INTERNATIONAL STANDARD

ISO 10065

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Steel bars for reinforcement of concrete — Bend and rebend tests

Barres en acier pour béton armé — Essais de pliage-dépliage

Reference number
ISO 10065:1990(E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 10065 was prepared by Technical Committee ISO/TC 17, *Steel*.

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Steel bars for reinforcement of concrete — Bend and rebend tests

1 Scope

This International Standard specifies procedures for bend and rebend testing of reinforcing steel bars. The purpose of the rebend test is to determine the ageing properties of bars exposed to plastic deformation.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7438:1985, *Metallic materials — Bend test.*

3 Principle

The bend test consists in submitting a test piece to plastic deformation by bending, without changing the direction of loading, until a specified angle of bend is reached.

Ageing properties are tested by the rebend test, which includes bending, subsequent heat treatment, and bending the bar back towards its original shape.

4 Symbols and designations

Symbols and designations used in this International Standard are specified in table 1 and illustrated in figure 1, figure 2 and figure 3.

Table 1

Symbol	Designation	Unit
a	Thickness of mandrel	Millimetre
d	Diameter of test piece	Millimetre
D	Diameter of mandrel	Millimetre
α	Angle of bend	Degree
δ	Angle of rebend	Degree

5 Test equipment

The test equipment is composed of the following elements.

5.1 Bending device

5.1.1 One example of a bending device is shown in figure 1. This system includes the following main components: support, mandrel, carrier.

Figure 1 shows a configuration where the mandrel and support rotate, and the carrier is locked. It is also possible that the carrier rotates and the support or mandrel is locked.

5.1.2 The bend test may also be carried out by using a universal testing machine as described in ISO 7438.

5.2 Rebending device

One example of a rebending device is shown in figure 2. The angles of bend and rebend are illustrated in figure 3.

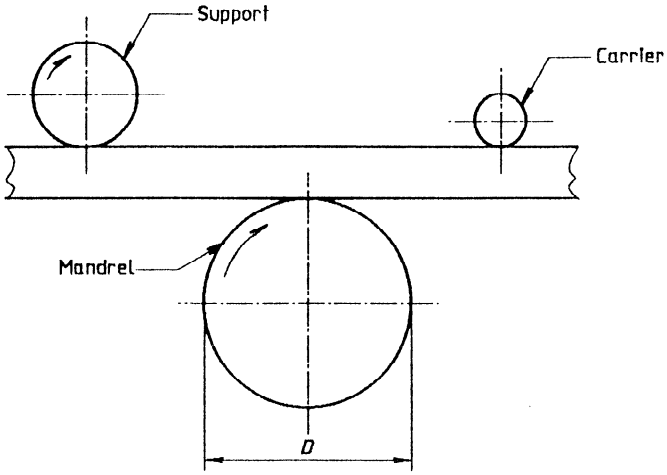


Figure 1 — Example of a bending device

5.3 Strain ageing of test piece for rebending

An oven or boiling water may be used for strain ageing.

The oven temperature shall be controlled by a thermostat, however, temperature control is not required for boiling water.

5.4 Instrument for measuring angle of bend

The angle of bend may be measured with a protractor.

6 Procedure

6.1 Bend test

6.1.1 The test shall be performed at a temperature between 10 °C and 35 °C.

6.1.2 The test piece shall be bent over a mandrel. The angle of bend (α) and diameter of mandrel (D) shall be in accordance with the relevant product standard.

6.1.3 The bending shall be performed at a rate not exceeding 20° per second. The test piece shall be carefully inspected for cracks and fissures visible to the naked eye.

6.2 Rebend test

6.2.1 The test piece shall be bent over a mandrel. The angle of bend (α) and diameter of mandrel (D) shall be in accordance with the relevant product standard. The bending shall be performed at a temperature between 10 °C and 35 °C.

6.2.2 The bent test piece shall be strain aged at 100 °C, and kept at this temperature for at least 30 min. After free cooling in air to a temperature between 10 °C and 35 °C, it shall be bent slowly back to a specified angle (δ).

6.2.3 The rebending shall be performed at a rate not exceeding 20° per second. The test piece shall be carefully inspected for cracks and fissures visible to the naked eye.

7 Test report

The test report shall include the following information:

a) reference to this International Standard;

b) identification of the test piece;

c) grade, shape, length and nominal diameter of the test piece;

d) mandrel diameter;

e) angles of bend and rebend;

f) result of inspection.

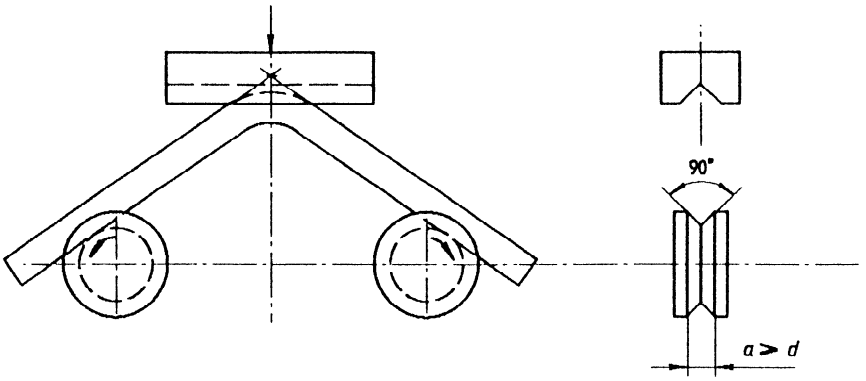
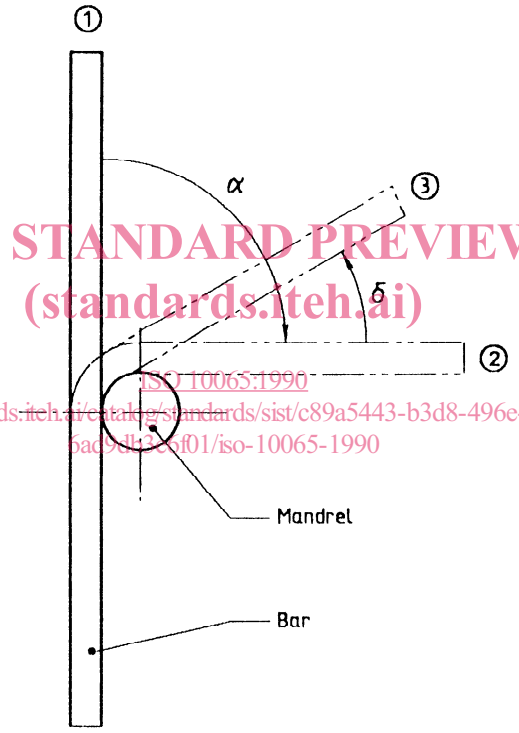


Figure 2 — Example of a rebending device



① Initial position
② Position after operation described in 6.1.3
③ Position after operation described in 6.2.3

Figure 3 — Bend and rebend tests — Angles of bend and rebend

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