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Measurement of water flow in closed conduits — Tracer methods — Part I : General

*Mesure de débit de l'eau dans les conduites fermées — Méthodes par traceurs —
Partie I : Généralités*

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FOREWORD

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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 2975/1 was drawn up by Technical Committee ISO/TC 30, *Measurement of fluid flow in closed conduits*, and circulated to the Member Bodies in October 1972.

It has been approved by the Member Bodies of the following countries :

Australia	Japan	Thailand
Belgium	Netherlands	United Kingdom
Czechoslovakia	New Zealand	U.S.A.
France	South Africa, Rep. of	U.S.S.R.
Germany	Spain	
Hungary	Switzerland	

No Member Body expressed disapproval of the document.

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Measurement of water flow in closed conduits — Tracer methods — Part I : General

0 INTRODUCTION

This International Standard is the first of a series of standards covering tracer methods of water flow measurement in closed conduits. The complete series of standards will be as follows :

- Part I : *General.*
- Part II : *Constant rate injection method using non-radioactive tracers.*
- Part III : *Constant rate injection method using radioactive tracers.*
- Part IV : *Integration (sudden injection) method using non-radioactive tracers.*
- Part V : *Integration (sudden injection) method using radioactive tracers.*
- Part VI : *Transit time method using non-radioactive tracers.*
- Part VII : *Transit time method using radioactive tracers.*

1 SCOPE AND FIELD OF APPLICATION

This International Standard deals with the measurement of water flow in closed conduits by using tracer methods; the flow of other liquids and of gases will be dealt with in subsequent International Standards.

These methods apply to flow measurement in conduits into which a solution can be injected and those cases where effective mixing of this solution with the water flowing in the conduit can be achieved, this last condition being fundamental.

Three fundamental procedures are used :

Two procedures, known as the constant rate injection method and the integration (sudden injection) method, are based on the dilution principle : a tracer solution is injected into the conduit and the dilution (ratio) of this tracer in the water flowing in the conduit is determined, this dilution being proportional to the rate of flow.

The third is a method of measurement of the mean transit time (formerly called Allen velocity method) : the tracer is injected into the conduit and the time taken by the tracer to travel a specified length between two cross-sections in each of which it is detected, is measured.

In these three methods, the advantages and disadvantages of which are considered in clause 4, the distance between injection and measuring sections should be great enough to achieve adequate mixing of the tracer with the water flowing in the conduit; the problem of an adequate mixing distance is considered in clause 6.

A large number of different tracers may be used, such as radioactive or non-radioactive, mineral or organic materials. The choice of tracer depends on the circumstances of the measurement (clause 5). The error in measurements using tracers can be less than 1 % under good conditions (clause 7).

2 VOCABULARY AND SYMBOLS

The vocabulary and symbols used in this International Standard will be defined in ISO ..., *Glossary of terms and symbols relative to the measurement of fluid flow in closed conduits*.¹⁾

3 UNITS

The basic units in this International Standard are SI units.

4 CHOICE OF METHOD

4.1 Comparison between dilution methods and methods based on transit time measurement

4.1.1 Advantage of the dilution methods

It is not necessary to know the geometrical characteristics of the conduit.

1) In preparation.