INTERNATIONAL STANDARD

ISO 1438-1

First edition
1980-04-15

AMENDMENT 1
1998-04-15

Water flow measurement in open channels using weirs and Venturi flumes —

Part 1:

Thin-plate weirs

AMENDMENT 1

Mesure de débit de l'eau dans les canaux découverts au moyen de déversoirs et de canaux Venturi —

Partie 1: Déversoirs en mince paroi

AMENDEMENT 1

Reference number
ISO 1438-1:1980/Amd.1:1998(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Amendment 1 to International Standard ISO 1438-1:1980 was prepared by Technical Committee ISO/TC 113, *Hydrometric determinations*, Sub-committee SC 2, *Notches, weirs and flumes.*

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Printed in Switzerland

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Page iii

In **Contents**, change existing annex to:

"Annex A"

and add the following new annex:

"Annex B (informative): Guide to the design and installation of a flow straightener"

Page 2

In **6.3.3**, add the following new paragraph between the existing second and third paragraphs.

However, if the maximum head to be measured is restricted to 2/3*p* for all types of weirs, flow straighteners can be used to reduce the effective length of the approach channel to B + 3 h_{max} for triangular and rectangular weirs and to B + 5 h_{max} for full-width weirs. This restriction is necessary due to the distortion of the velocity distribution in the approach channel that would result from an overflow running over the top of each baffle of the straightener, if the head on the weir was too high.

NOTE — For this purpose, the specification of a typical straightener[1)2)] calls for at least four perforated plates, with a percentage open area of between 40 % and 60 % inclusive, separated from each other by 0,2 m minimum. The perforations should be uniformly distributed. A guide for the design and for the installation of the straightener, and also a typical example of perforation are given in annex B.

At the foot of page 2, add the following footnotes:

1) Kurokawa J. *et al*, "*Flow measurement using full-width weir: Comparison of ISO, JIS and HIS formulae*" - Proc. 3rd triennial Int. Symp. on Fluid Control, Meas. and Visual - San Francisco. 1991 Aug., p 669.

2) Kurokawa T, "*Flow measurement using weirs*" - Journ. JSME, vol. 55, No 407 (1952-12), p 759 (in Japanese).

Page 3

In clause **8 Maintenance**, add a new paragraph at the end:

If a flow straightener is used in the approach channel, perforated plates shall be kept clean so that the percentage open area remains greater than 40 %.

Page 4

Replace the existing figure 2 by the new figure 2 below.

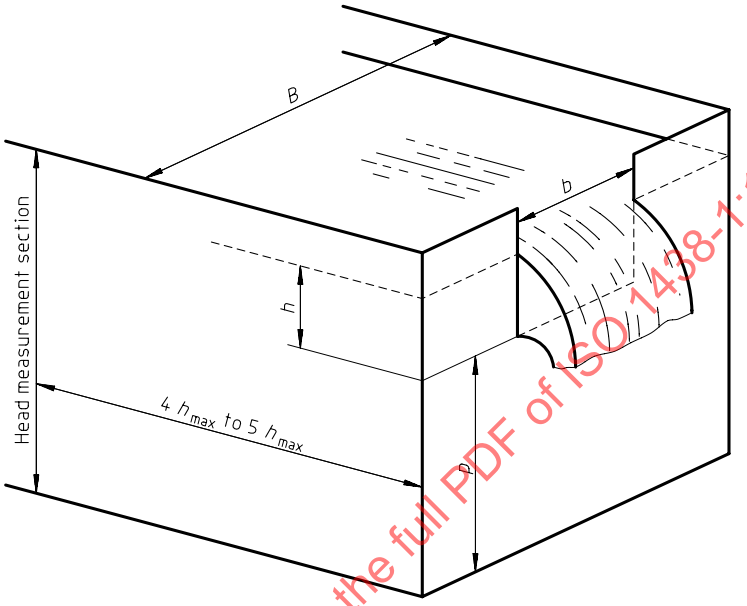

Figure 2 — Rectangular-notch thin-plate weir

Page 9

Insert the following new subclause after **9.7.2**:

9.7.3 JIS[3] formula

The JIS formula for a full-width weir is:

$$Q = Cbh^{3/2}$$

where

$$C = 1{,}785 + \left(\frac{0{,}00295}{h} + \frac{0{,}2367\,h}{p}\right)(1+\varepsilon)$$

in which

$\varepsilon = 0$ for $p \leq 1$ m

$\varepsilon = 0{,}55\,(p - 1)$ for $p > 1$ m

Practical limitations to the use of the JIS formula are:

a) *h/p* shall not be greater than 0,667;

b) *h* shall be between 0,03 m and 0,80 m; and not greater than *b/4*;

c) *b* shall not be less than 0,50 m;

d) *p* shall be between 0,30 m and 2,50 m.

In cases where the effective length of the approach channel has been reduced by the installation of flow straighteners, the use of the JIS formula is recommended.

At the foot of page 9, add the following footnote:

3) Japanese Industrial Standard JIS B 8302.

Page 10

Replace the existing figure 6 by the new figure 6 below:

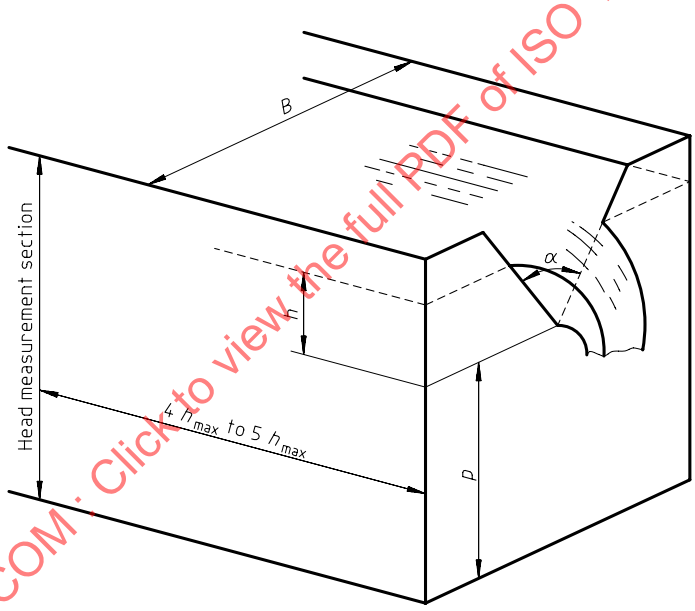

Figure 6 — Triangular-notch thin-plate weir

After page 27

Add new annex B as follows:

Annex B
(informative)

Guide to the design and installation of a flow straightener

A flow straightener may be used for reducing the approach channel length.

The purpose of a flow straightener is to modify the flow in a shortened approach channel so that the velocity distribution of the flow is normal and steady. Subclause 6.3.3 and figure 1 specify a normal velocity distribution.

A flow straightener should consist of several perforated plates (at least four), installed vertically and perpendicular to the flow direction with a minimum spacing of 0,2 m between adjacent plates. The percentage of the open area of each plate should be between 40 % and 60 % inclusive.

Figure B.1 shows an example of perforation. Holes are distributed in a staggered formation; in the example, the distance between the centres of two neighbouring holes is 30 mm; the hole diameter 20 mm. This gives a percentage of open area equal to 40,31 %.

The plates should be thick and sufficiently strong to sustain the force exerted by the channel flow. The dimension of the holes may be varied in accordance with the channel width, provided that the spacing between the plates is adjusted in proportion to the hole diameter.

The straightener plates may be fixed on the approach channel, either with the perforations of the different plates aligned on the general direction of the stream (figure B.2), or with them positioned in a staggered formation, provided that the distance between adjacent plates is large compared with the hole diameter (figure B.3).

Dimensions in millimetres

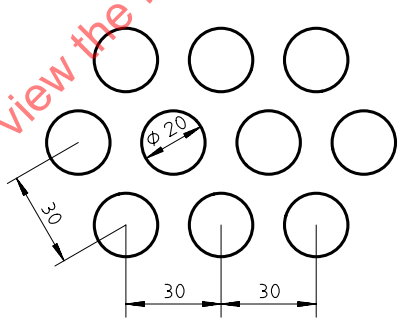

Figure B.1 — Example of perforation

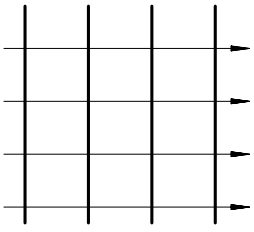

Figure B.2 — Aligned perforations

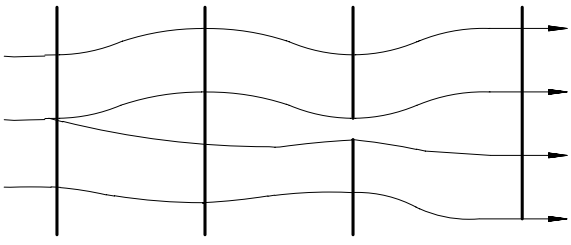

Figure B.3 — Staggered perforations