

ICS 03.120.30

CCS A 41



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/Z 22553-2010

**Guidance for the use of repeatability, reproducibility and
trueness estimates in measurement uncertainty estimation**

利用重复性、再现性和正确度的估计值评估测量不确定度的指南

(English Translation)

Issued on: September 2, 2010

Implemented on: December 1, 2010

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of People's Republic of China, China National Standardization
Administration**

Table of Contents

Foreword	
Introduction	
1 Scope	
2 Normative references	
3 Terms and definitions	
4 Symbol	
5 Principle	
5.1 Single Results and Measurement Process Performance	
5.2 Applicability of reproducible data	
5.3 Basic Statistics Model	
5.4 Repeatability data	
6 Assess measurement uncertainty using estimates of repeatability, reproducibility and accuracy	
6.1 Measurement Uncertainty Assessment Procedure	
6.2 Expected precision vs. actual precision	
7 Establish the relationship between method performance data and measurement results during a particular measurement	
7.1 Overview	
7.2 Biased laboratory component control representation	
7.3 Repeatability confirmation	
7.4 Performance Confirmation	
8 Test sample related processing	
8.1 Overview	
8.2 Sample	
8.3 Sample Preparation and Pretreatment	
8.4 Test sample type changes	
8.5 Uncertainty as the response level changes	
9 Other factors	

Foreword

This technical note is equivalent to ISO/T S21748.2004 "Estimating measurements using repeatability, reproducibility and accuracy Guide to Uncertainty. " the main differences

between this guidance document and ISO/T S21748.2004 are as follows.

- Remove the foreword of the international standard;
- Use the decimal point "." Instead of as a decimal point comma ",";
- A.6 in A.2.1 " $u(y) = u(B) + u(er) = u_{2L} + s_{2r}$ " to " $u(y) = u(B) + u(er) = s_{2L} + s_{2r}$ ";
- Correction of "WvN" in formula (C.2) of Appendix C, C.2.2 to "W mN".

Appendices A, B and C of this guidance document are informative appendices.

This Guidance Document is proposed and managed by the National Technical Committee for Standardization of Statistical Methods (SAC/TC21).

The drafting of the guidance of technical documents. Liaoning Exit Inspection and Quarantine, China National Institute of Standardization, Nankai University, Beijing Aerospace University, Institute of Mathematics and Systems Science, Chinese Academy of Sciences, China National Accreditation Service for Conformity Assessment.

Introduction

The uncertainty of the measurement results is very important for interpreting the measurement results. Without a quantitative assessment of uncertainty, it is impossible to determine the measurement the differences observed between the fruits contain information outside the test variation, whether the test items are in compliance with the specifications, and whether they exceed the regulations under which they are based limit. Without uncertainty, there is the risk of erroneously processing the results, and the resulting wrong decisions can lead to unnecessary industrial use Loss of law, wrong legal prosecution, or harmful health and adverse social consequences.

In accordance with GB/T 27025 accreditation and related system requirements, the laboratory should assess the uncertainty of measurement and test results, and give the relevant Uncertainty Report. The Measurement Uncertainty Indication (GUM), published by ISO et al., Is a widely adopted standard method but it is only suitable if the measurement process model is known. However, most of the standard test methods are based on GB/T 6379.2-2004 the collaborative test to complete. This guidance document provides a cost-effective method of evaluating the results of these standard test methods of the uncertainty is estimated in full compliance with the relevant principles of GUM, taking into account the method performance data obtained by the collaborative experiment.

The general methodology of this guidance document is as follows.

- According to GB/T 6379.2-2004 described in the collaborative test described in the test method repeatability, reproducibility and accuracy of the estimate Values, available from published information about the test method used. This information provides the variance between laboratories and laboratories the estimated value, but also relates to the accuracy

of the test method to estimate the uncertainty.

--- Laboratory should verify its own bias and precision, to determine whether the implementation of test methods meet the performance requirements of the method, this shows that the published data can be applied to laboratory measurements.

--- Collaborative tests can not be included in all measurement results should be identified, and the resulting variance to be quantified.

According to the method described by GUM, an estimate of the uncertainty is given by synthesis of the variance estimates.

Similarly, the scatter of synergistic test results is often compared with the measurement uncertainty of the GUM program to test the validity of the method A comprehensive understanding. Such a comparison is more effective if there is a consistent method of estimating the same parameters with the collaborative experimental data.

Use estimates of repeatability, reproducibility, and accuracy Guidelines for assessing measurement uncertainty

1 Scope

This Guidance Document specifies.

--- Based on GB/T 6379.2-2004 collaborative test data to assess the measurement uncertainty (MU).

--- Comparison of test results and uncertainty of measurement uncertainty obtained by the principle of measurement (see Chapter 14).

This guidance document defines other model studies of ISO 5725-3 intermediate precision, although this method can also be applied to these Extensions, but do not include uncertainty assessments under these models.

This technical note is applicable to all aspects of measurement and testing uncertainty in the assessment of the scope does not apply to the lack of reproducibility Data repetitive data application method.

This guideline is applicable to identified, non-negligible system effects that have been corrected for assumptions and can be applied as part of a measurement methodology Divide the value of the correction, or by looking for and eliminating the cause of the effect to complete.

This guidance document serves as a guideline and provides an effective method for assessing the uncertainty under various uses. However, He appraised the method.

This guidance applies to measurement results, methods and procedures or test results, methods and procedures.

2 Normative references

The following documents contain provisions which, through reference in this Guidance Document, become the provisions of this Guidance Note document. All dated Cited documents, all subsequent amendments (not including errata content) or revisions do not apply to this guidance document. However, drums Recipients of the agreement based on this guidance document are encouraged to study whether the latest versions of these documents are applicable. All undated references the latest version of this document applies to this guidance document.

Statistical vocabulary and symbols - Part 1. General statistical terms and terms used in probability (ISO 3534-1:2006, IDT) ISO 5725-3 Accuracy (accuracy and precision) of measurement methods and results Part 3. Standard measurement methods Precision Interval measurement

3 Terms and definitions

The following terms and definitions apply to this guidance document.

Bias bias

The difference between the expectation of the test result and the accepted reference value.

Note: In contrast to random errors, biases are the sum of systematic errors. Bias may be caused by one or more systematic errors. System error and accepted reference value the greater the difference, the greater the bias.

[Cited from GB/T 3358.1] 3.2 Combined standard uncertainty $u(y)$ the standard uncertainty, calculated as the variance of other quantities or (and) the covariance, when the measurement is obtained from several other quantities.

[JJF1059-1999]