

# ISO 748:2007-10 (E)

## Hydrometry - Measurement of liquid flow in open channels using current-meters or floats

---

<b>Contents</b>		<b>Page</b>
Foreword .....		v
<b>1</b>	<b>Scope .....</b>	<b>1</b>
<b>2</b>	<b>Normative references .....</b>	<b>1</b>
<b>3</b>	<b>Terms and definitions .....</b>	<b>1</b>
<b>4</b>	<b>Principle of the methods of measurements .....</b>	<b>1</b>
<b>5</b>	<b>Selection and demarcation of site .....</b>	<b>2</b>
5.1	Selection of site .....	2
5.2	Demarcation of site .....	3
<b>6</b>	<b>Measurement of cross-sectional area .....</b>	<b>3</b>
6.1	General .....	3
6.2	Measurement of width .....	3
6.3	Measurement of depth .....	4
<b>7</b>	<b>Measurement of velocity .....</b>	<b>5</b>
7.1	Measurement of velocity using current-meters .....	5
7.1.1	Rotating-element current-meters .....	5
7.1.2	Electromagnetic current-meters .....	5
7.1.3	Measurement procedure .....	5
7.1.4	Oblique flow .....	6
7.1.5	Determination of the mean velocity in a vertical .....	7
7.1.6	Errors and limitations .....	10
7.2	Measurement of velocity using floats .....	11
7.2.1	General .....	11
7.2.2	Selection of site .....	11
7.2.3	Measuring procedure .....	11
7.2.4	Types of float .....	11
7.2.5	Determination of velocity .....	12
7.2.6	Main sources of error .....	13
<b>8</b>	<b>Computation of discharge .....</b>	<b>13</b>
8.1	General .....	13
8.2	Graphical method .....	13
8.2.1	Depth-velocity-integration .....	13
8.2.2	Velocity-area integration method (velocity-contour method) .....	14
8.3	Arithmetic methods .....	16
8.3.1	Mean-section method .....	16
8.3.2	Mid-section method .....	16
8.4	Independent vertical method .....	17
8.5	Mean-section method -- Horizontal planes .....	20
8.6	Determination of discharge from surface-float velocity measurements .....	20
8.7	Determination of discharge for variations of water level .....	22
8.7.1	General .....	22
8.7.2	Computation of discharge .....	22
8.7.3	Computation of mean water level .....	22

<b>9</b>	<b>Uncertainties in flow measurement .....</b>	<b>23</b>
<b>9.1</b>	<b>General .....</b>	<b>23</b>
<b>9.2</b>	<b>Definition of uncertainty .....</b>	<b>23</b>
<b>9.3</b>	<b>Method of calculating the uncertainty in discharge by measurement of velocity by current-meter .....</b>	<b>24</b>
<b>9.3.1</b>	<b>General .....</b>	<b>24</b>
<b>9.3.2</b>	<b>Contributory uncertainties .....</b>	<b>24</b>
<b>9.3.3</b>	<b>Example .....</b>	<b>26</b>
<b>9.3.4</b>	<b>Combined uncertainty .....</b>	<b>26</b>
<b>9.4</b>	<b>Method of calculating the uncertainty in discharge by measurement of velocity using floats .....</b>	<b>27</b>
<b>9.4.1</b>	<b>General .....</b>	<b>27</b>
<b>9.4.2</b>	<b>Contributory uncertainties .....</b>	<b>27</b>
<b>9.4.3</b>	<b>Combined uncertainty in discharge .....</b>	<b>28</b>
<b>9.4.4</b>	<b>Example .....</b>	<b>28</b>
<b>Annex A (informative)</b>	<b>Correction for sag, pull, slope and temperature in measurement of cross- section width by tape or wire .....</b>	<b>30</b>
<b>Annex B (informative)</b>	<b>Distance measurement across the cross-section .....</b>	<b>33</b>
<b>Annex C (informative)</b>	<b>Corrections for wetted length of wire when measuring depths with wire not normal to surface .....</b>	<b>36</b>
<b>Annex D (informative)</b>	<b>Correction for drift .....</b>	<b>39</b>
<b>Annex E (informative)</b>	<b>Uncertainties in the velocity-area measurement .....</b>	<b>40</b>
<b>Annex F (informative)</b>	<b>Determination of mean velocity from float measurements .....</b>	<b>44</b>
<b>Bibliography</b>	<b>.....</b>	<b>46</b>