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**Measurement of liquid flow in open  
channels under tidal conditions**

**AMENDMENT 1**

*Mesure de débit des liquides dans les canaux découverts dans des  
conditions de marée*

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AMENDEMENT 1

ISO 2425:1999/Amd 1:2003

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## Foreword

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Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

Amendment 1 to ISO 2425:1999 was prepared by Technical Committee ISO/TC 113, *Hydrometry*, Subcommittee SC 1, *Velocity area methods*.

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# Measurement of liquid flow in open channels under tidal conditions

## AMENDMENT 1

### *Cover page*

Replace the title in French with “*Mesure de débit des liquides dans les canaux découverts dans des conditions de marée*”.

### *Page 2, Subclause 4.3.1*

Add the following sentence at the end of the subclause:

“This value, when used in conjunction with the cross-sectional area, will provide an estimate of the flow in the channel.”

### *Page 2, Subclause 4.3.2*

Replace the last sentence with the following:

“After calibration, measurements of electrical parameters and water depth provide a means of estimating the discharge.” <https://standards.iteh.ai/catalog/standards/sist/86e70b42-b30a-47f2-922a-e38c6f01901b/iso-2425-1999-amd-1-2003>

### *Page 3, Subclause 5.1 c)*

In the first line, replace “usually” with “could”.

### *Page 3, Subclause 5.2.1*

Replace the penultimate sentence with the following:

“Under variable or unsteady conditions, the frequency of measurement, although affecting the operational cost of each gauging station and important economically, may not be compromised.”

### *Page 3, Subclause 5.2.2 a)*

Replace “tidal range” with “tidal range including level, flow and velocity”.

### *Page 4, Subclause 5.2.2 f)*

Replace this item in the list with the following:

“f) change in flow direction during a tidal cycle including flow reversal or backwater effects;”.

### *Page 4, Subclause 5.2.2 p)*

Delete this item in the list.

Page 6, Subclause 6.1.1.3.1

Replace the second paragraph with the following one:

“To limit the risk of error due to changes in the direction of flow, the use of a direction-indicating current meter is recommended. Since the direction of flow may not be the same at different levels in the vertical, the depths at which the directions of flow are measured should also be recorded, and the measurement made at a number of points (at least surface, mid-depth and bed) in the vertical. An alternative but less reliable method of determining the direction of flow is to use a sub-surface float.”

Page 8, Subclause 6.1.1.3.2, Note

For the definition of  $T$ , replace “cycle” with “cycle(s)”.

Page 9, Subclause 6.2.1 e)

Replace this item in the list with the following:

“e) measurement may not be possible if high concentrations of suspended solids are present. Annex B, Table B.2 gives the relationship between pathlength, transducer frequency and suspended solid concentrations;”

Page 9, Subclause 6.2.1 h)

Delete this item from the list.

Page 10, Subclause 6.2.3, Note

For the definition of  $q$ , add “(m<sup>3</sup>/s)” after “flow”.

For the definition of  $T$ , replace “ebb flow” with “ebb flow(s)”

Page 17, Annex B

Replace the first paragraph with

“This annex provides guidance to the selection of an appropriate method (Table B.1) and estimates of tolerable sediment concentration for acoustic velocity meter systems (Table B.2).”

Pages 17 to 19, Annex B, Tables B.1 to B.3

Delete Table B.2. Renumber Table B.3 as Table B.2.

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Replace Table B.1 with the following Table B.1:

**Table B.1 — Guide to the selection of gauging method**

Parameter	Current meter fixed station	Current meter moving boat	Ultrasonic method	Electromagnetic method
Depth < 1 m	√	×	a	√
> 1 m	√	√	a	√
Width: depth ratio < 30	√	√	a	√
> 30	√	√	a	√
Width < 30 m	√	×	a	√
30 m to 200 m	√	√	a b	e
> 200 m	√	√	a b	×
Tidal range > 1 m	c	c	√	√
Width variation < 10 m	√	d	√	√
10 m to 30 m	√	d	√	√
> 30 m	√	d	√	e
Dense waterborne traffic	×	g	h	×
Limited number of staff	×	×	√	√
Limited number of equipment	×	√	√	√
Salt wedge	i	i	j	×
Temperature gradient	√	√	×	√
Wind seiches	c	c	√	√
<p>√ Method is suitable for this parameter.</p> <p>× Method is not suitable for this parameter.</p> <p>a Minimum distance between path and the surface or bed is:  <math display="block">27 \sqrt{\frac{\text{Pathlength (m)}}{\text{Transducer frequency (Hz)}}}</math></p> <p>b In wider rivers, problems of signal loss from suspended solids and temperature gradients become important. See ISO 6416.</p> <p>c Measurements shall be taken quickly, so that measured velocity is representative of that over full depth.</p> <p>d Measurement in shallow water not possible.</p> <p>e Method may be uneconomic if widths exceed 30 m.</p> <p>f Mounting of transducers and keeping paths free of weed becomes difficult.</p> <p>g Risk of collision.</p> <p>h Loss of record when boats are in the measurement section and for up to 3 min after they leave the section.</p> <p>i Water velocities may be in opposing directions above and below the interface. Meters should be direction-sensing.</p> <p>j Is not recommended for use in nonhomogeneous water; but velocities may be able to be measured in the freshwater region and in the salt-water region. No measurements can be made in the interface (see ISO 6416).</p>				

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