

# ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

## ISO RECOMMENDATION R 954

SIMPLE BEND TEST  
FOR LIGHT METAL AND LIGHT METAL ALLOY SHEET AND STRIP  
OF THICKNESS BETWEEN 0.2 mm (0.008 in) AND 7 mm (0.25 in)

1st EDITION  
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## BRIEF HISTORY

The ISO Recommendation R 954, *Simple bend test for light metal and light metal alloy sheet and strip of thickness between 0.2 mm (0.008 in) and 7 mm (0.25 in)*, was drawn up by Technical Committee ISO/TC 79, *Light metals and their alloys*, the Secretariat of which is held by the Association Française de Normalisation (AFNOR).

Work on this question led, in 1966, to the adoption of a Draft ISO Recommendation.

In March 1967, this Draft ISO Recommendation (No. 1134) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Belgium	Israel	Switzerland
Canada	Italy	Thailand
Chile	Japan	Turkey
Czechoslovakia	Netherlands	U.A.R.
France	New Zealand	United Kingdom
Germany	Norway	U.S.A.
Greece	Poland	U.S.S.R.
Hungary	South Africa, Rep. of	Yugoslavia
India	Sweden	

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in January 1969, to accept it as an ISO RECOMMENDATION.

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**SIMPLE BEND TEST**  
**FOR LIGHT METAL AND LIGHT METAL ALLOY SHEET AND STRIP**  
**OF THICKNESS BETWEEN 0.2 mm (0.008 in) AND 7 mm (0.25 in)**

**1. SCOPE**

This ISO Recommendation relates to the application of the simple bend test to light metal and light metal alloy sheet and strip of thickness between 0.2 mm (0.008 in) and 7 mm (0.25 in). It does not apply to rods, bars, or extruded sections.

**2. PRINCIPLE OF TEST**

- 2.1 A rectangular test piece, cut from the sheet or strip, is subjected to plastic deformation by bending. The direction of bending is not reversed during the test.
- 2.2 The bending is continued until one leg of the test piece makes, under load, a specified angle with the extension of the other (see Fig. 2). The axes of the two legs of the test piece remain in a plane perpendicular to the axis of bending. In the case of a 180° bend the two legs may, depending on the requirements of the material specification, lie flat against each other (see Fig. 5) or be parallel at a specified distance apart (equal to twice the bend radius specified in the material specification). An intermediate piece may be used for the control of this distance (see Fig. 4).
- 2.3 The test is carried out at a temperature not exceeding 30 °C.

**3. SYMBOLS AND DESIGNATIONS**

Reference number*	Symbol	Designation
1	<i>a</i>	Thickness of test piece
2	<i>b</i>	Width of test piece
3	—	Distance between supports
4	$\alpha$	Angle of bend
5	<i>R</i>	Radius of support surfaces
6	<i>D</i>	Diameter of mandrel
7	<i>r</i>	Internal radius of bend

\* See Figures 1, 2 and 4.

#### 4. TEST PIECE

- 4.1 The thickness of the test piece should be that of the sheet or strip from which the sample is taken, the rolled surface being undisturbed.
- 4.2 The width of the test piece should be  $20 \begin{smallmatrix} 0 \\ -5 \end{smallmatrix}$  mm ( $3/4 \begin{smallmatrix} 0 \\ -3/16 \end{smallmatrix}$  in), unless otherwise specified by the material specification.  
Narrower strips may be tested full width as supplied.
- 4.3 The direction of the major axis of the test piece should be specified in the material specification.
- 4.4 The test piece should be prepared so that the edges are free from burrs and cracks. Cold-worked zones may be removed by machining or filing. However, the test is acceptable, whether or not the edges have been prepared, provided the resultant bend is satisfactory.

#### 5. METHOD OF TEST

- 5.1 The test may be carried out in one of the following ways :
- (a) The test piece is placed on two parallel supports or rollers and bent in the middle by means of a mandrel (see Fig. 1 and 2).
  - (b) One end of the test piece is clamped in a vice between two blocks and the test piece is bent round one of the blocks, which is rounded to the specified radius and of sufficient hardness (see Fig. 3). The test piece may be bent by hand or by means of rollers attached to a lever pivoted at the centre of curvature of the block.
  - (c) For thin material, the use of a mandrel or former may be impracticable. The test piece may then be bent by hand to a U-form and subsequently closed in a vice until the inner surfaces of the bend are separated by twice the specified bend radius (or are in general contact if the test piece is to withstand a flat bend) (see Fig. 4 and 5).

The procedure to be adopted should be indicated in the material specification.

- 5.2 The bending force should be applied slowly so as to permit free plastic flow of the material.
- 5.3 The test piece may be lubricated before testing.

#### 6. INTERPRETATION OF TEST RESULTS

- 6.1 After bending, the outside of the bent portion should be examined.
- 6.2 The interpretation of the appearance of the outside of the bent portion should be specified in the material specification.