

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.

SANS 13528:2017
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