

Australian Standard<sup>®</sup>

**Metallic materials—Tensile testing at  
elevated temperatures**



This Australian Standard® was prepared by Committee MT-006, Mechanical Testing of Metals. It was approved on behalf of the Council of Standards Australia on 19 January 2007. This Standard was published on 20 February 2007.

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The following are represented on Committee MT-006:

- Australian Railway Association
  - Bureau of Steel Manufacturers of Australia
  - CSIRO National Measurement Laboratory
  - CSIRO Telecommunications and Industrial Physics
  - Institute of Materials Engineering Australia Limited
  - National Association of Testing Authorities Australia
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Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through public comment period.

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STANDARDS AUSTRALIA

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RECONFIRMATION

OF

AS 2291—2007

**Metallic materials—Tensile testing at elevated temperatures**

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Technical Committee MT-009 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

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## NOTES

Australian Standard<sup>®</sup>

**Metallic materials—Tensile testing at  
elevated temperatures**

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## PREFACE

This Standard was prepared by Standards Australia Committee MT-006, Mechanical Testing of Metals to supersede AS 2291—1979, *Methods for the tensile testing of metals at elevated temperatures*. The Committee decided to change the title of the Standard to align with the title used for AS 1391. The title was changed to *Metallic materials—Tensile testing at elevated temperatures*.

The objective of this edition is to align more closely with ISO 783:1999, *Metallic materials—Tensile testing at elevated temperature*.

During this preparation of this Standard, cognisance was taken of the following Standards:

## AS

1391 Metallic materials—Tensile testing at ambient temperature

1545 Methods for the calibration and grading of extensometers

## ISO

377 Steel and steel products—Location and preparation of samples and test pieces for mechanical testing

783 Metallic materials—Tensile testing at elevated temperature

3785 Metallic materials—Designation of test specimen axes in relation to product texture

This Standard is one of a series of Standards covering the range of tensile testing methods. The series comprises the following:

## AS

1391 Metallic materials—Tensile testing at ambient temperature

1545 Methods for the calibration and grading of extensometers

1855 Methods for the determination of transverse properties of round steel pipes

2291 Metallic materials—Tensile testing at elevated temperatures (this Standard)

2346 Methods for the determination of uniform elongation in sheet and strip metals

2403 Method for the measurement of plastic strain ‘r’ of sheet and strip metals

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

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## STANDARDS AUSTRALIA

## Australian Standard

## Metallic materials—Tensile testing at elevated temperatures

**1 SCOPE**

This Standard specifies the method by which a test piece of metal is strained in uni-axial tension at elevated temperature in order to determine one or more of its short-time tensile properties. It defines the properties to be determined and the terms used in describing tests and test pieces. It specifies the dimensions of standard test pieces, temperature requirements and method of tensile testing.

**2 REFERENCED DOCUMENTS**

The following documents are referred to in this Standard:

## AS

- 1545 Methods for the calibration and grading of extensometers  
1654 ISO system of limits and fits  
1654.2 Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts  
2193 Calibration and classification of force-measuring systems

## ISO

- 2566 Steel—Conversion of elongation values  
2566-1 Part 1: Carbon and low alloy steels  
2566-2 Part 2: Austenitic steels

## ASTM

- E1012-05 Standard practice for verification of test frame and specimen alignment under tensile and compressive axial force application

**3 DEFINITIONS**

For the purpose of this Standard, the following definitions apply.

**3.1 Elongation**

Increase in the original gauge length ( $L_0$ ) at any moment during the test (see Figure 1).

**3.2 Engineering stress**

At any moment during the test, force divided by the original cross-sectional area ( $S_0$ ) of the test piece.

**3.3 Extensometer gauge length ( $L_e$ )**

Length of the parallel portion of the test piece used for the measurement of extension by means of an extensometer.

NOTE: It is recommended that for measurement of yield and proof strength parameters,  $L_e$  should span as much of the parallel length of the test piece as possible. Ideally, as a minimum,  $L_e$  should be greater than  $0.50L_0$  but less than  $0.9L_c$ . This should ensure that the extensometer detects all yielding events that occur in the test piece. It is further recommended that for measurement of parameters 'at' or 'after' maximum force,  $L_e$  is approximately equal to  $L_0$ .

**3.4 Final gauge length ( $L_u$ )**

Gauge length after rupture of the test piece.