SLOVENSKI STANDARD
SIST EN 1717:2001

01-december-2001

Varovanje pitne vode pred onesnaževanjem v napeljavah za pitno vodo in splošne zahteve za varovala za preprečitev onesnaževanja pitne vode zaradi povratnega toka

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

Schutz des Trinkwassers vor Verunreinigungen in Trinkwasser-Installationen und allgemeine Anforderungen an Sicherungseinrichtungen zur Verhütung von Trinkwasserverunreinigungen durch Rückfließen

Protection contre la pollution de l'eau potable dans les réseaux intérieurs et exigences générales des dispositifs de protection contre la pollution par retour

Ta slovenski standard je istoveten z: **EN 1717:2000**

ICS:

13.060.20	Pitna voda	Drinking water
91.140.60	Sistemi za oskrbo z vodo	Water supply systems

SIST EN 1717:2001 **en,fr,de**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1717

November 2000

ICS 13.060.20; 91.140.60

English version

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

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This European Standard was approved by CEN on 20 January 2000.

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

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 164, "Water supply", the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by month of May 2001, and conflicting national standards shall be withdrawn at the latest by May 2001.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Annex A of this European Standard is normative, the annexes B and C are informative.

Introduction

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the products covered by this standard :

1) this standard provides no information as to whether the products may be used without restriction in any of the Member state of the EU or EFTA ;

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 these products remain in force.

1 Scope

This standard deals with the means to be used to prevent the pollution of potable water inside premises and the general requirements of protection devices to avoid pollution by backflow.

The hygiene protection specifications of this standard are applicable to all the standards for systems or appliances connected to the private supply system for water intended for human consumption.

This standard specifies the minimum requirements for product standards of protection units.

The product standards are used to detail product specifications. In the absence of a product standard, this standard is used as a reference in order to draw up a specification for the products out of new development.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

prEN 806, *Specification for installations inside buildings conveying water for human consumption.*

3 Terms and definitions

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

3.1
air break to drain
the unobstructed distance between the low point of overflow, discharge or drain of a device or installation, leading from a water apparatus, and the top point of the device which collects this water

3.2
air gap
the physical break between the lowest level of the water inlet and the maximum fault level or critical level of an appliance or installation, a feed pipe, or an air inlet orifice incorporated into a hydraulic circuit

3.3
air inlet
an orifice designed to admit air from the atmosphere into a hydraulic circuit

3.4
appliance, equipment
a device in which the potable water is used and/or is modified e.g. water heater, chemical dosing unit, coffee-machine, WC-pan

3.5
backflow
movement of the fluid from downstream to upstream within an installation

3.6
backflow protection device
a device which is intended to prevent contamination of potable water by backflow

3.7
contamination
result of rendering impure by contact or mixture, to corrupt, defile, pollute, sully, taint or infect

3.8
disconnection
break in a hydraulic circuit creating an atmospheric area between two elements, one carrying or containing potable water (upstream) and another carrying or containing another fluid (downstream)

3.9
domestic use
any use related to residential or similar dwellings

— normal use for dwellings and homes, as well as hotels, schools and offices, communal residences, etc. (for example kitchen sink, wash and handbasin, bath, shower, WC, production of hot water for sanitary purposes, domestic washing machine and dishwasher, bidet, watering of garden) ;

— special uses relating to similar consumers where products are used with low concentrations and presenting no danger for human health (for example authorised water conditioning, air conditioning) ;

— in industrial and commercial premises "Domestic use" is limited to water used for those applications/appliances described under normal use in dwelling and homes (for example excludes water used for process, fire fighting, central heating or irrigation systems).

3.10
downstream
the side to which fluid flows under normal conditions

3.11
potable water system
water system located downstream of the delivery point specified by the water supply authorities or regulations

3.12
family of protection
general identification of a backflow protection device principle

3.13
fluid
all substances which can be deformed by small forces. Fluids are divided into liquids and gases

3.14
liquid levels

3.14.1
critical level
physical or piezometric level of the liquid reached in any part of the appliance 2 s after closing the water inlet, starting from maximum fault level

3.14.2
maximum operational level
in an open system, this is the maximum level of the liquid. In a pressurized system, this is the maximum piezometric height possible

3.14.3
maximum fault level
the highest physical or piezometric level of the liquid reached in any part of the appliance when it operates continuously under fault conditions as described in product standard

3.15
LD_{50}
the quantities of substances or mixture which, given on one intake through oral and parental path, bring about within 15 days (the required time to take into account potential delayed effect) the death of 50 out of 100 treated animals

3.16
non domestic use
all uses related to a professional activity within industry, trade, agriculture, health establishments, etc. All uses related to private and public swimming pools and public baths

3.17
overflow
a means for discharging naturally excess fluid from an appliance when it has reached a specified level

3.18
point of use
the point where water is drawn by the user either directly or by connecting an apparatus

3.19
pollution of potable water
any degradation of the quality of potable water

3.20
protection point
location in a hydraulic circuit where a protection unit is installed

3.21
protection unit
a device or a device in combination with other hydraulic components which constitutes the protection against backflow

3.22
type of protection
an identified operating principle applied to a protection device belonging to a given family

3.23
upstream
the side from which fluid flows under normal conditions

4 Pollution of potable water : general observations

Water installations, described in prEN 806, due to their design or construction, shall not be liable to generate pollution of public or private potable water supply system by residual matters, harmful water or any undesirable substance.

4.1 Backflow of used water

The quality of the water distributed can be impaired when used water flows back into the potable water system.

4.2 Connection

When there is a mixing of public potable water and any other water supply, the public water supply shall be protected by an unrestricted air gap.

The non-potable or suspicious water distribution network shall be separated and the whole installation marked (for example different coloured pipes). The non-potable or suspicious water taps shall have markings with clearly visible warning signs.

4.3 External influences

Potable water cisterns, pipes and protection units shall be protected from external pollution.

No other fluid shall be conveyed in a potable water installation (gas, compressed air, ventilation conduct, vapour, chemicals, water used in heating equipment, recycled water, drainage or run-off water, waste water, etc.) than potable water.

If it is considered possible that under the prescribed operation any contaminant could enter through the protection device (for example air gap, air inlet) into the potable water installation, corresponding protection measures are to be provided.

4.4 Materials

The materials used in water installations, including the materials of protection units in contact with potable water, shall satisfy the European standards and national acceptance criteria and / or national restrictions for use currently in force in EU and EFTA.

They shall be compatible with each other, with the water supplied, and with the fluids or substances that can come into contact with them.

4.5 Stagnation

A stagnation of water in the systems can result in impairment of the water quality due to a significant concentration of dissolved substances or substances in suspension or to-bacterial growth.

The level of impairment depends on the materials used, the water quality, the temperature (for example pipes in boiler rooms) and the duration of stagnation.

For reasons of hygiene, it is necessary that pipe systems are flushed after periods of stagnation.

Pipes which are only used rarely or which are used for short periods shall be shut off after use and flushed before being brought back into service. Pipes which are no longer in use shall be disconnected from the potable water system.

4.6 Harm caused by inadequate or improper maintenance

Any insufficient or improper maintenance of the potable water installation including backflow protection devices can result in an impaired water quality. Regular maintenance of the protection units shall be carried out. Their proper functioning shall be checked regularly in conformity with national or local provisions.

5 Analysis method of the risks at the point of use and choice of protection

5.1 General remarks

A backflow of fluid in a potable water supply system can occur by :

a) backsiphonage : by partial vacuum (drop in pressure) in the potable water supply system (due for example to the operation of a valve, the bursting of a pipe, the operation of a booster pump, excessive water demands in a part of the system, water taken for emergency use from a fire hydrant) ;

b) pressure backflow : by a back pressure originating in a non-potable system in which the pressure exceeds the pressure in the potable water system.

Two conditions must exist in order to give rise to backflow :

a) possible contact by a physical mixing between the potable water and another fluid ;

b) pressure difference at a given point of the installation reversing the normal direction of flow.

If a common protection to several hydraulic circuits present within a potable water system is sought, it is necessary to consider the technical parameter presenting the highest risk value in the most unfavourable fluid category to all the associated circuits.

The analysis of an existing or projected installation provides information about its characteristics and the fluid categories. The result of this analysis is fixed by a cross in the appropriate field of the installation matrix (see Table 1).

For specific installations presenting an exceptional risk, additional technical parameters may be considered.

In an uncontrolled situation the worst risk shall be assumed.

5.2 Determination of fluid categories which are or could be in contact with potable water

In normal use fluids which are or can be in contact with potable water are classified in five categories as defined below.

In cases where insignificant concentrations or substantial amounts of substances are present it may be appropriate to redefine the safety measurement.

5.2.1 Category 1

Water to be used for human consumption coming directly from a potable water distribution system.

5.2.2 Category 2

Fluid presenting no human health hazard.

Fluid recognised as being fit for human consumption, including water taken from a potable water distribution system, which can have undergone a change in taste, odour, colour or a temperature change (heating or cooling).

5.2.3 Category 3

Fluid representing some human health hazard due to the presence of one or more harmful substances [1)].

5.2.4 Category 4

Fluid presenting a human health hazard due to the presence of one or more toxic or very toxic substances[1)] or one or more radioactive, mutagenic or carcinogenic substances.

5.2.5 Category 5

Fluid presenting a human health hazard due to the presence of microbiological or viral elements.

[1)] The border between category 3 and category 4 is in principle LD 50 = 200 mg/kg body weight in reference to the EU Directive 93/21 EEC dated April 27th, 1993.

5.3 Determination of the installation characteristics

5.3.1 Pressure

For each hydraulic circuit present in the apparatus, locate the desired or existing point(s) to be protected, or, failing this, the point of connection of the apparatus to the potable water network.

Determine the maximal operational.

Define whether the protection point (existing or foreseen) or, failing this, the point of connection of the apparatus to the potable water network is subjected to atmospheric pressure (p = atm) or to a pressure exceeding atmospheric pressure (p > atm) :

— the situation will be p = atm if the protection point (existing or foreseen) or, failing this point, the point of connection of the apparatus to the potable water network is located above the maximal operational level ;

— the situation will be p > atm if the protection point (existing or foreseen) or, failing this point, the point of connection of the apparatus to the potable water network is located below this maximal operational level.

5.3.2 Connections

All connections are considered permanent.

5.3.3 Risk attenuation

The principle of risk attenuation is accepted only for certain facilities for domestic use listed in clause 6 and in conformity with 3.9.

5.4 Separation by single or double walls

A single wall separator consists of a single fixed and sealed partition or casing that can be in contact with the potable water on one side, and with another fluid on the other.

A double wall separator consists of at least two fixed and sealed partitions or casings creating a neutral intermediate zone between the potable water on one side and another fluid on the other.

The intermediate zone may be designed in two ways :

— containing a gaseous fluid or an inert porous material (open cells) ;

— containing a fluid of category 1, 2, 3.

5.4.1 Rules

5.4.1.1 With respect to backflow prevention

Category 2 or 3 fluids may be separated from the potable water by a single wall.

When the fluid from which potable water shall be protected against backflow is of category 4 or 5, a single wall is not sufficient.

A double wall with a safety medium in between (liquid or gas) and an acoustical or visual alarm system is always considered to be able to separate the potable water from the second fluid.

5.4.1.2 With respect to direct consumer protection

When the fluid from which potable water shall be protected against is of category 4 or 5 and downstream of the appliance the water is intended for sanitary or food related use, a double wall shall be required.

5.4.2 Performances of separation walls

The performances of the separation by single or double walls are described in the appropriate standards.

5.5 Air break to drain

All apparatus connected to a potable water network and including a water draining device has to be provided with an air-break before its discharge to the drainage system.

This air gap shall satisfy the prescriptions described in clause 9. Otherwise the fluid in the apparatus has to be considered as fluid category 5.

5.6 Installation matrix

Table 1 - Installation matrix

Category of fluid					
Pressure	1	2	3	4	5
p = atm					
p > atm					

By making an analysis of an installation, assessment of the fluid category from which it shall be protected, as well as its technical characteristics (see 5.3 to 5.5), the pollution risk of the potable water can be determined.

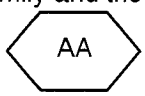
Any backflow prevention arrangement already incorporated into the apparatus or the installation shall be disregarded in the analysis.

The matrix above can be completed by inserting a cross for an existing parameter resulting in the installation matrix.

5.7 Protection units

5.7.1 Generalities

When the protection unit is represented by a symbol it shall be a hexagon shape containing the letter of the protection family and the letter of the type of protection in this family.

EXAMPLE 

The hydraulic circuit of an installation or of an appliance connected to an installation may have several protection units ; each unit comprises a protection device and the accessories needed for protection of the water and for its proper functioning, and for inspection, maintenance ; (for example valve, strainer, etc.).

The protection device itself is an assembled finished product ready to be installed in a hydraulic circuit.

The characteristic of families and types of protection, and the principle diagrams are given in 5.7.3.

In order to ensure that the risk coverage is fully satisfied it is necessary to correctly install the backflow protection unit.

In the selection of a backflow protection unit, it has to be verified that the device will not be affected by the attitude or angle of its installation.

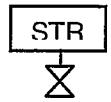
The elements constituting a protection unit combined with a protection device can be :

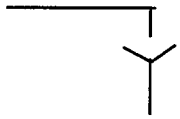
— a stop valve ; 

— a test cock ; 

— a sampling cock ; 

— a strainer ; 

— a strainer with rinsing tap ; 

— an air break to drain. 

In addition, devices shall be installed in accordance with the instructions contained in technical documents supplied by the manufacturer, provided of course that this does not compromise the protection safety.

5.7.2 Functional requirements for backflow protection units

Protection units shall be so constructed that they will safely prevent backflow by backpressure and/or by backsiphonage of a contaminated fluid into a potable water system.

The degree of protection security and the method of operation of the device, i.e. either an air gap arrangement, air inlet port, or a mechanical arrangement, will depend upon the category of the contaminated fluid from which the potable water system needs to be protected.

Except for particular fields of application, backflow protection devices shall be able to operate without either modification or adjustment :

— at any pressure up to and including 1 MPa (10 bar) ;

— for any pressure variation up to 1 MPa (10 bar) ;

— when operating continuously at a temperature limited to 65 °C and at 90 °C for 1 h.

Product specifications for the protection device shall include an endurance test for its expected life time.

When a backflow protection device is designed with an holding back of water, it shall be fitted with a water drain port.

Internal and external parts of these devices shall be accessible for :

— inspection and test ;

— replacement or repair.

On devices of DN > 50 mm it is preferable for these operations to be carried out in situ.

Replaceable components shall be designed so that they can only be reassembled without error in their original positions (with no risk of inversion, reversal etc.).

Elements contributing to the setting shall be fixed and not adjustable. Details are provided in the appropriate product standard.

Additional actuating devices (electric, pneumatic, etc.) are not to have a negative influence on the operation of the backflow protection function.

Materials shall be selected as described in 4.4.

5.7.3 Description of the listed protection units

See Annex A.

5.8 Matrix of the protection units appropriate to fluid categories

The suitability of each protection unit is indicated in the Table 2.