

SURVEOTSTARBELISED LEHTTERASED. OSA 2: SÜSINIK-
JA LEGEERTERASED, MILLEL ON KINDLAKSMÄÄRATUD
OMADUSED KÕRGEL TEMPERATUURIL

Flat products made of steels for pressure purposes -
Part 2: Non-alloy and alloy steels with specified
elevated temperature properties

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 10028-2:2017 sisaldab Euroopa standardi EN 10028-2:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 10028-2:2017 consists of the English text of the European standard EN 10028-2:2017.
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 26.07.2017.	Date of Availability of the European standard is 26.07.2017.
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 77.140.30, 77.140.50

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:
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:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

**Flat products made of steels for pressure purposes - Part
2: Non-alloy and alloy steels with specified elevated
temperature properties**

Produits plats en aciers pour appareils à pression -
Partie 2 : Aciers non alliés et alliés avec
caractéristiques spécifiées à température élevée

Flacherzeugnisse aus Druckbehälterstählen - Teil 2:
Unlegierte und legierte Stähle mit festgelegten
Eigenschaften bei erhöhten Temperaturen

This European Standard was approved by CEN on 7 May 2017.

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, Serbia, 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	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
4 Tolerances on dimensions	4
5 Calculation of mass	4
6 Classification and designation	4
6.1 Classification	4
6.2 Designation	4
7 Information to be supplied by the purchaser	5
7.1 Mandatory information	5
7.2 Options	5
7.3 Example for ordering	5
8 Requirements	6
8.1 Steelmaking process	6
8.2 Delivery condition	6
8.3 Chemical composition	6
8.4 Mechanical properties	10
8.5 Surface condition	10
8.6 Internal soundness	10
8.7 Resistance to hydrogen induced cracking	10
8.8 Embrittlement of CrMo steels	10
9 Inspection	10
9.1 Types of inspection and inspection documents	10
9.2 Tests to be carried out	10
9.3 Retests, sorting and reprocessing	10
10 Sampling	10
11 Test methods	10
12 Marking	11
Annex A (informative) Guidelines for heat treatment	17
Annex B (informative) Critical time temperature parameter P_{crit} and possible combinations of stress relieving temperature and holding time	18
Annex C (informative) Reference data of strength values for 1 % (plastic) creep strain and creep rupture	20
Annex D (normative) Evaluation of resistance to hydrogen induced cracking	26
Annex E (normative) Step cooling test	27
Annex F (informative) Changes to the previous version EN 10028-2:2009	28
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of European Directive 2014/68/EU	29
Bibliography	30

European foreword

This document (EN 10028-2:2017) has been prepared by Technical Committee ECISS/TC 107 “Steels for pressure purposes”, 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 2018 and conflicting national standards shall be withdrawn at the latest by January 2018.

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 10028-2:2009.

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.

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

A list of changes between this document and the previous version can be found in Annex F.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies requirements for flat products for pressure equipment made of weldable non-alloy and alloy steels with elevated temperature properties as specified in Table 1.

The requirements and definitions of EN 10028-1:2017 also apply.

NOTE Once this European Standard is published in the EU Official Journal (OJEU) under Directive 2014/68/EU, presumption of conformity to the Essential Safety Requirements (ESRs) of Directive 2014/68/EU is limited to technical data of materials in this European Standard (Part 1 and this Part 2 of the series) and does not presume adequacy of the material to a specific item of equipment. Consequently, the assessment of the technical data stated in this material standard against the design requirements of this specific item of equipment to verify that the ESRs of Directive 2014/68/EU are satisfied, needs to be done.

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 1011-1:2009, *Welding - Recommendations for welding of metallic materials - Part 1: General guidance for arc welding*

EN 1011-2:2001, *Welding - Recommendations for welding of metallic materials - Part 2: Arc welding of ferritic steels*

EN 10028-1:2017, *Flat products made of steels for pressure purposes - Part 1: General requirements*

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

EN 10229:1998, *Evaluation of resistance of steel products to hydrogen induced cracking (HIC)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 10028-1:2017 apply.

4 Tolerances on dimensions

See EN 10028-1:2017.

5 Calculation of mass

See EN 10028-1:2017.

6 Classification and designation

6.1 Classification

In accordance with EN 10020, the grades P235GH, P265GH, P295GH and P355GH are non-alloy quality steels. All other grades are alloy special steels.

6.2 Designation

See EN 10028-1:2017.