BS EN 10314:2016

BSI Standards Publication

Method for the derivation of minimum values of proof strength of steel at elevated temperatures

bsi.

This British Standard is the UK implementation of EN 10314:2016. It supersedes BS EN 10314:2002 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ISE/107, Steels for Pressure Purposes.

A list of organizations represented on this committee can be obtained on request to its secretary.

ISBN 978 0 580 84031 9

ICS 77.140.30

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 June 2016.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD **EN 10314**

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2016

ICS 77.140.30 Supersedes EN 10314:2002

English Version

Method for the derivation of minimum values of proof strength of steel at elevated temperatures

Méthode de dérivation des valeurs minimales de la limite conventionnelle d'élasticité des aciers à températures élevées

Verfahren zur Ableitung von Mindestwerten der Dehngrenze von Stahl bei erhöhten Temperaturen

This European Standard was approved by CEN on 18 March 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

Ref. No. EN 10314:2016 E

Contents

Page

European foreword

This document (EN 10314:2016) 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 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 10314:2002.

Regarding the most significant technical changes that have been made in this new edition of EN 10314, see Annex A.

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

Minimum values for tensile properties are specified in European Standards for steels and other metals for elevated temperature service. Such values are used to determine design strength values particularly where the materials are used in pressure systems.

Two International Standards, ISO 2605-1 and ISO 2605-2 (meanwhile withdrawn) were adopted by CEN as European Prestandards, ENV 22605-1 and ENV 22605-2. They set out procedures, based on statistical assessments of bodies of data, for the derivation and verification of minimum values of 0,2 % proof strength at elevated temperatures. These procedures determine the minimum values from lower confidence lines. A third International Standard, ISO 2605-3, adopted by CEN as ENV 22605-3, sets out procedures for determining minimum values from the average trend behaviour of the property of interest as a function of temperature.

One of the purposes of the procedures in ISO 2605-1 and ISO 2605-2 (ENV 22605-1 and ENV 22605-2) is to give an alternative to the requirement for elevated temperature tensile acceptance tests on individual products by organizations and manufacturers contributing data for assessment and as a result of this to reduce the test frequency.

Experience has shown that the procedures in ISO 2605-1 and ISO 2605-2 (ENV 22605-1 and ENV 22605-2) have limitations affecting the relationship between derived minimum property values and the minima of the test data arising from the statistical and some subjective decisions at various stages of the procedures. They also require relatively large amounts of data to produce an acceptable level of accuracy.

The procedure set out in ISO 2605-3 (ENV 22605-3) requires less data but because it is designed to always give conservative values from few data can give non-representative results. However, the principle of this procedure is considered to be more realistic and is adopted as the basis of this European Standard; the objective is to produce an assessment procedure for tensile property data which is simple to operate, gives representative results and is usable in computerized form.

This European Standard, which supersedes EN 10314:2002, which in turn superseded ENV 22605-1, −2 and −3, sets out a method for deriving minimum proof strength values for steels at elevated temperatures with the intention that such values are specified in relevant product standards.

This European Standard does not specify a frequency of testing for the product standards where EN 10314 is applied. Verification of tensile properties at elevated temperatures is normally specified in the relevant product standard using the minimum property values derived by the procedure established in this European Standard.

The method has been tested for proof strength values of steel. However, it is considered that the method can also be applied for the derivation of minimum values of tensile strength at elevated temperatures.

1 Scope

This European Standard specifies a method for deriving the minimum proof strength values for steels at elevated temperatures.

However, this European Standard does not specify a verification procedure.

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

EN ISO 6892-2, *Metallic materials — Tensile testing — Part 2: Method of test at elevated temperature (ISO 6892-2)*

3 Terms and definitions

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

3.1
data set
property value data from room and elevated temperatures from the product selected for testing

Note 1 to entry: This data can include averaged values where more than one set of tests at a given temperature representing one location is carried out.

3.2
data group
property value data from 'X' data sets as used for each assessment

3.3
result set
ratio values for each data set

4 Symbols and abbreviations

For the purposes of this document, the following symbols apply.

— t elevated temperature in °C;

— $f_{(t)}$ ratio value; property value at elevated temperature t (in °C) divided by property value at room temperature;

— $f_{av(t)}$ the $f_{(t)}$- value resulting from the trend curve for a specified temperature;

— R_e yield strength (in MPa[1)]);

— R_p proof strength (in MPa[1)]);

1) 1 MPa = 1 N/mm^2.