

ISO 3354:2008-07 (E)

Measurement of clean water flow in closed conduits - Velocity-area method using current-meters in full conduits and under regular flow conditions

Contents		Page
Foreword		v
1	Scope	1
2	Normative references	1
3	Terms and symbols	2
3.1	Terms	2
3.2	Symbols	3
4	Principle	4
4.1	General	4
4.2	Measurement of the measuring cross-section	5
4.3	Measurement of local velocities	6
4.4	Location and number of measuring points in the cross-section	7
5	Description of the current-meter	9
6	Requirements for the use of current-meters	9
6.1	Selection of the measuring cross-section	9
6.2	Devices for improving flow conditions	10
6.3	Calibration of the current-meter	11
6.4	Limits of use	11
6.5	Inspection and maintenance of current-meters	13
7	Setting of current-meters into the conduit	13
7.1	Setting of current-meters	13
7.2	Mounting in a circular cross-section	13
7.3	Mounting in a rectangular cross-section	14
8	Determination of the mean axial fluid velocity by graphical integration of the velocity area	16
8.1	General	16
8.2	Circular cross-sections	16
8.3	Rectangular cross-sections	18
9	Determination of the mean axial fluid velocity by numerical integration of the velocity area	20
9.1	General	20
9.2	Circular cross-sections	21
9.3	Rectangular cross-sections	22
10	Determination of the mean axial fluid velocity by arithmetical methods	23
10.1	General	23
10.2	Log-linear method	23
10.3	Log-Chebyshev method	25
11	Uncertainty in the measurement of flow-rate	27
11.1	General	27
11.2	Sources of error in local velocity measurements	27
11.3	Sources of error in estimation of flow-rate	28
11.4	Propagation of errors	29

11.5	Presentation of results	29
11.6	Calculation of uncertainty	30
Annex A (normative) Measuring sections other than circular or rectangular sections		33
Annex B (normative) Corrections for blockage effect		38
Annex C (normative) Recommendations for the selection of the type of current-meter and mounting strut		39
Annex D (normative) Example of measuring point distribution along a radius for velocity measurement in a conduit of circular cross-section in the case of the graphical and numerical methods		41
Annex E (normative) Determination of boundary layer coefficient, m , for extrapolation near the wall		43
Annex F (normative) Definition of terms and procedures used in the uncertainty calculation		45
Annex G (normative) Student's t distribution		48
Annex H (informative) Examples of values of component uncertainties		49
Annex J (informative) Example of calculation of the uncertainty in the flow-rate measurement using current-meters		51