

DIN EN ISO 25377:2024-10 (E)

Hydrometric uncertainty guidance (HUG) (ISO 25377:2020)

Contents		Page
European foreword		4
Foreword		5
Introduction		6
1 Scope		8
2 Normative references		8
3 Terms and definitions		8
4 Symbols		8
5 ISO/IEC Guide 98-3 (GUM) — Basic definitions and rules		10
5.1 General.....		10
5.2 Uncertainty of sets of measurements.....		10
5.3 Random and systematic effects.....		11
5.4 Uncertainty models — Probability distributions.....		12
5.5 Combining uncertainties — Law of propagation of uncertainties.....		12
5.6 Expressing results.....		13
6 Open channel flow — Velocity area methods		13
6.1 General.....		13
6.2 Mean velocity, \bar{V}_x		14
6.3 Velocity-area method for discharge calculation.....		15
6.4 Measurement of velocity.....		16
6.5 Uncertainty associated with the velocity-area method.....		16
6.5.1 General.....		16
6.5.2 Random and systematic effects.....		18
6.6 Integration uncertainties $[u^*(F_y), u^*(F_z)]$		18
6.6.1 General.....		18
6.6.2 Vertical scanning uncertainties.....		18
6.6.3 Horizontal scanning uncertainties.....		19
6.7 Perimeter flow uncertainties, $u(Q_p)$		19
7 Open channel flow — Critical depth methods		20
7.1 General.....		20
7.2 Head and geometry determination.....		20
7.3 Iterative calculation.....		21
7.4 Evaluating uncertainty.....		21
8 Dilution methods		22
8.1 General.....		22
8.2 Continuous feed.....		22
8.3 Transient mass.....		24
9 Hydrometric instrumentation		25
9.1 Performance specifications.....		25
9.2 Validity of uncertainty statements.....		25
9.3 Manufacturer's specifications.....		26
9.4 Performance guide for hydrometric equipment for use in technical standard examples.....		27
10 Guide for the drafting of uncertainty clauses in hydrometric standards		28
10.1 General.....		28

10.2	Equipment, methods and measurement systems.....	28
10.2.1	General.....	28
10.2.2	Equipment.....	28
10.2.3	Methods.....	28
10.2.4	Systems.....	29
11	Examples.....	29
11.1	General.....	29
11.2	Uncertainty in water level measurement.....	29
11.2.1	Example 1: Float/shaft encoder sensor installed in stilling well at gauging station.....	29
11.2.2	Example 2: Pressure transmitter installed in tube.....	30
11.3	Uncertainty in flow measurement using flow measurement structures.....	30
11.4	Uncertainty in flow measurement by current meter.....	33
	Annex A (informative) Introduction to hydrometric uncertainty.....	38
	Annex B (informative) Introduction to Monte Carlo Simulation (MCS).....	55
	Annex C (informative) Interpolated Variance Estimation (IVE) method.....	60
	Annex D (informative) Performance guide for hydrometric equipment for use in technical standard examples.....	64
	Annex E (informative) Uncertainty analysis of stage-discharge relation.....	67
	Annex F (informative) Measurement of velocity.....	71
	Bibliography.....	76