

SVENSK STANDARD

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Vattenundersökningar – Undersökning och bestämning av färg (ISO 7887:2011)

Water quality – Examination and determination of colour (ISO 7887:2011)



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Denna standard ersätter SS-EN ISO 7887, utgåva 1.

The European Standard EN ISO 7887:2011 has the status of a Swedish Standard. This document contains the official version of EN ISO 7887:2011.

This standard supersedes the Swedish Standard SS-EN ISO 7887, edition 1.

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

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 7887

December 2011

ICS 13.060.60

Supersedes EN ISO 7887:1994

English Version

**Water quality - Examination and determination of colour (ISO
7887:2011)**

Qualité de l'eau - Examen et détermination de la couleur
(ISO 7887:2011)

Wasserbeschaffenheit - Untersuchung und Bestimmung
der Färbung (ISO 7887:2011)

This European Standard was approved by CEN on 14 December 2011.

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.

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Foreword

This document (EN ISO 7887:2011) 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of an identical text or by endorsement, at the latest by June 2012, and conflicting national standards shall be withdrawn at the latest by June 2012.

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

This document supersedes EN ISO 7887:1994.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 7887:2011 has been approved by CEN as a EN ISO 7887:2011 without any modification.

Water quality — Examination and determination of colour

WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

IMPORTANT — It is absolutely essential that tests conducted in accordance with this International Standard be carried out by suitably qualified staff.

1 Scope

This International Standard specifies four different methods, designated A to D, for the examination of colour.

The previously most employed method for assessment of water colour in water treatment plants, limnological surveys, etc. was based on the hexachloroplatinate scale (Reference [1]). Methods C and D are harmonized with this traditional procedure (References [2][3]).

Method A involves examination of apparent colour by visually observing a water sample in a bottle. This gives only preliminary information, for example for use in field work. Only the apparent colour can be reported.

Method B involves determination of the true colour of a water sample using optical apparatus and is applicable to raw and potable water and to industrial water of low colour. A subclause on interferences is included.

Method C involves determination of the true colour of a water sample using optical apparatus for comparison with hexachloroplatinate concentration at wavelength, $\lambda = 410$ nm. A subclause on interferences is included.

Method D involves determination of colour by visual comparison with hexachloroplatinate standard solutions and can be applied to raw and drinking water. A subclause on interferences is included.

Methods A and B are appropriate if the colour hue of the sample differs from the hue of the matching solution.

NOTE 1 Under certain circumstances, strongly coloured water samples require dilution before examination or determination. However, this can alter the physical-chemical conditions leading to a change in colour.

NOTE 2 An internal quality control procedure for all methods specified in this International Standard is given in Annex A. Precision data are given in Annex B.

When stating the result, the procedure used (methods A to D) is also recorded.

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 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 5667-3, *Water quality — Sampling — Part 3: Preservation and handling of water samples*

ISO 10523, *Water quality — Determination of pH*

SS-EN ISO 7887:2012 (E)

3 Terms and definitions

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

3.1
apparent colour of water
colour due to dissolved substances and undissolved suspended matter, determined in the original water sample without filtration or centrifugation

3.2
colour of water
optical property that causes the changing of the spectral composition of transmitted visible light

3.3
dissolved organic carbon
DOC
sum of organically bound carbon present in water originating from compounds passing through a membrane filter of 0,45 µm pore size, including cyanate and thiocyanate

[ISO 8245:1999,^[6] 3.4]

NOTE DOC in natural waters often originates from natural organic matter (NOM), a complex mixture of compounds formed as a result of the breakdown of animal and plant material in the environment. The composition of the mixture is strongly dependent on the environmental source. Spectroscopic methods are often used to characterize the dissolved organic matter in natural waters (Reference [4]). The ratio of UV absorbance and DOC concentration (specific UV-absorption, SUVA) has proved to be useful for optimization of water treatment processes.

3.4
specific colour
ratio between the true colour of a sample and its concentration of dissolved organic carbon

3.5
true colour of water
colour due only to dissolved substances, determined after filtration of the water sample through a membrane filter of pore size 0,45 µm

4 Method A: Visual examination

4.1 Sampling bottles

Colourless bottle, see ISO 5667-3.

Maintain all glassware that comes into contact with the sample in a scrupulously clean condition by washing with hydrochloric acid [$c(\text{HCl}) \approx 2 \text{ mol l}^{-1}$] or with surfactant cleaning solution which is recommended for laboratory use. Finally rinse with water for washing (5.4.2) and allow to drain.

4.2 Sampling and samples

Collect samples in bottles (4.1) and carry out the colour test as soon as possible. If storage is unavoidable, the samples can be stored for up to 5 days in the dark at $4 \text{ °C} \pm 2 \text{ °C}$. Prevent extensive aeration during storage, especially in cases where colour-changing redox reactions are likely to occur.

4.3 Procedure

Shake the sample to solubilize any matter that can dissolve.

Put the unfiltered sample into a bottle (4.1) and examine the sample in diffused light against a white background for colour intensity and hue. Allow any suspended matter that settles to do so before examination.

4.4 Qualitative description

State the intensity of the colour (nil, pale, light or dark) and the hue (e.g. yellow, yellowish brown).

EXAMPLE Apparent colour in accordance with ISO 7887, method A: pale, yellowish brown.

5 Method B: Determination of the true colour using optical instruments

5.1 General

The intensity of the colour of a water sample is characterized by its light absorption at the wavelength of maximum absorption and quantified by measuring the absorption coefficient with a filter photometer or spectrophotometer. Normally, most of the yellow-brown coloured natural waters, and the coloured waste water samples of discharges of domestic treatment plants can be measured at 436 nm. Waste water from industrial waste water treatment plants does not show sufficiently sharp and distinguished absorption maxima. Those waters shall be examined using the wavelengths specified in 5.2.

5.2 Principle

Characterization of the intensity of colour of a water sample is performed by measuring the attenuation (absorption) of light. Different colours cause maximum absorption at different wavelengths of the incident radiation. In accordance with Method B of this International Standard, the colour of the water is determined using a photometer or a spectrometer at a minimum of three different wavelengths, distributed over the range of the visible spectrum:

- a) $\lambda(1) = 436 \text{ nm}$;
- b) $\lambda(2) = 525 \text{ nm}$;
- c) $\lambda(3) = 620 \text{ nm}$.

Always use the wavelength $\lambda = 436 \text{ nm}$ (Hg 436 nm); wavelengths $\lambda(2)$ and $\lambda(3)$ can differ slightly from those specified above, depending on the type of optical filter employed. For a better characterization, measurements at additional wavelengths near the absorption maximum can be performed.

5.3 Interferences

Prior to measurement, the water sample is filtered (5.7) to avoid interferences by undissolved matter. This filtration can, however, lead to further interferences (e.g. due to oxidation reactions caused by contact with air or due to precipitations initiated by the filtration step). As an example, iron and manganese compounds can be retained on the filter or transferred to a coloured oxidation state. In some cases, particularly in the presence of colloidal solids, e.g. clay or other finely dispersed matter, it can prove impossible to obtain a clear filtrate. In this case, mention in the test report that colloidal solids are present.

NOTE Colours often depend on pH. Therefore, the pH of the water sample is regularly determined in parallel with optical measurements and these results are reported with the other findings.