INTERNATIONAL STANDARD 136

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Steel — Simple torsion testing of wire

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 136 was drawn up by Technical Committee ISO/TC 17, *Steel*.

It was approved in July 1972 by the Member Bodies of the following countries :

Australia	Hungary	South Africa, Rep. of
Austria	India	Spain
Belgium	Iran	Sweden
Canada	Ireland	Switzerland
Chile	Italy	Thailand
Czechoslovakia	Netherlands	Turkey
Denmark	New Zealand	United Kingdom
Egypt, Arab Rep. of	Norway	U.S.A.
Finland	Pakistan	U.S.S.R.
France	Portugal	
Germany	Romania	

No Member Body expressed disapproval of the document.

This International Standard cancels and replaces ISO Recommendation R 136-1959.

Steel — Simple torsion testing of wire

1 SCOPE AND FIELD OF APPLICATION

This International Standard applies to the simple torsion testing of steel wire having a diameter or characteristic dimension equal to or greater than 0,4 mm (0.016 in). The diameter or characteristic dimension is usually not greater than 10 mm (0.4 in).

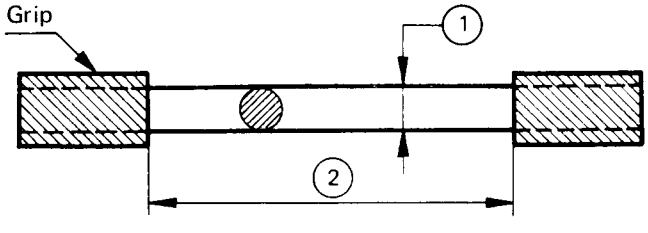
2 PRINCIPLE

Twisting a test piece round its own axis until the test piece breaks or until the specified number of twists have been made. The twisting is in one direction only during the test.

3 SYMBOLS AND DESIGNATIONS

Number	Symbol	Designation
1	d	Nominal diameter of round wire or characteristic dimension[1] for non-circular wires
2	L	Free length between grips
—	N_t	Number of turns

1) The characteristic dimension for non-circular wires is usually given in the standard for the material and is the maximum dimension of the cross-section.



4 TESTING MACHINE

4.1 The grips of the testing machine are to be arranged in such a way that, during testing, they remain on the same axis and do not apply any bending to the test piece.

4.2 The machine is to be so constructed that change of length between the grips during the test is not prevented.

4.3 One of the grips shall be capable of being rotated around the axis of the test piece while the other shall not be subject to any angular deflection, except for such deflection as may be necessary to measure the torque.

4.4 The distance between the grips shall be capable of adjustment for different test lengths.

4.5 The machine shall be so constructed that an appropriate tensile stress may be applied to the test piece.

5 TEST PIECE

5.1 The test piece, consisting of a piece of wire, shall be straight before being tested. If straightening is necessary, it shall be done by hand or, if this is not possible, by hammering on a level surface of wood, plastics material or copper using a hammer made of one of these materials.

5.2 The nominal free length between the grips of the machine shall be as follows :

Nominal size d		Free length between grips (nominal)
mm	in	
$0{,}4 \leqslant d < 1$	$0.016 \leqslant d < 0.040$	$200\,d$
$1 \leqslant d < 3{,}6$	$0.040 \leqslant d < 0.142$	$100\,d$
$3{,}6 \leqslant d < 5$	$0.142 \leqslant d < 0{,}200$	$100\,d$
$5 \leqslant d \leqslant 10$	$0.200 \leqslant d \leqslant 0.400$	$50\,d$

5.3 For wires of large size, in particular sizes over 5 mm, shorter lengths between grips may be used by special agreement. Where the recommended length is $100\,d$, the alternative shorter length shall be $50\,d$ and where the recommended length is $50\,d$, the alternative shorter length shall be $30\,d$.

6 PROCEDURE

6.1 Place the test piece in the machine in such a way that its longitudinal axis coincides with the axis of the grips and it remains straight during the test. Unless otherwise specified, this may be ensured by applying to the test piece a constant tensile stress just sufficient to straighten it, but not exceeding 2 % of the nominal tensile strength of the wire.

6.2 After placing the test piece in the machine, rotate one grip at a reasonably constant speed until the test piece breaks or until the specified number of turns is reached. Count only the number of complete turns of the rotating grip.

6.3 The speed of testing shall be sufficiently slow to prevent any rise in temperature likely to affect the result of the test. In any case it shall not exceed the following values :

Nominal size d		Maximum number of turns per minute per 100 d	Equivalent turns per minute in preferred length
mm	in		
$0{,}4 \leqslant d < 1$	$0.016 \leqslant d < 0.040$	90	180
$1 \leqslant d < 3{,}6$	$0.040 \leqslant d < 0.142$	60	60
$3{,}6 \leqslant d < 5$	$0{,}142 \leqslant d < 0.200$	30	30
$5 \leqslant d \leqslant 10$	$0{,}200 \leqslant d \leqslant 0.400$	30	15

NOTE – For nominal sizes above 10 mm, the speed of testing is to be reduced.

7 TEST REQUIREMENTS

7.1 Unless otherwise specified, the test is to be made at ambient temperature.

7.2 If the number of turns is satisfactory, the test piece is to be considered as having passed the test, irrespective of the position of failure. If the number of turns reached does not satisfy the requirements of the specification, and if the failure is within 2 d of the grips, the test is to be considered as invalid and is to be repeated.

7.3 If so required by the specification for the material, the surface of the test piece, including the fracture, shall be examined. The method of examination and the interpretation of the appearance of the test piece are matters for the material specification.