

ISO 5725-2:2025-12 (E)

Accuracy (trueness and precision) of measurement methods and results - Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method

Contents		Page
Foreword		v
Introduction		vi
1	Scope	1
2	Normative references	2
3	Terms and definitions	2
4	Symbols and subscripts	2
4.1	Symbols	2
4.2	Subscripts	4
5	Estimates of the parameters in the basic model	4
6	Requirements for a precision experiment	5
6.1	Layout of the experiment	5
6.2	Recruitment of the laboratories	6
6.3	Preparation of the materials	6
7	Personnel involved in a precision experiment	7
7.1	Panel	7
7.2	Statistical functions	8
7.3	Executive functions	8
7.4	Supervisors	9
7.5	Operators	9
8	Statistical analysis of a precision experiment	10
8.1	Preliminary considerations	10
8.2	Tabulation of the results and notation used	10
8.2.1	Cells	10
8.2.2	Redundant data	10
8.2.3	Missing data	11
8.2.4	Outliers	11
8.2.5	Outlying laboratories	11
8.2.6	Erroneous data	11
8.2.7	Balanced uniform-level test results	11
8.2.8	Collation of data and intermediate values	11
8.2.9	Original test results	12
8.2.10	Cell means (Form B of Figure 2)	12
8.2.11	Measures of cell spread (Form C of Figure 2)	12
8.2.12	Corrected or rejected data	12
8.3	Scrutiny of results for consistency and outliers	13
8.3.1	Approaches for scrutiny of data	13
8.3.2	Graphical consistency technique	13
8.3.3	Numerical outlier technique	16
8.3.4	Cochran's test	16
8.3.5	Grubbs' tests	18

8.3.6	Repeated testing for outlying means or outlying data points	20
8.3.7	Alternative outlier inspection and test methods	20
8.4	Calculation of the general mean and variances	20
8.4.1	Method of analysis	20
8.4.2	Basic data	21
8.4.3	Non-empty cells	21
8.4.4	Calculation of the general mean, \bar{m}	21
8.4.5	Calculation of variances	21
8.4.6	Alternative calculation methods for variances	22
8.4.7	Dependence of the variances upon m	23
8.5	Establishing a functional relationship between precision values, s, and the mean level, m	23
8.5.1	Choice of functional relationship	23
8.5.2	Fitting relationships I and II	24
8.5.3	Fitting relationship in 8.5.1.3 c)	25
8.5.4	Fitting relationship in 8.5.1.3 d)	26
8.6	Statistical analysis as a step-by-step procedure	28
8.7	Report to the panel and decisions to be taken by the panel	30
8.7.1	Report by the statistical expert	30
8.7.2	Decisions to be taken by the panel	32
8.7.3	Full report	32
9	Statistical tables	33
	Annex A (informative) Number of laboratories required for an estimate of precision	38
	Annex B (informative) Alternative calculations of variance components	41
	Annex C (informative) Examples of the statistical analysis of precision experiments	43
	Annex D (informative) Calculation of critical values and indicators	64
	Bibliography	67