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Measurement of liquid flow in open channels — Method of specifying performance of hydrometric equipment

Mesure de débit des liquides dans les canaux découverts — Méthode de spécification des caractéristiques de fonctionnement des appareils hydrométriques

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Contents

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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.

International Standard ISO 11655 was prepared by Technical Committee ISO/TC 113, *Hydrometric determinations*, Subcommittee SC 5, *Instruments, equipment and data management*.

Annex A of this International Standard is for information only.

Introduction

This International Standard contains recommendations for a method of specifying the performance of equipment used for the sensing, measuring and, as appropriate, recording of physical variables related to measurement of liquid flow in open channels.

The process of sensing, measuring and recording hydrological phenomena requires the conversion of a time-related physical event or state into a numerical expression in terms relative to a standard scale of measurement units. The steps in the conversion are the following:

a) adaptation or conversion (as the individual situation requires) of the naturally occurring phenomenon into a state where a representative determination can be made;

b) if necessary, identification of a surrogate parameter and the establishment of the relation between changes in that parameter value and changes in the phenomenon to be measured;

c) sensing, measurement and (if appropriate) recording of the physical phenomenon or its surrogate as it varies with the passage of time;

d) conversion of sampled data into numerical information.

The ultimate measure of equipment performance is the evaluation of the uncertainty with which the equipment converts the absolute value or level of the hydrological variable into a measured quantity, relative to another arbitrary or fixed reference datum. The suitability of a piece of equipment, however, may also be related to the particular method of measurement and to the measurement frequency.

The nature of the uncertainty is closely related to the physical method or principle employed in the process of conversion from the natural variable to the measured quantity. Different physical systems are affected to differing degrees by such factors as:

— intrinsic design of the equipment;

— calibration methods;

— natural environmental factors;

— man-made environmental factors;

— levels of care and maintenance;

— operator methods and skills.

The user should seek to identify the three fundamental factors which may affect the uncertainty; these, which should be objectively defined from study of the method of measurement, are:

a) the level of uncertainty of each individual measurement due to the principle of operation of the measurement equipment;

b) the range of factors, for example environmental conditions (expressed numerically) and other external forces which influence the performance of the measurement equipment;

c) the frequency with which the hydrological variable should be sampled by the equipment in order to achieve the required level of data uncertainty.

The previous information represents the minimum which must be made available to the manufacturer before he can recommend a product or commence design and manufacture.

Taken together these factors describe the customer specifications for the performance of the measurement equipment.

Once a design is selected for the equipment, the specifications for use are established through the relevant standards documentation on methods of measurement. Levels of care and maintenance are laid down by the manufacturer in the equipment handbook, and should be adhered to if the manufacturer's claims of performance levels are to be achieved and maintained.

If followed by the manufacturer, this method will provide the user with a basis for understanding the ability of a particular piece of equipment to meet the purpose intended. It further provides a framework within which the user may specify his requirements to the manufacturer and against which he may judge the usefulness of a product.

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