Second edition
2009-04-15

Water quality — Sampling —

Part 11: Guidance on sampling of groundwaters

Qualité de l'eau — Échantillonnage —

Partie 11: Lignes directrices pour l'échantillonnage des eaux souterraines

Reference number
ISO 5667-11:2009(E)

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Published in Switzerland

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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.

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 5667-11 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 6, *Sampling (general methods)*.

This second edition cancels and replaces the first edition (ISO 5667-11:1993) and ISO 5667-18:2001, which have been technically revised.

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

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

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

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

— *Part 5: Guidance on sampling of drinking water from treatment works and piped distribution systems*

— *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*

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

— *Part 11: Guidance on sampling of groundwaters*

— *Part 12: Guidance on sampling of bottom sediments*

— *Part 13: Guidance on sampling of sludges from sewage and water treatment works*

— *Part 14: Guidance on quality assurance of environmental water sampling and handling*

— *Part 15: Guidance on preservation and handling of sludge and sediment samples*

— *Part 16: Guidance on biotesting of samples*

— *Part 17: Guidance on sampling of suspended sediments*

— *Part 19: Guidance on sampling of marine sediments*

— *Part 20: Guidance on the use of sampling data for decision making — Compliance with thresholds and classification systems*

— *Part 21: Guidance on sampling of drinking water distributed by tankers or means other than distribution pipes*

— *Part 22: Guidance on design and installation of groundwater sample points*

— *Part 23: Determination of significant pollutants in surface waters using passive sampling*

This part of ISO 5667 should be read in conjunction with other parts, in particular ISO 5667-1 and ISO 5667-3.

Introduction

This part of ISO 5667 is a revision of both ISO 5667-11:1993, *Guidance on sampling of groundwaters* and ISO 5667-18:2001, *Guidance on sampling of groundwater at contaminated sites*.

The guidance in this part of ISO 5667 can be used in parallel with other guidance on water quality sampling and/or investigation of contaminated or potentially contaminated sites, as any groundwater sampling from such sites is likely to form part of a much wider investigation programme.

Development of a groundwater sampling programme depends on the purposes of the investigation. A definition of the purpose of groundwater sampling is an essential prerequisite for identifying the principles to be applied to a particular sampling problem.

The principles set out in this part of ISO 5667 can be used to satisfy the following more detailed objectives:

a) to determine the suitability of groundwater as a source of drinking water or industrial/agricultural water;

b) to identify, at an early stage, contamination of aquifers caused by potentially hazardous surface or sub-surface activities (e.g. the operation of waste disposal sites, land contamination, industrial developments, mineral exploitation, agricultural practices, changes in land use) and its potential to impact on surface waters and other potential receptors in the vicinity of the site;

c) to establish whether migration of contaminants is occurring in order to assess the impact on groundwater quality and to calibrate and validate suitable groundwater quality models;

d) to develop an understanding of groundwater quality and flow variations, including those caused by deliberate actions (e.g. variations in groundwater pumping regimes, groundwater recharge caused by effluent, surface clean-up activities arising from contaminated sites), in order to achieve optimal resource management, provide data for undertaking risk assessment and to enable enforcement of pollution-control law;

e) to assist in the selection of remedial measures and remediation process design, and monitor the performance and effectiveness of these measures or facility design;

f) to demonstrate compliance with licence conditions, or collect evidence for regulatory purposes;

g) to identify and characterise discrete aquifer water bodies.

Examples of situations where this guidance can be used include:

— general surveys of groundwater quality for chemical and microbiological assessment;

— investigation of present or former industrial sites with a history of potentially contaminatory activities;

— groundwater investigation and monitoring of waste disposal (landfill) sites;

— investigation of sites where natural and/or artificial processes have led to potential land and groundwater contamination;

— investigation of sites where products have been spilled or released as a result of accidents or other unforeseen events, e.g. transportation accidents.

The guidance contained in this part of ISO 5667 covers selection of sampling points, selection of sampling installations and devices, groundwater parameter selection and sampling frequency.

Prescriptive guidance on methods and applications is not possible. Therefore, this guidance provides information on the most commonly applied, and available, techniques and lists their advantages, disadvantages and limitations of use where these are known. When considering design of sampling strategies, the properties of the groundwater (aquifer) system, monitoring point design, contaminant source(s), pathways for migration and the receptors need to be considered.