



BSI Standards Publication

## Steel — Conversion of elongation values

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Part 1: Carbon and low-alloy steels

## National foreword

This British Standard is the UK implementation of EN ISO 2566-1:2021. It is identical to ISO 2566-1:2021. It supersedes BS EN ISO 2566-1:1999, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ISE/100, Steel, General Issues.

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

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## Steel - Conversion of elongation values - Part 1: Carbon and low-alloy steels (ISO 2566-1:2021)

Acier - Conversion des valeurs d'allongement  
- Partie 1: Aciers au carbone et aciers  
faiblement alliés (ISO 2566-1:2021)

Stahl - Umrechnung von Bruchdehnungswerten  
- Teil 1: Unlegierte und niedrig legierte  
Stähle (ISO 2566-1:2021)

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## European foreword

This document (EN ISO 2566-1:2021) has been prepared by Technical Committee ISO/TC 17 "Steel" in collaboration with Technical Committee CEN/TC 459/SC 1 "Test methods for steel (other than chemical analysis)" 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of an identical text or by endorsement, at the latest by June 2022, and conflicting national standards shall be withdrawn at the latest by June 2022.

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

This document supersedes EN ISO 2566-1:1999.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

### Endorsement notice

The text of ISO 2566-1:2021 has been approved by CEN as EN ISO 2566-1:2021 without any modification.

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 20, *General technical delivery conditions, sampling and mechanical testing methods*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 459/SC 1, *Test methods for steel (other than chemical analysis)*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 2566-1:1984), of which it constitutes a minor revision. The changes are as follows:

- complete editorial revision;
- [Tables 2](#) to [5](#) have been renamed due to reordering in order to follow the logical flow of information of this document;
- [Clause 9](#) has been restructured into four sub-clauses in order to follow the logical flow of information of this document.

A list of all parts in the ISO 2566 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

Several different gauge lengths are commonly in use for the determination of percentage elongation of steels in tensile testing. Fixed gauge lengths of 50 mm, 80 mm, 100 mm and 200 mm are used; proportional gauge lengths of  $k\sqrt{S_0}$  are also used for flat and round test pieces, where  $k$  may be one of a number of values, i.e. 4; 5,65; 8,16 or 11,3.

The value  $5,65\sqrt{S_0}$  is adopted as the internationally preferred proportional gauge length.

Arising from this choice and the existence of specifications stipulating minimum percentage elongations on different gauge lengths, a growing need has been evident for an International Standard that could be used to convert test results into values based on the different gauge lengths. Accordingly, this document includes tables of conversion factors, tables of actual conversions for some of the most commonly used gauge lengths and elongation values, and figures which may also be used for such conversions. When using these conversions, however, note should be taken of the limitations on their applicability, as stated in [Clause 1](#).

# Steel — Conversion of elongation values —

## Part 1: Carbon and low-alloy steels

### 1 Scope

This document specifies a method of converting room temperature percentage elongations after fracture obtained on various proportional and non-proportional gauge lengths to other gauge lengths.

[Formula \(1\)](#), on which conversions are based, is considered to be reliable when applied to carbon, carbon manganese, molybdenum and chromium molybdenum steels within the tensile strength range 300 N/mm<sup>2</sup> to 700 N/mm<sup>2</sup> and in the hot-rolled, hot-rolled and normalized or annealed conditions, with or without tempering.

These conversions are not applicable to:

- a) cold reduced steels;
- b) quenched and tempered steels;
- c) austenitic steels.

These conversions are not applicable when the gauge length exceeds  $25\sqrt{S_0}$  or where the width to thickness ratio of the test piece exceeds 20.

### 2 Normative references

There are no normative references in this document.

### 3 Terms, definitions and symbols

#### 3.1 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

##### 3.1.1

##### **gauge length**

length of the parallel portion of the test piece used for measurement of strain

Note 1 to entry: The term is hereafter used in this document to denote the original gauge length,  $L_0$ , marked on the test piece for the determination of percentage elongation after fracture,  $A$ .

##### 3.1.2

##### **proportional gauge length**

*gauge length* (3.1.1) having a specified relation to the square root of the cross-sectional area, for example  $5,65\sqrt{S_0}$