

VASK JA VASESULAMID. ÕMBLUSTETA ÜMARAD TORUD
KONDITSIONEERIMISE JA JAHUTUSE JAOKS. OSA 1:
TORUD TORUSTIKUSÜSTEEMIDE JAOKS

Copper and copper alloys - Seamless, round tubes for
air conditioning and refrigeration - Part 1: Tubes for
piping systems

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 12735-1:2016 sisaldab Euroopa standardi EN 12735-1:2016 ingliskeelset teksti.	This Estonian standard EVS-EN 12735-1:2016 consists of the English text of the European standard EN 12735-1:2016.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 15.06.2016.	Date of Availability of the European standard is 15.06.2016.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 23.040.15

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Aru 10, 10317 Tallinn, Eesti; koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Aru 10, 10317 Tallinn, Estonia; homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

Copper and copper alloys - Seamless, round tubes for air conditioning and refrigeration - Part 1: Tubes for piping systems

Cuivre et alliages de cuivre - Tubes ronds sans soudure pour l'air conditionné et la réfrigération - Partie 1: Tubes pour canalisations

Kupfer und Kupferlegierungen - Nahtlose Rundrohre für die Kälte- und Klimatechnik - Teil 1: Rohre für Leitungssysteme

This European Standard was approved by CEN on 28 February 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

Contents

Page

European foreword.....	4
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	8
4 Designations.....	9
4.1 Material.....	9
4.1.1 General.....	9
4.1.2 Symbol.....	9
4.1.3 Number	9
4.2 Material condition	9
4.3 Product.....	9
5 Ordering information	10
6 Requirements	11
6.1 Composition	11
6.2 Mechanical properties.....	11
6.3 Dimensions and tolerances	12
6.3.1 General.....	12
6.3.2 Nominal dimensions	12
6.3.3 Tolerances on outside diameter	14
6.3.4 Tolerances on wall thickness.....	14
6.3.5 Tolerances on length.....	15
6.3.6 Tolerances of form.....	15
6.4 Drift expanding	15
6.5 Freedom from defects.....	15
6.6 Surface quality.....	15
7 Sampling.....	16
8 Test methods	16
8.1 Analysis.....	16
8.2 Tensile test	16
8.3 Hardness test.....	16
8.4 Drift expanding test.....	16
8.5 Carbon content test	16
8.6 Freedom from defects test.....	16
8.7 Retests.....	17
9 Declaration of conformity and inspection documentation.....	17
9.1 Declaration of conformity	17
9.2 Inspection documentation.....	17
10 Packaging, marking and form of delivery	17
10.1 Packaging and marking	17
10.2 Marking of tubes.....	18

10.3 Form of delivery	18
Annex A (normative) Marking durability test.....	19
A.1 Abrasion test	19
A.2 Climatic test	19
Annex B (normative) Freedom from defects test.....	20
B.1 Eddy current test	20
B.2 Hydrostatic test	20
B.3 Pneumatic test	21
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of Directive 2014/68/EU aimed to be covered.....	22
Bibliography	23
Tables	
Table 1 — Composition of copper	11
Table 2 — Composition of low alloyed copper alloys	11
Table 3 — Mechanical properties	12
Table 4 — Nominal outside diameters and wall thicknesses	13
Table 5 — Tolerances on outside diameter	14
Table 6 — Tolerances on wall thickness	14
Table B.1 — Maximum drill diameters for the reference standard tube	20
Table B.2 — Hydrostatic pressure test.....	20
Table ZA.1 — Correspondence between this European Standard and Annex I of the Directive 2014/68/EU	22

European foreword

This document (EN 12735-1:2016) 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 December 2016 and conflicting national standards shall be withdrawn at the latest by December 2016.

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 12735-1:2010.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of Directive 2014/68/EU, Pressure Equipment Directive (PED).

For relationship with Directive 2014/68/EU, see informative Annex ZA, which is an integral part of this document.

In comparison with EN 12735-1:2010, the following significant technical changes were made:

- a) The size range of the outside diameter has been increased from 133 mm to 219 mm;
- b) Nominal outside diameters have been added to Table 3;
- c) The alloy CuFe2P (CW107C) has been included;
- d) Sub-clause 8.6 has been revised and a new normative Annex B "Freedom from defects test" has been added.

EN 12735, *Copper and copper alloys — Seamless, round tubes for air conditioning and refrigeration* consists of two parts:

— *Part 1: Tubes for piping systems;*

— *Part 2: Tubes for equipment.*

This is one of a series of European Standards for copper and copper alloy tubes. Other products are specified as follows:

- EN 1057, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications*
- EN 12449, *Copper and copper alloys — Seamless, round tubes for general purposes*
- EN 12450, *Copper and copper alloys — Seamless, round copper capillary tubes*
- EN 12451, *Copper and copper alloys — Seamless, round tubes for heat exchangers*
- EN 12452, *Copper and copper alloys — Rolled, finned, seamless tubes for heat exchangers*

- EN 12735-2, *Copper and copper alloys — Seamless, round tubes for air conditioning and refrigeration — Part 2: Tubes for equipment*
- EN 13348, *Copper and copper alloys — Seamless, round copper tubes for medical gases or vacuum*
- EN 13349, *Copper and copper alloys — Pre-insulated copper tubes with solid covering*
- EN 13600, *Copper and copper alloys — Seamless copper tubes for electrical purposes*

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, 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.

Introduction

It is recommended that tubes manufactured to this European Standard are certified as conforming to the requirements of this standard based on continuing surveillance which should be coupled with an assessment of a supplier's quality management system such as EN ISO 9001.

NOTE It is advised to take appropriate precautions if applying insulating material because it could be detrimental to the tube.

1 Scope

This European Standard specifies the requirements, sampling, test methods and conditions of delivery for seamless round copper and copper alloy tubes used for refrigeration and air-conditioning piping systems (i.e. piping, connections and repairs).

It is applicable to tubes with an outside diameter from 3 mm up to and including 219 mm.

Tubes made of the copper-grade Cu-DHP are supplied in straight lengths in the material conditions hard or half-hard, or in coils in the annealed material condition.

Tubes made of the alloy CuFe2P are supplied in straight length in the material conditions hard or annealed.

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 723, *Copper and copper alloys - Combustion method for determination of the carbon content on the inner surface of copper tubes or fittings*

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

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

EN 1971-1, *Copper and copper alloys - Eddy current test for measuring defects on seamless round copper and copper alloy tubes - Part 1: Test with an encircling test coil on the outer surface*

EN 1971-2, *Copper and copper alloys - Eddy current test for measuring defects on seamless round copper and copper alloy tubes - Part 2: Test with an internal probe on the inner surface*

EN 10204:2004, *Metallic products - Types of inspection documents*

EN ISO 6507-1, *Metallic materials - Vickers hardness test - Part 1: Test method (ISO 6507-1)*

EN ISO 6892-1, *Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1)*

EN ISO 8493, *Metallic materials - Tube - Drift-expanding test (ISO 8493)*

ISO 1553, *Unalloyed copper containing not less than 99,90 % of copper - Determination of copper content - Electrolytic method*

ISO 4741, *Copper and copper alloys - Determination of phosphorus content - Molybdovanadate spectrometric method*