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AS 1391—2007

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 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
-

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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 the public comment period.

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OF

AS 1391—2007

Metallic materials—Tensile testing at ambient temperature

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NOTES

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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—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 rate 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.

CONTENTS

	<i>Page</i>
1 SCOPE.....	5
2 REFERENCED DOCUMENTS.....	5
3 DEFINITIONS.....	5
4 TEST CONDITIONS.....	8
5 SYMBOLS AND DESIGNATIONS.....	8
6 TEST PIECE.....	11
7 MARKING THE ORIGINAL GAUGE LENGTH (L_0).....	11
8 ACCURACY OF TESTING APPARATUS.....	12
9 TESTING RATE	12
10 DETERMINATION OF THE PERCENTAGE PLASTIC EXTENSION AT MAXIMUM FORCE (A_g).....	13
11 DETERMINATION OF PERCENTAGE ELONGATION AFTER FRACTURE (A)	13
12 DETERMINATION OF PERCENTAGE TOTAL ELONGATION AT MAXIMUM FORCE (A_{gt})	14
13 DETERMINATION OF THE PERCENTAGE YIELD POINT EXTENSION (A_e).....	15
14 DETERMINATION OF PROOF STRENGTH, PLASTIC EXTENSION (R_p)	15
15 DETERMINATION OF PROOF STRENGTH, TOTAL EXTENSION (R_t).....	16
16 METHOD OF VERIFICATION OF PERMANENT SET STRENGTH (R_r).....	16
17 DETERMINATION OF PERCENTAGE REDUCTION OF AREA (Z).....	16
18 ACCURACY OF THE RESULTS.....	16
19 RECORD OF RESULTS	16
20 TEST REPORT.....	17
21 FORCE-EXTENSION DIAGRAMS.....	18
22 TEST PIECE MARKINGS.....	25
 APPENDICES	
A TYPES OF TEST PIECE TO BE USED FOR THIN PRODUCTS: SHEETS, STRIPS AND FLATS BETWEEN 0.1 mm AND 3 mm THICK	28
B TYPES OF TEST PIECE TO BE USED FOR WIRE, BARS AND SECTIONS WITH A DIAMETER OR THICKNESS OF LESS THAN 4 mm.....	31
C TYPES OF TEST PIECE TO BE USED FOR SHEETS AND FLATS OF THICKNESS EQUAL TO OR GREATER THAN 3 mm AND WIRE, BARS AND SECTIONS OF DIAMETER OR THICKNESS EQUAL TO OR GREATER THAN 4 mm.....	32
D TYPES OF TEST PIECE TO BE USED FOR TUBES	35
E PRECAUTIONS TO BE TAKEN WHEN MEASURING THE PERCENTAGE ELONGATION AFTER FRACTURE IF THE SPECIFIED VALUE IS LESS THAN 5%.....	37
F MEASUREMENT OF PERCENTAGE ELONGATION AFTER FRACTURE BASED ON SUBDIVISION OF THE ORIGINAL GAUGE LENGTH	38
G DETERMINATION OF THE PERCENTAGE PLASTIC ELONGATION WITHOUT NECKING (A_{wn}) FOR LONG PRODUCTS SUCH AS BARS, WIRE AND RODS..	40

H	AN ‘ERROR BUDGET’ APPROACH TO THE ESTIMATION OF THE UNCERTAINTY OF MEASUREMENT IN TENSILE TESTING.....	41
I	DESIGNATION OF TEST PIECE AXES	45
J	LOCATION AND PREPARATION OF SAMPLES AND TEST PIECES	49

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STANDARDS AUSTRALIA

Australian Standard

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_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 $0.50 L_0$ but less than $0.9 L_e$. 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 .