AS 1391—2007
(Incorporating Amendment No. 1)

AS 1391—2007

Australian Standard®

Metallic materials—Tensile testing at ambient temperature

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 7 May 2007. This Standard was published on 12 July 2007.

The following are represented on Committee MT-006:

- Bureau of Steel Manufacturers of Australia
- Materials Australia
- National Association of Testing Authorities
- National Measurement Institute

This Standard was issued in draft form for comment as DR 06728.

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 the public comment period.

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Metallic materials—Tensile testing at ambient temperature

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PREFACE

This Standard was prepared by Standards Australia Committee MT-006, Mechanical Testing of Metals to supersede AS 1391—2005, *Metallic materials—Tensile testing at ambient temperatures.*

This Standard incorporates Amendment No. 1 (July 2012). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The objective of this edition is to revise the allowable methods for preparing samples for tensile testing.

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 (this Standard)
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
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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Metallic materials—Tensile testing at ambient temperature

1 SCOPE

This Standard specifies methods by which a test piece of metal is strained in uni-axial tension at room temperature in order to determine one or more of its tensile properties. It defines the properties to be determined and the terms used in describing tests and test pieces. The Standard also specifies the dimensions of standard test pieces and methods for tensile testing a wide range of product forms.

Where material Standards (product Standards) specify the dimensions of the test piece, those dimensions take precedence over the dimensions which are specified in Appendices A and C.

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
5725	Accuracy (trueness and precision) of measurement methods and results
5725-2	Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method

3 DEFINITIONS

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

3.1 Elongation

Increase in the original gauge length (L_o) 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_o) 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 0.50 L_o but less than 0.9 L_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_o.

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