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Vattenförsörjning – Invändig utrustning – Utrustning för nitratreduktion – Krav på utförande, säkerhet och provning

Water conditioning equipment inside buildings – Nitrate removal devices – Requirements for performance, safety and testing

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Europastandarden EN 15219:2006+A1:2007 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 15219:2006+A1:2007.

Denna standard ersätter SS-EN 15219:2006.

The European Standard EN 15219:2006+A1:2007 has the status of a Swedish Standard. This document contains the official English version of EN 15219:2006+A1:2007.

This standard supersedes the Swedish Standard SS-EN 15219:2006.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00.
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Information about the content of the standard is available from the Swedish Standards Institute (SIS), tel +46 8 555 520 00.
Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15219:2006+A1

November 2007

ICS 91.140.60

Supersedes EN 15219:2006

English Version

Water conditioning equipment inside buildings - Nitrate removal devices - Requirements for performance, safety and testing

Appareils de traitement d'eau à l'intérieur des bâtiments - Dispositifs de dénitratation - Exigences de performances, de sécurité et d'essais

Anlagen zur Behandlung von Trinkwasser innerhalb von Gebäuden - Nitratentfernungsanlagen - Anforderungen an Ausführung, Sicherheit und Prüfung

This European Standard was approved by CEN on 4 November 2006 and includes Amendment 1 approved by CEN on 21 October 2007.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, 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 United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 15219:2006+A1:2007) has been prepared by Technical Committee CEN/TC 164 “Water supply”, the secretariat of which is held by AFNOR.

This document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2008 and conflicting national standards shall be withdrawn at the latest by May 2008.

This document includes Amendment 1, approved by CEN on 2007-10-21.

This document supersedes EN 15219:2006.

The start and finish of text introduced or altered by amendment is indicated in the text by tags 〚A1〉 〈A1〛.

With respect of potential adverse effects on the quality of water intended for human consumption caused by the product covered by this European Standard, the following is pointed out to the user:

1) this European Standard provides no information as to whether the product may be used without restriction in any of the Member States;

2) it should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

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, 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 United Kingdom.

1 Scope

This European Standard specifies requirements relating to the construction and mode of operation and relevant methods for testing automatic, salt-regenerated, anion exchange nitrate removal devices for drinking water installations inside buildings, which are permanently connected to the mains supply.

NOTE Products intended for use in water supply systems are to comply, when existing, with national regulations and testing arrangements that ensure fitness for contact with drinking water. The Member State's relevant regulators and the EC Commission agreed on the principle for a future unique European Acceptance Scheme (EAS) which would provide a common testing and approval arrangement at European level.

If and when the EAS is adopted, European Standards on products will be amended by the addition of an Annex Z/EAS under Mandate M/136, which will contain formal references to the testing, certification and product marking requirements of the EAS. Until the EAS comes into force, the current national regulations remain applicable.

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.

EN 973, *Chemicals used for treatment of water intended for human consumption — Sodium chloride for regeneration of ion exchangers*

EN 1717, *Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow*

EN 14743, *Water conditioning equipment inside buildings — Softeners — Requirements for performance, safety and testing*

[A1] EN 15161, *Water conditioning equipment inside buildings — Installation, operation, maintenance and repair* [A1]

EN 60335-1, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2001, modified)*

EN ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*

EN ISO 3822-1, *Acoustics — Laboratory tests on noise emission from appliances and equipment used in water supply installations — Part 1: Method of measurement (ISO 3822-1:1999)*

EN ISO 3822-3, *Acoustics — Laboratory tests on noise emission from appliances and equipment used in water supply installations — Part 3: Mounting and operating conditions for in-line valves and appliances (ISO 3822-3:1984)*

EN ISO 10304-1, *Water quality — Determination of dissolved fluoride, chloride, nitrite, orthophosphate, bromide, nitrate and sulphate ions, using liquid chromatography of ions — Part 1: Method for water with low contamination (ISO 10304-1:1992)*

EN ISO 11885, *Water quality — Determination of 33 elements by inductively coupled plasma atomic emission spectroscopy (ISO 11885:1996)*

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

3 Terms and definitions

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

3.1
blending device
internal or external device used to blend treated with untreated water

3.2
brining
main phase of the regeneration process, during the course of which the brine flows through the bed of resin for the purpose of exchanging the nitrate ions fixed during the service run by chloride ions, and thereby recovering the exchange capacity of the resin bed

3.3
brining efficiency
link, expressed in grams of nitrate ion (NO_3^-) per kilogram of salt, between the exchange capacity and the salt consumption

3.4
anion exchange resin
synthetic material that has the capability to exchange anions reversibly

3.5
continuous flow rate
maximum flow rate at which a duplex appliance can operate continuously (24 h a day) without a premature breakthrough of nitrate

3.6
duplex appliance
system employing two resin tanks, enabling the production of uninterrupted treated water supply

3.7
exchange capacity of the nitrate removal unit
quantity of nitrate, expressed in grams of nitrate ion, fixed by the device between the end of the last regeneration and the beginning of the exhaustion of the resin

NOTE 1 The end of the regeneration is defined as the moment when the unit is available for service.

NOTE 2 The resin is considered to be exhausted when the residual nitrate concentration of the treated water increases above a defined value.

3.8
monitoring device
time controller, flow integrator, resin exhaustion sensor or a combination of these, used to determine the appropriate moment in the operating cycle for regeneration to begin and to initiate that regeneration

3.9
nominal flow rate
flow rate of water, expressed in cubic metres per hour, at which a pressure drop of maximum 100 kPa is established

3.10
operating cycle
two successive and repetitive runs: the treated water run (or service) and the regeneration run

3.11
operating range
physical and chemical conditions (temperature, pressure, flow rate, chemical water composition) within which a nitrate removal unit can operate and meet its performance guarantees

3.12
pressure drop
decrease in pressure between the inlet and outlet of the unit, expressed in kilopascals, at nominal flow rate

3.13
regeneration process
part of operating cycle, during which all the operations needed to restore the ion exchange capacity of a resin bed are carried out

3.14
regeneration water
quantity of water, expressed in litres (or in cubic meters), necessary for a complete regeneration process, including water used for the preparation of the brine

3.15
residual nitrate concentration
nitrate concentration of water sampled at the outlet of a unit during the service run

3.16
salt consumption
quantity of salt, expressed in kilograms, used for each regeneration

3.17
salt tank
tank containing the regenerating salt and the brine production device

3.18
nitrate removal device
complete installation necessary for the production of treated water

3.19
nitrate removal unit
appliance employing the anion exchange principle and which generally comprises the following constituent parts:

— pressure vessel containing the anionic ion exchange resin and devices for distributing and collecting hydraulic flows;

— devices for monitoring hydraulic flows (water and brine) through a multi-way valve or a set of pipes and multiple valves;

— tank (called salt-tank) for storage of the regeneration salt and production of the brine

3.20
volume of resin
quantity of anion exchange resin, expressed in litres, indicated on the rating plate or in the technical documentation

4 Requirements

4.1 Nitrate removal devices specification

Nitrate removal devices shall include all of following features and equipment:

a) resin tank, control valve, brine tank, monitoring device;

b) automatic regeneration;

c) continuity of supply during regeneration;

d) manual override facility;

e) protection against backflows.

Some devices in the market are intended to remove nitrates and to soften water simultaneously (see Annex A). These are commonly known as “mixed beds” and include a mixture of anionic and cationic resin that regenerates simultaneously. These devices shall comply with this European Standard and also with EN 14743, except for the items stated in 4.3.8 and 4.4.4 and relevant tests that are specifically covered in this European Standard for this kind of devices.

NOTE When necessary to meet national or local provisions, the nitrate removal devices may be required to include additional features; for example:

— automatic initiated regeneration after a certain period without regeneration;

— feature to control microbiological growth.

4.2 Quality of materials and chemicals

4.2.1 Anion exchange resin

The anion exchange resin used in the nitrate removal device shall be certified by the resin manufacturer to be suitable for its intended application.

4.2.2 Regenerating salt

Salt shall comply with national and local regulations. All requirements of this European Standard are based on the use of sodium chloride (NaCl) in accordance with EN 973 as regenerating salt.

NOTE Some countries also allow the use of potassium chloride (KCl) as regenerating salt.

4.3 Design and manufacturing specifications

4.3.1 Resistance to hydrostatic pressure

The nitrate removal unit shall resist, without visible damage nor leakage, a hydrostatic pressure of 1,5 times the maximum design pressure or 1 000 kPa, whichever is the greater for 10 $^{+2}_{0}$ min as defined in 7.4.1.

4.3.2 Resistance to cyclic pressure

The nitrate removal unit shall resist, without visible damage nor leakage, a cyclic pressure test of not less than 5 000 cycles with the pressure fluctuating at a frequency of 15 $^{+2}_{-1}$ cycles per minute between 150 kPa and 1,3 times the maximum design pressure as defined in 7.4.2.