AS 2403—2008

Australian Standard®

Metallic materials—Sheet and strip—Determination of plastic strain ratio

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 2 May 2008. This Standard was published on 6 June 2008.

The following are represented on Committee MT-006:

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

This Standard was issued in draft form for comment as DR 07121.

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—Sheet and strip—Determination of plastic strain ratio

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PREFACE

This Standard was prepared by Standards Australia Committee MT-006, Mechanical Testing of Metals to supersede AS 2403—1980, *Method for the measurement of the plastic strain ratio 'r' of sheet and strip metals.* The Committee decided to change the title of the Standard to align with the title of ISO 10113, *Metallic materials—Sheet and strip—Determination of plastic strain ratio.*

The objective of this edition is to align more closely with ISO 10113:2006.

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

ISO	
10113	Metallic materials—Sheet and strip—Determination of plastic strain ratio

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
2403	Metallic materials—Sheet and strip—Determination of plastic strain ratio (this Standard)

CONTENTS

STANDARDS AUSTRALIA

Australian Standard

Metallic materials—Sheet and strip—Determination of plastic strain ratio

1 SCOPE

This Standard specifies a method for determining the plastic strain ratio of flat products (sheet and strip) made of metallic materials.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS
1391 Metallic materials—Tensile testing at ambient temperature
1545 Methods for the calibration and grading of extensometers

3 DEFINITIONS

For the purpose of this Standard the following definitions apply.

3.1 Plastic strain ratio *r*

The ratio of the true width strain to the true thickness strain in a test piece that has been subjected to uniaxial tensile stress, i.e.—

$$r = \frac{\varepsilon_b}{\varepsilon_a} \quad \ldots (1)$$

NOTES:

1 The above expression using a single point is only valid in the region where the plastic strain is homogeneous.

2 Since it is easier and more precise to measure changes in length than in thickness, the following relationship derived from the law of constancy of volume is used. This is valid up to the percentage plastic extension at maximum force A_g.

$$r = \frac{\ln\left(\frac{L_o}{L}\frac{b_o}{b}\right)}{\ln\left(\frac{L\,b}{L_o b_o}\right)} \quad \ldots (2)$$

3 Because the value *r* depends on the orientation of the test piece relative to the rolling direction, as well as on the strain level, the symbol *r* may be supplemented by the angle which characterizes this orientation and the strain level. For example $r_{45/20}$ (see Table 1).

4 For some materials exhibiting a phase change during plastic deformation, the volume of the measured section cannot always be assumed to be constant. In such cases, the procedure should be defined and agreed between the parties involved.