AS 1391—2005

Australian Standard™

Metallic materials—Tensile testing at ambient temperature

STANDARDS AUSTRALIA

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 30 May 2005. This Standard was published on 21 June 2005.

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
National Association of Testing Authorities Australia

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Australian Standard™

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—1991, *Methods for tensile testing of metals*. The Committee decided to change the title of the Standard to indicate the testing temperature at the time of test. The title was changed to *Metallic materials—Tensile testing at ambient temperature*.

The objective of this edition is to align more closely with ISO 6892:1998, *Metallic materials—Tensile testing at ambient temperature*.

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

AS
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

3785 Steel—Designation of test piece axes

6892 Metallic materials—Tensile testing at ambient temperature

9513 Metallic materials—Calibration of extensometers used in uniaxial 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 tensile properties of round steel pipes

2291 Methods for tensile testing of metals at elevated temperatures

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

2346 Methods for the determination of uniform elongation in 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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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 purposes 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.