TECHNICAL REPORT

ISO/TR 21074

First edition
2016-10-15

Application of ISO 5725 for the determination of repeatability and reproducibility of precision tests performed in standardization work for chemical analysis of steel

Application de la norme ISO 5725 pour la détermination de la répétabilité et la reproductibilité des essais de précision réalisés en travaux de normalisation pour l'analyse chimique de l'acier

Reference number
ISO/TR 21074:2016(E)

© ISO 2016



COPYRIGHT PROTECTED DOCUMENT

© ISO 2016, 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 Precision test ... **1**
4.1 Structure of the precision test ... 1
4.2 Homogeneity of samples ... 2
4.3 Number of laboratories and number of levels ... 2

5 Representation of the experimental results ... **2**
5.1 General ... 2
5.2 Table of results and number of decimal places ... 2
5.3 Graphical representation of the data ... 3
5.3.1 General ... 3
5.3.2 Data plot ... 3

6 Statistical evaluation ... **4**
6.1 Cochran's test ... 5
6.2 Grubbs' test ... 6
6.2.1 General ... 6
6.2.2 Grubbs' test for one outlier observation ... 7
6.2.3 Grubbs' test for two outlier observations ... 7
6.3 Treatment of outlier observations ... 8
6.4 Calculation of precision ... 8
6.5 Representation of the results of the statistical evaluations ... 9
6.6 Functions linking the level and the precision parameters ... 13

7 Determining smoothed precision and scope ... **15**

Bibliography ... **16**

© ISO 2016 – All rights reserved

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 17, *Steel*, Subcommittee SC 1, *Methods of determination of chemical composition*.

© ISO 2016 – All rights reserved

Application of ISO 5725 for the determination of repeatability and reproducibility of precision tests performed in standardization work for chemical analysis of steel

1 Scope

This document describes how to determine the repeatability and reproducibility of precision tests performed within standardization work using the chemical analysis method. Specifically, this document explains the procedure for calculating precision, using precision test data of ISO 5725-3:1994, Table D.2 for the precision test in ISO 9647:1989 as an example.

The procedure of the international test for determining precision is described in ISO 5725-2 and ISO 5725-3.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

4 Precision test

4.1 Structure of the precision test

The structure of the precision test normally used within standardization work using chemical analysis is a 3-factor, staggered-nested structure, as shown in Figure 1.

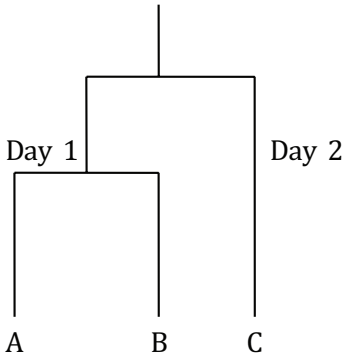


Figure 1 — Structure of the precision test

© ISO 2016 – All rights reserved