

ISO 21748:2017-04 (E)

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

Contents		Page
Foreword		v
Introduction		vii
1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	Symbols	5
5	Principles	7
5.1	Individual results and measurement process performance	7
5.2	Applicability of reproducibility data	7
5.3	Basic equations for the statistical model	8
5.4	Repeatability data	9
6	Evaluating uncertainty using repeatability, reproducibility and trueness estimates	9
6.1	Procedure for evaluating measurement uncertainty	9
6.2	Differences between expected and actual precision	10
7	Establishing the relevance of method performance data to measurement results from a particular measurement process	10
7.1	General	10
7.2	Demonstrating control of the laboratory component of bias	10
7.2.1	General requirements	10
7.2.2	Methods of demonstrating control of the laboratory component of bias	10
7.2.3	Detection of significant laboratory component of bias	13
7.3	Verification of repeatability	13
7.4	Continued verification of performance	13
8	Establishing relevance to the test item	13
8.1	General	13
8.2	Sampling	14
8.2.1	Inclusion of sampling process	14
8.2.2	Inhomogeneity	14
8.3	Sample preparation and pre-treatment	14
8.4	Changes in test-item type	14
8.5	Variation of uncertainty with level of response	14
8.5.1	Adjusting sR	14
8.5.2	Changes in other contributions to uncertainty	15
9	Additional factors	15
10	General expression for combined standard uncertainty	16
11	Uncertainty budgets based on collaborative study data	16
12	Evaluation of uncertainty for a combined result	18

13	Expression of uncertainty information	18
13.1	General expression	18
13.2	Choice of coverage factor	18
13.2.1	General	18
13.2.2	Level of confidence desired	18
13.2.3	Degrees of freedom associated with the estimate	18
14	Comparison of method performance figures and uncertainty data	19
14.1	Basic assumptions for comparison	19
14.2	Comparison procedure	19
14.3	Reasons for differences	20
Annex A (informative)	Approaches to uncertainty evaluation	21
Annex B (informative)	Experimental uncertainty evaluation	26
Annex C (informative)	Examples of uncertainty calculations	27
Bibliography		37