International Standard

ISO 19234

Hydrometry — Low cost baffles to aid fish passage on triangular profile gauging weirs

Hydrométrie — Chicanes à faible coût pour faciliter le passage des poissons par les déversoirs à profil triangulaire

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 113, *Hydrometry*, Subcommittee SC 2, *Flow measurement structures*.

This first edition cancels and replaces (ISO/TR 19234:2016), which has been technically revised.

The main changes are as follows:

— this document has been restructured;

— low-cost baffles on flat-V weirs have been included.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Flow gauging structures such as triangular profile weirs are commonly used for the measurement of open channel flows. This document applies to weirs operating under modular flow conditions, with flow passing through critical depth. To operate under these conditions, such weirs require a sufficient head difference to be generated between upstream and downstream. At structures operating in the modular flow range, flow rate is solely a function of the upstream head.

In recent years, greater emphasis has been placed on environmental issues, including the free migration of fish in watercourses. It is acknowledged that the head drop required to achieve modular flow can inhibit the movement of fish. It has become important, therefore, to consider ways of aiding fish migration without significantly affecting flow measurement accuracy.

Applied research has shown that baffles of suitable form and placement on the downstream face of triangular profile weirs can partially mitigate fish passage impacts while retaining the gauging function.

NOTE The coefficient of discharge of the weir would normally remain the same although it is an option to recalibrate the coefficient to take into account the placement of baffles.

The baffle system described in this document was adapted from an optimal solution for aiding fish passage[1] [2] on non-gauging sloping weirs commonly used for other purposes (e.g. abstraction, flow diversion, power generation, navigation).

The following Excel[1)] spreadsheet tools can be used to design the layout of the baffles according to this document:

— Crump weir spreadsheet (LCB placement sheet for Crump weirs 2023.xlsm);

— Flat-V weir spreadsheet (LCB placement sheet for flat-V weirs 2023.xlsx).

The spreadsheet tools are available at: https://standards.iso.org/iso/19234//ed-1/en/

1) Excel is the trademark of a product supplied by Microsoft. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.

Hydrometry — Low cost baffles to aid fish passage on triangular profile gauging weirs

1 Scope

This document specifies how to integrate baffles to aid the passage of fish on the downstream face of triangular profile weirs that conform to ISO 4360 (including Crump weirs) and ISO 4377 (flat-V weirs).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 772, *Hydrometry — Vocabulary and symbols*

ISO 4360, *Hydrometry — Open channel flow measurement using triangular profile weirs*

ISO 4377, *Hydrometric determinations — Flow measurement in open channels using structures — Flat-V weirs*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 772 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
anguillid
eel and lamprey
long and cylindrical body-shaped species including eel (*Anguilla anguilla*) and lamprey *(Lampetra fluviatillis* and *Petromizon marinus*)

3.2
non-migratory salmonid
fish of the family Salmonidae that migrates solely in freshwater including brown trout (*Salmo trutta*) and grayling (*Thymallus thymallus*)

3.3
coarse fish
non-salmonid fish found in freshwater habitats

3.4
Crump weir
weir with a triangular profile in the streamwise direction and a horizontal crest in the transverse direction used for gauging

Note 1 to entry: This weir was named after the inventor E.S. Crump. The upstream slope is 1:2 and downstream slope is 1:5 (see ISO 4360).