

STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 2505.3—2004

Metallic materials

Method 3: Tubular products—Bend and related tests

RECONFIRMATION NOTICE

Technical Committee MT-009 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 20 March 2017.

The following are represented on Technical Committee MT-009:

Australasian Institute of Surface Finishing
Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Steel Institute
Bureau of Steel Manufacturers of Australia
Galvanizers Association of Australia
Galvanizing Association of New Zealand
New Zealand Metal Roofing Manufacturers

NOTES

Australian Standard™

Metallic materials**Method 3: Tubular products—Bend and related tests**

PREFACE

This Standard was prepared by Standards Australia Committee MT-006, Mechanical Testing of Metals to supersede AS 2503.3—1989, *Methods for bend and related testing of metals*, Method 3: *Tubular products*.

The objective of this revision is to revise the testing procedure to allow a wider variation in sizes.

This Standard is a Method 3 of a series of Standards on the methods of bending wire and related testing of metals. The series comprises the following methods:

AS

2505	Metallic materials
2505.1	Method 1: Sheet, strip and plate—Bend tests
2505.2	Method 2: Bars, rods and solid shapes—Bend tests
2405.3	Method 3: Tubular products—Bend and related tests (this Standard)
2405.4	Method 4: Wire—Reverse bend test
2505.5	Method 5: Wire—Simple torsion test
2505.6	Method 6: Wire—Wrapping test

METHOD

1 SCOPE

This Standard specifies four test methods for determining the resistance of metallic seamless and welded tubes to plastic deformation.

NOTE: Criteria for assessment of results of tests are not included; they are set out in appropriate product Standards.

2 DEFINITIONS

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

2.1 Test sample

A portion of metal or product, or items selected from a batch or group by a sampling procedure.

2.2 Test specimen

A portion, or a single item, taken from a test sample for the purpose of applying a particular test.

2.3 Test piece

A piece taken from each test specimen, and suitably prepared for testing.

3 NOTATION

The quantity symbols used in this Standard are listed below.

a = wall thickness of tube, in millimetres

D = original external diameter of tube, in millimetres

D_u = ultimate external diameter after testing, in millimetres

H = distance between platens, in millimetres

L = length of test piece, in millimetres

R = radius of the flange, in millimetres

r = internal radius of bend, in millimetres

α = angle of bend, in degrees

β = conical angle of the mandrel, in degrees

4 APPARATUS

The test apparatus shall be of such construction that test pieces can be appropriately controlled during the performance of the test, and be of adequate design to ensure reproducibility of results. The required apparatus is shown in Figures 1, 2, 3 and 4 as appropriate to the specific test methods.

All mandrels and drift surfaces shall have an N4 finish ($R_a = 0.2 \mu\text{m}$) or smoother, and a surface hardness of 600 HV minimum.

5 TEMPERATURE OF TEST PIECE

The temperature of the test piece at the beginning of the test shall be room temperature which, unless otherwise specified in the product Standard, shall be between 10°C and 35°C.

In the event of dispute, the temperature of the test piece at the beginning of the test shall be $23 \pm 5^\circ\text{C}$.

6 BEND TEST (FULL SECTION)

6.1 Test piece selection and preparation

The test piece shall be selected and prepared for testing as specified in the relevant product Standard. If not specified, the test piece shall be taken from a portion of straight tube, and be of length suitable for the test to be carried out in the bending machine.

6.2 Test procedure

The full-section bend test shall be carried out as follows:

- (a) Insert the test piece in the bend test machine using a grooved former of specified radius (see Figure 1).

Where welded tubes are being tested, position the weld in relation to the plane of bending as specified in the product Standard.

Where not specified in the product Standard, place the weld at 45 degrees to the contact line at the start of the test.

- (b) Bend the tube until the angle of bend reaches the value specified in the product Standard.
- (c) Remove the force and examine the external bent portion of the test piece for cracks, or as required by the product Standard.