INTERNATIONAL STANDARD

ISO 4374

Second edition
1990-03-15

Liquid flow measurement in open channels — Round-nose horizontal broad-crested weirs

Mesure de débit des liquides dans les canaux découverts — Déversoirs horizontaux à seuil épais arrondi

Reference number
ISO 4374 : 1990 (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 approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 4374 was prepared by Technical Committee ISO/TC 113, *Measurement of liquid flow in open channels*.

This second edition cancels and replaces the first edition (ISO 4374 : 1982), of which it constitutes a technical revision.

Annexes A, B and C form an integral part of this International Standard.

NOTE — Guidelines for the selection of weirs and flumes for the measurement of the discharge of water in open channels are given in ISO 8368 : 1985, *Liquid flow measurement in open channels — Guidelines for the selection of flow gauging structures.*

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Printed in Switzerland

Liquid flow measurement in open channels — Round-nose horizontal broad-crested weirs

1 Scope

1.1 This International Standard deals with the measurement of flow in rivers and artificial channels under steady flow conditions using round-nose horizontal broad-crested weirs (see figures 1 and 2).

1.2 The flow conditions considered are limited to steady flows which are uniquely dependent on the upstream head. Drowned flows, which depend on downstream as well as upstream levels, are not covered by this International Standard.

1.3 The round-nose horizontal broad-crested weir has a good discharge range and modular limit and is appropriate for use in small- and medium-sized installations. It is particularly robust and insensitive to minor damage.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 772 : 1988, *Liquid flow measurement in open channels — Vocabulary and symbols.*

ISO 5168 : 1978, *Measurement of fluid flow — Estimation of uncertainty of a flow-rate measurement.*

3 Definitions and symbols

For the purposes of this International Standard, the definitions given in ISO 772 apply. A full list of symbols with the corresponding units of measurement is given in annex A.

4 Installation

4.1 Selection of site

4.1.1 The weir shall be located in a straight section of channel, avoiding local obstructions, roughness or unevenness of the bed.

4.1.2 A preliminary study shall be made of the physical and hydraulic features of the proposed site, to check that it conforms (or can be made to conform) to the requirements necessary for measurement of discharge by the weir. Particular attention should be paid to the following features in selecting the site:

a) the adequacy of the length of channel of regular cross-section available (see 4.2.2.2);

b) the uniformity of the existing velocity distribution (see annex B);

c) the avoidance of a steep channel (but see 4.2.2.6);

d) the effects of any increased upstream water level due to the measuring structure;

e) the conditions downstream (including influences such as tides, confluences with other streams, sluice gates, mill dams and other controlling features which might cause drowning);

f) the impermeability of the ground on which the structure is to be founded and the necessity for piling, grouting or other means of controlling seepage;

g) the necessity for flood banks, to confine the maximum discharge to the channel;

h) the stability of the banks, and the necessity for trimming and/or revetment in natural channels;

i) the uniformity of the cross-section of the approach channel;

j) the prevailing wind, which can have a considerable effect on the flow in a river, or over a weir or flume, especially when the river, weir or flume is wide and the head is small and when the prevailing wind is in a transverse direction;

k) aquatic weed growth;

l) sediment transportation.

4.1.3 If the site does not possess the characteristics necessary for satisfactory measurements, or if an inspection of the stream shows that the velocity distribution in the approach channel deviates appreciably from the examples described in annex B, the site shall not be used unless suitable improvements are practicable. Alternatively, the performance of the installation may be checked by independent flow measurements.