

SVENSK STANDARD

SS-EN ISO 5667-3:2018



Fastställt/Approved: 2018-06-25
Utgåva/Edition: 4
Språk/Language: engelska/English
ICS: 13.060.45; 13.060.50

Vattenundersökningar – Provtagning – Del 3: Riktlinjer för konservering och hantering av vattenprover (ISO 5667-3:2018)

Water quality – Sampling – Part 3: Preservation and handling of water samples (ISO 5667-3:2018)

This preview is downloaded from www.sis.se. Buy the entire standard via <https://www.sis.se/std-80004834>

Standarder får världen att fungera

SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.

Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

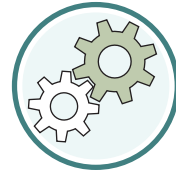
Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på www.sis.se eller ta kontakt med oss på tel 08-555 523 00.



Standards make the world go round

SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.

Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

If you want to know more about SIS, or how standards can streamline your organisation, please visit www.sis.se or contact us on phone +46 (0)8-555 523 00



Europastandarden EN ISO 5667-3:2018 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 5667-3:2018.

Denna standard ersätter SS-EN ISO 5667-3:2012, utgåva 3

The European Standard EN ISO 5667-3:2018 has the status of a Swedish Standard. This document contains the official version of EN ISO 5667-3:2018.

This standard supersedes the SS-EN ISO 5667-3:2012, edition 3

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Kemiska vattenundersökningar, SIS/TK 424.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

EUROPEAN STANDARD

EN ISO 5667-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2018

ICS 13.060.45

Supersedes EN ISO 5667-3:2012

English Version

Water quality - Sampling - Part 3: Preservation and handling of water samples (ISO 5667-3:2018)

Qualité de l'eau - Échantillonnage - Partie
3: Conservation et manipulation des
échantillons d'eau (ISO 5667-3:2018)

Wasserbeschaffenheit - Probenahme - Teil
3: Konservierung und Handhabung von
Wasserproben (ISO 5667-3:2018)

This European Standard was approved by CEN on 9 June 2018.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

European foreword	vii
Introduction	viii
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Sampling and chain of custody	2
5 Reagents and materials	2
6 Containers	4
6.1 Container selection and preparation	4
6.2 Filtration on site.....	5
6.3 Filling the container	5
7 Sample handling and preservation	5
7.1 Sample handling and preservation for physical and chemical examination.....	5
7.2 Sample handling and preservation for biological examination.....	6
7.3 Sample handling and preservation for radiochemical analysis.....	6
8 Sample transport	7
9 Identification of samples	7
10 Sample reception	8
11 Sample storage	8
Annex A (informative) Techniques for sample preservation	9
Annex B (informative) Container preparation	43
Annex C (informative) Protocol as used in Dutch validation studies	44
Bibliography	46

European foreword

This document (EN ISO 5667-3:2018) has been prepared by Technical Committee ISO/TC 147 "Water quality" in collaboration with Technical Committee CEN/TC 230 "Water analysis" the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2018, and conflicting national standards shall be withdrawn at the latest by December 2018.

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

This document supersedes EN ISO 5667-3:2012.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 5667-3:2018 has been approved by CEN as EN ISO 5667-3:2018 without any modification.

Introduction

This document is intended to be used in conjunction with ISO 5667-1, which deals with the design of sampling programmes and sampling techniques.

Where possible this document has been brought into line with current standards. Where new research or validation results have provided new insights, the latest knowledge has been used.

Guidance on validation protocols can be found in ISO 17034.

ISO 5667-3 provides in [Table A.1](#) validated preservation times and/or conditions as well as descriptions of best practice. [Table A.1](#) also refers, for each analyte, to those ISO standards available at the date of publication of this ISO 5667-3. This is however not an exhaustive list. Other methods may be used when they have been validated. However, it is strongly recommended that where a method validation is not available, the preservation times for the analyte as listed in [Table A.1](#) for ISO test methods be followed.

The preservation and storage conditions and maximum storage times per analyte as listed in [Table A.1](#) should be regarded as default conditions to be applied in the absence of any other information.

However, if validation of preservation techniques and holding times has been carried out, relative to specific circumstances and matrices, by a laboratory, then, provided that it can produce evidence of this validation where they differ from those set out in [Table A.1](#) of this standard, these validated preservation and storage conditions and maximum storage times are deemed acceptable for use by the validating laboratories.

Attention is drawn to the proposed development of a new part in the ISO 5667 series, which further elaborates on ISO 5667-3:2018, Annex C, and which will contain guidelines and the elaboration of the required techniques of how to validate new storage times or preservative methods and details of the techniques described.

Water quality — Sampling —

Part 3: Preservation and handling of water samples

NOTICE — This document and the analytical International Standards listed in [Annex A](#) are complementary. Where no analytical International Standard is applicable, the technique(s) described in [Tables A.1](#) to [A.3](#) take(s) normative status.

1 Scope

This document specifies general requirements for sampling, preservation, handling, transport and storage of all water samples including those for biological analyses.

It is not applicable to water samples intended for microbiological analyses as specified in ISO 19458, ecotoxicological assays, biological assays and passive sampling as specified in the scope of ISO 5667-23.

This document is particularly appropriate when spot or composite samples cannot be analysed on site and have to be transported to a laboratory for analysis.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 5667 (all parts), *Water quality — Sampling*

ISO 19458, *Water quality — Sampling for microbiological analysis*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

integrity

property that the parameter(s) of interest, information or content of the sample container has not been altered or lost in an unauthorized manner or subject to loss of representativeness

3.2

sample preservation

any procedure used to stabilize a sample in such a way that the properties under examination are maintained stable from the collection step until preparation for analysis

Note 1 to entry: Different analytes may require several samples from the same source that are stabilized by different procedures.

[SOURCE: ISO 11074:2015, 4.4.20, modified — Note 1 to entry has been added.]

3.3

sample storage

process, and the result of keeping a sample available under predefined conditions, usually for a specified time interval between collection and further treatment of a sample

Note 1 to entry: Specified time is the maximum time interval.

[SOURCE: ISO 11074:2015, 4.4.22, modified — Note 1 to entry has been added; “soil sample” has been changed to “sample”.]

3.4

storage time

period of time between filling of the sample container and further treatment of the sample in the laboratory, if stored under predefined conditions

Note 1 to entry: Sampling finishes as soon as the sample container has been filled with the sample. Storage time ends when the sample is taken by the analyst to start sample preparation prior to analysis.

Note 2 to entry: Further treatment is, for most analytes, a solvent extraction or acid destruction. The initial steps of sample preparation can be steps complementary to the storage conditions for the maintenance of analyte concentrations.

4 Sampling and chain of custody

If there is a need to take samples, this is done according to a sampling programme. The first step is to design a sampling programme. Guidance on this topic is given in ISO 5667-1.

Depending on the sample type and matrix, the guidelines found in ISO 19458 and in the relevant part(s) of ISO 5667 shall be consulted.

The process of preservation and handling of water samples consists of several steps. During this process, the responsibility for the samples might change. To ensure the integrity of the samples, all steps involving the sample shall be documented.

All preparation procedures shall be checked to ensure positive or negative interferences do not occur. As a minimum, this shall include the analysis of blanks (e.g. field blank or sample container) or samples containing known levels of relevant analytes as specified in ISO 5667-14.

5 Reagents and materials

WARNING — Certain preservatives (e.g. acids, alkalis, formaldehyde) need to be used with caution. Sampling personnel should be warned of potential dangers, and appropriate safety procedures should be followed.

The following reagents are used for the sample preservation and shall only be prepared according to individual sampling requirements. All reagents used shall be of at least analytical reagent grade and water shall be of at least ISO 3696, grade 2. Acids referred to in this document are commercially available “concentrated” acids.

All reagents shall be labelled with a “shelf-life”. The shelf-life represents the period for which the reagent is suitable for use, if stored correctly. This shelf-life shall not be exceeded. Any reagents that are not completely used by the expiry of the shelf-life date shall be discarded.

NOTE Often the shelf-life of reagents is supplied by the receiving laboratory.

Check reagents periodically, e.g. by field blanks, and discard any reagent found to be unsuitable.

Between on-site visits, reagents shall be stored separately from sample containers and other equipment in a clean, secure cabinet in order to prevent contamination.

Each sample shall be labelled accordingly, after the addition of the preservative. Otherwise, there could be no visible indication as to which samples have been preserved, and which have not.

5.1 Solids.

5.1.1 Sodium thiosulfate pentahydrate, $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$, $w(\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}) > 99 \%$.

5.1.2 Ascorbic acid, $\text{C}_6\text{H}_8\text{O}_6$, $w(\text{C}_6\text{H}_8\text{O}_6) > 99 \%$.

5.1.3 Sodium hydroxide, NaOH , $w(\text{NaOH}) > 99 \%$.

5.1.4 Sodium tetraborate decahydrate, $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$, $w(\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}) > 99 \%$.

CAUTION — Sodium tetraborate decahydrate is known to be a carcinogen, mutagen and reproductive toxin (CMR).

5.1.5 Hexamethylenetetramine (hexamine, urotropine), $\text{C}_6\text{H}_{12}\text{N}_4$, $w(\text{C}_6\text{H}_{12}\text{N}_4) > 99 \%$.

5.1.6 Potassium iodide, KI , $w(\text{KI}) > 99 \%$.

5.1.7 Iodine, I_2 , $w(\text{I}_2) > 99 \%$.

5.1.8 Sodium acetate, $\text{C}_2\text{H}_3\text{NaO}_2$, $w(\text{C}_2\text{H}_3\text{NaO}_2) > 99 \%$.

5.1.9 Ethylenediamine, $\text{C}_2\text{H}_8\text{N}_2$, $w(\text{C}_2\text{H}_8\text{N}_2) > 99 \%$.

5.2 Solutions.

5.2.1 Zinc acetate solution $\text{C}_4\text{H}_6\text{O}_4\text{Zn}$ (10 g/l).

Dissolve 10,0 g of zinc acetate in ~100 ml of water. Dilute to 100 ml with water. Store the solution in a polypropylene or glass bottle for a maximum period of 1 a.

5.2.2 Orthophosphoric acid ($\rho \approx 1,7$ g/ml), H_3PO_4 , $w(\text{H}_3\text{PO}_4) > 85 \%$, $c(\text{H}_3\text{PO}_4) = 15$ mol/l.

5.2.3 Hydrochloric acid ($\rho \approx 1,2$ g/ml), HCl , $w(\text{HCl}) > 36 \%$, $c(\text{HCl}) = 12,0$ mol/l.

5.2.4 Nitric acid ($\rho \approx 1,42$ g/ml), HNO_3 , $w(\text{HNO}_3) > 65 \%$, $c(\text{HNO}_3) = 15,8$ mol/l.

5.2.5 Sulfuric acid ($\rho \approx 1,84$ g/ml), H_2SO_4 (freshly prepared).

Dilute concentrated sulfuric acid (H_2SO_4), $\rho \approx 1,84$ g/ml, $w(\text{H}_2\text{SO}_4) \approx 98 \%$ 1 + 1 by carefully adding the concentrated acid to an equal volume of water and mix.

WARNING — Adding the concentrated acid to the water can give violent reactions because of an exothermic reaction.

5.2.6 Sodium hydroxide solution ($\rho \approx 0,40$ g/ml), NaOH .

5.2.7 Formaldehyde solution (formalin), CH_2O , $\varphi(\text{CH}_2\text{O}) = 37 \%$ to 40% (freshly prepared).

WARNING — Beware of formaldehyde vapours. Do not store large numbers of samples in small work areas.