TECHNICAL REPORT

ISO/TR 9824

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Hydrometry — Measurement of free surface flow in closed conduits

Hydrométrie — Mesurage du débit des écoulements à surface dénoyée dans les conduites fermées

Reference number
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TR 9824 was prepared by Technical Committee ISO/TC 113, *Hydrometry*, Subcommittee SC 1, *Velocity area methods*.

This first edition of ISO/TR 9824 cancels and replaces ISO/TR 9824-1:1990 and ISO/TR 9824-2:1990, of which it constitutes a technical revision.

Hydrometry — Measurement of free surface flow in closed conduits

1 Scope

This Technical Report provides a synopsis of the methods of flow gauging that can be deployed in closed conduits flowing part full, i.e. with a free open water surface. It provides a brief description of each method with particular reference to other International Standards where appropriate, the attributes and limitations of each technique, possible levels of uncertainty in the flow determinations and specific equipment requirements. The uncertainties quoted herein are expanded uncertainties with a coverage factor of 2 and an approximate confidence level of 95 %.

2 Normative references

The following referenced documents are indispensable for the application 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, *Hydrometric determinations — Vocabulary and symbols*

3 Terms and definitions

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

3.1
free surface flow in closed conduits
flow within closed conduits, under the influence of gravity only, and normally having a free surface

4 Characteristics of a closed conduit system

4.1 Physical structure

Closed conduits can be located below ground (e.g. sewer) or above ground (e.g. culvert). Systems constructed underground usually incorporate a means of access through a suitable sized shaft (manhole) sealed at the surface with a secure, but removable, cover. Access shafts may be provided at frequent intervals along the length of the conduit. It is normal to locate shafts at points of structural change in the system, such as bends, or junctions, or where for some reason, inspection or entry to the system may be required. Access will be subject to strict health and safety conditions and operatives may require special training. Also, access may not be allowed during or following a period of rainfall.