

ISBN 978-0-626-34256-2

SANS 13528:2017

Edition 2

ISO 13528:2015

Edition 2

SOUTH AFRICAN NATIONAL STANDARD

Statistical methods for use in proficiency testing by interlaboratory comparison

This national standard is the identical implementation of ISO 13528:2015, and is adopted with the permission of the International Organization for Standardization.

WARNING

This document references other documents normatively.

SANS 13528:2017

Edition 2

ISO 13528:2015

Edition 2

Table of changes

Change No.	Date	Scope

National foreword

This South African standard was approved by National Committee SABS/TC 169, *Applications of statistical methods*, in accordance with procedures of the SABS Standards Division, in compliance with annex 3 of the WTO/TBT agreement.

This document was approved for publication in February 2017.

This document supersedes SANS 13528:2009 (edition 1).

Compliance with this document cannot confer immunity from legal obligations.

INTERNATIONAL STANDARD

ISO
13528

Second edition
2015-08-01

Statistical methods for use in proficiency testing by interlaboratory comparison

*Méthodes statistiques utilisées dans les essais d'aptitude par
comparaison interlaboratoires*



Reference number
ISO 13528:2015(E)

© ISO 2015



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	v
0 Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 General principles	4
4.1 General requirements for statistical methods.....	4
4.2 Basic model.....	5
4.3 General approaches for the evaluation of performance.....	5
5 Guidelines for the statistical design of proficiency testing schemes	6
5.1 Introduction to the statistical design of proficiency testing schemes.....	6
5.2 Basis of a statistical design.....	6
5.3 Considerations for the statistical distribution of results.....	7
5.4 Considerations for small numbers of participants.....	8
5.5 Guidelines for choosing the reporting format.....	8
6 Guidelines for the initial review of proficiency testing items and results	10
6.1 Homogeneity and stability of proficiency test items.....	10
6.2 Considerations for different measurement methods.....	11
6.3 Blunder removal.....	11
6.4 Visual review of data.....	11
6.5 Robust statistical methods.....	12
6.6 Outlier techniques for individual results.....	12
7 Determination of the assigned value and its standard uncertainty	13
7.1 Choice of method of determining the assigned value.....	13
7.2 Determining the uncertainty of the assigned value.....	14
7.3 Formulation.....	15
7.4 Certified reference material.....	15
7.5 Results from one laboratory.....	16
7.6 Consensus value from expert laboratories.....	17
7.7 Consensus value from participant results.....	18
7.8 Comparison of the assigned value with an independent reference value.....	19
8 Determination of criteria for evaluation of performance	20
8.1 Approaches for determining evaluation criteria.....	20
8.2 By perception of experts.....	20
8.3 By experience from previous rounds of a proficiency testing scheme.....	20
8.4 By use of a general model.....	21
8.5 Using the repeatability and reproducibility standard deviations from a previous collaborative study of precision of a measurement method.....	22
8.6 From data obtained in the same round of a proficiency testing scheme.....	22
8.7 Monitoring interlaboratory agreement.....	23
9 Calculation of performance statistics	23
9.1 General considerations for determining performance.....	23
9.2 Limiting the uncertainty of the assigned value.....	24
9.3 Estimates of deviation (measurement error).....	25
9.4 z scores.....	26
9.5 z' scores.....	27
9.6 Zeta scores (ζ).....	28
9.7 E_n scores.....	29
9.8 Evaluation of participant uncertainties in testing.....	29
9.9 Combined performance scores.....	30