

This is a preview of "ISO 16331-1:2017". [Click here to purchase the full version from the ANSI store.](#)

Second edition
2017-03

Optics and optical instruments — Laboratory procedures for testing surveying and construction instruments —

Part 1: Performance of handheld laser distance meters

*Optique et instruments d'optique — Méthodes d'essai de laboratoire
des instruments d'observation et construction —*

Partie 1: Performance de télémètres laser de poche



Reference number
ISO 16331-1:2017(E)

© ISO 2017



COPYRIGHT PROTECTED DOCUMENT

© ISO 2017, 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

This is a preview of "ISO 16331-1:2017". [Click here to purchase the full version from the ANSI store.](#)

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Symbols and abbreviated terms	1
5 General information	2
5.1 General.....	2
5.2 Target reflectivity.....	2
5.3 Background illumination.....	2
5.4 Temperature of key components.....	3
5.5 Atmospheric influence.....	3
5.6 Measurement resolution.....	3
5.7 Average deviation and uncertainty of measurement.....	3
5.8 Relevant contribution to uncertainty.....	3
5.9 Instruction for instrument specifications.....	3
6 Test procedure for determining the compliance with accuracy specifications	4
6.1 Test concept.....	4
6.2 Requirements.....	4
6.2.1 General.....	4
6.2.2 Apparatus.....	4
6.3 Configuration of check points.....	5
6.4 Measurement procedure.....	5
6.4.1 General.....	5
6.4.2 Absolute distance test.....	5
6.4.3 Background illumination test.....	6
6.4.4 Temperature test.....	6
6.5 Calculation of deviations and uncertainty of measurement.....	7
6.5.1 Absolute distance test.....	7
6.5.2 Background illumination test.....	7
6.5.3 Temperature test.....	8
6.5.4 Combined deviation and combined uncertainty of measurements.....	9
6.5.5 Expanded uncertainty of measurements.....	10
6.5.6 Statement of test result.....	10
7 Test procedure for determining compliance with range specifications	10
7.1 Test concept.....	10
7.2 Requirements.....	10
7.3 Description of measurement procedure.....	11
7.4 Calculation of deviation and uncertainty of measurement.....	11
7.5 Statement of test result.....	12
Annex A (informative) Example of performance specification	13
Annex B (informative) Examples of determining compliance with accuracy specifications	14
Annex C (informative) Examples of determination of compliance with range specifications	27
Annex D (informative) Background illumination simulation	31
Annex E (informative) Target plates	32
Annex F (informative) Typical characteristics of targets	33
Annex G (informative) Typical alignment issues	35
Bibliography	37

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 voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by ISO/TC 172, *Optics and photonics*, Subcommittee SC 6, *Geodetic and surveying instruments*.

This second edition cancels and replaces the first edition (ISO 16331-1:2012), which has been technically revised.

A list of all parts in the ISO 16331 series can be found on the ISO website.

This is a preview of "ISO 16331-1:2017". [Click here to purchase the full version from the ANSI store.](#)

Introduction

Starting in 1993, several companies developed handheld laser distance meters and introduced them into the market. With a growing number of different manufacturers, it became obvious that a standard was needed to establish requirements for device specifications and to describe how to check compliance with the specified performance of accuracy and range.

ISO 17123 specifies methods of checking specification compliance by the user of the instrument without any additional measurement equipment. In contrast, ISO 16331 specifies procedures to check specification compliance using additional laboratory equipment that is unavailable to the typical user.