SLOVENSKI STANDARD
SIST ISO 5667-10:1996

01-junij-1996

Kakovost vode - Vzorčenje - 10. del: Navodilo za vzorčenje odpadnih vod

Water quality -- Sampling -- Part 10: Guidance on sampling of waste waters

Qualité de l'eau -- Échantillonnage -- Partie 10: Guide pour l'échantillonnage des eaux résiduaires

Ta slovenski standard je istoveten z: **ISO 5667-10:1992**

ICS:

13.060.30	Odpadna voda	Sewage water
13.060.45	Preiskava vode na splošno	Examination of water in general

SIST ISO 5667-10:1996 **en**

INTERNATIONAL STANDARD

ISO 5667-10

First edition
1992-11-15

Water quality — Sampling —

Part 10:
Guidance on sampling of waste waters

Qualité de l'eau — Échantillonnage —

Partie 10: Guide pour l'échantillonnage des eaux résiduaires

Reference number
ISO 5667-10:1992(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 voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 5667-10 was prepared by Technical Committee ISO/TC 147, *Water quality*, Sub-Committee SC 6, *Sampling (general methods)*.

ISO 5667 consists of the following parts, under the general title *Water quality — Sampling*:

— *Part 1: Guidance on the design of sampling programmes*

— *Part 2: Guidance on sampling techniques*

— *Part 3: Guidance on the preservation and handling of samples*

— *Part 4: Guidance on sampling from lakes, natural and man-made*

— *Part 5: Guidance on sampling of drinking water and water used for food and beverage processing*

— *Part 6: Guidance on sampling of rivers and streams*

— *Part 7: Guidance on sampling of water and steam in boiler plants*

— *Part 8: Guidance on the sampling of wet deposition*

— *Part 9: Guidance on sampling from marine waters*

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland
Printed in Switzerland

— *Part 10: Guidance on sampling of waste waters*

— *Part 11: Guidance on sampling of groundwaters*

— *Part 12: Guidance on sampling of sediments*

Annex A forms an integral part of this part of ISO 5667.

Introduction

This part of ISO 5667 is one of a group of standards dealing with the sampling of specific types of water. It should be read in conjunction with ISO 5667-1, ISO 5667-2 and ISO 5667-3.

The general terminology used is in accordance with the various parts of ISO 6107, particularly ISO 6107-2.

Water quality — Sampling —

Part 10:
Guidance on sampling of waste waters

1 Scope

This part of ISO 5667 contains details on the sampling of domestic and industrial waste water, i.e. the design of sampling programmes and techniques for the collection of samples. It covers waste water in all its forms, i.e. industrial waste water, and crude and treated domestic waste water.

Sampling of accidental spillages is not included, although the methods described in certain cases may also be applicable to spillages.

1.1 Objectives

A sampling programme may be based on many different objectives. Some of the more common objectives are:

— to determine the concentration of pollutants in a waste-water stream;

— to determine the load of pollutants carried by a waste-water stream;

— to provide data for the operation of a waste-water treatment plant;

— to test whether given discharge concentration limits are kept;

— to test whether given discharge load limits are kept;

— to provide data for the levy upon discharge of waste water.

When designing a waste-water sampling programme, it is essential for the objective of the study to be kept in mind, so that the information gained from the study corresponds closely to the information required.

Generally, the objectives of sampling are quality control or quality characterization, as described in 1.1.1 and 1.1.2.

1.1.1 Quality characterization

Quality characterization aims at determining the concentration or load of pollutants in a waste-water stream, generally during an extended period of time, for example, to monitor compliance with a standard, to determine trends, to provide data on unit process efficiency, or to provide loading data for planning and/or design purposes.

1.1.2 Quality control

The objective of quality control may be one of the following:

a) to provide data for either short-term or long-term control of waste-water treatment plant operation (e.g. control of biomass growth in activated sludge units, control of anaerobic digestion processes, control of industrial effluent treatment plants);

b) to provide data for waste-water treatment plant protection (e.g. to provide domestic waste-water plants with protection against deleterious effects from industrial effluents, to identify the sources of undesirable industrial effluent residues);

c) to provide data for pollution control (e.g. controlling disposal operations to land, sea or water courses).

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 5667. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this

part of ISO 5667 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 2602:1980, *Statistical interpretation of test results — Estimation of the mean — Confidence interval.*

ISO 2854:1976, *Statistical interpretation of data — Techniques of estimation and tests relating to means and variances.*

ISO 5667-1:1980, *Water quality — Sampling — Part 1: Guidance on the design of sampling programmes.*

ISO 5667-2:1991, *Water quality — Sampling — Part 2: Guidance on sampling techniques.*

ISO 5667-3:1985, *Water quality — Sampling — Part 3: Guidance on the preservation and handling of samples.*

ISO 5667-5:1991, *Water quality — Sampling — Part 5: Guidance on sampling of drinking water and water used for food and beverage processing.*

ISO 6107-2:1989, *Water quality — Vocabulary — Part 2.*

3 Definitions

For the purposes of this part of ISO 5667, the following definitions, taken from ISO 6107-2, apply.

3.1 composite sample: Two or more samples or sub-samples, mixed together in appropriate known proportions (either discretely or continuously), from which the average result of a desired characteristic may be obtained. The proportions are usually based on time or flow measurements.

3.2 sampling line: The conduit which leads from the sampling probe to the sample delivery point or the analysing equipment.

3.3 sampling point: The precise position within a sampling location from which samples are taken.

3.4 spot sample: A discrete sample taken randomly (with regard to time and/or location) from a body of water.

4 Sampling equipment

4.1 Sample containers

The laboratory responsible for analysing the samples should be consulted on the type of container that should be used for sample collection, storage and transportation.

ISO 5667-2 and ISO 5667-3 contain detailed information on the selection of sample containers.

The sample container needs to prevent losses due to adsorption, volatilization and contamination by foreign substances.

Desirable factors to be considered when selecting sample containers are

— high resistance to breakage;

— good sealing efficiency;

— ease of reopening;

— good resistance to temperature extremes;

— practicable size, shape and mass;

— good potential for cleaning and re-use;

— availability and cost.

For waste-water sampling, plastics containers are recommended for most determinands. Some exceptions exist where only glass containers should be used, when for example the following analyses are to be made:

— oil and grease;

— hydrocarbons;

— detergents;

— pesticides.

If sterilized or disinfected sewage samples are to be collected, sterile containers and sampling apparatus should be used (e.g. see ISO 5667-5).

4.2 Type of apparatus

4.2.1 Manual sampling equipment

The simplest equipment used for taking effluent samples consists of a bucket, ladle, or wide-mouthed bottle that may be mounted on a handle of a suitable length. The volume should not be less than 100 ml. When manual samples are to be used for the preparation of composite samples, the volume of the bucket, ladle or bottle should be well defined and known to a precision of within ± 5 %. Manual samples can also be taken with a Ruttner or Kemmerer sampler, consisting of a 1 litre to 3 litre volume tube with a hinged lid at each end of the tube, or other samplers operating on a similar principle.

Manual sampling equipment should be made of an inert material that does not influence the analyses that will be carried out on the samples later (see ISO 5667-2).

Before starting sampling, the equipment should be cleaned with detergent and water, or as directed by the equipment manufacturer, and finally rinsed with water. The sampling equipment may be washed before use in the waste-water stream from which the sample is taken in order to minimize the risk of contamination. Special attention should be paid to rinsing after cleaning, if the analytes under study are detergents. The sampling equipment cannot be washed in the waste stream when this will influence the analysis carried out later (e.g. analysis for oil and grease, and microbiological analysis).

4.2.2 Automatic sampling equipment

A number of commercially available devices allow a continuous sample or a series of samples to be collected automatically. They are often easily portable and may be used for any type of waste water. Two types of automatic samplers are primarily available, namely time-proportional and flow-proportional (see ISO 5667-2), but some of the samplers have both possibilities built in. The sampler can be based on the following principles of sample collection:

— a chain pump (paternoster pump);

— compressed air and/or vacuum;

— continuous stream of the effluent;

— pumping (often by means of a peristaltic pump).

No single principle can be recommended as being suitable for all sampling situations. When selecting sampling equipment, the following features should be taken into consideration, and the user should determine the relative importance of each feature when establishing the requirements for a specific sampling application.

a) The sampler should be able to take time-weighted composite samples, for example, sampling over different time intervals of flow activity for constant flow rates.

b) The sampler should be able to take a series of discrete samples taken at fixed intervals, held in individual containers. For example, when carrying out diurnal studies to identify periods of peak load.

c) The sampler should be able to take a succession of short period composite samples being held in individual containers. This can also be useful in monitoring specific periods known to be of interest.

d) The sampler should be able to take flow-weighted composite samples, i.e. taking variable volumes of sample depending on stream flow for a fixed period of time. This facility can be useful when carrying out substrate load studies.

e) The sampler should be able to take a succession of flow-weighted samples, each being held in individual containers. This can be useful when trying to identify periods of variable substrate loading, when data need to be correlated with variable flow rates.

The features listed in items a) to e) refer to the types of sample to be collected according to 5.3.1. Additionally, the user should also aim for the following attributes when choosing sampling equipment, unless the circumstances dictate that certain of them may not be necessary, in particular the ability to take samples from a pressurized main or sewer.

f) The ability of the sampler to lift samples through the required height for any chosen situation.

g) Rugged construction and minimum of functional components.

h) Minimum number of parts exposed or submerged in the water.

i) The sampler should be corrosion resistant and electrical parts should be protected against the action of ice, damp or a corrosive atmosphere.

j) The sampler should be of simple design and easy to maintain, operate and clean.

k) The sampling line from intake point to sample delivery point should have a minimum internal diameter of 9 mm to minimize clogging, and the intake should be protected in order to prevent clogging of the uptake line.

l) The intake liquid velocity should be a minimum of 0,5 m/s, in order to prevent phase separation in the sampling line and measuring chamber.

m) The ability to purge sampling lines to receive fresh sample.

n) The precision and accuracy of delivered volumes should be at least 5 % of the intended volume.

o) The time interval between discrete samples should be adjustable from 5 min to 1 h.

p) Sample containers and tube joints should be such that they can be easily detached, cleaned and replaced in the sampling apparatus.

q) It may be necessary for the sampler to provide integral compartments for storage of sample con-