AS 1391:2020
ISO 6892-1:2019

AS 1391:2020

Australian STANDARD®

Metallic materials — Tensile testing — Method of test at room temperature

STANDARDS Australia

AS 1391:2020

This Australian Standard® was prepared by MT-006, Mechanical Testing Of Metals. It was approved on behalf of the Council of Standards Australia on 17 June 2020.

This Standard was published on 26 June 2020.

The following are represented on Committee MT-006:

Australian Pipelines and Gas Association
Bureau of Steel Manufacturers of Australia
Materials Australia
National Association of Testing Authorities Australia
University of Technology Sydney
Weld Australia

This Standard was issued in draft form for comment as DR AS 1391:2020.

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ISBN 978 1 76072 913 4

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Metallic materials — Tensile testing — Method of test at room temperature

Originated as AS A23—1928.
Third edition 1964.
Revised and redesignated as AS 1391—1974.
Previous edition 2007.
Fifth edition 2020.

Preface

This Test Method was prepared by the Standards Australia Committee MT-006, Mechanical Testing of Metals to supersede AS 1391—2007 *Metallic materials—Tensile testing at ambient temperature*.

The objective of this Test Method is to specify the method for tensile testing of metallic materials and define the mechanical properties which can be determined at room temperature.

NOTE Annex A contains further recommendations for computer controlled testing machines.

This Test Method is identical with, and has been reproduced from, ISO 6892-1:2019, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*.

As this document has been reproduced from an International Standard or Test Method or Technical Specification or Technical Report, the following applies:

(a) In the source text "this part of ISO 6892" should read "this Australian Test Method".

(b) A full point substitutes for a comma when referring to a decimal marker.

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The terms "normative" and "informative" are used in Standards to define the application of the appendices or annexes to which they apply. A "normative" appendix or annex is an integral part of a Standard, whereas an "informative" appendix or annex is only for information and guidance.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 164, *Mechanical testing of metals*, Subcommittee SC 1, *Uniaxial testing*.

This second edition cancels and replaces the first edition (ISO 6892-1:2009), which has been technically revised with the following changes:

a) renumbering of Clause 10;

b) additional information about the use of Method A and B;

c) new denomination for:

   1) Method A closed loop → A1

   2) Method A open loop → A2;

e) addition of A.5;

f) addition in Annex F for determination of the stiffness of the testing equipment;

g) new normative Annex G: Determination of the modulus of elasticity of metallic materials using a uniaxial tensile test;

h) the old Annex G is renamed to Annex H, Annex H to Annex I, etc.

ISO 6892 consists of the following parts, under the general title *Metallic materials — Tensile testing*:

— *Part 1: Method of test at room temperature*

— *Part 2:Method of test at elevated temperature*

— *Part 3:Method of test at low temperature*

— *Part 4: Method of test in liquid helium*

Introduction

During discussions concerning the speed of testing in the preparation of ISO 6892, it was decided to recommend the use of strain rate control in future revisions.

In this part of ISO 6892, there are two methods of testing speeds available. The first, method A, is based on strain rates (including crosshead separation rate) and the second, method B, is based on stress rates. Method A is intended to minimize the variation of the test rates during the moment when strain rate sensitive parameters are determined and to minimize the measurement uncertainty of the test results. Therefore, and out of the fact that often the strain rate sensitivity of the materials is not known, the use of method A is strongly recommended.

Australian Standard®

Metallic materials — Tensile testing — Method of test at room temperature

1 Scope

This part of ISO 6892 specifies the method for tensile testing of metallic materials and defines the mechanical properties which can be determined at room temperature.

NOTE Annex A contains further recommendations for computer controlled testing machines.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

ISO 9513, *Metallic materials — Calibration of extensometer systems used in uniaxial testing*

3 Terms and definitions

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

NOTE In what follows, the designations "force" and "stress" or "extension", "percentage extension", and "strain", respectively, are used on various occasions (as figure axis labels or in explanations for the determination of different properties). However, for a general description of point on a curve, the designations "force" and "stress" or "extension", "percentage extension", and "strain", respectively, can be interchanged.

3.1
gauge length
L
length of the parallel portion of the test piece on which elongation is measured at any moment during the test

3.1.1
original gauge length
L_o
length between *gauge length* (3.1) marks on the test piece measured at room temperature before the test

3.1.2
final gauge length after fracture
L_u
length between *gauge length* (3.1) marks on the test piece measured after rupture, at room temperature, the two pieces having been carefully fitted back together so that their axes lie in a straight line

3.2
parallel length
L_c
length of the parallel reduced section of the test piece

Note 1 to entry: The concept of parallel length is replaced by the concept of distance between grips for unmachined test pieces.

3.3
elongation
increase in the *original gauge length* (3.1.1) at any moment during the test