INTERNATIONAL STANDARD ISO 3847

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Liquid flow measurement in open channels by weirs and flumes — End-depth method for estimation of flow in rectangular channels with a free overfall

Mesure de débit des liquides dans les canaux découverts au moyen de déversoirs et de canaux jaugeurs — Méthode d'évaluation du débit par détermination de la profondeur en bout des chenaux rectangulaires à déversement dénoyé

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

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.

International Standard ISO 3847 was developed by Technical Committee ISO/TC 113, *Measurement of liquid flow in open channels*, and was circulated to the member bodies in July 1975.

It has been approved by the member bodies of the following countries :

Austria	Italy	Sweden
Belgium	Japan	Switzerland
Canada	Netherlands	Turkey
Czechoslovakia	Norway	United Kingdom
France	Pakistan	U.S.A.
Germany	Romania	U.S.S.R.
India	South Africa, Rep. of	Yugoslavia

The member body of the following country expressed disapproval of the document on technical grounds :

Australia

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0 INTRODUCTION

Free overfall occurs in many hydraulic structures when the bottom of a flat channel is abruptly discontinued. Such an overfall forms a control section and offers an approximate means for the estimation of flow. The flow at the brink is curvilinear and therefore the depth at the drop or end is not equal to the critical depth as computed by the principle based on the parallel flow assumption. However, the ratio between the end depth and the critical depth (as in the case of the assumption of parallel flow) has a unique value for each condition of the nappe, namely confined and unconfined. Therefore, from the depth measured at the end, the flow may be estimated.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for the estimation of sub-critical flow of clear water in smooth, straight, rectangular prismatic open channels with a vertical drop and discharging freely. Using the measured depth at the end, the flow in rectangular channels (horizontal or sloping) with confined nappe and unconfined nappe may be estimated.

The advantages and disadvantages of this device and other types of weirs and flumes, as well as the relative accuracies of each of these devices, are given in the annex.

2 REFERENCE

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

3 DEFINITIONS

For the purposes of this International Standard, in addition to the definitions given in ISO 772, the following definitions apply :

3.1 confined nappe : The jet formed by the flow where the guide walls of the structure extend to at least six times the end depth at maximum flow beyond the crest (or edge) and where the nappe is sufficiently ventilated to ensure atmospheric pressure below the nappe (see figure 1).

3.2 unconfined nappe : The jet formed by the flow where the guide walls of the structure end at the crest (or edge) and permit free lateral expansion of flow and where the nappe is sufficiently ventilated to ensure atmospheric pressure below the nappe (see figure 2).

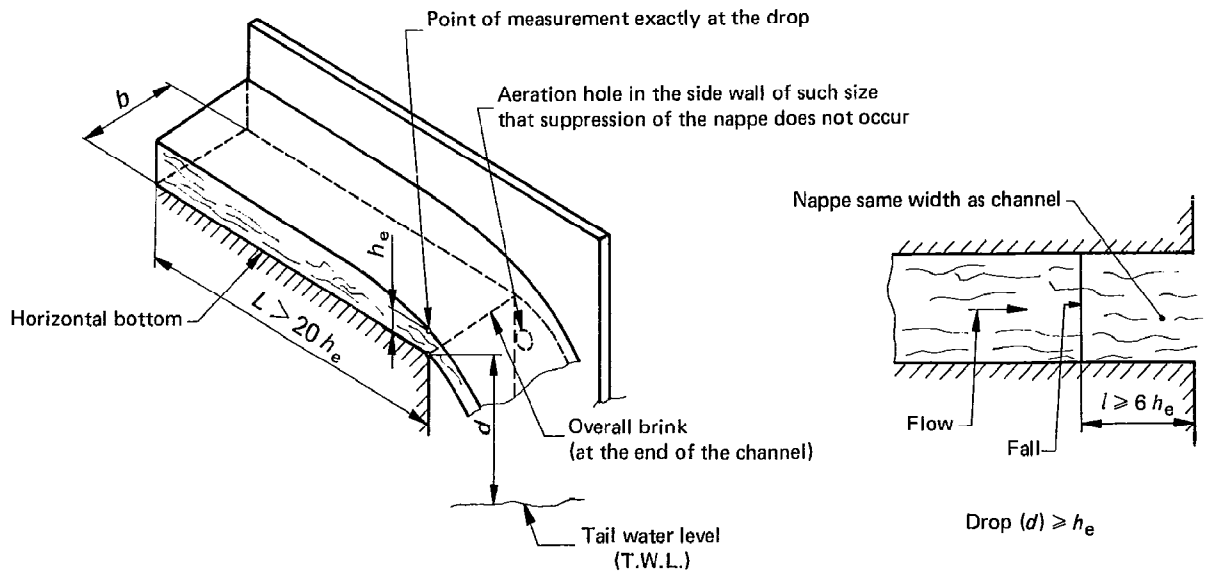

FIGURE 1 — **Confined nappe (nappe to be aerated)**