
**Metallic materials — Torsion test at
ambient temperature**

Matériaux métalliques — Essai de torsion à température ambiante



This document is a preview generated by EBS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2015, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Symbols and designations	3
5 Principle of test	4
6 Test piece	5
6.1 Shape and dimensions of test pieces	5
6.1.1 Cylinder test pieces	5
6.1.2 Tube test pieces	5
6.1.3 Preparation of test pieces	6
7 Determination of original cross-sectional dimensions	7
7.1 Cylinder test pieces	7
7.2 Tube test pieces	7
8 Accuracy of the testing apparatus	7
8.1 Testing machine	7
8.2 Troptometer	7
9 Conditions of testing	8
10 Determination of the properties	8
10.1 Calculations of shear stress and shear strain	8
10.2 Determination of the slope of linear portion of shear stress-shear strain curve	8
10.3 Torsional proof strength, plastic torsion	9
10.4 Upper torsional yield strength and the lower torsional yield strength	10
10.5 Determination of torsional strength	11
10.6 Determination of maximum plastic shear strain	11
11 Test report	12
Annex A (informative) Determination of the reference proof strength, plastic torsion and reference torsional strength	13
Bibliography	17

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 164, *Mechanical testing of metals*, Subcommittee SC 2, *Ductility testing*.

Metallic materials — Torsion test at ambient temperature

1 Scope

This International Standard specifies the method for torsion test at room temperature of metallic materials. The tests are conducted at room temperature to determine torsional properties.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 377, *Steel and steel products — Location and preparation of samples and test pieces for mechanical testing*

ISO 9513, *Metallic materials — Calibration of extensometers used in uniaxial testing*

ASTM E2624, *Standard Practice for Torque Calibration of Testing Machines and Devices*

DIN 51309, *Materials testing machines — Calibration of static torque measuring devices*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

troptometer gauge length

L_e

length of the parallel reduced section of the test piece for measurement of angle of twist by means of a troptometer

3.2

torque

T

moment of couple that generates or tends to generate rotation or torsion

3.3

maximum torque

T_m

for materials displaying discontinuous yielding, highest torque that the test piece withstands during the test after the yielding period, or for materials displaying no discontinuous yielding, highest torque that the test piece withstands during the test

3.4

angle of twist

ϕ

angle of relative rotation measured between two planes normal to the test-piece's longitudinal axial over the gauge length

Note 1 to entry: See [Figure 1](#).