>Table 5 — Composition of copper-nickel-zinc alloys.....</b>	<b>19</b>
<b>Table 6 — Composition of copper-zinc alloys.....</b>	<b>20</b>
<b>Table 7 — Composition of copper-zinc-lead alloys .....</b>	<b>21</b>
<b>Table 8 — Composition of complex copper-zinc alloys.....</b>	<b>23</b>
<b>Table 9 — Mechanical properties of round forging stock of copper .....</b>	<b>25</b>
<b>Table 10 — Mechanical properties of round forging stock of low alloyed copper alloys.....</b>	<b>25</b>
<b>Table 11 — Mechanical properties of round forging stock of copper-aluminium alloys .....</b>	<b>26</b>
<b>Table 12 — Mechanical properties of round forging stock of copper-nickel alloys.....</b>	<b>26</b>
<b>Table 13 — Mechanical properties of round forging stock of copper-nickel-zinc alloys .....</b>	<b>26</b>
<b>Table 14 — Mechanical properties of round forging stock of copper-zinc alloys .....</b>	<b>27</b>
<b>Table 15 — Mechanical properties of round forging stock of copper-zinc-lead alloys .....</b>	<b>27</b>
<b>Table 16 — Mechanical properties of round forging stock of complex copper-zinc alloys .....</b>	<b>28</b>
<b>Table 17 — Tolerances on diameter of round forging stock.....</b>	<b>29</b>
<b>Table 18 — Tolerances on straightness of round forging stock .....</b>	<b>29</b>
<b>Table 19 — Sampling rate.....</b>	<b>29</b>

**EN 12165:2016 (E)****European foreword**

This document (EN 12165:2016) has been prepared by Technical Committee CEN/TC 133 “Copper and copper alloys”, 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 January 2017, and conflicting national standards shall be withdrawn at the latest by January 2017.

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 12165:2011.

Within its programme of work, Technical Committee CEN/TC 133 requested CEN/TC 133/WG 4 “Extruded and drawn products, forgings and scrap” to revise the following standard:

— EN 12165:2011, *Copper and copper alloys — Wrought and unwrought forging stock.*

This document is one of a series of European Standards for the copper and copper alloy products rod, wire, profile and forgings. Other products are specified as follows:

- EN 12163, *Copper and copper alloys — Rod for general purposes;*
- EN 12164, *Copper and copper alloys — Rod for free machining purposes;*
- EN 12166, *Copper and copper alloys — Wire for general purposes;*
- EN 12167, *Copper and copper alloys — Profiles and bars for general purposes;*
- EN 12168, *Copper and copper alloys — Hollow rod for free machining purposes;*
- EN 12420, *Copper and copper alloys — Forgings;*
- EN 13601, *Copper and copper alloys — Copper rod, bar and wire for general electrical purposes;*
- EN 13602, *Copper and copper alloys — Drawn round copper wire for the manufacture of electrical conductors;*
- EN 13605, *Copper and copper alloys — Copper profiles and profiled wires for electrical purposes.*

In comparison with EN 12165:2011, the following significant technical changes were made:

- a) addition of three new materials: CuZn35Pb1,5AlAs (CW625N), CuZn33Pb1,5AlAs (CW626N) and CuZn33Pb1AlSiAs (CW725R) due to the market requirements on restriction of lead and modification of the chemical composition for CuZn39Pb1 (CW611N);
- b) introduction of an optional procedure how to refer to restrictions to the chemical composition imposed by the 4 MS Common Composition List for materials used for products accepted for contact with drinking water;
- c) requirements and test methods for resistance of dezincification modified;



- d) provisions for surface quality added;
- e) mechanical properties for CuZn21Si3P (CW724R) modified.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, 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.

**EN 12165:2016 (E)****Introduction**

The European Committee for Standardization (CEN) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning the alloy CuZn21Si3P (CW724R) and CuZn33Pb1AlSiAs (CW725R) given in 6.1.

CEN takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has ensured the CEN that he is willing to negotiate licenses either free of charge or under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with CEN.

— For CuZn21Si3P (CW724R) information may be obtained from:

Wieland-Werke AG  
Graf Arco Straße 36  
D-89079 Ulm  
GERMANY

— For CuZn33Pb1AlSiAs (CW725R) information may be obtained from:

Diehl Metall Messing  
Heinrich-Diehl-Straße 9  
D-90552 Röthenbach/Pegnitz  
GERMANY

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. CEN shall not be held responsible for identifying any or all such patent rights.

CEN and CENELEC maintain online lists of patents relevant to their standards. Users are encouraged to consult the lists for the most up to date information concerning patents (<ftp://ftp.cencenelec.eu/EN/IPR/Patents/IPRdeclaration.pdf>).

Due to developing legislation, the composition of a material may be restricted to the composition specified in this European Standard with respect to individual uses (e.g. for the use in contact with drinking water in some Member States of the European Union). These individual restrictions are not part of this European Standard. Nevertheless, for materials for which traditional and major uses are affected, these restrictions are indicated. The absence of an indication, however, does not imply that the material can be used in any application without any legal restriction.

## 1 Scope

This European Standard specifies the composition, property requirements and dimensional tolerances for forging stock of copper and copper alloys.

The sampling procedures and the methods of test for verification of conformity to the requirements of this European Standard are also specified.

## 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 1173, *Copper and copper alloys - Material condition designation*

EN 1412, *Copper and copper alloys - European numbering system*

EN 1655, *Copper and copper alloys - Declarations of conformity*

EN 1976, *Copper and copper alloys - Cast unwrought copper products*

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

EN ISO 6506-1, *Metallic materials - Brinell hardness test - Part 1: Test method (ISO 6506-1)*

EN ISO 6509-1, *Corrosion of metals and alloys — Determination of dezincification resistance of brass (ISO 6509-1)*

ISO 1190-1, *Copper and copper alloys — Code of designation — Part 1: Designation of materials*

## 3 Terms and definitions

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

### 3.1

#### **forging**

three-dimensional shaped product produced by a plastic forming process such as hammering or pressing between open or closed dies, including hammering between flat surfaces, normally when hot

Note 1 to entry Forging processes include, drop forging, hot stamping and hot pressing.

### 3.2

#### **forging stock**

extruded, rolled or drawn product such as rod, hollow rod, bar or profile or cast product, intended for the production of forgings

### 3.3

#### **deviation from circular form**

difference between the maximum and the minimum diameters measured at any one cross-section of a round product

[SOURCE: EN 12163:2016, 3.2]

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
  - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-