BS ISO 24213:2017

BSI Standards Publication

# Metallic materials — Sheet and strip — Method for springback evaluation in stretch bending

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# National foreword

This British Standard is the UK implementation of ISO 24213:2017.
It supersedes BS ISO 24213:2008 , which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ISE/101/2, Ductility testing.

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

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


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BS ISO 24213:2017

INTERNATIONAL STANDARD

**ISO 24213**

Second edition
2017-07

# Metallic materials — Sheet and strip — Method for springback evaluation in stretch bending

*Matériaux métalliques — Tôles et bandes — Méthode d'évaluation du retour élastique lors d'un cintrage sous traction*

Reference number
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# Foreword

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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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 164, *Mechanical testing of metals*, Subcommittee SC 2, *Ductility testing*.

This second edition cancels and replaces the first edition (ISO 24213:2008), which has been technically revised.

The main changes compared to the previous edition are:

— the Normative references has been updated;

— Clause 7 c) and Clause 9 a) have been revised to specify the test piece more clearly;

— In Figure 2 b), a label to the test piece has been added;

— Clause 8 d) has been revised because the use of dial gauge is one of the methods for determining the radius of curvature;

— the Bibliography has been updated.

# Introduction

This document has been established to evaluate the amount of springback occurring in metallic sheets deformed by stretch bending. It may be used for specifying a material, directly controlling a forming operation, designing dies, or calibrating finite element programs.

In metallic sheet forming processes, the geometry of the formed parts may deviate from the design geometry after the parts are removed from the dies due to elastic recovery. This phenomenon is referred to as springback.

INTERNATIONAL STANDARD ISO 24213:2017(E)

# Metallic materials — Sheet and strip — Method for springback evaluation in stretch bending

## 1 Scope

This document specifies a method for evaluating the amount of springback of sheets of metallic materials known to exhibit large amounts of springback subjected to plane-strain stretch bending, which is a typical deformation mode generated in press-formed panels. By using this method, the amount of springback under stretch bending is evaluated accurately and quantitatively[1][2].

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 80000-1, *Quantities and units — Part 1: General*

## 3 Terms and definitions

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

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

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

**3.1**
**curvature**
$\kappa$
reciprocal of the radius of curvature, $r$, determined at the centre of a stretch-bent specimen on the inner surface in the longitudinal direction

$$\kappa = \frac{1}{r}$$

**3.2**
**amount of springback**
$\eta$
relative change in curvature of a test piece under force and after removal of the force shown in Figure 1

$$\eta = \frac{|\kappa' - \kappa|}{\kappa} = \frac{r' - r}{r'}$$